



# City of Stevenson

## Planning Department

(509)427-5970

7121 E Loop Road, PO Box 371  
Stevenson, Washington 98648

**TO:** Planning Commission  
**FROM:** Ben Shumaker  
**DATE:** June 14<sup>th</sup>, 2021  
**SUBJECT:** 2021 Work Plan

---

### Introduction

This memo presents the Planning Commission with an update on past projects, introduces 2021-2023 project priorities established by the City Council, and provides a list of additional projects the Planning Commission could prioritize for action at their meetings.

### Projects from 2020

Project priorities for 2020 were identified by the Planning Commission in September, 2019. Staff family/medical leave, COVID-19, and the significant workload related to these projects caused many priorities to continue into 2021. These projects include Downtown Plan Review/Implementation, Increasing Residential Building Capacity, the Public Tree Inventory/Management Plan, and Capital Improvement Program.

### City Council Priority Projects

The Planning Commission has not yet reviewed priorities for 2021. The City Council has established goals for 2022-2023 which could involve Planning Commission or staff support. These items are in bold text.

- First Tier:
  - Wastewater Upgrades
  - **Downtown Planning**
  - Fire Hall
  - Water System Continued Maintenance
  - **Develop Deliberate Growth Strategy**
- Second Tier Projects:
  - **Housing Affordability**
  - Russel Avenue Rebuild, Phase 2
  - **Broadband**
  - Waterfront Development
  - **Parks Plan**
  - Workforce Education/**Youth Leadership**

### Community Suggested Priorities

Over the last month, several community members have suggested City action on projects.

- **Critical Areas Ordinance** – See attached. Implementation of the Critical Areas Code has triggered concern about its appropriateness. Critical Areas Ordinances are required by the State and must be reviewed according to State expectations on 8-year cycles. Stevenson last reviewed/amended its Code in 2018 and is not required to do so again until 2026. An out-of-cycle review is possible.
  - Planning Commission Meetings: 2 to 4
  - Staff Time: Moderate
  - Specialized Studies: Best available science synthesis
- **Downtown On-Street Parking Permits** – Regulation of on-street parking (duration, vehicle height/length, overnight prohibition) have not been comprehensively reviewed in decades. Downtown businesses, property owners, and residents have suggested modifications to the regulations on a quick timeline. This regulation bridges land use, public works, and policing.

- Planning Commission Meetings: ~1 (if the City Council acts as the lead public forum)
- Staff Time: Low effort
- Specialized Studies: Parking inventory & usage model (to be generated by our Parking Intern)
- **Cemetery Planning** – A joint effort has been suggested by the public to work with the Cemetery District on future cemetery sites. Currently, the City regulates where cemeteries are and are not allowed via the Zoning Code and the draft Shoreline Master Program. The scope for a joint effort has not been explored, nor has the City discussed the concept with the Cemetery District.
  - Planning Commission Meetings: ~2 (if a subcommittee leads the effort)
  - Staff Time: Low to Moderate effort
  - Specialized Studies: Meeting facilitation, GIS mapping, hydro-geologic analysis
- **Opportunity Zones** – A suggestion has been made for the City to lead a discussion of how Opportunity Zones—a relatively new tax shelter—are promoted and used in our area. Full details of the program’s intricacies are the domain of accountants. As understood by the City’s Planning staff, the federal program is intended to funnel capital into census tracts which have been determined disadvantaged by states. The capital comes from private sector entities through the deferral or avoidance capital gains taxes when the gains are invested directly into new developments in designated Opportunity Zones such as Stevenson.
  - Planning Commission Meetings: Unknown
  - Staff Time: Low to Moderate
  - Specialized Studies: Unknown
- **Rock Creek Public Access** – Resulting partially from the discussion of Iman Cemetery Road’s requested vacation, a petition has been submitted asking the City to “consider actions to alleviate the problems that trespassing and abuse have brought to our neighborhood. In addition, the enhancement of a pathway to Rock Creek would benefit our community and visitors alike.” This area is identified in the Comprehensive Plan as a potential park with the opportunity to be one of Stevenson’s “Sacred Places”. Assumed needs:
  - Planning Commission Meetings: ~2 (with additional public workshops/charrettes)
  - Staff Time: Moderate to High
  - Specialized Studies: Meeting facilitation, design visualization via graphics/maps, geologic analysis, habitat analysis, cost estimation

### **Ongoing Planning Commission Projects**

While the City Council priorities above will require Planning Commission meeting time, there are still opportunities for the Planning Commission to undertake additional work. Some recommendations follow:

- **Residential Building Capacity** – The project is underway through grant support from the Washington Department of Commerce. All deliverables for the grant must be submitted by June 30, and the work associated with the project is expected to be completed by October 15<sup>th</sup>, 2021.
  - Planning Commission Meetings: 2-4 (with additional public workshops possible)
  - Staff Time: Moderate to High
  - Specialized Studies: Meeting facilitation
- **Comprehensive Plan Amendment** – The Planning Department received an application to amend the Comprehensive Plan in 2020. The application was submitted by the City Administrator and review of the proposal began according to the cycle established in SMC 17.11. During the review, the COVID-19-related restriction on meetings occurred. The City has agreed to defer action until the Planning Commission could meet and engage the public on the proposal. , and In January of even years, the Planning Commission must establish a review calendar for any comprehensive plan amendment proposals submitted during the last biennium. At this time no amendments have been proposed, but a request is anticipated prior to the

deadline. Expect minimal to moderate staff time and moderate commission meeting time (during Q1 only).

- Planning Commission Meetings: ~2 (with additional public workshops/charrettes)
- Staff Time: Moderate to High
- Specialized Studies: Meeting facilitation
- **Shoreline Master Program** – In December, 2018, the City finalized a proposed amendment to the Shoreline Master Program and submitted it to the Washington Department of Ecology for their review. Ecology is expected to issue its list of “Required and Recommended Changes” shortly. The Planning Commission/Shoreline Advisory Committee will be asked to review the recommended changes to determine which should be included in the draft presented to City Council.
  - Planning Commission Meetings: 1 to 2
  - Staff Time: Moderate
  - Specialized Studies: None
- **Downtown Planning** – Several parking-related activities are scheduled for this summer including a graduate-level intern and traffic study. The result of these efforts will involve inventorying on- and off-street parking, monitoring parking usage, identifying opportunities to increase supply, and estimating costs for the improvements. Additionally, work will begin on a brownfields-related grant studying the realignment of Columbia Street and creating an actionable plan for the redevelopment of adjacent properties.
  - Planning Commission Meetings: 4+
  - Staff Time: High
  - Specialized Studies: Graduate intern, traffic consultant, cost estimation, brownfields analysis, market studies/pro formas
- **Conditional Use Permit Reviews** – Periodic review of conditional use permits are typically scheduled to occur in October of the odd numbered years after issuance.
  - Planning Commission Meetings: 1 to 2
  - Staff Time: Low
  - Specialized Studies: None
- **Application Reviews** – An unknown amount of land division and conditional use permit activity will occur in 2019 that will require commission and staff time to address.
- **Lot Line Considerations** – Boundary Line Adjustments, Lot Consolidations, Tax Lot Segregations, Legal Lot Determinations. In the past few years, staff has dealt with several questions and issues regarding applications and request related to each of these concepts. However, the City only has policies related to Boundary Line Adjustments and to some degree Lot Consolidations. Even those are somewhat ambiguous and have frustrated the regulated public. The Planning Commission has reviewed ~70% of the project and has so far delayed establishing its public involvement expectations for the project.
  - Planning Commission Meetings: 2 to 4
  - Staff Time: Moderate
  - Specialized Studies: None

#### **Other Potential Planning Commission Projects**

- **Zoning Code Reformat, Next Phase** – Earlier phases of the reformat took the existing content and reorganized it, incorporated some policy changes and past Use Interpretations, and streamlined the number of uses considered within select use categories. The scope of this could extend to other use categories and work to align the Zoning Code and Shoreline Master Program, a design standards update related to Downtown development, and/or the Lot Line Considerations project.

- **New Projects from Comprehensive Plan** – The Planning Commission could consider implementing any of the numerous projects called out in the 2013 Comprehensive Plan (attached).

Prepared by,

Ben Shumaker  
Community Development Director

Attachments

- Community Submissions/Emails, City Council Goals, Comprehensive Plan Chapter 3



Ben Shumaker <[ben@ci.stevenson.wa.us](mailto:ben@ci.stevenson.wa.us)>

---

## Re: Affordable housing comment

---

**Scott Anderson** <[scott.anderson@ci.stevenson.wa.us](mailto:scott.anderson@ci.stevenson.wa.us)>  
To: Hayden Damian <[hayden.damian@gmail.com](mailto:hayden.damian@gmail.com)>  
Cc: Ben Shumaker <[ben@ci.stevenson.wa.us](mailto:ben@ci.stevenson.wa.us)>

Wed, May 12, 2021 at 1:28 PM

Thank you for your email Hayden and your interest in Housing Affordability. This has been a hot topic of mine since taking office. I would encourage you to keep an eye out for Planning Commission meetings which will be discussing this topic. Feel free to reach out to our Planner Ben Shumaker (CC'd) to be added to the email list.

On Sat, Apr 17, 2021 at 10:43 PM Hayden Damian <[hayden.damian@gmail.com](mailto:hayden.damian@gmail.com)> wrote:

Honorable Mayor Scott Anderson,

I am writing you to support the Stevenson City Council goals for 2021-2022, specifically goal #7 Housing Affordability. The cost of homes and the lack of available rental housing is concerning to me, as I am from a younger generation, and is something I consider very relevant to the community. The zoning laws currently in place discourage people from my generation from renting homes and apartments. They also limit options and opportunities, as some people who work here are seasonal, and may not have any options for housing.

With these things considered, I would like to voice my concern on this issue. In my opinion, I would like to see this topic being discussed more on future city council meetings. I also would like to hear more about possible alternatives to the current zoning laws, especially in relation to rental apartments, or multi-family housing. Again, I believe this issue is relevant, especially towards younger generations. If you would like to discuss this further, my contact information is below.

Respectfully,

Hayden Damian

[750 NW Angel Heights Rd.](#)

[Stevenson, WA 98648](#)

[hayden.damian@gmail.com](mailto:hayden.damian@gmail.com)

--  
**Scott Anderson**  
Mayor, City of Stevenson  
[scott.anderson@ci.stevenson.wa.us](mailto:scott.anderson@ci.stevenson.wa.us)  
7121 E. Loop Rd/PO Box 371  
Stevenson, WA 98648-0371  
(509) 427-5970  
Find more at [ci.stevenson.wa.us](http://ci.stevenson.wa.us)  
and [cityofstevenson.com](http://cityofstevenson.com)

5-19-2021

Hello City Council, Planning Commission and members of the public,

Please add these comments to the packets for the May 20, 2021 City Council and June 14, 2021 Planning Commission meetings. I had submitted this for inclusion in the City Council Meeting packet for the April 15<sup>th</sup> meeting. While not printed, Leana Kinley kindly read the original in the meeting. Unfortunately, the numbers associated with the complex issue of “affordable housing” included are better understood when read. Since then, I have added some further thoughts on the realities of “affordable housing” and what it means for the City of Stevenson.

I am writing to address the definition and use of the buzz words “affordable housing” and “workforce housing” as it pertains to the stated desire of Stevenson City Government to increase affordable housing and business density in the Stevenson downtown core. As described by Ben Schumaker, the generally accepted standard measure of “affordable housing” is considered to be 30% of a person’s gross monthly income, including utilities. Stevenson’s downtown economic vitality is based largely on tourism. The Covid-19 pandemic has shown how fickle relying on that can be. Service industry workers are at the bottom end of the wage scale. Often these are seasonal minimum wage jobs without health care benefits and offering less than full time employment.

WA just increased the minimum wage to \$13.69/hour. Let’s look at an example of what “affordable housing” might be for a local worker making \$15/hour. A cook, cashier, housekeeper, factory worker, etc. working 40 hours per week at \$15/hour will earn \$600/week, or \$2400 gross income per month. “Affordable housing” at 30% of \$2400 = \$760/month including utilities (utilities can easily reach \$150/month). Currently, 1-bedroom residences in downtown Stevenson run between \$900 and \$1200/month. However, rents are paid in net wages. Doing the math, \$1000/month rent (including utilities) will leave about \$1000 for food, auto, insurance, health care, etc. What if this was a single earner with a family or a single parent?

If hotels, restaurants, and industry (i.e., port factory workers) cannot find low wage help, they should be encouraged to find their own solutions beyond expecting City, County or State tax and housing subsidies while paying low wages without the benefit of health care (aka, a living wage). Not everyone wants to be a service industry or factory worker, even if they are receiving subsidized rent. At current wages a minimum wage worker would likely not be eligible for subsidized housing benefits.

“Affordable housing” is a great goal. But what it really means is “subsidized housing” in the form of direct rental assistance from government agencies. Other hidden subsidizes are those provided by local governments to promote development. Service industry jobs are not likely to offer “living wages” anytime soon. Without calling on current property owners to forego charging market rates reflecting rising property taxes, local levies and increased repair costs (and some are!), rents will continue to rise with demand. However, as will be seen below, perhaps current rents are actually affordable.

“Subsidies” include HUD Section 8 assistance and other government financial assistance to those in need. It also includes potential City “subsidies” to developers in the form of zoning changes such as reduced off-street parking requirements and increasing the allowed number of buildings on C1, R1, R2, and R3 lots to encourage further development. If I were a developer I would wait for these City “subsidies” to increase the potential return on investment. In depth public input should be gathered before the City moves to

give developers big breaks on City system development charges, especially extending services beyond City limits.

Let's face the facts here, building and owning "affordable (aka subsidized) housing" is not a popular investment for most developers or the small-scale investor. These are often built by a developer and then sold to a corporate entity or REIT (real estate investment trust) who employ administrators to handle the multiple issues that make subsidized housing less attractive to own (Google search "pros and cons of owning Section 8 housing"). Commissioner Breckel aptly noted that funding for such projects are largely matters for banks and developers to pursue. However, the Stevenson City Council seems hyper interested in providing concessions to get high density housing development moving, especially in the C1 downtown area.

One factor that could benefit developers who might want to build low-income housing, but may be stymied by zoning ordinances and skyrocketing building costs, should be considered. Stevenson is included in the HUD Fair Market Rent Rate formula for Portland, OR and Vancouver, WA. Stevenson has long been a bedroom community to Portland and Vancouver. Rents are still slightly lower here and make moving here attractive. The high subsidized rental rates below should be incentive enough for developers.

**HUD Final FY 2021 Fair Market Rents By Unit Bedrooms**

**Efficiency One-Bedroom Two-Bedroom Three-Bedroom Four-Bedroom**

\$1,245      \$1,331              \$1,536              \$2,193              \$2,657

As demand for housing increases a developer could expect a reasonable rate of return on investment if they build "subsidized housing" targeting low-income renters/workers. If the City feels that this type of housing is necessary and appropriate a thorough study of the parking issues for mixed-use, multifamily residences and businesses in the downtown core should be fully completed first. Stevenson's is currently highly "livable" and therefore very attractive. Adding density while reducing parking for residents will negatively affect the downtown core. There is a lot of work to be done to create the infrastructure (parking, new fire hall, new home for EMS, sewers, Columbia Ave project, etc.) necessary for the growth anticipated in the Johnson Economics Report for Stevenson, Stevenson Downtown Plan and the Plan for "SUCCESS". The "word on the street" is that many residents and stakeholders do not value a "high density" future without infrastructure keeping pace.

I encourage the Mayor and City Council members to carefully read the minutes of the Planning Commission meetings and public comments between March 8, 2021 and May 10, 2021. There you will see that the Commission members and public request more intensive public input (not Facebook, short notices in the Pioneer or corner of the post office bulletin board) and improved liaison between City Council and Planning Commission.

We are slowly crawling out of a horrible pandemic and the resulting devastation to the world economy. There is no reason to rush into hasty decisions that may not reflect the future "SUCCESS" of Stevenson!

Thank You,

Brian McNamara

Stevenson resident



Ben Shumaker <ben@ci.stevenson.wa.us>

---

## Opportunity Zones conversation ~ Re: Creative ways to achieve some planning goals

---

Julie May <julie@bowlesmarketplace.com>

Thu, May 20, 2021 at 8:05 PM

To: Scott Anderson <scott.anderson@ci.stevenson.wa.us>, Ben Shumaker <ben@ci.stevenson.wa.us>, Leana Kinley <leana@ci.stevenson.wa.us>, Karl Russell <Karl@ci.stevenson.wa.us>

Cc: Julie May <julie@bowlesmarketplace.com>, Robert Muth <rcmuth88@gmail.com>, Robert Muth <robert.muth@ci.stevenson.wa.us>, Amy Weissfeld <amy.weissfeld@ci.stevenson.wa.us>, Paul Hendricks <paul.hendricks@ci.stevenson.wa.us>, Annie McHale <annie.mchale@ci.stevenson.wa.us>, Dave Cox <dave.cox@ci.stevenson.wa.us>, David Ray <david.ray@ci.stevenson.wa.us>, Mike Beck <mike.beck@ci.stevenson.wa.us>, Jeff Breckel <jeff.breckel@ci.stevenson.wa.us>, Valerie Hoy <valerie.hoy@ci.stevenson.wa.us>, Auguste Zettler <auguste.zettler@ci.stevenson.wa.us>

Hello All~

In regards to opening up more discussions about "tools" in the City's tool box to help with supporting affordable housing and interesting "mixed-use" development in the downtown core that would have housing at a rate & configuration to support some goals spoken about for "worker-housing" etc... Please see if this is a useful tool to explore.

This is something that may not be available in future years as it sunsets as a government plan. (Let's hope it gets extended) However, it is a very very interesting investment tool with advantages for people who may be in the process of a 1031 Exchange sale wanting to get better advantages or just anyone wanting to invest into a model that does have better tax advantages as hold the investment in the property over 5, 7, 10 years. Of course there is much to learn if not versed in these and it feels like there are more layers to know about the "out" needed for the investment, however, this could be a tool to promote for the city of Stevenson to attract.

Opportunity Zones:

<https://badermartin.com/want-to-defer-or-reduce-capital-gains-tax-looking-to-invest-in-a-real-estate-or-other-business-what-to-know-about-the-tax-benefits-of-opportunity-zones/#02>

I just think we need to be looking at many many creative solutions and do not want to lose sight of this possibility.

Does anyone on these councils know more, have been involved in, know of folks trying to get these going in Stevenson or money to invest in a project?

By the way~ ALL of Stevenson qualifies to be in these "Opportunity Zone" currently and WE can create our own. Community group, individual, City.

I believe this is something interesting to understand and tap into.

Bullets on as if a 1031 Exchanged property is in the mix:

The Readers Digest version of the benefits are as follows:

- Invest your gain without the need to replace the debt
- Defer the taxes you'd pay now for 5 years.
- If you hold the investment in the Fund for 5 years, you will receive a 10% step up in basis from the initial investment. (ie. If you reinvested a gain of \$1M, at the end of the 5th year, you'd owe tax on \$900,000 instead of \$1M.)
- If you hold the investment in the fund for 10 years, 100% of the gain during the 10-year hold is tax free at the federal level and in all but 4 states.
- If the property is substantially improved, there are accelerated depreciation benefits and you can avoid recapturing the depreciation at the time of sale.

There are a lot of Qualified Opportunity Zone Funds out there. You can even create your own~ which we should figure out HOW TO DO IN STEVENSON.

Hope this is helpful~

~Julie

Julie May;

Marketing & Public Relations Manager for Bowles Marketplace

[julie@bowlesmarketplace.com](mailto:julie@bowlesmarketplace.com)

(cell) 503-201-9460

On May 17, 2021, at 6:09 PM, Julie May <julie@bowlesmarketplace.com> wrote:

Hello Planning Commission members, City Council members and Scott, Ben, Leana~

I've been thinking a lot about how to bridge some gaps and problem-solve since the last Planning Commission meeting, and actually longer to be fair.

I realize there is a lot of discussion going on about how to do zoning changes that the City could possibly benefit from doing and being a little out in front of the "change" curve that is headed our way inevitably.

What I have gathered from discussions, feedback, pushback, dialogues and the Planning Commission meetings is that there is a need to take a good look at zoning changes, yet what has been put on the table is a bit hard to pull off in the larger scope approach it currently has been laid out to be.



Overall feedback is that we need more community and land/property owner input before any more sweeping changes occur. I agree and would like to support that in any capacity I can for gathering input.

What also has happened as the community has had a chance to voice concerns is a "slow-down" or outright halt to some changes. For the most part, that is good. Time to think a bit on things and regroup for an even better outcome. But... I do feel like if we can also take a look at things that are common sense changes that may have a positive move toward things I have heard as themes in these conversations around how do we do this, what do we want, how does this go "**equitably**" ~ like:

- ~Flexibility
- ~Expanded ability to develop &/or increase density (w/o impacting the "feel" of the community we all enjoy)
- ~Common sense fixes to "issues" repeatedly run into. Ex: lot set-backs, parking, driveways
- ~Support for "affordable housing"

I wonder if even though we have heard loud and clear that more time is needed for public input on zoning changes, that there could be an opportunity to still do some common sense changes to the zoning codes now, that do not dive into complete re-zoning like changing R1 to R3 etc.

My suggestion is to have a "break out" work group look at what makes sense to still move forward on now to achieve some positive goals.

Things like the suggestions from the Housing Needs Study the City paid for seem to make sense.

One that stands out as solving a lot of the above bullets is to allow one attached & one detached ADU per lot.

Other things that seem to make sense~ fix some of the setbacks, possibly look at shared driveway regulations to be more flexible, (maybe more controversial given the sewer issue, yet positive for infill-development) take another look at continuing to allow septic in areas with no current sewer access or creative solutions like the decentralized sewer solutions mentioned in the reports.

I don't think we need to go all the way back to the drawing board on zoning as you do have a number of reports now and could expand on them if feel the need. There are some great ways we can ease into assisting the density of growth in Stevenson without having to completely change zoning in large areas or disrupting the "neighborhood" feel many are worried about.

I believe there is enough interest in some of these "fixes" toward flexibility that you could have community support and community involvement in such "break out" work groups to explore this route and then present to the public.

I hope you seriously consider this avenue as I think this could be one great step in the right direction as you spend more time on gathering more public input on the larger discussions of "what, when, how" of the larger zoning vision for our community.

I also would challenge the City to continue to gather supports and resources for how to do "affordable housing" and support investment into apartments as that need is apparent. (Anyone want to find out more about utilizing the Opportunity Zones here??)

I hope this is helpful and I look forward to more open discussion of possibilities.  
Let me know your thoughts.

Wishing you all well~  
~Julie

Stevenson, WA

Julie May;  
Marketing & Public Relations Manager for Bowles Marketplace  
[julie@bowlesmarketplace.com](mailto:julie@bowlesmarketplace.com)  
(cell) 503-201-9460

May 27, 2021

To the City of Stevenson planning department:

Attn: Ben

I am the landowner of 201 SW Atwell Rd in Stevenson, WA. I am aware that the city is planning to rezone the area close to my property and I would like to be included in this rezoning. I would like my property to be rezoned as R3. If there is any additional information needed or anything I can do to aid in the process, please contact me at [Mercedes.lux@yahoo.com](mailto:Mercedes.lux@yahoo.com).

Respectfully,

Mercedes Lux



Ben Shumaker <ben@ci.stevenson.wa.us>

---

## Clarifications of Definitions of Waters of the US

---

Rick May <rick@mayandassociates.net>

Fri, May 28, 2021 at 2:01 PM

To: Ben Shumaker <ben@ci.stevenson.wa.us>

Cc: Scott Anderson <scott.anderson@ci.stevenson.wa.us>, "Kolb, Samuel S (DFW)" <Samuel.Kolb@dfw.wa.gov>

Hello Ben,

Thank you for the quick response. I appreciate you reaching out and asking for clarification. It appears the City of Stevenson has classified all streams in Stevenson relying on Fish & Wildlife Conservation Area Reports. It also appears these reports relied on WAC stream categories. If so, the WAC has no such category as a seasonal ditch with no "fish and wildlife habitat conservation areas". If you use only the WAC categories in your report, then of course a seasonal ditch has to be classified as something. Therefore, with no other option, a seasonal ephemeral stream becomes a regulated Ns stream. When all you have is a hammer, the whole world looks like a nail. This is a basic problem with requiring reports to use specific WAC classification systems. This is also may be the reason why The Army Corp of Engineers and EPA has recently stated there is a category called ephemeral stream that is not regulated. In addition, this is why other jurisdictions have created the classification of non-regulated ephemeral streams. This classification helps handle the hole in relying on the WAC classifications. If your Conservation Area Report cannot classify a seasonal ephemeral stream with no significant fish and wildlife function as something beside a Ns stream, then your report is creating setbacks that have no reason to exist. I realize the importance of being able to rely on code and regulations. However, you have an opportunity to create a reasonable method to solve a significant problem. Creating a method to verify with a habitat expert whether a seasonal stream has or does not have significant fish and wildlife habitat conservation attributes would be a benefit to all. It gives the public a way to remove unneeded setbacks and create additional development opportunities. It also supports your goal of increasing density. Thank you.

Rick May

On Fri, May 28, 2021 at 11:43 AM Ben Shumaker <ben@ci.stevenson.wa.us> wrote:

Hi Rick-

I believe the approach you are asking for already exists.

The first task of qualified professionals when preparing Fish & Wildlife Habitat Conservation Area Reports is to confirm or correct the classifications of habitats and/or stream types on a site. This process prioritizes the expertise of those professionals over the City's maps and allows for them to perform site-specific reviews to determine where the regulations do and do not apply.

See SMC 18.13.020(B)(3) & (4) and SMC 18.13.095(C)(1)(a).

Is the existing process somehow different than the one you describe?

Thank you,

*BEN SHUMAKER*

**From:** Rick May [mailto:rick@mayandassociates.net]

**Sent:** Friday, May 28, 2021 11:27 AM

**To:** Ben Shumaker <ben@ci.stevenson.wa.us>

**Cc:** Scott Anderson <scott.anderson@ci.stevenson.wa.us>; Kolb, Samuel S (DFW) <Samuel.Kolb@dfw.wa.gov>

**Subject:** Re: Clarifications of Definitions of Waters of the US

Hello Ben,

Thank you for the information. As for SMC 18.13.020 (B) I believe the City of Stevenson is on very shaky ground when it considers all local ephemeral streams not regulated by the EPA, Army Corp of Engineers or any other agency as "fish and wildlife habitat conservation areas". Studies can easily be provided by Environmental Engineers which shows at least some local ephemeral streams have no significant fish and wildlife habitat conservation attributes. This is especially true with seasonal streams running in ditches in Stevenson. You can also see a number of cities that break out Ns streams from ephemeral streams and choose not to regular ephemeral streams. There is a vast difference between Ns streams that have significant fish and wildlife habitat conservation areas and ditches which run only in the rainy season. This is an opportunity for Planning and the City to look at setbacks that may have no real purpose. It is an opportunity to bring usable land back into economic use. The simple request is for the city to allow a method to provide an environmental analysis from an appropriate engineer to show whether an ephemeral stream has any significant fish and wildlife habitat conservation areas. If not, then setbacks have no purpose. This is a common sense approach that gives the public an opportunity to remove harmful and unnecessary setbacks, while continuing to protect the environment.

Rick May

503-341-2932

RCW-365-190-130 - "Fish and wildlife habitat conservation" means land management for maintaining populations of species in suitable habitats within their natural geographic distribution so that the habitat available is sufficient to support viable populations over the long term and isolated subpopulations are not created. This does not mean maintaining all individuals of all species at all times, but it does mean not degrading or reducing populations or habitats so that they are no longer viable over the long term.

On Fri, May 28, 2021 at 9:32 AM Ben Shumaker <[ben@ci.stevenson.wa.us](mailto:ben@ci.stevenson.wa.us)> wrote:

Hi Rick-

Yes, the Planning Department believes the City has authority to regulate development near ephemeral streams.

The Stevenson Critical Areas Code designates Critical Areas at SMC 18.13.020(B), which includes "fish and wildlife habitat conservation areas". Such designations are required of the City by the State Growth Management Act, RCW 36.70A.170 and subject to the State's guidelines at WAC 365-190-130.

The Stevenson Critical Areas Code classifies fish and wildlife habitat conservation areas at SMC 18.13.095(B). Included within these classifications are Type Ns waters, "streams that do not have surface flow during at least some portion of the year, and do not meet the physical criteria of a Type F stream" as a riparian area. This classification relies on the State water typing system of WAC 222-16-030.

Regarding the State's regulation of development near ephemeral streams, Sam Kolb has been copied here to represent the Washington Department of Fish & Wildlife's interests in those areas.

The Planning Department is unaware of a regional governmental entity with the authority to regulate development near ephemeral streams.

Thank you,

*BEN SHUMAKER*

**From:** Rick May [mailto:[rick@mayandassociates.net](mailto:rick@mayandassociates.net)]  
**Sent:** Wednesday, May 26, 2021 2:03 PM  
**To:** Ben Shumaker <[Ben@ci.stevenson.wa.us](mailto:Ben@ci.stevenson.wa.us)>  
**Cc:** [scott.anderson@ci.stevenson.wa.us](mailto:scott.anderson@ci.stevenson.wa.us)  
**Subject:** Re: Clarifications of Definitions of Waters of the US

Hello Ben,

Thank you for your response. Does the Planning Department believe the City of Stevenson or any other Washington State or regional governmental department have jurisdictional powers over ephemeral streams? If so, please state the code or regulation which gives this power to the City of Stevenson or any regional governmental entity to regulate streams not considered as waters of the United States. Please be specific if possible. Thank you.

Rick May  
503-341-2932

On Tue, May 25, 2021 at 11:53 AM Ben Shumaker <[Ben@ci.stevenson.wa.us](mailto:Ben@ci.stevenson.wa.us)> wrote:

Thank you for this clarification of federal regulatory practices.

On Sat, May 22, 2021 at 2:51 PM Rick May <[rick@mayandassociates.net](mailto:rick@mayandassociates.net)> wrote:

Hello Scott, Ben and Karl,

Attached is a recent clarification of what is considered as waters of the US. This clarification states "ephemeral streams, swales, gullies, rills and pools" are not considered waters of the US and therefore not regulated by EPA or the Army Corp of Engineers. Karl, a lot of the water work you do is also considered non-jurisdictional

There may be a number of streams noted as Ns streams in Stevenson which would better fit under the category of ephemeral streams. If so, the 50 foot setbacks on both sides of these Ns streams could be removed. This may significantly increase the amount of developable land in

Stevenson.

I have one short stream on our property which is currently dry and flows only during heavy rains. I believe this may be a good example of this type of non-jurisdictional stream. I suggest the City find a fairly easy way for Property Owners to supply an engineering report, which would state a stream meets the definition of an ephemeral stream. If the City accepts the report, the setbacks could then be removed, freeing up land for development. Thank you.

Rick May

[Rick@mayandassociates.net](mailto:Rick@mayandassociates.net)

503-341-2932

--

Rick May

[Rick@mayandassociates.net](mailto:Rick@mayandassociates.net)

503-341-2932

--

Rick May

[Rick@mayandassociates.net](mailto:Rick@mayandassociates.net)

503-341-2932

--

Rick May

[Rick@mayandassociates.net](mailto:Rick@mayandassociates.net)

503-341-2932



---

## Cesar didn't create the 50 ft buffer zone for a drainage ditch - YOU DID

---

Pat Rice <easylivingpat@gmail.com>

Tue, Jun 1, 2021 at 6:05 AM

To: Scott Anderson <scott.anderson@ci.stevenson.wa.us>

Cc: Ben Shumaker <ben@ci.stevenson.wa.us>, City Council <citycouncil@ci.stevenson.wa.us>, Bill Weiler <bill@sandyriver.org>, David Ray <david.ray@ci.stevenson.wa.us>, Mike Beck <mike.beck@ci.stevenson.wa.us>, Jeff Breckel <jeff.breckel@ci.stevenson.wa.us>, Valerie Hoy <valerie.hoy@ci.stevenson.wa.us>, Auguste Zettler <auguste.zettler@ci.stevenson.wa.us>

Dear Scott,

### Cesar's story

You know the story of my friend Cesar Hernandez and his family, who are now homeless living in an RV park in a small trailer with three children.

You know because my neighbors and I toured his building site with you on May 17, 2021. We showed you the drainage ditch that Ben Shumaker is using as an excuse to hold up his family's building permit.

### We showed you the problem

We showed you the school property which directly abuts the drainage ditch with the pipe coming into the stream with who knows what affluent secreting out of it. We showed you how the school district years ago channelized the non-fish bearing seasonal runoff water into a perfectly straight ditch that now runs this way for several hundred feet.

We showed you that the most ecologically restored area anywhere along this seasonal drainage ditch is in fact the area directly abutting Cesar's property. *The only* area similarly cared for is my property directly adjacent.

### Your council's vote now halts construction

On September 20, 2018 you held a meeting at city hall and your council voted to have the buffer zone for this drainage ditch be 50 feet.

You could have voted to have it be 25 feet, but you didn't.

You could have seen that the adjoining school property has no buffer zone whatsoever. But you didn't take the time to come and look. No, instead of conducting a ten minute site visit, you and others sat in your comfortable chairs at the council meeting and simply voted, without thinking of what your regulations were doing to people like Cesar.

Now Cesar Hernandez can't build a home for his family. And now your employee Ben Shumaker is using the buffer zone you created to nitpick the biologist's report saying he didn't dot every I and cross every T on an application to get a waiver to build in a "critical area". If this area was important to the city you would have had your own biologist or other expert look at the drainage ditch before you voted, but you didn't. A deep dive into city records shows that the only biologist who has ever visited this drainage ditch has been Mr. Weiler - when Cesar and I hired him.

### The experts be damned

Even though a qualified and long time habitat biologist, Bill Weiler, has twice now praised the diversity next to Cesar's building site, and said putting a home *where one has always been*, won't harm anything, your employee Ben is "flabbergasted" that the more isn't said. Yet you and your council codified the 50 foot buffer on each side for a drainage ditch WITHOUT SO MUCH AS DOING A SITE VISIT.

### Cesar didn't create this problem. You did. Therefore, I ask YOU, not Cesar, to fix it.

Please put this item on your next city council agenda and vote to do what Vancouver\*, Camas\*, North Bonneville\* and others have done. That is, put the buffer zone for this Ns (non-fish bearing and seasonal only) drainage ditch at 25 feet.

Pat Rice  
360-281-3406

 [Video of no buffer at all nxt to Cesar's proper...](#)

\*Source materials:

**Vancouver:** See page 22 of Vancouver city code here [https://www.cityofvancouver.us/sites/default/files/fileattachments/vmc/titles\\_chapters/20.740.pdf](https://www.cityofvancouver.us/sites/default/files/fileattachments/vmc/titles_chapters/20.740.pdf)

**Camas:** See table entitled "Stream Buffer Widths" in Camas city code 16.61.040 ([https://library.municode.com/wa/camas/codes/code\\_of\\_ordinances?nodeId=TIT16EN\\_CRAR\\_CH16.61FIWIHACOAR\\_16.61.040PESTPEHA](https://library.municode.com/wa/camas/codes/code_of_ordinances?nodeId=TIT16EN_CRAR_CH16.61FIWIHACOAR_16.61.040PESTPEHA))

**North Bonneville:** See Table 5, page 32 of North Bonneville Substation and Feeder Upgrade Project, Stevenson Critical Area Report, April 9, 2021



Ben Shumaker <ben@ci.stevenson.wa.us>

## Fwd: Request for add on to your June 17th city council agenda

Pat Rice <easylivingpat@gmail.com>

Fri, Jun 4, 2021 at 10:29 AM

To: Ben Shumaker <ben@ci.stevenson.wa.us>

Cc: Leana Kinley <leana@ci.stevenson.wa.us>, Underwood Conservation District <info@ucdwa.org>, Jan Thomas <jan@ucdwa.org>, weeds@co.skamania.wa.us, Emily Stevenson <estevenson@co.skamania.wa.us>, Cyndi Soliz <soliz@co.skamania.wa.us>, Philip Watness <scpioneernews@gorge.net>, Bill Weiler <bill@sandyriver.org>, "Davy Ray (Stevenson PC)" <david.ray@ci.stevenson.wa.us>, "Mike Beck (Stevenson PC)" <mike.beck@ci.stevenson.wa.us>, "Jeff Breckel (Stevenson PC)" <jeff.breckel@ci.stevenson.wa.us>, "Valerie Hoy-Rhodehamel (Stevenson PC)" <valerie.hoy@ci.stevenson.wa.us>, City Council <citycouncil@ci.stevenson.wa.us>

Ben,

I believe the record is clear. I look forward to two things:

1. My meeting with Leana about this, and
2. The items I have requested be put on the next city council agenda.

**I now also ask, through you, that the planning commission take up the two issues I have asked the council to look at, during their upcoming planning commission meeting. This way, as I believe their meeting will come first, they have weighed in on the matter prior to the council's meeting.**

Thank you.

Pat Rice

On Fri, Jun 4, 2021 at 9:50 AM Ben Shumaker <ben@ci.stevenson.wa.us> wrote:

Pat-

I ask you to please stop falsely accusing me of actions which I have not taken and motivations that I do not have.

At no point have I accused you of doing anything. I did tell you that changes to the site had been observed and specifically said "the City has not assigned any responsibility for the changes evident on the site."

At no point did I tell you that an action of yours triggered any requirement for Mr. Hernandez. I did provide you with code citations which establish requirements for applicants, all applicants, to produce reports for projects that are likely to affect critical areas.

I want to issue the permit for this project. I remain willing to meet with you, Mr. Hernandez, Mr. Borup, Mr. Weiler, and anyone else chosen to produce the required reports. When the City receives a report that is consistent with the City's requirements, I anticipate issuing an approval within a very short timeframe.

Thank you,

*BEN SHUMAKER*

**From:** Pat Rice [mailto:easylivingpat@gmail.com]

**Sent:** Friday, June 04, 2021 8:43 AM

**To:** Leana Kinley <leana@ci.stevenson.wa.us>; Ben Shumaker <ben@ci.stevenson.wa.us>

**Subject:** Fwd: Request for add on to your June 17th city council agenda

**Leana and Ben, I see that I mistakenly did not include you in the below email. Here is your copy. Pat**

----- Forwarded message -----

**From:** Pat Rice <easylivingpat@gmail.com>

**Date:** Fri, Jun 4, 2021 at 7:59 AM

**Subject:** Request for add on to your June 17th city council agenda

**To:** City Council <citycouncil@ci.stevenson.wa.us>

**Cc:** Underwood Conservation District <info@ucdwa.org>, Jan Thomas <jan@ucdwa.org>, <weeds@co.skamania.wa.us>, Emily Stevenson <estevenson@co.skamania.wa.us>, Cyndi Soliz <cyndi.soliz@gmail.com>, Philip Watness <scpioneernews@gorge.net>, Bill Weiler <bill@sandyriver.org>, David Ray <david.ray@ci.stevenson.wa.us>, Mike Beck <mike.beck@ci.stevenson.wa.us>, Jeff Breckel <jeff.breckel@ci.stevenson.wa.us>, Valerie Hoy <valerie.hoy@ci.stevenson.wa.us>

Dear Stevenson City Council,

As you know by now, yesterday I was accused of committing a crime by Ben Shumaker and Leana McKinley because I had removed by hand tool the invasive species Himalayan blackberries from the drainage ditch commonly referred to as "Owl Creek".

In addition, Ben Shumaker told me that even if you, the council, voted to return the drainage ditch Owl Creek back to its original 25 foot buffer, that because I had removed invasive blackberries by hand without a permit, that he "would still require" Cesar Hernandez to produce for him a habitat biologist report before signing off on his permit request to build his family a home at [199 NW Del Ray](#).

In addition to my previous request to put on your June 17th agenda the topic of reverting Owl Creek back to a 25 foot buffer\*, **I also ask you consider at this meeting a proposal to amend your city code to allow for the removal by hand the invasive Himalayan blackberry plant without requiring a permit.**

I make this request based on the latest available science. Page 26 of the attached report from the Washington Department of Fish and Wildlife states:

4. Invasive and/or Noxious Plant Removal – Many CAOs do not require a permit for control and removal of invasive and/or noxious weeds within the riparian ecosystem. We support this when weed control efforts (1) employ hand weeding with light equipment; (2) use only Ecology approved aquatic herbicides and adjuvants (a substance added to herbicides to improve application); avoid use of hazardous substances; and (3) do not result in soil compaction.

Thank you for considering this request.

Pat Rice

\*Because you lacked the science when you affirmed this in 2018 and had never even performed a cursory site visit.





Ben Shumaker <ben@ci.stevenson.wa.us>

---

## Some clarifications that could be helpful

---

Pat Rice <easylivingpat@gmail.com>

Thu, Jun 3, 2021 at 5:15 PM

To: Leana Kinley <leana@ci.stevenson.wa.us>

Cc: Ben Shumaker <ben@ci.stevenson.wa.us>, City Council <citycouncil@ci.stevenson.wa.us>

Leana,

The debris in these photos was illegally dumped by someone and I simply cleaned it up. Are you serious? Please tell me this is some kind of joke. Your other anecdotal information is also equally troubling.

I would like to sit down with you soon to discuss this further.

Pat Rice

On Thu, Jun 3, 2021 at 5:04 PM Leana Kinley <leana@ci.stevenson.wa.us> wrote:

Pat,

Records regarding violations of any ordinance or law, city, state or federal are attached and further description is below.

This includes three photos submitted by you on June 18, 2020 regarding brush and debris at [199 NW Del Ray](#) and the subsequent photos included in the report submitted by William Weiler showing the vegetation removed and stating: "On his own volition, Mr. Rice has taken the lead with his neighbors to undertake extensive riparian and upland habitat restoration, covering 356 feet of stream bank on both sides. They have cleared ivy, Himalayan blackberries, vinca minor, bamboo and English holly. Up to one-half acre along the creek within the 50 foot regulator buffer on each side of the stream corridor is also being restored as well as 7/10th of an acre that has been enhanced beyond the creek corridor area." This is in violation of the following codes: SMC 18.13.010(A)(2), [18.13.035\(B\)](#). and [18.13.035\(D\)](#).

There was a fire call for an illegal yard burn containing building materials on February 20, 2021, incident report attached. This is in violation of SMC [8.25.030\(5\)](#).

Evidence of demolition of a building without a permit includes the photos mentioned above, and the report by William Weiler where there is a house in the photo, and the report references an extension of an existing house. The current application in process is for a new house at [199 NW Del Ray](#) rather than a remodel and/or addition (application attached). There is no demolition permit on record for [199 NW Del Ray](#). This is in violation of SMC [15.01.020\(A\)](#) (specifically IBC Ch 33: Safeguards During Construction, section 3303: Demolition attached), SMC [15.01.030\(C\)](#), SWCAA 476-040(2) and SWCAA 476-050(1) (a copy of SWCAA 476 is attached).

This is the extent of the records pertaining to your request.

Thanks,

**Leana Kinley, EMPA, CMC**

City Administrator  
7121 E. Loop Rd/PO Box 371  
Stevenson, WA 98648-0371  
(509) 427-5970

On Thu, Jun 3, 2021 at 3:22 PM Ben Shumaker <ben@ci.stevenson.wa.us> wrote:

Hi Pat-

See [green text](#) below.

Thank you,

*BEN SHUMAKER*

**From:** Pat Rice [mailto:easylivingpat@gmail.com]

**Sent:** Thursday, June 03, 2021 2:34 PM

**To:** Ben Shumaker <ben@ci.stevenson.wa.us>

**Cc:** Leana Kinley <leana@ci.stevenson.wa.us>

**Subject:** Re: Some clarifications that could be helpful

Ben,

I just read your response and I need a little help.

- Please let me clarify my question. **Besides you indicating to me that Cesar Hernandez (or someone else) may have taken down his house without a permit, do you have evidence of anything else happening anywhere in the vicinity that you think violated any ordinance or law, city, state, or federal?** First, I never indicated to you that Cesar Hernandez took down the house, only that the house is now gone. If so, I now expound on my public records request and ask for an electronic copy of this evidence. Leana will provide City records responsive to your request.
- And should you believe that you have evidence of a violation, what causes you to believe that Cesar Hernandez is the responsible party? Again, the City has not assigned any responsibility for the changes evident on the site.
- Additionally, I think you'd have to prove that Cesar Hernandez himself violated some rule or regulation in the first 25 feet next to his property before you could force him to complete a habitat report for anything that occurred within that area (should the city council at its next meeting revert the buffer zone back to its original 25 feet).
- Also, I ask you now to provide me with your legal authority to force anyone to file a "habitat biologist report" should you be able to prove they in fact did work within a buffer zone. I assume you must have this authority, or you wouldn't have brought it up. I just need the code or statute you are relying on. Refer to SMC 18.13.015(A) in addition to the specific sections related to Critical Area Report requirements which were provided earlier today [SMC 18.13.020(A), SMC 18.13.020(B)(3), SMC 18.13.035(B), SMC 18.13.050(A), SMC 18.13.095(C)(1), SMC 18.13.095(E)].

Thank you for your help on the above.

Pat Rice

On Thu, Jun 3, 2021 at 2:07 PM Ben Shumaker <[ben@ci.stevenson.wa.us](mailto:ben@ci.stevenson.wa.us)> wrote:

Hello Pat-

The full scope of the regulated activities occurring on the property is unknown to the City at this time, in part, because:

- The lack of any past Critical Areas Permit authorizing regulated activities on the site, and
- The failure of the Critical Area Report submitted with the current proposal to supply the information required in SMC 18.13.050(C), especially (4), and SMC 18.13.095(C)(1), especially (g).

When that report is provided, we anticipate it will address, and secure authorization for, the activities occurring on the site leading to the observed changes below as well as others that may be desired by the project proponents. Among the observed changes:

- At some point between June 18<sup>th</sup>, 2020 and February 9<sup>th</sup>, 2021 the vegetated state of the property changed from that shown in the first attachment's photos to that shown in the second attachment's photos. The second attachment verbally describes this work but does not provide a site plan showing its location in relation to the Type Ns stream, and it concludes with a recommendation justified by "the lack of current vegetation".
- At some point between February 9<sup>th</sup> and April 9<sup>th</sup>, 2021 the existing structures on the property were demolished.

If this response by email was not what you were hoping for, please feel free to call for a phone conversation.

Thank you,

*BEN SHUMAKER*

**From:** Pat Rice [mailto:[easylivingpat@gmail.com](mailto:easylivingpat@gmail.com)]  
**Sent:** Thursday, June 03, 2021 1:03 PM  
**To:** Ben Shumaker <[ben@ci.stevenson.wa.us](mailto:ben@ci.stevenson.wa.us)>  
**Cc:** Leana Kinley <[leana@ci.stevenson.wa.us](mailto:leana@ci.stevenson.wa.us)>  
**Subject:** Re: Some clarifications that could be helpful

Ben,

Thank you so much for answering my email. Regarding your answer to my number 4 question, could you tell me what specific "activities" that took place on the property that you are referring to? Again, I appreciate your help on this.

Pat

On Thu, Jun 3, 2021 at 10:38 AM Ben Shumaker <ben@ci.stevenson.wa.us> wrote:

See [green text](#) below.

A request: In your email, you express appreciation for the phone call and also a desire to communicate via email instead. If you would prefer one type of response over another, please continue to specify as part of your future communications. I am happy to connect with the public in the way they most prefer.

Thank you,

*BEN SHUMAKER*

**From:** Pat Rice [mailto:easylivingpat@gmail.com]  
**Sent:** Thursday, June 03, 2021 4:58 AM  
**To:** Ben Shumaker <ben@ci.stevenson.wa.us>  
**Cc:** Leana Kinley <leana@ci.stevenson.wa.us>  
**Subject:** Some clarifications that could be helpful

Good morning Ben,

I appreciate your time on the phone yesterday. The purpose of this email is to help me understand some things. If you would answer by return email, rather than calling me, that would be helpful.

1. Regarding my public records request, my understanding of what you were saying to me is that you already sent me in earlier emails all the science, studies, etc., that you and others relied on to update Chapter 18.13 of the city code on September 20, 2018. Is this what you were saying? [Yes. In particular, references to the science used to develop the current regulations are available in the 2 attached documents. See the graphic and table in the first attachment and the 3<sup>rd</sup> recital in the second.](#)

If I misunderstood you, and you still have documents that I have not yet received that are responsive to my PRR dated yesterday, June 2, 2021, please let me know, and I will look forward to receiving them.

2. Has the city ever had a habitat biologist or other science type expert look at any of the Ns streams within the Stevenson City limits? [As an applicant, yes. In advance of the 2008 update, yes.](#)

3. Do you have any data or information of any kind that [specifically](#) supports the Ns stream commonly known as Owl Creek as needing a protective buffer of 50 feet? Or is all the science and information you and others relied on more generally about what is best for Ns streams and not tied specifically to any particular Ns stream within Stevenson? [No. No. As required by RCW 36.70A.172 and under the guidance of WAC 365-195, the City used the best available science to determine buffers widths. Science in the form of site specific analyses on private properties was not available to the City.](#)

4. You told me that even if the council voted to reverse themselves and re-establish the old buffer of 25 on the Ns drainage ditch passing by Cesar's property, that you would still require a habitat biologist report. Please tell me why you said this. [Some relevant sections of the Critical Areas Code include SMC 18.13.020\(A\), SMC 18.13.020\(B\)\(3\), SMC 18.13.035\(B\), SMC 18.13.050\(A\), SMC 18.13.095\(C\)\(1\), SMC 18.13.095\(E\). Facts related to the activities performed on the site and the development proposal are also relevant.](#)

Thanks Ben.

Pat Rice



# RIPARIAN ECOSYSTEMS, VOLUME 2: MANAGEMENT RECOMMENDATIONS

*A PRIORITY HABITATS AND SPECIES DOCUMENT OF THE  
WASHINGTON DEPARTMENT OF FISH AND WILDLIFE*

December 2020



*This document should be cited as follows:*

Riparian Ecosystems, Volume 2: Management Recommendations. 2020. Amy Windrope, Terra Rentz, Keith Folkerts, and Jeff Azerrad. A Priority Habitats and Species Document of the Washington Department of Fish and Wildlife, Olympia, Washington.

## ACKNOWLEDGMENTS

**Land Acknowledgement:** We acknowledge the traditional, ancestral, territory of Washington state on which we are learning, working, and organizing today. We recognize the longstanding history that has brought us to reside on this land and seek to understand those who first lived here.

Many people were involved with creation of both Volumes 1 and 2 for Priority Habitats and Species (PHS) Riparian Ecosystems. WDFW extends our sincere appreciation to the following individuals and organizations that played important roles during development and/or review of both volumes.

The Washington Department of Ecology (Ecology) and U.S. Environmental Protection Agency (EPA) provided funds that made this document possible (Contract C1300107).

The Washington State Academy of Sciences, with coordination by Dr. Robert Bates, provided an independent peer review that improved the scientific rigor of Volume 1.

Federal (EPA and NOAA Fisheries) and tribal entities (individual tribes, the Northwest Indian Fisheries Commission, Columbia River Inter-Tribal Fish Commission, and Upper Columbia United Tribes) as well as numerous state agencies (Washington State departments of Ecology, Natural Resources, and Commerce; Recreation and Conservation Office; Washington State Conservation Commission; and Puget Sound Partnership) reviewed draft versions of this document. During the summer 2018 public comment period, local governments and members of the public provided valuable feedback that led to a more concise and user-friendly final version of Volume 2.

Within WDFW, Keith Folkerts led coordination, contract planning and budgeting for this work. Tim Quinn and George Wilhere were integral in ensuring a strong relationship with information in Volume 1 and provided additional valuable feedback on multiple drafts. Terry Johnson developed the Site-Potential Tree Height mapping tool and wrote the associated user guide information in the Appendix to this Volume 2. Alison Hart produced final graphics and ensured consistent formatting and stylistic usage throughout. Mary Huff provided editorial support, improved the document's organization, and (in late 2020) took it across the finish line.

WDFW recognizes and appreciates the significant role that tribes, local governments, conservation organizations, and others play in accomplishing our agency's mission. Indeed, we are certain that without these concerted efforts to designate and protect the riparian ecosystems that are essential for most of the state's fish and wildlife species, WDFW would be unable to fulfill its mandate on behalf of all of Washington's residents.

While we acknowledge and have deep appreciation for all the review and comments provided, WDFW bears sole responsibility for this document and any errors contained herein.

# TABLE OF CONTENTS

Acronyms for Volume 2 .....	iii
CHAPTER 1. Overview .....	1
1.1    Our Role as Washington’s Conservation Agency .....	1
1.2    Purpose and Applicability of Volume 2 .....	3
1.3    Science Synthesis and Management Implications (Volume 1) Summary .....	4
1.4    Key Findings and Recommendations.....	6
1.5    Relationship with Washington’s Development Laws and Regulations.....	9
1.6    Organization of Volume 2 .....	10
CHAPTER 2. Riparian Management Zone Delineation .....	11
2.1    Introduction .....	11
2.2    Foundational Concepts in RMZ Determinations .....	11
2.3    Procedures for RMZ Delineation .....	14
CHAPTER 3. Riparian Regulatory Protections .....	23
3.1    Introduction .....	23
3.2    Recommendations to Local Jurisdictions .....	23
3.3    Riparian Management in Urban Areas.....	29
3.4    Managing Watersheds.....	30
CHAPTER 4. Restoring Riparian Ecosystems.....	34
4.1    Introduction .....	34
4.2    Restoration Actions .....	35
4.3    Implementing Riparian Strategies Through Incentives .....	36
4.4    Suggested Restoration Practices .....	38
CHAPTER 5. Improving Protection through Adaptive Management .....	40
5.1    Introduction .....	40
5.2    Common Questions Addressed by Adaptive Management .....	41
5.3    Recommended Implementation Monitoring Efforts .....	42
5.4    Effectiveness of Regulatory Protections of Critical Areas .....	44
5.5    Using Land Cover Change to Understand Long-term Regulatory Protection.....	44
5.6    Conclusion.....	47
Literature Cited .....	48
Glossary of Terms.....	53
APPENDIX. Site-Potential Tree Height Mapping Tool.....	61

## ACRONYMS FOR VOLUME 2

CAO	Critical Areas Ordinance
CMZ	Channel Migration Zone
CREP	Conservation Reserve Enhancement Program
DFC	Desired Future Condition
DNR	Department of Natural Resources (Washington State)
EBM	Ecosystem Based Management
EPA	Environmental Protection Agency (U.S.)
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FEMAT	Forest Ecosystem Management Assessment Team
FPA	Forest Practices Act
FWHCA	Fish and Wildlife Habitat Conservation Area
GIS	Geographic Information System
GMA	Growth Management Act
HMP	Habitat Management Plan
HRCD	High Resolution Change Detection
LID	Low Impact Development
NHD	National Hydrography Dataset
NOAA	National Oceanographic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
OHWM	Ordinary High-Water Mark
OSS	On-site Sewage Systems
PHS	Priority Habitats and Species
RCO	Recreation and Conservation Office (Washington State)
RCW	Revised Code of Washington
RMZ	Riparian Management Zone
RZ	Riparian Zone
SMA	Shoreline Management Act
SMP	Shoreline Master Program
SPTH	Site-Potential Tree Height
SPTH <sub>200</sub>	Site-Potential Tree Height (at age 200 years)
USFS	United States Forest Service



USFWS	United States Fish and Wildlife Service
UWCIG	University of Washington Climate Impacts Group
VSP	Voluntary Stewardship Program
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WFPB	Washington Forest Practices Board
WRIA	Water Resource Inventory Area
WSCC	Washington State Conservation Commission
WWRP	Washington Wildlife and Recreation Program

# CHAPTER 1. OVERVIEW

## 1.1 OUR ROLE AS WASHINGTON’S CONSERVATION AGENCY

The mission of the Washington Department of Fish and Wildlife (WDFW) is to preserve, protect, and perpetuate the state’s fish, wildlife, and ecosystems while providing sustainable fish and wildlife recreational and commercial opportunities.

We offer the following science-based guidance to further that mission through the preservation, protection, and—where possible—restoration of healthy, intact, and fully functioning riparian ecosystems statewide. As described throughout this volume, we believe that protection *and* restoration<sup>1</sup> of Washington’s riparian ecosystems is a foundational conservation action; considering a growing population and changing climate, it is also an urgent one.

Within the State of Washington’s land use decision-making framework, WDFW’s role is that of advisor. We provide information relative to our mission about the habitat needs of fish and wildlife, and the likely implications of various land use decisions on those resources over time. Through the Priority Habitats and Species (PHS) Program, we work cooperatively with land use decision makers and landowners to facilitate solutions that accommodate their needs *and* the needs of fish and wildlife. We provide this PHS document, *Riparian Ecosystems Volume 2: Management Recommendations* in support of that effort.

Priority Habitats are places that warrant special consideration for protection when land use decisions are made and should also be prioritized for restoration or enhancement wherever possible. To qualify as a “Priority Habitat” in WDFW’s PHS program, an ecosystem or habitat component must provide unique or significant value to many species. Specifically, it must have one or more of the following attributes (WDFW 2008):

- Comparatively high fish and wildlife density
- Comparatively high fish and wildlife species diversity
- Important fish or wildlife breeding habitat

---

### WDFW’S MISSION

To preserve, protect, and perpetuate Washington’s fish, wildlife, and ecosystems while providing sustainable fish and wildlife recreational and commercial opportunities.

### WDFW’S RIPARIAN VALUES

We value the protection and restoration of healthy, intact, and fully functioning riparian ecosystems statewide.

### WDFW’S RECOMMENDATION

Within the context of wise watershed management, preserve, protect, and—where possible—restore the full extent of riparian ecosystems.

---

<sup>1</sup> Restoration of riparian ecosystems is critically important because legacy of environmental impacts resulting from the ways land use has affected riparian areas over the past 200 years. In other words, what remains available for protection is not enough to provide the full functions and values Washington’s fish and wildlife need.

- Important fish or wildlife seasonal ranges
- Important fish or wildlife movement corridors
- Limited availability
- High vulnerability to habitat alteration
- Unique or dependent species

Riparian areas (comprised of riparian ecosystems, active floodplains, and riverine wetlands) meet all these criteria, and were among the first Priority Habitats described by WDFW. Riparian areas provide important ecological functions that help create and maintain aquatic habitats in addition to supporting terrestrial wildlife. Riparian areas alongside rivers and streams are the focus of this document, however much of the science reviewed in Volume 1 and the recommendations in this Volume 2 are relevant for lakes, ponds, and marine shorelines as well.

As previously mentioned, one role of WDFW in land use decision making is that of advisor. In that role, recommendations like those contained in this document and in complementary PHS documents (available at <https://wdfw.wa.gov/species-habitats/at-risk/phs/recommendations>) provide critical information for the protection (and where necessary, recovery) of Washington’s fish and wildlife. We recognize landowners and land managers most often face situations where various human needs must also be met; and thus, considerations other than fish and wildlife will be incorporated into land use decision making.

The information presented in this management recommendation document is not, in and of itself, science. Rather, it consists of policy recommendations which are informed by the best available science summarized in Volume 1<sup>2</sup> and which reflect WDFW’s mission and legislative mandate. To that end, these recommendations represent WDFW’s guidance for the protection and restoration of healthy, intact, and fully functioning riparian ecosystems and

---

## Ecosystem Based Management & WDFW’s Conservation Principles

In 2013, WDFW adopted ecosystem-based management principles into policy (WDFW Policy 5004). Ecosystem-based management is an integrated, science-based approach to natural resource management that aims to sustain the ability of ecosystems to provide goods and services upon which humans and other species depend. Importantly, ecosystem-based management recognizes the magnitude of humans as change agents in the ecosystem, and the role of social, economic, and ecological factors in managing complex and dynamic systems.

We believe that conservation is best achieved through employing the following ecosystem-based management principles:

1. We practice conservation by managing, protecting, and restoring ecosystems for the long-term benefit of people, and for fish wildlife and their habitats.
  2. We work across disciplines to solve problems because of their connections among organisms, species and habitats.
  3. We integrate ecological, social, economic, and institutional perspectives into our decision-making.
  4. We embrace new knowledge and apply best science to address changing conditions through adaptive management.
  5. We collaborate with our co-managers and conservation and community partners to help us achieve our shared goals.
- 

---

<sup>2</sup> The original manuscript of *Riparian Ecosystems, Volume 1: Science Synthesis and Management Implications* was publicly released in May 2018. In 2020, the format of the document was professionally designed, which included making limited updates to content focused on copyediting and improving usability. In accordance with standard citation practice, Volume 1 is now cited as having a 2020 publication date, but substantively, the current document is equivalent to the original 2018 version.

for how land managers and land use regulators can utilize best available science to protect these ecosystems within the scope of their authority and/or ability.

For example, local governments are encouraged to use information provided through PHS to guide critical area ordinance (CAO) updates and other land use policies, plans, or regulations. More specifically, WDFW advises using the information in this PHS Riparian Volume 2 for designating riparian areas as Fish and Wildlife Habitat Conservation Areas (FWHCAs) and protecting them for their inherent value, rather than just as buffers for rivers and streams. This is because riparian areas are so important for helping sustain endangered, threatened, and sensitive species; providing habitat connectivity for both aquatic and terrestrial wildlife; and for their critical role in protecting salmonid habitat (WAC 365-190-130).

In short, Volumes 1 and 2 focus on the science and management, respectively, of riparian ecosystems to support fish and aquatic wildlife species. Volume 1 characterizes riparian ecosystem functions and essential processes, while Volume 2 provides management guidance for riparian ecosystems in the context of watershed processes. To be clear, these two volumes do *not* provide a summary of science or recommendations regarding the contribution of riparian ecosystems for the protection of terrestrial wildlife species. However, our first generation PHS Riparian-specific document, *Management Recommendations for Washington's Priority Habitats: Riparian* (Knutson and Naef 1997) does provide terrestrial species information related to riparian areas. Further, PHS has separate, species-specific management recommendations that address the needs of many terrestrial Priority Species.

This document provides recommendations applicable across the State of Washington but does not address unusual, site-scale environmental conditions or issues specific to particular ecological communities. We strongly encourage addressing such matters at a local level with the assistance of WDFW regional habitat biologists, and other technical experts and stakeholders such as tribal biologists and conservation organizations.

## 1.2 PURPOSE AND APPLICABILITY OF VOLUME 2

The purpose of this document is to provide guidance to protect and—where possible—restore healthy, intact, and fully functioning riparian ecosystems, which are fundamental for clean water, healthy salmon populations, and climate resilient watersheds.

Volume 2 provides information to:

- Protect existing and restore degraded riparian ecosystem functions in support of aquatic and terrestrial species recovery;
- Assist local governments with their responsibilities to protect priority fish and wildlife and their habitats;
- Assist landowners and local groups in implementing voluntary restoration actions on and off working lands; and
- Incorporate monitoring and adaptive management to understand how well regulatory and non-regulatory efforts are protecting riparian functions and values.

This guidance is applicable to riparian ecosystems statewide. We offer a specific focus on lands within the purview of the Growth Management Act (GMA) and Shoreline Management Act (SMA), although a broader application by local governments and other users is also appropriate.

While many other federal, state, and tribal government programs and policies pertain to riparian ecosystems, they are not specifically addressed in this document. For instance, we do not discuss holistic protection of floodplains, nor do we discuss specific Endangered Species Act (ESA) requirements relative to listed salmonids and other species. Also, we do not address commercial forestlands that fall under the jurisdiction of the Forest Practices Act (FPA), or the Department of Ecology’s clean water regulations. These other programs and policies were developed with specific goals and objectives that may be different from the goals of this document, and as such may differ with guidance provided herein.

### 1.3 SCIENCE SYNTHESIS AND MANAGEMENT IMPLICATIONS (VOLUME 1) SUMMARY

As stated above, Volume 1 (Quinn et al. 2020; see footnote 2) provides important information integral to the development of these management recommendations. It includes both overarching as well as specific considerations important to all efforts, large and small, to protect rivers and streams for the benefit of the aquatic species associated with them. Volume 1 focuses on the science of riparian ecosystems—specifically, how riparian areas interact with large-scale drivers (e.g., topography, geology, climate, and land use) and watershed processes to create and maintain riparian and aquatic habitat in support of fish and wildlife. Thus, we provide here an explicit definition of riparian ecosystems from Volume 1 that combines a variety of conceptual riparian descriptions from the scientific literature:

Riparian ecosystems are transitional between terrestrial and aquatic ecosystems, distinguished by gradients in biophysical conditions, ecological processes, and biota. They are areas through which surface and subsurface hydrology connect waterbodies with adjacent uplands. They include those portions of terrestrial ecosystems (i.e., *a zone of influence*) that significantly influence exchanges of energy and matter with aquatic ecosystems and the portion of the ecosystem characterized by moist soils and plants adapted to periodically saturated soils – the *riparian zone* (RZ). The width of the riparian ecosystem is typically defined by the outer edge of the zone of influence, which, in forested regions, is based on site-potential tree height (SPTH) measured from the edge of the active channel. While our definition of riparian ecosystem does not include the water in river or streams, it does include riverine wetlands and recognizes the riparian zone as a distinctive area within riparian ecosystems.

To assist managers in understanding important implications of the science synthesized in Volume 1, we reiterate the ten overarching findings of that document below. These findings are also discussed in more detail in later chapters.

1. Protection and restoration of riparian ecosystems continues to be critically important because: (a) they are disproportionately important, relative to area, for aquatic species (e.g., salmon) and terrestrial wildlife; (b) they provide ecosystem services such as water purification and fisheries (Naiman and Bilby 2001, NRC 2002, Richardson et al. 2005); and (c) by interacting with watershed-scale processes, they contribute to the creation and maintenance of aquatic habitats.
2. Stream riparian ecosystems encompass the riparian zone; the active floodplain, including riverine wetlands and the terraces; and adjacent uplands that contribute matter and energy

to the active channel or active floodplain (Gregory et al. 1991, Naiman and Bilby 1998). Such terraces and adjacent uplands are called the zone of influence.

3. The width of the riparian ecosystem is estimated by one 200-year SPTH measured from the edge of the active channel or active floodplain. Protecting functions within at least one 200-year SPTH is a scientifically supported approach if the goal is to protect and maintain full function of the riparian ecosystem.
4. Where the riparian zone is narrow (<100 ft [30 m]) and the zone of influence lacks tall trees (<100 ft), (e.g., in parts of the Columbia Plateau Ecoregion), the pollution removal function may determine the width of the zone of influence.
5. The riparian ecosystem begins at the edge of the active channel or active floodplain, whichever is wider. As the active channel moves back and forth across the channel migration zone (CMZ), the riparian ecosystem moves with it. Consequently, there are times when the riparian ecosystem lies adjacent to or overlaps the CMZ (see Figure 2.3). Hence, to maintain riparian ecosystem functions, management must anticipate and protect future locations of the riparian ecosystem.
6. A near consensus of scientific opinion holds that the most effective and reliable means of maintaining viable self-sustaining fish, especially salmon, and wildlife populations is to maintain/restore ecosystems to conditions that resemble or emulate their historical range of natural variability (Swanson et al. 1994, Reeves et al. 1995, Bisson et al. 2009). This opinion is based in part on the complexity of processes that affect the expression of habitats over time and space.
7. The protection and restoration of watershed-scale processes, especially related to hydrology, water quality, connectivity, and inputs of wood, shade, and sediment are important for aquatic system function, and help maximize the ecological benefits of riparian ecosystem protections.
8. Riparian areas and surrounding watersheds are complex and dynamic systems comprised of many interacting components. Natural disturbances (flood, fire, and landslides) across the watershed and through time create the mosaic of conditions necessary for self-sustaining populations of fish, especially salmon, and other aquatic organisms.
9. Impending changes to aquatic systems as a result of climate change increase risk to species already threatened by human activities. The effects of climate change on rivers and streams threaten to reduce fish distribution and viability throughout the Pacific Northwest (Beechie et al. 2013).
10. The use of the precautionary principle and adaptive management are particularly appropriate when dealing with complex and dynamic systems, and when we have uncertainty related to exactly how management activities affect functioning of watersheds and riparian ecosystems.

## 1.4 KEY FINDINGS AND RECOMMENDATIONS

WDFW recognizes that there is a significant amount of work currently being done throughout the state to protect and restore riparian areas. This focus is longstanding and has ranged from regulatory protections that guide Washington's growing population to voluntary conservation on our working lands. Below, we highlight what we believe—based on best available science and our agency's mission—are the most important recommendations to ensure healthy, intact, and fully functioning riparian ecosystems that provide for the preservation, protection and perpetuation of Washington's fish and wildlife:

1. **Designate riparian ecosystems as critical areas:** WDFW recognizes riparian ecosystems as a Priority Habitat for fish and wildlife and recommends that local jurisdictions designate those ecosystems as Fish and Wildlife Habitat Conservation Areas (FWHCAs), a type of critical area. We define the bounds of the riparian ecosystem as the riparian management zone (RMZ), and this RMZ should be designated as the location where protection and restoration of riparian ecosystem functions and values are addressed. RMZs provide a framework for delineating, evaluating, planning, and managing functions and values. In this volume, we provide a process for RMZ delineation (Chapter 2).
2. **Include watershed-scale management considerations:** Watershed-scale management is critical to realizing the full benefits of riparian ecosystem protection and restoration. Certain types of anthropogenic changes at the watershed scale can dramatically reduce the effectiveness of riparian ecosystems to protect aquatic habitat. For example, unmitigated delivery of stormwater from impervious surfaces like roads, parking lots, and rooftops to streams, for example, dramatically increases peak stream flows, alters channel form, and short-circuits the capacity of riparian areas to remove pollutants from runoff. Similarly, road-crossing culverts that are impassible to fish can reduce stream-network connectivity and dramatically reduce amounts of otherwise suitable habitat.
3. **Use reference points to locate the inner edge of the RMZ:**
  - For streams without Channel Migration Zones (CMZs), the inner edge of the RMZ should be delineated starting at the outer edge of active floodplain, if this has or can be determined; otherwise, from the active channel, as delineated by the Ordinary High-Water Mark (OHWM)<sup>3</sup>.
  - For streams with CMZs, the unpredictable nature of channel migration should be accommodated through delineation of an RMZ that encompasses both the entire CMZ and future locations of the riparian ecosystem. In these instances, the inner edge of the RMZ should be located at the outer edge of the CMZ.

Whether or not a stream has a CMZ, the distance from the inner edge of the RMZ to the outer edge of the RMZ should be one SPTH<sub>200</sub>.

---

<sup>3</sup> Active floodplain delineations are rarely available, and we currently lack a repeatable, well-vetted, and widely accepted method for the delineation of active floodplains. Therefore, until such a process is developed, we recommend delineating the RMZ's inner edge using the OHWM for streams without CMZs.

4. **Include CMZs in delineation of the RMZ:** CMZs are important to protect for maintaining riparian functions and values, and so are included in the delineation of RMZs. Over time, a riparian ecosystem will occupy different parts of the CMZ and uplands outside the CMZ. Lateral channel migration and related streambank erosion processes can pose risks to homes and communities located near rivers; however, when channels are constrained from moving, aquatic and riparian ecosystems may degrade over time. To maintain riparian ecosystem functions, land managers must anticipate and protect future locations of the riparian ecosystem and thus delineate the RMZ accordingly.
5. **Establish RMZ widths based on site-specific conditions:** From the perspective of those riparian ecosystem functions affecting aquatic systems, the width of the riparian ecosystem varies with ecological conditions. The most efficient way to protect riparian functions is to adopt protections that recognize these differences, rather than uniform-width (i.e., one-size-fits-all) RMZs, as these may result in over-protection in some places and under-protection in others.
  - a. **In forested ecoregions, start with SPTH<sub>200</sub>:** At most riparian areas in forested ecoregions, SPTH<sub>200</sub> is 100 feet or greater, and so the RMZ is delineated using one SPTH<sub>200</sub>. If SPTH<sub>200</sub> is less than 100 feet, the RMZ is delineated by the pollution removal function (see below). In highly altered areas where soil data are not available, it may be necessary to estimate SPTH<sub>200</sub> values based on nearby soils.
  - b. **In dryland ecoregions, start with SPTH<sub>200</sub> (if available), or the width of the riparian vegetation community:** If site conditions do not support tree species or SPTH<sub>200</sub> is less than 100 feet, then RMZ width is determined by the full extent of all riparian vegetation (the riparian zone) or by the pollution removal function—see below.
  - c. **For both forested and dryland ecoregions, use the pollution removal function when appropriate:** Where the SPTH<sub>200</sub> and/or the width of the riparian vegetative community is less than 100 feet, we recommend that RMZ width be delineated at a minimum of 100 feet, as this provides the width necessary for 95% pollution removal target for most pollutants (approximately 85% for surface nitrogen.)<sup>4</sup>

To aid with site-specific RMZ delineation, WDFW created an internet-based mapping tool that reports recommended widths for RMZs (Appendix 1) statewide based on SPTH<sub>200</sub>. The tool also notes instances where a 100-foot RMZ should be applied to support the pollution removal function.

6. **Apply the recommended RMZ delineation steps to all streams, whether or not they are fish-bearing:** In 1997, WDFW recommended a lower level of protection for non-fish bearing streams than fish-bearing streams. In reviewing the current science literature for Volume 1, we found no evidence that full riparian ecosystem functions along non-fish-bearing streams are less important to aquatic ecosystems than full riparian ecosystem

---

<sup>4</sup> See Chapter 2, Section 2.3.5 for more information about surface nitrogen removal and other site-specific characteristics that may require RMZ distances greater than 100 feet in order to ensure an adequate pollution removal function.



functions along fish-bearing streams. This recommendation is based on four additional considerations. Non-fish-bearing streams:

- Support a unique community of aquatic and riparian-obligate wildlife;
- Provide movement corridors for wildlife, particularly in the face of changing climate conditions;
- Provision fish-bearing streams with matter and energy; and
- Provide cool water to downstream reaches. Washington State has already experienced increased stream temperatures due to climate change and expect further increases, which have direct implications for the persistence of fish.

7. **Establish monitoring and adaptive management frameworks:** We believe it is critical to understand if riparian ecosystems protections are working as intended, and if not, to adjust them accordingly. We recommend the establishment of monitoring and adaptive management designed to improve (where necessary) local permit implementation and compliance, and to increase effectiveness of actions intended to protect aquatic species.

8. **Consider needs of relevant terrestrial species:** As stated earlier, a review of new literature related to the needs of terrestrial Priority Species was not a focus of Volume 1.

Nonetheless, riparian areas provide important functions for threatened, endangered, and sensitive terrestrial wildlife that require consideration by landowners and land managers. WDFW regional habitat biologists, tribal biologists and/or other local habitat experts can assist in identification of site-specific terrestrial species needs. Because riparian protections

---

## WAC 365-190-130

### FISH AND WILDLIFE HABITAT CONSERVATION AREAS

(1) “Fish and wildlife habitat conservation” means land managed for maintaining populations of species in suitable habitats within their natural geographic distribution, so that the habitat is sufficient to support viable populations over the long term and isolated subpopulations are not created. This does not mean maintaining all individuals of all species at all times, but it does mean not degrading or reducing populations or habitats so that they are no longer viable over the long term. Counties and cities should engage in cooperative planning and coordination to help assure population viability.

Fish and wildlife habitat conservation areas contribute to the state’s biodiversity and occur on both publicly- and privately-owned lands. Designating these areas is an important part of land use planning for appropriate development densities, urban growth area boundaries, open space corridors, and incentive-based land conservation and stewardship programs.”



## WAC 173-26-186

### GOVERNING PRINCIPLES OF THE [SMP] GUIDELINES

(8) “Through numerous references to and emphasis on the maintenance, protection, restoration, and preservation of “fragile” shoreline “natural resources,” “public health,” “the land and its vegetation and wildlife,” “the waters and their aquatic life,” “ecology,” and “environment,” the act makes protection of the shoreline environment an essential statewide policy goal consistent with other policy goals of the act. It is recognized that shoreline ecological functions may be imparted not only by shoreline development subject to the substantial development permit requirements of the act but also by past actions, unregulated activities, and development that is exempt from the act’s permit requirements. The principle regarding protecting shoreline ecological systems is accomplished by these guidelines in several ways, and in the context of related principles.”

benefit both aquatic and many terrestrial wildlife species, concentrating protections around riparian areas may also be an efficient use of resources.

## 1.5 RELATIONSHIP WITH WASHINGTON'S DEVELOPMENT LAWS AND REGULATIONS

### 1.5.1 *Relationship with the Growth Management Act (GMA)*

The GMA requires local jurisdictions to designate and protect critical areas, and in so doing, use best available science and give special consideration to anadromous species<sup>5</sup>. The GMA also encourages state agencies to provide technical assistance to counties and cities in the review of their critical areas ordinances (CAOs), comprehensive plans, and development regulations [RCW [36.70A.130\(6\)\(g\)](#)]. While the Washington State Department of Commerce (Commerce) administers the GMA, WDFW is the lead state agency for advising local governments on matters related to one type of critical area: Fish and Wildlife Habitat Conservation Areas (FWHCAs), and we produce PHS Management Recommendations like this Volume 2 in support of that role.

This document provides guidance that is consistent with the GMA, under which local governments exercise their land use responsibilities: specifically, protection of the functions and values of critical areas. It also reflects the legal and policy framework within which WDFW and the PHS program operate, which includes among other things providing a source of best available science necessary to support local governments in distinguishing and delineating those critical areas (e.g., FWHCAs).

WDFW understands that local jurisdictions have existing critical area regulations that have been approved by elected officials and in many cases have been found to be compliant with GMA through the Growth Management Hearings Board and courts. We acknowledge that revising a critical area regulation can be a lengthy, expensive, and contentious process, and so jurisdictions frequently do not make updates to their CAOs more frequently than required by law or rule. In this volume, we aim to be more precise about where recent science has improved our certainty around the need for riparian protections, as well as for specific practices; and how to incorporate best available science and WDFW's management recommendations.

WDFW also recommends local jurisdictions continue considering PHS best available science (e.g., Volume 1; PHS maps), incorporating PHS Management Recommendations, and seeking technical assistance from WDFW's regional habitat biologists not just when updating and implementing critical area policies and regulations, but in all land use planning efforts.

### 1.5.2 *Relationship with the Shoreline Management Act (SMA)*

As with GMA, WDFW plays a role of technical advisor under SMA, working directly through locally led development processes, with the goal of addressing needs for fish and wildlife. Under SMA, the Department of Ecology (Ecology) has a role approving Shoreline Master Program (SMP) updates when they are deemed consistent with all statutory and regulatory requirements. Ecology also has

---

<sup>5</sup> RCW 36.70A.172(1): "In designating and protecting critical areas under this chapter, counties and cities shall include the best available science in developing policies and development regulations to protect the functions and values of critical areas. In addition, counties and cities shall give special consideration to conservation or protection measures necessary to preserve or enhance anadromous fisheries."

a direct role in implementation of SMPs, including issuing the final decision to approve, deny, or put conditions on locally issued conditional use permits and variances. [Under GMA, Commerce does not approve comprehensive plan updates or CAOs.]

The goal of SMA is “to prevent the inherent harm in an uncoordinated and piecemeal development of the state’s shorelines” (RCW [90.58.020](#)). To achieve that end, WDFW recommends local jurisdictions designate riparian areas and provide the same levels of protection for them within the SMA jurisdiction areas as they do under GMA. While the SMA does not apply to streams with 20 cubic feet per second (cfs) or less mean annual flow, we recommend the application of the guidelines in this Volume 2 to all rivers and streams, regardless of size.

## 1.6 ORGANIZATION OF VOLUME 2

Chapter 1 aims to establish Volume 2’s purpose and intent; articulate WDFW’s values; and provide policy context regarding protection and designation of riparian ecosystems.

In Chapter 2, we define the RMZ based on SPTH<sub>200</sub> with special considerations for urban and dryland landscapes; and provide a stepwise process for identifying and delineating the RMZ both for requiring riparian protections and for classifying RMZs as a FWHCA under GMA.

Chapter 3 articulates policies, plans, and practices that protect riparian ecosystems. WDFW recognizes that counties and cities have a long history of providing such protections, and the responsibility to include best available science when updating CAOs. The protection recommendations described in this chapter are intended to help counties and cities moving forward with reviewing and updating their CAOs and other relevant policies and plans.

Chapter 4 explains the importance of restoration in riparian management, which is necessary for recovery of the degraded riparian functions present in many locations and is critical to recover salmon stocks and preserve Washington’s riparian-dependent Priority Species. To that end, we outline voluntary approaches to improve riparian functions. Although Volume 2 is not a restoration guide, it is applicable to restoration practitioners in that it describes management actions that enhance riparian functions and values. We do not address restoration project design or standards but provide links within this chapter to resources that do.

Chapter 5 will assist with developing monitoring programs in support of adaptive management, designed to ensure transparent programs that consistently deliver sufficient protection of riparian functions. Careful monitoring and adaptive management are particularly important when a land use may harm a critical area and scientific information about the likely severity of harm is lacking. Although specific to local governments, this chapter provides valuable resources for any land manager interested in engaging in adaptive management.

Finally, this volume includes an appendix that contains a “how-to” process for utilizing WDFW’s SPTH mapping tool to help determine recommended minimum RMZ widths around the state. The tool itself is available at [wdfw.maps.arcgis.com/apps/MapSeries/index.html?appid=919ea98204eb4f5fa70eca99cd5b0de1](http://wdfw.maps.arcgis.com/apps/MapSeries/index.html?appid=919ea98204eb4f5fa70eca99cd5b0de1).

# CHAPTER 2. RIPARIAN MANAGEMENT ZONE DELINEATION

## 2.1 INTRODUCTION

We define the extent of the riparian ecosystem as the area that provides full ecological function for bank stability, shade, pollution removal, contributions of detrital nutrients, and recruitment of large woody debris. For the purposes of management or regulatory protection, the riparian management zone (RMZ) encompasses the riparian ecosystem, and—when present—the channel migration zone (CMZ) to account for lateral movement of the riparian ecosystem over time. RMZs can also provide habitat for many terrestrial wildlife species including movement corridors. WDFW categorizes the riparian ecosystem as a Priority Habitat, and thus recommends local jurisdictions designate all riparian areas as critical areas: specifically, Fish and Wildlife Habitat Conservation Areas (FWHCAs), as mentioned in Chapter 1.

The RMZ provide an initial framework for delineating, assessing, planning, and managing riparian ecosystems. The RMZ as defined here is not necessarily the same as setbacks or buffers. Setbacks are areas meant to protect an important feature (e.g., a stream or wetland) from certain types of adjacent activities, e.g., the area separating a building from the bank of a river. Setbacks are not typically designed to provide ecological function. On the other hand, buffers, which also protect important features, are commonly undeveloped, naturally vegetated areas that can contribute habitat and in the case of a stream, to riparian functions. In this document, we reserve the use of the term RMZ to mean the area capable of providing full function and managed to that end.

## 2.2 FOUNDATIONAL CONCEPTS IN RMZ DETERMINATIONS

### 2.2.1 *Desired Future Condition*

A major goal in fulfilling WDFW's mission to preserve, protect, and perpetuate Washington's fish, wildlife, and ecosystems is the protection and restoration of healthy, intact, and fully functioning riparian areas. More specifically, the goal will be achieved through management strategies that result in ecosystem composition and structure that provides the five key ecological functions associated with riparian ecosystems. A useful benchmark for this goal is desired future condition (DFC) for riparian areas. DFC describes what land managers are attempting to achieve, often in terms of composition and structure (e.g., vegetation or land-use), over a period of time in a given geographic area. The DFC we recommend results in fully functioning riparian ecosystems as measured by the five key ecological functions (bank stability, shade, pollution removal, contributions of detrital nutrients, and recruitment of large woody debris) in western Washington. The DFC for composition and structure is old, structurally complex conifer-dominant forest. Such forests exhibit large diameter trees, contain numerous large snags and logs, and have multi-layered canopies and canopy gaps, which promote understory plant diversity.

Throughout the Columbia Plateau, differences in hydrology and geomorphology manifest substantial site-level differences in composition and structure of riparian vegetation, and hence, the DFC for composition and structure is more site-dependent in the Columbia Plateau than in western Washington. Nonetheless, the DFC in the Columbia Plateau is based on the same concepts of ecosystem composition and structure that support the same five key ecological functions in forested regions; specifically, biologically diverse vegetation communities consisting of native trees,

shrubs, grasses and forbs. In addition, the DFC for the upland portion of the riparian ecosystem which serves as the zone of influence and contributes to the pollution removal function in the Columbia Plateau is often intact native shrub-steppe or prairie vegetation.

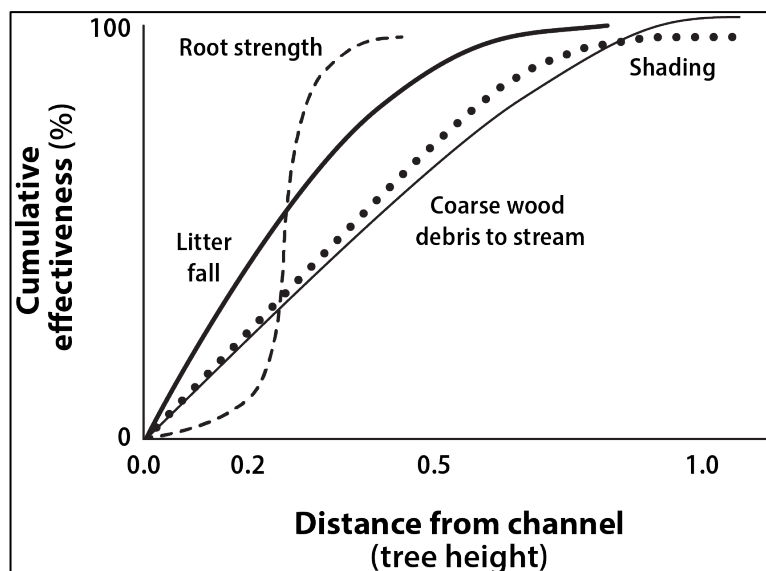
### 2.2.2 Site-Potential Tree Height (SPTH) Background

A fundamental component of our recommendation is the use of site-potential tree height (SPTH). In this section, we provide background information on its origin, applicability, and usefulness (see also Volume 1, Chapter 9).

In 1993, a group of experts (Forest Ecosystem Management Assessment Team [FEMAT]) was convened to develop a conceptual model to determine how to protect riparian areas in forested landscapes. This model has come to be known as the FEMAT curves (FEMAT 1993). Though this model is over 25 years old, it continues to be one of the most useful conceptual models informing riparian management.

The FEMAT curves provide a conceptual model of important riparian functions and how those functions change with increased distance from the stream channel (Figure 2.1). The model conveys two important points: (1) four of the five riparian ecosystem functions or processes occur within one 200-year SPTH; and (2) the marginal return for each function or process decreases as distance from the stream channel increases. Thus, designating a riparian area based on at least one SPTH<sub>200</sub> is a scientifically supported approach if the goal is to protect and maintain full function of the riparian ecosystem for aquatic habitat and species, including salmon.

The FEMAT curves and SPTH have been used to describe the lateral extent of riparian ecosystems, and accordingly, the width of the RMZ needed to provide full riparian ecosystem function.



**Figure 2.1.** The “FEMAT Curves” (FEMAT 1993): a generalized conceptual model describing contributions of key riparian ecosystem functions to aquatic ecosystems as the distance from a stream channel increases. “Tree height” refers to average height of the tallest dominant tree (200 years old or greater); referred to as site-potential tree height (SPTH).

FEMAT (1993, p. V-34) defined SPTH as “the average maximum height of the tallest dominant trees (200 years or more) for a given site class.” The key phrase in this definition is “200 years or more” which refers to the approximate minimum age of old-growth forests. This reflects FEMAT’s underlying assumption that old-growth forest conditions are needed for full riparian ecosystem functions. WDFW uses SPTH at 200 years (abbreviated SPTH<sub>200</sub>) in our recommendations in this Volume 2.

Given its utility, the height of site-potential trees has been described for a variety of tree species and can be readily found in silvicultural literature. Mean heights of dominant trees in riparian old-growth forest of Washington range from 100 to 240 feet (Fox 2003). The wide range of heights reflects differences in site productivity, i.e., local differences in soil nutrients and moisture, light and temperature regimes, and topography. Site productivity is described quantitatively through a site index, which is the average height that dominant trees of a species are expected to obtain at a specified tree age at a given location.

---

FEMAT defined Site potential tree height (SPTH) as “the average maximum height of the tallest dominant trees (200 years or more) for a given site class.”

“200 years or more” is the approximate minimum age of old-growth forests which are thought to be necessary for full riparian ecosystem functions.

---

### 2.2.3 *The Importance of Channel Migration Zones (CMZs)*

Not all streams have CMZs, but where CMZs are present, it is necessary to map the CMZ in order to establish an RMZ. The Washington Forest Practices Board Manual (DNR 2004) provides a useful definition of the CMZ as “the area where the active channel of a stream is prone to move and this results in a potential near-term loss of riparian function and associated habitat adjacent to the stream, except as modified by a permanent levee or dike” (DNR 2004, Section M2).

Protecting the CMZ from incompatible land uses (e.g., development) is important for providing riparian ecosystem functions. Human alterations to river channels that limit channel migration and bank erosion can degrade aquatic and riparian habitats. For these reasons, geomorphologists have developed protocols for delineating CMZs. Further, RMZ delineation along streams with CMZs ensures that riparian functions do not degrade as a channel moves. Proper delineation also helps landowners avoid siting homes and infrastructure in CMZs that coincide with geologically hazardous critical areas and floodplains ([WAC 365-190-120\[6f\]](#)).

### 2.2.4 *Relationship of CMZs and Floodplains*

This document does not include guidance on the integration of floodplains into RMZ delineation (see footnote 4 for a brief explanation about the active floodplain). However, a general understanding of floodplains and their relationship to CMZs is valuable, as the two often overlap.

Both federal and state regulations establish floodplain protections. Floodplain data and [maps](#) (typically 100-year floodplains) are readily available through the Federal Emergency Management Agency’s National Flood Insurance Management Program. Ecology is the state’s authority as lead on floodplain management and we support their recommendations for management of [Frequently Flooded Areas](#) (another type of critical area specified in GMA) and the use of the [Floodplains by Design](#) grant program to reduce hazards and restore natural functions. Proper floodplain delineation and protection helps landowners and land managers avoid placing homes and infrastructure in areas at high-risk of flooding.

The Bureau of Land Management provides common clues to help determine the presence of an active floodplain (BLM 2015) such as visual evidence of frequent inundation, which may include but is not limited to:

- Fresh deposits of fine sediment;
- Floodplain vegetation matted down or lying flat on floodplain from overbank flow or by deposition or overbank sediment;
- Debris piled on the upstream side of tree trunks; or
- High water marks seen on rocks, trees, or other stationary objects; and ice-rafted deposits on the floodplain.

However, BLM advises caution when relying on these visual clues. Furthermore, looking for signs that an active floodplain is present is only the first step toward delineating the outer edge of an active floodplain. We recommend reviewing BLM's technical reference titled *Proper Functioning Condition Assessment for Lotic Areas* (BLM 2015) and to consult Ecology for assistance regarding floodplain delineation and protections.

Good floodplain management is not only beneficial for human communities, it is also good for fish and wildlife. Although we do not describe use of the 100-year floodplain to measure the RMZ in Volume 2, we recommend that landowners and land use decision makers treat floodplains similarly to RMZs due to their importance to instream health, as habitat, and for their ecological services.

## 2.3 PROCEDURES FOR RMZ DELINEATION

To conserve riparian habitat, one must first establish the lateral extent (i.e., width) of the RMZ. In Chapter 1, we noted that an RMZ encompasses the riparian zone and zone of influence (Figure 2.2, page 16), and, where present, considers the CMZ (Figure 2.3, page 18). In this section, we outline general steps for collecting site-specific information essential to map an RMZ. These steps will help you identify a site's proximity to streams as well as essential site characteristics. With this information, we then explain how to delineate an RMZ.

In the rest of this section, we explain how to:

- Identify the ecoregion in which the riparian ecosystem is located (e.g., forested or dryland);
- Verify the presence of a stream;
- Identify the inner edge of the RMZ; and finally
- Determine the RMZ width.

### 2.3.1 *Determining Ecosystem Location*

We have identified two distinct types of ecoregions statewide, each with a slightly different RMZ delineation procedure: (1) Forested, and (2) Dryland. In general, forested ecoregions dominate western Washington, northeastern Washington, and portions of southeast, north central, and eastern Cascades. Dryland ecosystems are more readily contained in the Columbia Plateau Ecoregion east of the Cascade Range.

Landowners and land use planners should utilize the SPTH mapping tool, described in Appendix 1, to determine the ecoregion where the river or stream lies. Appendix 1 also provides instructions for using this tool to determine the 200-year site-potential tree height (SPTH<sub>200</sub>) at a given location.



### 2.3.2 *Verifying the Presence of a Stream*

Once you have identified which ecoregion you are in (e.g., Columbia Plateau), a qualified professional<sup>6</sup> should visit the site to verify the stream's location on or near the project area. It is very important not to rely solely on "stream maps" (e.g., DNR stream layer, National Hydrography Dataset) in place of a site visit (which is also important for mapping RMZs) because existing mapped stream layers often have errors, including streams whose locations are mapped inaccurately on the landscape, and streams actually present on the landscape that are missing from maps. Instead, use the site visit to validate existing stream maps.

### 2.3.3 *Identifying the Inner Edge of the RMZ*

Once you have verified a stream's location, proceed to locate the inner edge of the RMZ. Accurate RMZ delineation is dependent on using the correct starting point. In this section, we describe how to determine the location of the RMZ's inner edge using either the Channel Migration Zone (CMZ), if one is present; or the Ordinary High-Water Mark (OHWM). Ecology, as the state's water quality lead, provides extensive guidance and resources associated with OHWM or CMZ, and those resources are referenced here forward.

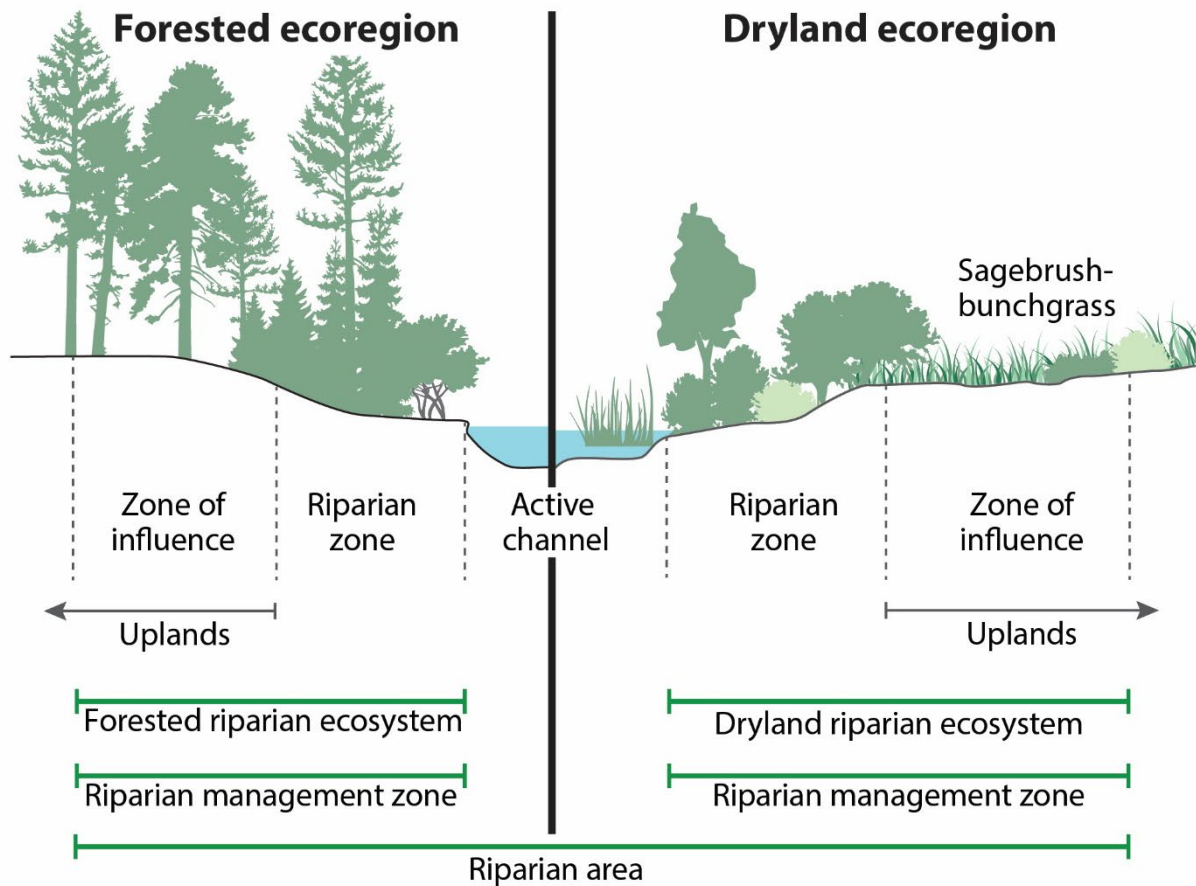
#### **2.3.3 (A) Identifying Ordinary High-Water Mark (OHWM)**

Delineate the RMZ's inner edge by identifying the OHWM along both sides of the stream following the procedure in Chapter 3 of Ecology's [OHWM delineation manual](#) (Anderson et al. 2016).

---

<sup>6</sup> Qualified professionals can be entities and individuals identified by the jurisdiction, WDFW regional habitat biologists, tribal biologists, Ecology staff, and/or other individuals familiar with stream verification and who have local expertise (e.g., Conservation District staff, Stream Teams, etc.).





**Figure 2.2.** The diagram depicts the riparian management zone (RMZ) for both forested (left) and dryland (right) ecoregions. The RMZ is coincident with the riparian ecosystem, which consists of the riparian zone (riparian vegetative community) and the zone of influence. The riparian zone extends from the edge of the active channel towards the uplands and it includes areas where vegetation is influenced at least periodically by flowing waters. The zone of influence includes areas where ecological processes significantly influence the stream, at least periodically.

### 2.3.3 (B) Identifying the Channel Migration Zone

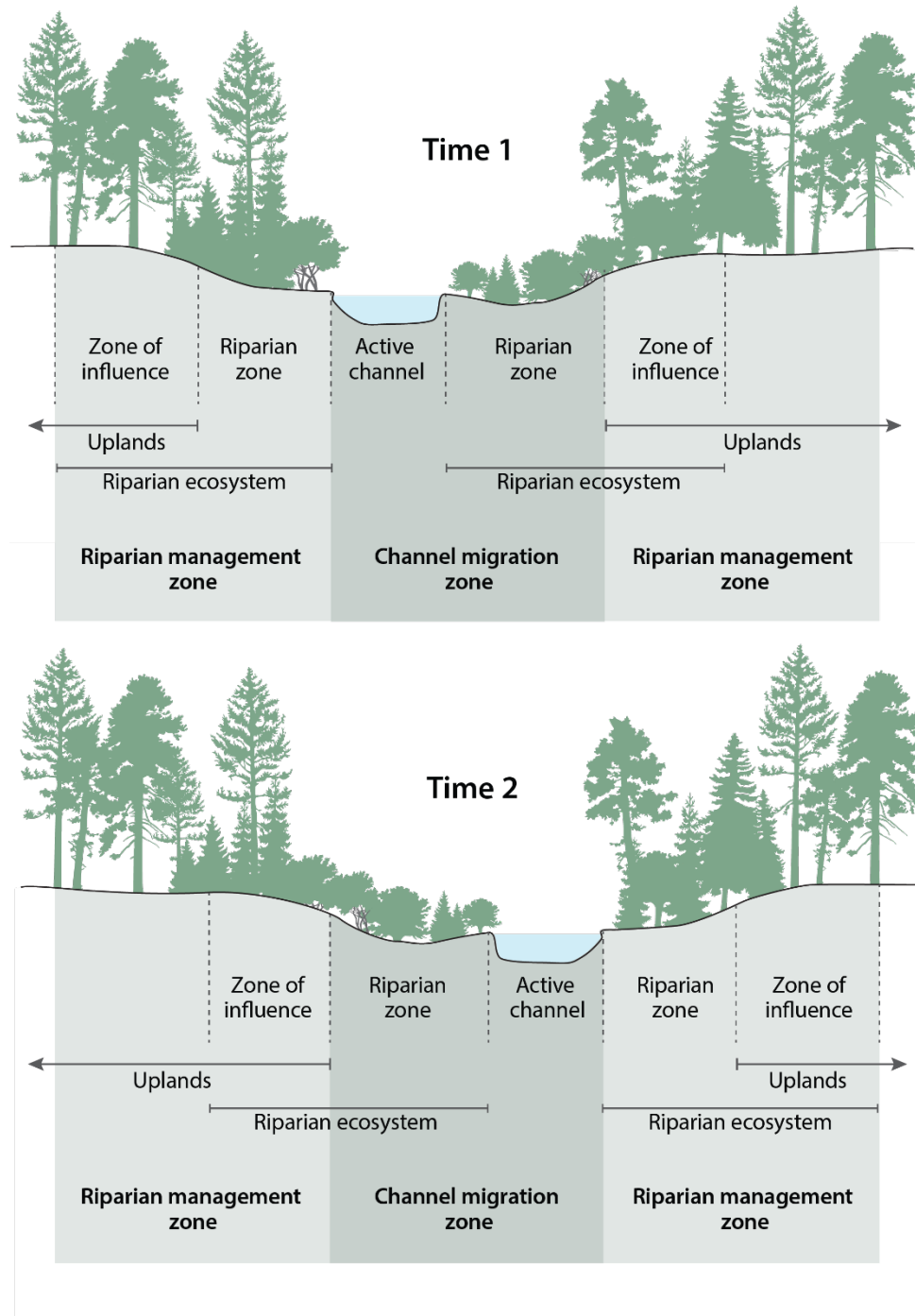
Delineate the RMZ's inner edge by identifying the edge of the CMZ. Information about CMZs is available for certain streams in the state. For example:

- **SMA-Covered Shorelines** – During Shoreline Master Program comprehensive updates, many jurisdictions map the general location of CMZs associated with shorelines that fall under the jurisdiction of SMA (RCW [36.70A.480](#)). Note that even smaller streams not subject to SMA jurisdiction can have CMZs. In these cases, we recommend jurisdictions still identify and analyze CMZs to protect riparian ecosystems and public health and safety.
- **Puget Sound Streams** – The federal Endangered Species Act may require CMZ delineation in Puget Sound basin streams under the FEMA National Flood Insurance Program Biological Opinion for Puget Sound.

- **Other Local Examples** – Check with your jurisdiction to see if they have more detailed CMZ maps.

Ecology provides the following resources which can help landowners and land managers assess the presence and extent of CMZs where maps and data on CMZs do not currently exist:

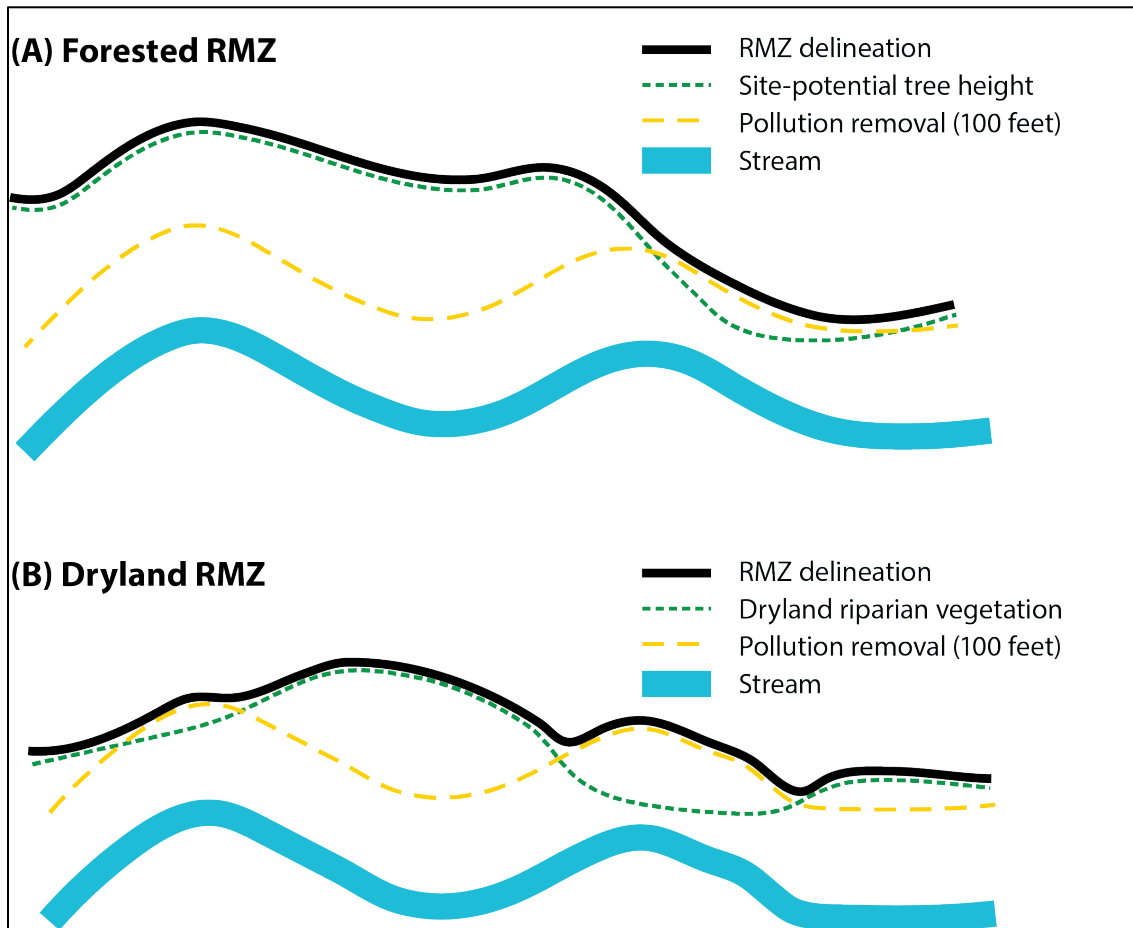
- [CMZ Home Page](#) provides a high-level look at CMZ identification, and references useful documents;
- [Channel Migration Processes and Patterns in Western Washington](#) (Legg and Olson 2014) describes the general channel migration processes that occur in western Washington;
- [A Methodology for Delineating Planning-Level Channel Migration Zones](#) (Olson et al. 2014) provides a process for delineating “planning-level” CMZs and gives a few good examples in the appendices;
- [A Framework for Delineating Channel Migration Zones](#) (Rapp and Abbe 2003) is a more in-depth guide on how to develop “detailed” CMZs; and
- [Screening Tools for Identifying Migrating Stream Channels in Western Washington](#) (Legg and Olson 2015) outlines the “CHAMP” (channel migration potential) GIS layer with guidance on using it to identify high-risk CMZs.



**Figure 2.3.** This diagram depicts the spatial relationship between the riparian management zone (RMZ) and channel migration zone (CMZ) over time. As the active channel moves laterally within the CMZ, the riparian ecosystem moves with it. As a result, when considering the establishment of an RMZ, delineation should occur at the edge of the CMZ to account for the full extent of both the present day and future riparian ecosystems. Time 1 and Time 2 could be separated by days or centuries. This depiction of a forested system is one representation of a CMZ, which are also present in dryland systems: both should be managed for accordingly.

### 2.3.4 Determining RMZ Width

Once you have determined the location of the RMZ's inner edge, you then establish the width of the RMZ. The following stepwise process aims to establish recommended minimum delineation distances based on  $SPTH_{200}$ , vegetation composition, and pollution removal function (Figure 2.4). We say "recommended minimum" because upland adjacent land uses may require further adjustment of the RMZ to provide adequate pollution removal functions. Landowners and land use regulators should also consider additional actions to support wildlife connectivity and/or to protect riparian adjacent Priority Habitats.



**Figure 2.4.** Aerial view of variable width RMZ delineation process for forested (A) and dryland (B) systems.

- Step 1: Identify the SPTH or full extent of the riparian vegetative community (green);
- Step 2: Overlay a 100-foot pollution removal distance (yellow);
- Step 3: Delineate the RMZ (black) as the greater of the two distances.

We tailor the following guidance based on two types of ecoregion: (1) Forested and (2) Dryland.

#### 2.3.4 (A) Forested Ecoregions

Forested ecoregions are well-suited for using  $SPTH_{200}$  consistently to establish RMZ widths, and so for these areas, landowners and land managers can rely on the  $SPTH_{200}$  information provided in the SPTH mapping tool (see Appendix 1). The tool provides the derived average height attained by the dominant tree species at age 200 years ( $SPTH_{200}$ ) using the U.S. Natural Resource Conservation

Service (NRCS) forest productivity site index values, which we recommend for delineation of RMZs (see Sec 9.3 in [Volume 1](#) for background on the origin and use of SPTH<sub>200</sub>). In forested ecoregions, contributions of large wood as a riparian ecosystem function often define the farthest lateral extent of the RMZ.

Occasionally, the SPTH<sub>200</sub> may be less than 100 feet, in which case the pollution removal function (described in more detail in Section 2.3.5 below) defines the lateral extent of the RMZ.

In Washington, SPTH<sub>200</sub> can be as large as 260 feet: therefore, be sure to evaluate each soil polygon within 260 feet of the stream channel to ensure that RMZ delineation is in fact being driven by the largest dominant tree species.

### **2.3.4 (B) Dryland Ecoregion**

Riparian ecosystems in arid and semi-arid regions of North America (also referred to as the dryland ecoregion) make up less than 1 to 3 percent of the landscape (Patten 1998). Dryland riparian ecosystems are hydrologically linked to and influenced by adjacent surface waters; as a result, surface waters sustain riparian vegetation that is clearly distinct from upland vegetation.

Riparian ecosystems in dryland environments are highly variable due to various site-level conditions. While these ecosystems may support large trees in low gradient floodplains, tree presence in riparian ecosystems throughout the dryland ecoregion is much more varied than in forested ecoregions, and so in many cases, the contribution of large wood no longer serves as the outermost ecological function for RMZ delineation. Further, riparian vegetation may be minimal or even non-existent, particularly along degraded, incised streams. In dryland ecoregions, the outermost of three factors drives delineation of the RMZ: (1) SPTH<sub>200</sub> (if trees are present); (2) riparian vegetative community; or (3) pollution removal function.

### **2.3.4 (C) Considerations in Highly Modified and Urban Systems**

In some locations, riparian systems have been substantially modified, and current site-specific conditions may not provide adequate indication of where riparian vegetation would naturally occur. On the whole, this is particularly true of riparian systems in dryland ecoregions. In these instances, we recommend considering nearby sites with unaltered vegetation or selecting a representative site with similar bank height and gradient conditions to identify adequate riparian vegetation delineation for both protection and restoration.

---

## **Protecting Columbia Plateau's Priority Habitats Supports Riparian Health**

Native shrub-steppe vegetation and other drought-tolerant plant communities dominate Washington's dryland environments. Approximately 450 plant community associations occur in this region, with over 20% of these associations considered vulnerable (WDFW 2005, p. 523). Among the most imperiled ecosystems in North America, historical shrub-steppe has been greatly reduced due to conversion to other land uses (Vander Haegen 2007).

Riparian areas are critical to most animal species using shrub-steppe. Biodiversity in these vegetative communities increases dramatically where surface water occurs, and riparian areas directly support numerous species found only in or near water (Rogers et al. 1988, Johnson and O'Neil 2001). Linking and protecting upland adjacent Priority Habitat(s) not only aims to support Washington's wildlife and their associated habitat conservation goals, but also works to protect and maintain riparian ecosystem integrity.

---

Similarly, four major urban areas (Seattle, Spokane, Tacoma, and Bellingham) in forested ecoregions lack NRCS soils data. For these areas, WDFW identified nearby NRCS soils polygons and calculated weighted averages as estimates reflective of the surrounding environment (“imputed SPTH<sub>200</sub>”). Much like in forested areas where SPTH<sub>200</sub> data are available, we recommend using the imputed SPTH<sub>200</sub> values specified for each of these urban areas to delineate RMZs within them.

### 2.3.5 Width delineation steps

*Step 1: Use SPTH<sub>200</sub> if it is at least 100 feet.*

In **forested ecoregions**, WDFW recommends full protection within one SPTH<sub>200</sub>, identified with the use of our SPTH mapping tool (<https://arccg.is/1ueq0a>). The mean SPTH<sub>200</sub> in western Washington ranges from 100 to 240 feet (Fox 2003). Some soil polygons have SPTH<sub>200</sub> information for multiple tree species; therefore, each soil polygon within one SPTH<sub>200</sub> should be evaluated to ensure RMZ delineation is driven by the largest dominant tree species. Occasionally the SPTH<sub>200</sub> in forested ecoregions is less than 100 feet; for example, red alder is a fairly common riparian tree species, yet the SPTH<sub>200</sub> for this species does not always exceed 100 feet. If red alder is the only species for which SPTH<sub>200</sub> information is available for a certain location, and it is less than 100 feet, then skip to Step 3.

In **dryland ecoregions**, it is less common, but still possible to find riparian vegetation which includes—and may even be dominated by—large trees. Examples of large tree species in these areas are black cottonwood (*Populus trichocarpa*) and ponderosa pine (*Pinus ponderosa*). If SPTH<sub>200</sub> in dryland ecoregions exceeds 100 feet, then it should be used for the RMZ width.

*Step 2: In dryland ecoregions, if SPTH<sub>200</sub> is less than 100 feet or if no large trees are present, identify the extent of the riparian vegetative community.*

In **dryland ecoregions**, the riparian vegetative community is often comprised of shrubs, sedges, grasses, and forbs that are distinct from upland communities. For example, in the Columbia Plateau, vegetation within riparian ecosystems often exhibits an abrupt demarcation between the riparian zone and zone of influence. Phreatophytic<sup>7</sup> trees and shrubs and hydrophytic<sup>8</sup> herbaceous plants are confined to moist streamside areas, but the upland zone of influence may consist of sagebrush or bunchgrass communities [for more information, see Volume 1, Chapter 7 (Section 7.1.1)]. Where trees are not present or consist only of small species (less than 100 feet tall), WDFW recommends full protection of the entire riparian vegetative community. In some places the community may only be a few feet wide but in others it may extend up to several hundred feet, particularly when associated with a wetland or floodplain (Bermingham et al. 2013). Where the riparian vegetative community is less than 100 feet wide, go to step 3.

---

<sup>7</sup> A phreatopyhtic plant is a species that obtains water from the subsurface zone of saturation either directly or through the capillary fringe (Thomas 2014).

<sup>8</sup> Hydrophytic plants are those that are adapted to growing conditions associated with periodically saturated soils. They include obligate wetland plants that almost always occur in wetlands under natural conditions, facultative wetland plants that usually occur in wetlands but are occasionally found in non-wetlands, and facultative plants that equally likely to occur in wetlands or non-wetlands (Lichvar et al. 2012).

### *Step 3: Overlay 100-foot pollution removal delineation*

The following applies to both **forested and dryland ecoregions**.

Our recommendation to protect full riparian function recognizes the importance of the pollution removal function of riparian ecosystems. Because pollution removal depends on multiple factors, including slope, soils, plant community composition, and upland uses, establishing a standard RMZ width for 100% pollution removal even at the site scale was impractical.

Where neither SPTH<sub>200</sub> nor the extent of the riparian vegetative community is at least 100 feet, we recommend RMZ delineation of a *minimum* distance of 100 feet, because this distance will achieve 95% or more removal efficacy of phosphorous, sediment, and most pesticides. To be clear, we value a similar removal efficacy for nitrogen, and at a 100-foot width, an RMZ would achieve only 80% removal efficacy for surface runoff containing excess nitrogen. However, the literature reflects that both the actual risk posed by excess nitrogen, as well as the efficacy of its removal, are very site-specific. In recognition of this, we strongly recommend that, where upland uses contribute nitrogen, the 100-foot minimum pollution removal distance be extended accordingly when determining the appropriate RMZ width.

Further, if RMZ widths are being based on a minimum pollution removal function at locations with steep slopes or poorly drained soils, distances greater than 100 feet should also be considered: this applies for all pollutants. Additionally, WDFW recommends cities and counties identify high intensity land uses that may be located adjacent to riparian areas within their jurisdiction and establish wider RMZs to enhance the pollution removal function in these locations as well, following guidance from Ecology.

When dealing with variables such as those outlined above, it may be necessary to seek expert assistance in determining the appropriate adjustments to RMZ widths based on the pollution removal function.



## CHAPTER 3. RIPARIAN REGULATORY PROTECTIONS

### 3.1 INTRODUCTION

This chapter gives guidance to help local governments review, develop, and implement regulatory tools to protect riparian ecosystems as critical areas, i.e., Fish and Wildlife Habitat Conservation Areas (FWHCAs). We describe key steps toward creating effective programs to protect riparian ecosystems consistent with the goals of the Growth Management Act (GMA), Shoreline Management Act (SMA), and Voluntary Stewardship Program (VSP). More specifically, this chapter describes recommendations for carrying out common land use activities and provides steps for developing Habitat Management Plans (HMPs). The riparian management zone (RMZ) should serve as the focal area to apply our recommendations.

Parcel-scale regulations are foundational to Washington's traditional land use regulatory approaches for protecting rivers and streams and their adjacent riparian ecosystem. However, sole reliance upon a regulatory approach at this site scale may result in loss of aquatic system function over the long term (*see* Volume 1). Thus, we believe that site-scale regulations must work in coordination with watershed-scale planning (Chapter 4) and that both should be monitored and adaptively managed (Chapter 5). In this chapter, we present considerations and recommendations for managing and protecting riparian ecosystems at both site- and watershed-scales.

### 3.2 RECOMMENDATIONS TO LOCAL JURISDICTIONS

Protection of watersheds commonly falls under the purview of agencies other than WDFW. Nonetheless, we encourage local jurisdictions (and their long-range planners in particular) to consider how land use patterns at all scales collectively affect fish and wildlife and other important ecosystem services.

The scientific literature review (*see* [Volume 1](#)) informs WDFW's position that protecting the area within one SPTH<sub>200</sub> from the edge of a stream channel maintains full riparian ecosystem functions for all aquatic species, including salmon, and promotes healthy, intact riparian ecosystems. This recommendation provides the greatest level of certainty that land use activities do not impair functions and values of riparian ecosystems. We recommend the use of monitoring and adaptive management (*see* Chapter 5) to inform regulations and evaluate the complement of both regulatory and voluntary conservation measures in achieving outcomes.

Land use decision makers should ensure all programs that can affect riparian habitat (e.g., CAOs; SMPs; and ordinances for clearing and grading, fire hazard reduction, and tree protection) are coordinated to optimize the ability of local policies, rules, and management activities to protect those habitats. Further, jurisdictions should look for gaps such as inconsistencies, exemptions and loopholes, or inefficient practices (e.g., inspection and monitoring protocols) that could impede protection of or cause harm to riparian ecosystems.

To that end, we provide important questions to consider when reviewing CAOs, Comprehensive Plans, or other plans that can affect riparian ecosystems:



### 1. **Conservation Strategies:**

- What external strategies exist (salmon recovery plans, reach-scale assessments, and incentive-based plans) to maintain, protect and restore riparian areas?
- Which of these strategies (if any) currently inform your regulatory, planning, and/or voluntary processes or programs?
- If these strategies are not in your current programs, could they be incorporated to provide additional benefits to riparian ecosystems? Are there other strategies that could also (or instead) benefit riparian ecosystems?
- Which of these strategies may help your jurisdiction satisfy mitigation obligations?
- How are riparian restoration and/or enhancement programs informed by these strategies?

### 2. **Regulatory Buffers:**

- Does your jurisdiction rely on  $SPTH_{200}$  for delineating regulatory riparian buffers?
- If your jurisdiction does not rely on  $SPTH_{200}$  for delineating those buffers, does your jurisdiction currently have regulatory buffers for riparian areas that are equal to or greater than the distance equal to  $SPTH_{200}$ ?
- Are there buffer exemptions? If so, how do those affect riparian function across your jurisdiction?
- Do your buffers consider the CMZ?
- Do your buffers consider adjacent wetlands and appropriate wetland delineation methodology as prescribed by Ecology?
- If your jurisdiction's CAO or SMP buffers are less than  $SPTH_{200}$ , can you use the RMZ to identify areas to do mitigation or areas impacted that will require mitigation?

### 3. **Restoration and Adaptive Management (see also Chapter 5):**

- Can your jurisdiction use the RMZ to identify areas for incentive-based restoration?
- Do you have a monitoring and adaptive management program for improving permit implementation?
- Is your jurisdiction collecting information on effectiveness of protecting riparian areas?
- If you collect effectiveness information, what programs (e.g., incentives, regulations) could you improve to increase riparian conservation?

### 4. **Other Programs and Regulations**

- What other regulations separate from CAOs, may inadvertently affect riparian areas? (e.g., clearing and grading ordinance that lack safeguards for riparian protection.)
- Are there opportunities to connect riparian areas with other protected areas (e.g., frequently flooded areas, geologically hazardous areas, green belts, parks, wetlands, and aquifer recharge areas)?

#### 3.2.1 *Recommendations for Common Activities in the RMZ*

Local governments should regulate all land use activities that are likely to impact functions of a riparian ecosystem found within the RMZ to ensure, at a minimum, that the existing functions and values are protected from development actions. For the purposes of meeting requirements under GMA, SMA, and VSP, we describe the RMZ as the area in which functions and values are contributed

to the riparian ecosystem: providing a delineated space not just for protection, but also for mitigation and management. We also recommend prioritizing the RMZ as the space for restoration<sup>9</sup>. We provide specific information and recommendations for the following ten common activities: (Note that neither the list of activities nor the recommendations themselves are exhaustive; for more information, contact your WDFW regional habitat biologist.)

1. On-site Sewage Systems (OSS)
  2. Bank hardening
  3. Clearing, grading, and placement of fill
  4. Removal of noxious weeds
  5. Forest practices and conversions
  6. Firewise and wildfire hazard reduction
  7. Removal of hazard trees
  8. Non-compensatory restoration and enhancement
  9. Emergency activities
  10. Educational or Recreational Areas
1. *On-site Sewage Systems (OSS)* – Historically, developers sited OSS at lower elevations bordering streams, lakes and wetlands in order to use passive gravity flow. The disadvantage of these systems is that when drain fields are located near water features, they can more easily contaminate water with high loads of nutrients and toxic pollutants, causing significant impacts to flora, fauna and water quality. The State Department of Health adopted rules establishing public health standards for location, design, installation, operation, maintenance, and monitoring of OSS, including requiring setbacks from waterbodies ([WAC 246-272A](#)) which modern OSS systems, using pump systems, can support. Some OSS may meet public health standards even if located within RMZs; nevertheless, jurisdictions should exercise authority to require HMPs to ensure project proponents protect habitat functions of riparian critical areas.
  2. *Bank Hardening* – We recommend jurisdictions avoid allowing new development that requires bank protection now or is likely to in the future (consider channel migration, wind and wave action, and climate change), unless it addresses an imminent threat as an emergency activity (*see* Emergency Activities in this section below). Always look to alternative places to site a project so that no bank protection measures are needed. If measures cannot be avoided, require that a project proponent evaluate the effectiveness of bioengineering alternatives (also known as soft armoring) prior to proposing hard armoring. Follow bank protection recommendations in the [Washington State Integrated Streambank Protection Guidelines](#) (Cramer et al. 2002) when bank protection is unavoidable.
  3. *Clearing, Grading, and Filling* – We recommend jurisdictions acknowledge impacts of clearing, grading, and filling on riparian areas in their CAOs by limiting these activities to areas outside the RMZ (unless directly related to restoration) as they can negatively affect riparian areas. If a clearing, grading, or filling project must encroach in an RMZ, limit disturbance and minimize

---

<sup>9</sup> As explained previously, many riparian areas had already experienced a substantial degree of degradation before laws like GMA, SMA, and VSP were passed, so while protecting what level of riparian functions and values remain is essential, protection alone will not be sufficient for meeting the needs of the state’s fish and wildlife species.

effects to the greatest extent possible. Require that a qualified professional prepare an HMP describing how the project proponent will follow the mitigation sequence.

Jurisdictions that exempt small areas from filling or grading ordinances in riparian ecosystems should calculate cumulative impacts from these exemptions. They should also mitigate impacts and subsequently establish monitoring to ensure that mitigation measures are effectively negating potential losses to habitat function.

4. *Invasive and/or Noxious Plant Removal* – Many CAOs do not require a permit for control and removal of invasive and/or noxious weeds within riparian ecosystem. We support this when weed control efforts (1) employ hand weeding with light equipment; (2) use only Ecology-approved aquatic herbicides and adjuvants (a substance added to herbicides to improve application); avoid use of hazardous substances; and (3) do not result in soil compaction. Local governments should retain some oversight authority for more extensive invasive and/or noxious plant control projects to ensure adequate protections of riparian functions, especially water quality. Most communities issue an exemption letter or permit, which should include conditions to ensure impacts to fish, wildlife, and habitat are minimal.

It is important to note that even plants native to the region can, in certain circumstances, be detrimental to riparian areas. An example is in Puget Sound Prairies, where in the absence of periodic fire events (typically prescribed fire), common western Washington conifer species like Douglas fir outcompete native deciduous species (primarily Oregon white oak). In these circumstances, conifer removal and re-establishment of historical riparian conditions (oak and prairie vegetation) should occur under an approved HMP. WDFW regional [habitat biologists](#) can assist in preparing, reviewing, and implementing such a plan.

5. *Forest Practices and Conversions* – The state’s Forest Practices Act ([RCW 76.09](#) and [WAC 222](#)) regulates forest practice activities on forestland: We recommend that the proponent always contact DNR prior to conducting forest practice activities and seek technical assistance from a WDFW regional habitat biologist to ensure protections for Priority Habitats and Species. When conducting commercial forest practice activities, the forest practice rules—not the CAO—apply for protection of resources on site. Lands converted from forestry to another use require a special forest practice permit, and when converting land, local CAOs are applied. If conversion occurs, WDFW recommends timber harvests not be allowed within SPTH<sub>200</sub>.
6. *Wildfire Hazard Reduction* – Wildfire is a concern in Washington, though the threat varies across the state. Local regulations to reduce wildfire hazards should be coordinated with a Firewise program in order to require landowners to consult with a Firewise professional (<http://www.dnr.wa.gov/firewise>) before removing trees or manipulating vegetation in an RMZ. Understanding the composition of historical forest stands and shrub-steppe can help ensure retention of riparian functions when carrying out wildfire hazard reduction activities. When fuel (vegetation) reduction efforts involve the removal of merchantable trees, the proponent should check with the local jurisdiction and DNR, which may require a permit for tree removal.
7. *Removing Hazard Trees* – Tree trimming or removal in RMZs is sometimes necessary to address public safety concerns but should be balanced with the potential impacts to riparian ecosystem function. Jurisdictions should define a “hazard tree” (sometimes referred to as a “danger tree”) as a threat to life, property or public safety, and require that the method of tree removal not

adversely affect riparian ecosystem functions if possible. Specifically, we recommend that any removal of hazard trees involve an avoidance and minimization of damage to remaining trees and vegetation within the RMZ. We further recommend that local governments require a qualified arborist to evaluate requests for hazard tree removal. The qualified arborist should be able to establish when a tree presents an imminent threat to life, property or public safety.

It is important to note that snags (dead trees) are a Priority Habitat feature for wildlife, and so should be preserved if not hazardous.

Some local governments use Forest Practice Rules ([WAC 222-21-010\[4\]](#)), which define a hazard tree as “any qualifying timber reasonably perceived to pose an imminent danger to life or improved property.” This applies to any tree within 1.5 tree-lengths of the structure. A DNR forester can verify during a site visit that a tree is a hazard based on this definition, and thus removing the hazard would not be subject to the Forest Practice jurisdiction or require a Forest Practice Application.

8. *Restoration and Enhancement* – We encourage local governments to include in their CAOs allowances for restoration and/or enhancement of the riparian ecosystem, including in-channel or streamside work, especially on lands set aside for conservation. To the extent possible, jurisdictions should promote incentives and set up a streamlined review process for restoration or enhancement projects to help facilitate project proponents not just meeting the minimum requirements of the local CAO, but instead going “above and beyond”. Significant resources are available to jurisdictions that address limiting factors in riparian areas or undertake high priority restoration activities that benefit salmon or other listed species (*see* Chapter 4 for information on restoration).
9. *Emergency Activities* – Local codes typically have provisions for emergency activities (e.g., bank stabilization to address imminent threats to homes) that provide relief from time delays related to procedural code requirements. Local regulations should distinguish the immediate need to permit an emergency activity from the need to compensate for its impacts after-the-fact.
10. *Educational or Recreational Areas* – Public access to shorelines is a priority use under the SMA and providing educational and/or recreational developments such as trails, viewing platforms, or similar facilities may also enhance the public’s understanding and appreciation of riparian areas, streams, and habitats. Thus, some focused use of the RMZ for educational and recreational activities may be desirable, if it does not create significant disturbances. Most CAOs include allowances for unpaved access to a stream for aesthetic or recreational enjoyment with defined limits on clearing to avoid impacts and minimizing soil, vegetation, and habitat disturbances: this is an allowance we support. That said, construction of trails could allow greater access for pets and other high intensity recreation, which may increase predation on, and/or disturbance of fish and wildlife species. Regulations should minimize impacts from recreational trails and interpretive facilities to the extent practicable, informed by PHS data and associated management recommendations.

### 3.2.2 *Project-specific Riparian Habitat Management Plans*

When reviewing proposed projects near streams, local governments typically require applicants to provide detailed site-specific HMPs (often called a Critical Area Report). Here we describe six aspects of Riparian HMPs that we recommend be addressed in CAOs:

1. When HMPs are required;
2. Which additional critical areas must be delineated, and how;
3. Which specific land use actions must be identified, and how;
4. Mitigation requirements;
5. Monitoring and Adaptive Management requirements; and
6. Articulate who must prepare and review the HMP.

1. *When required* – We recommend jurisdictions require an HMP whenever someone proposes a land use activity in an RMZ (regardless of the jurisdiction’s regulatory RMZ delineation) or when a proposal likely could affect riparian or aquatic functions. In cases where there is less confidence in the spatial accuracy of the RMZ, consider requiring a Riparian HMP when impacts occur adjacent to the RMZ’s zone of influence.

Maps, [DNR’s stream layers](#), the [National Hydrography Dataset](#) (NHD), and other (e.g., local) stream layers are important for triggering HMPs. An HMP should be required whenever a stream is present near proposed development activities, including but not limited to subdivisions (plats, short plats, and large lot subdivisions), land/vegetation disturbing activities (e.g., clearing and grading, septic drain field siting), and stormwater routing.

2. *Critical Area Delineation* – HMPs should have the extent of critical areas within and adjacent to a proposed project site identified, along with ecosystem functions that need protection. Follow the RMZ delineation procedure outlined in Chapter 2, along with locations of other critical areas on or near the site (e.g., wetlands, geologic hazards, frequently flooded, critical aquifer recharge areas; informed by Ecology). Also, identify salmon and other priority aquatic species that use the stream network in the immediate vicinity as well as up- and downstream. Likewise, HMPs should identify Priority Species that may use the riparian corridor and any other Priority Habitats to which the corridor is connected. Attach the delineation map (1) to the property’s title to inform future property owners of the site’s critical areas, and (2) use it to update the jurisdiction’s critical areas maps.
3. *Land Use Action Identification* – A complete HMP should describe relevant management recommendations for Priority Habitats and Species found on or near the site. Include a map in the HMP showing the location of proposed land use actions. It should identify and quantify current and proposed disturbances to the RMZ and other FWHCAs.
4. *Mitigation* – The HMP should have a description of the project proponent’s mitigation sequencing. It should describe in detail measures to avoid impacts and minimize unavoidable impacts (e.g., clustering, conservation easements, and seasonal construction restrictions). If mitigation or compensation is necessary, the HMP should identify ways to improve riparian ecosystem function by enhancing riparian corridor connectivity (e.g., removal of stream barriers) or by improving the quality of the riparian area (e.g., replacing invasive vegetation with appropriate native vegetation).
5. *Monitoring and Adaptive Management* – The HMP should describe requirements for monitoring and adaptive management. In addition, it should identify measurable standards and expectations to monitor compliance (e.g., areal extent of vegetative cover, composition of riparian tree species, maximum invasive plant cover). The HMP should identify frequency of visits to monitor the site (e.g., at year 1, 2, 3, 5, 8, and 10) as well as measurable triggers for requiring more actions (e.g., maximum percent area coverage of invasive plants). The HMP

should specify who is responsible for preparing, reviewing, and submitting reports. Finally, if deemed necessary by the jurisdiction, the report should include a cost estimate for monitoring, and the project proponent should post a bond for this amount or more to allow for overages.

6. *Preparer and Reviewer* – A qualified professional biologist, botanist, or ecologist should prepare the HMP; additional expertise related to CMZs, unstable slopes, and wetlands may also be necessary. Additionally, an independent professional with similar qualifications should review the HMP. WDFW’s regional habitat biologists can often serve in this role, especially for larger projects. USFWS or NOAA Fisheries should also review the HMP if the project might affect a federally listed fish or wildlife species.

### 3.3 RIPARIAN MANAGEMENT IN URBAN AREAS

Some people have raised questions about the applicability of RMZs to urban and urbanizing areas. These concerns generally fall into two categories: (1) the science on RMZs comes largely from agricultural and forestry settings, and so is perceived to be irrelevant to urban areas; and (2) there is a belief that the need to maximize density of development in urban areas is in direct conflict with the protection of riparian areas.

Concerns over the relevancy of literature on riparian functions to urban areas is largely unfounded. While most riparian ecosystem studies are from non-urban settings, the principles are the same. Functions of shade, bank stability, large wood recruitment, nutrient inputs, and pollutant removal operate similarly in urban areas as they do in other settings. However, within urban areas, these riparian ecosystem functions are often greatly diminished or even absent altogether.

The role that urban RMZs play in delivering habitat functions for aquatic and many terrestrial species is also like that in non-urban areas. Factors that may be different in urban areas are that urban riparian ecosystems may perform some functions at reduced levels due to their position in developed watersheds, which are often heavily degraded. However, intact RMZs in urban areas function as wildlife corridors that link habitat patches, which is critical for many species. In fact, sometimes RMZs in urban areas may be more important from a habitat standpoint, because within urban areas, adjacent uplands are often even more degraded than the RMZs, which then are often the only remaining areas where habitat functions are provided. Thus, a key element to maintain in urban RMZs is connectivity, both in and along streams.

Many Puget Sound salmon move through channelized streams, traversing heavily urbanized areas prior to reaching spawning grounds and as juveniles on a reciprocal journey to marine waters. Salmon must pass through a wide spectrum of development. For example, adults returning to spawn often start in urban cores (e.g., downtown Seattle), where streams are often channelized; then pass through areas with small lots and high urban density and into suburban creeks where larger lots allow for more riparian protection; and finally, to rural lots with less development and better ecosystem health. When juveniles make their journeys in reverse, they generally spending more time in each of these areas than their parents did, and yet because of their small size, they are also at much greater risk of not surviving any of them. While the decades-long decline of many of our native salmon stocks illustrate just how challenging this is, their persistence—especially the subspecies which are showing signs of improvement—shows us what is possible. Therefore, it is critical that the urban environment maintain and enhance the ability of different species and ages of salmon to not just survive, but thrive, while in these disturbed areas.

Many of the actions we recommend urban communities focus on are the same or similar to those appropriate in less densely developed areas. For example, it is critical to maintain connectivity through properly sized culverts such that all fish can pass through at all relevant life stages. Additional riparian function can be achieved through revegetation efforts using native plants and by improving connectivity between habitat patches. A landscape analysis can help identify existing connections to protect, as well as areas where restoring connectivity is a priority. On the other hand, some actions are particularly well-suited to urban jurisdictions, like standards for Low Impact Development (LID) and state-of-the-art stormwater management. Further, when changes are made to urban infrastructure, this may create opportunities to improve riparian functions while contributing to new or improved public open spaces.

Recommendations for urban riparian ecosystems:

1. Delineate urban RMZs to protect what areas remain and to highlight lost or degraded areas to target for restoration.
2. Quantify current conditions, with a goal of maintaining and improving functions through regulatory and voluntary means.
3. Identify and prioritize restoration opportunities and projects within the RMZ:
  - a. Protect riparian functions that remain, especially in places that are relatively high functioning; implement actions that enhance degraded functions (*see* Chapter 4).
  - b. Prioritize opportunities to maintain and restore in-stream and riparian connectivity.
  - c. Adopt a stormwater design manual equivalent to Ecology's most current manual for western and eastern Washington.
  - d. Manage stormwater by adopting Ecology's latest manual regarding LID for new development, redevelopment and retrofit projects.
4. When replacing or removing existing infrastructure within an RMZ:
  - a. Map RMZ to pinpoint the best sites to restore – consider connectivity and adjacency to other Priority Habitats;
  - b. Improve aquatic connectivity by replacing culverts and removing barriers to movement;
  - c. Revegetate with native plants and consider improvements for wildlife by integrating structures necessary for nesting, breeding, and foraging;
  - d. As infrastructure is remodeled or replaced, incorporate additional setbacks from streams;
  - e. Control access to RMZ to limit soil compaction;
  - f. Avoid operating equipment near the stream to reduce sedimentation and soil compaction; and
  - g. Avoid using chemicals in the RMZ which are not approved for use there by Ecology.

### 3.4 MANAGING WATERSHEDS

As described in Chapter 8 of Volume 1, land use activities in a watershed can affect the stream network, even when the riparian ecosystem itself is relatively undisturbed. "Watershed management" is a land management approach that seeks to minimize negative effects of upland land uses on aquatic systems, which include riparian areas. The remainder of this chapter focuses on key watershed elements important to managing and protecting functional aquatic systems. Many of the approaches we outline here are non-regulatory and can complement regulatory efforts;



as previously stated, we recommend cities and counties inventory current conditions of critical areas and, based on that inventory, develop watershed scale management plans accordingly.

Fully functional riparian ecosystems, in combination with targeted watershed protections, provide significant benefits to humans. These benefits, often described as ecosystem goods and services, include clean water; decreased flooding; increased nutrient cycling, sediment and pollutant filtering; reduced erosion; carbon sequestration; and cultural services such as recreational, spiritual, and other nonmaterial benefits. These services provide real but often unquantified economic benefits to individuals and society that largely go unnoticed until they are lacking.

### 3.4.1 *Watershed-Scale Recommendations to Protect Aquatic Systems*

To achieve desired ecosystem goods and services watershed managers should focus on influencing watershed processes that act upon water, wood, sediment, nutrients, vegetation, and pollutants at both the site- and watershed-scale. This section focuses on watershed-scale management.

*Restore and Protect Watershed Processes* – Efforts to improve watershed conditions should first focus on protecting and restoring watershed *processes* (e.g., natural disturbances) that create and retain habitat for fish and wildlife. Maintain the frequencies, magnitudes, and durations of natural disturbances (flood and fire being the most common) to the greatest extent that surrounding land uses can tolerate.

*Manage Land for Stormwater* – Stormwater runoff can change the timing, quality, and quantity of water provided to streams. Land uses should avoid/minimize changes to surface water flows. Protection and restoration efforts should focus on attenuating peak flows and reducing pollutants. Primary tools available to local governments include land use designations/zoning code, and stormwater regulations. See [City of Redmond Watershed Management Plan](#) (City of Redmond 2013).

*Manage Land for Stream Temperatures* – Reduced riparian vegetation cover, decreased streamflow, and simplified stream channels (e.g., increased width-to-depth ratio and reduced groundwater exchange) can lead to increased water temperature (Volume 1, Chapter 4). Modifications like these are often the result of land use activities such as riparian vegetation removal; water diversions; unmanaged livestock grazing; and stream channelization associated with roads, levees, and other forms of development. Identify and restore thermally sensitive stream reaches at the watershed scale to maintain optimal stream temperatures for sensitive aquatic species such as salmonids.

*Restore and Protect Connectivity* – Manage watersheds to avoid creating longitudinal (e.g., dams, road crossings), lateral (e.g., levees and roads/buildings that cutoff riparian areas and floodplains from their stream), and vertical (water withdrawals, reductions of floodplains) barriers to fish and wildlife movement and fragmentation of their habitat. This is especially important for highly mobile species that require a variety of habitat components across large areas. For example, where CMZs interact with floodplains, dikes and levees restrict the movement of the river or stream and also serve as a barrier for fish and many forms of wildlife.

Restoration to correct existing barriers to movement of water, wood, sediment, and species (e.g., removing blocking culverts) is a high priority with proven benefits for salmon. Connectivity to achieve nearly or completely contiguous RMZs is important to water quality and to achieve



connectivity among patches. Ensuring connectivity both for terrestrial and aquatic wildlife works towards a more interconnected and healthy riparian system.

*Plan for Climate Change* – Impending changes to aquatic systems caused by climate change increases risk to species already threatened, and riparian ecosystem protection is one of the most useful responses to ameliorate those risks. For example, because more intense rainfall events will lead to wider streams, larger culverts will be necessary to support fish passage. WDFW, in collaboration with the University of Washington’s Climate Impacts Group, created an [online tool](#) (UWCIG 2017) that estimates how much a stream’s channel width will increase with climate change in the years 2040 and 2080. Connectivity within the RMZ allows voluntary migration for species and helps minimize temperature change and increase off-channel storage of water to reduce low flows.

*Conduct Monitoring and Adaptive Management* – Monitoring and adaptive management are important elements to both site-scale and watershed-scale; this is addressed further in Chapter 5.

### 3.4.2 *Tools and Key References for Assessing Current Watershed Conditions*

Washington’s State agencies, including WDFW, have developed multiple tools to assist local government in assessing watershed conditions. Jurisdictions can utilize these resources—many available at no cost—to quantify changes in land cover, tailor planning for specific species, coordinate monitoring activities, inform restoration, and assess watershed health.

WDFW’s High Resolution Change Detection (HRCD) is a spatial dataset that characterizes changes in land cover. This tool allows jurisdictions to evaluate in specific ways how watersheds are changing at a sub-parcel scale over 2- to 3-year intervals. This dataset is currently available throughout the entire Puget Sound basin and in some Eastern Washington watersheds. HRCD data is available at [www.pshrcd.com](http://www.pshrcd.com).

WDFW’s [Priority Habitats and Species](#) program has several resources of interest to watershed planners. In addition to this two-volume document on riparian ecosystems, readers will find useful ideas in [Land Use Planning for Salmon, Steelhead and Trout: A land use planner’s guide to salmonid habitat protection and recovery](#) (Knight 2009) and [Landscape Planning for Washington’s Wildlife: Managing for Biodiversity in Developing Areas](#) (Azerrad et al. 2009).

Since 2004, the [Pacific Northwest Aquatic Monitoring Partnership](#) has collaborated with West Coast federal, state, and tribal agencies to coordinate monitoring activities and develop common approaches. This partnership provides best practices, mapping tools, and protocols, and serves as a voluntary clearinghouse for a wide variety of monitoring projects.

Since 2009, Ecology’s [Watershed Health Monitoring Project](#) has been monitoring sites throughout the state to assess watershed health. This project’s protocols can be adapted by jurisdictions and scaled to watersheds of various sizes. Data is stored in the [Environmental Information Management database](#). This sophisticated database allows users to input and retrieve data via the web, reliably store it, and make it available for analysis. Quality assurance/quality control measures ensure data put into the database are of high quality.

Ecology’s [Puget Sound Watershed Characterization](#) is a Puget Sound-wide tool that compares areas based on their suitability and value for restoration and protection. This tool informs two fundamental questions: (1) where to focus protection and restoration on the landscape first, and

(2) what types of activities and actions (i.e., restoration, protection, conservation, or development) are most appropriate to that place. With insights gained by this tool, decision-makers can incorporate information regarding watershed processes to improve plans (e.g., comprehensive plans, subarea plans, CAOs, stormwater plans) and conservation efforts (e.g., in-lieu fee programs, open space tax credits, open space land acquisitions).

In 2016, the Washington Department of Commerce (Commerce) published [Building Cities in the Rain](#) (Ballash 2016) to help communities improve watersheds while redeveloping and revitalizing urban areas. The guidance describes an optional three-step process for prioritizing watersheds for stormwater retrofits in urban areas. Commerce's [Puget Sound Mapping Project](#) uses an interactive map to help users develop insights about how current and expected development patterns might affect the region's environmental health. The tool is designed to help decision makers consider information from the Puget Sound Watershed Characterization (described above) when making decisions regarding development projects, urban growth boundaries, and compensatory mitigation.

Finally, the University of Washington's [Climate Impacts Group](#) has developed a suite of tools, many in concert with WDFW, which may be useful for landowners and land use decision makers including climate trends, culvert design projections, and habitat connectivity.

# CHAPTER 4. RESTORING RIPARIAN ECOSYSTEMS

## 4.1 INTRODUCTION

This chapter provides high-level guidance to landowners, land use decision makers, and conservation partners to promote restoration of riparian areas. Despite recent efforts to protect existing riparian systems, imperiled salmon stocks and other riparian dependent endangered species are not recovering as hoped (Table 4.1). Since non-indigenous settlement of Washington began in the 1800s, between 50 percent and 90 percent of riparian ecosystems have been lost or extensively modified (RCO 2019). While two subspecies (Hood Canal summer chum and Snake River fall Chinook) are moving towards recovery, most listed salmon in Washington are below recovery goals (Table 4.1).

The lack of recovery is also evidenced in the ongoing decline of salmon fishing, which affects the long-term health of Washington’s tribes, Washington’s economy, and our shared cultural heritage. The lack of salmon is one of the primary reasons Southern Resident Killer Whales are at risk of extinction, in addition to other impacts such as vessel disturbance and pollutants. (Lacy et al. 2017, Murray et al. 2019)

Given the extent of historical loss, WDFW recognizes that protection alone of remaining riparian ecosystems, will not recover salmon or the Southern Resident Killer Whale population. Therefore, WDFW recommends restoring and enhancing riparian ecosystems to achieve healthy, intact, and fully functioning riparian systems statewide. Continued investments in restoration will be required at all levels of government and in concert with Washington tribes.

**Table 4.1.** Non-statistical evaluation of natural origin (wild) fish that returned to spawn with consideration for threats and factors affecting health including habitat, harvest, and hydropower. (Adapted from RCO 2019; Data sources: WDFW, Indian tribes, NOAA).

Below Goal (Endangered Species Act-Listed Salmon in Washington)			Near Goal
Getting Worse	Not Making Progress	Showing Signs of Progress	Approaching Goal
Upper Columbia River Spring Chinook	Upper Columbia River Steelhead	Mid-Columbia River Steelhead	Hood Canal Summer Chum
Puget Sound Chinook	Lower Columbia River Chum	Lake Ozette Sockeye	Snake River Fall Chinook
	Lower Columbia River Coho	Lower Columbia River Steelhead	
	Lower Columbia River Fall Chinook	Snake River Steelhead	
	Lower Columbia River Spring Chinook	Puget Sound Steelhead	
	Snake River Spring Chinook		
	Snake River Summer Chinook		

## 4.2 RESTORATION ACTIONS

Although this section focuses on restoring riparian areas for the benefit of salmon, emulating historical conditions benefits many other aquatic and terrestrial species as well. WDFW is available to provide technical assistance and species-specific guidance for terrestrial species-focused restoration and recovery efforts. To recover salmon, we must protect all remaining existing riparian and watershed functions, while seeking opportunities to restore functions that have been lost over time. We provide the following information to assist the restoration community<sup>10</sup> in understanding what is important to restore.

### 4.2.1 *Developing a Restoration Strategy*

Aquatic restoration strategies typically start with a clear set of goals and objectives. The selection of appropriate restoration strategies is informed by the political, social, and ecological context of the watershed, and bounded by the extent of opportunities and constraints. It is important in ecosystem restoration to consider the habitat attributes and scale necessary for a desired suite of species, be they aquatic or terrestrial. At a watershed scale, restoration efforts should focus first on projects that offer the greatest potential for success. The [Stream Habitat Restoration Guidelines](#) (Cramer 2012) suggest the following prioritization of stream habitat restoration strategies that are specific to instream related activities most often geared at anadromous fish:

1. *Protect existing habitat.* Protect areas that provide healthy, high-quality habitat functions (strongholds, refugia, and key sub-watersheds) to prevent further degradation. Secure, expand, and link protected areas.
2. *Connect habitat.* Connect and provide access to isolated habitat, including instream, off-channel, and estuarine habitat made inaccessible by culverts, levees, fragmentation, or other man-made obstructions.
3. *Restore habitat-forming processes.* Employ land use recovery and watershed restoration techniques to restore processes that create, maintain, and connect habitats (including restoring sediment dynamics, large wood dynamics, and flow regimes; avoiding/removing manmade disturbances within the riparian ecosystem; and maintaining water quality, floodplain connectivity, and channel evolutionary processes). Employ a combination of active or passive restoration techniques, as necessary. Active restoration involves accelerating processes or attempting to change the trajectory of succession; passive restoration simply involves ceasing environmental stressors such as agriculture, grazing, or timber harvest, and then allowing nature to take its course.
4. *Create new or enhance existing habitat.* Improve existing or create new habitat for specific species by installing instream structures such as large woody debris; reconfiguring channel shape, cross-section, or profile to reduce incision or restore flow; or constructing one or more new side channels.

In conjunction with other state agencies and partners, WDFW provides multiple technical guidance documents to help design and implement riparian restoration projects that have proven successful

---

<sup>10</sup> Many watersheds in Washington have salmon recovery restoration goals that can be obtained from regional Salmon Recovery Boards or Lead Entities for Salmon Recovery. Lead Entities and Salmon Recovery Boards are in every region of the state, including those areas without salmon or other anadromous fish ([https://www.rco.wa.gov/salmon\\_recovery/regions/regional\\_orgs.shtml](https://www.rco.wa.gov/salmon_recovery/regions/regional_orgs.shtml)).

in different types of landscapes, including on marine shorelines, and on river- and streambanks. These are part of a suite of Aquatic Habitat Guidelines found at <https://wdfw.wa.gov/licenses/environmental/hpa/application/assistance>. They include:

- [Water Crossing Design Guidelines](#) (Barnard et al. 2013)
- [Stream Habitat Restoration Guidelines](#) (Cramer 2012)
- [Integrated Streambank Protection Guidelines](#) (Cramer et al. 2012)
- [Land Use Planning for Salmon, Steelhead and Trout: A land use planner's guide to salmonid habitat protection and recovery](#) (Knight 2009)
- [Draft Fishway Guidelines for Washington State](#) (Bates 2000)
- [Draft Fish Protection Screen Guidelines for Washington State](#) (Nordlund and Bates 2000)
- [Marine Shoreline Design Guidelines](#) (Johannessen et al. 2014)
- [Your Marine Waterfront](#) (WDFW 2016)
- [Protecting Nearshore Habitat and Functions in Puget Sound](#) (AHGP 2010)

### 4.3 IMPLEMENTING RIPARIAN STRATEGIES THROUGH INCENTIVES

There are several types of conservation incentives available to individuals and local governments:

- *Financial assistance*: grant programs that provide funding for conservation activities
- *Tax adjustment*: tax reductions for landowners undertaking conservation activities
- *Technical assistance*: advice and/or hands-on help for landowners on tools or techniques
- *Recognition*: promotion of landowners who undertake conservation actions

Each of these will be described (and examples provided) in more detail, below.

#### 4.3.1 *Financial Assistance*

State and federal grant funds are available for riparian ecosystem conservation and restoration projects on public and private lands through the Recreation and Conservation Office (RCO) and Salmon Recovery Funding Board. To access these funds and to learn more, go to <https://www.rco.wa.gov/grants/index.shtml>. Grant programs include:

- [Aquatic Lands Enhancement Account](#)
- [Washington Wildlife and Recreation Program](#) (WWRP; Riparian Protection, Critical Habitat, Natural Areas, and Urban Wildlife Habitat Categories)
- [Salmon Recovery Funding Board](#)
- [Estuary and Salmon Restoration Program](#)—a program of WDFW
- [Land and Water Conservation Fund](#)
- [Puget Sound Acquisition and Restoration](#)

Land trusts also help land owners conserve habitat for key aquatic and terrestrial species, often leveraging funds from foundations and other non-governmental sources; see [www.walandtrusts.org](http://www.walandtrusts.org) for a county-specific list of land trusts.

For agricultural property owners, local conservation districts and the Washington State Conservation Commission (WSCC) can provide technical assistance to find an approach that works for the farmer and improves riparian ecosystem function. Technical assistance is also available

from the federal Natural Resources Conservation Service (NRCS), Washington State University Extension, and WDFW. Additionally, a host of state and federal financial incentives to expand and maintain riparian functions within the riparian management zone (RMZ) are available, some of which are listed below. For example, the Conservation Reserve Enhancement Program (CREP) provides funding to landowners for riparian preservation and is the most successful riparian buffer program in Washington. Since CREP's 1999 inception in our state, more than 900 miles of stream buffers have been planted, and as of October 2020, producers had over 13,500 acres actively enrolled in CREP. Contact your local conservation district or the RCO to learn more.

- [Conservation Reserve Enhancement Program](#) (NRCS)
- [Environmental Quality Incentives Program](#) (NRCS)
- [Conservation Stewardship Program](#) (NRCS)
- [Conservation Reserve Program](#) (NRCS)
- [Regional Conservation Partnership Program](#) (NRCS)
- [Agricultural Conservation Easement Program](#) (NRCS)
- [Agricultural Land Easements](#) (NRCS)
- WWRP [Farmland Preservation Grants](#) (RCO)

Timber landowners have access to a variety of forestry-oriented conservation incentive programs (see list, below) and can also receive technical assistance from DNR's Forest Stewardship Program ([foreststewardship@dnr.wa.gov](mailto:foreststewardship@dnr.wa.gov) / 360-902-1428):

- [Forestry Riparian Easement](#) (DNR)
- [Rivers and Habitat Open Space Program](#) (DNR)
- [Healthy Forests Reserve Program](#) (NRCS)
- [Family Forest Fish Passage Program](#) (DNR)
- [Forest Legacy](#) (USFS)
- WWRP [Forestland Preservation Grant Program](#) (RCO)

#### 4.3.2 *Tax Reduction Incentives*

Landowners can receive a substantial tax reduction by converting land into "open space" status because of the Open Space Taxation Act ([WAC 458-30](#)), enacted in 1970. Lands with riparian areas often qualify for this incentive; see your county assessor and local planning department for details.

#### 4.3.3 *Technical Assistance*

Local governments and individual landowners who want to improve riparian habitat for a suite of species can request land use advice from a variety of sources, including:

- WDFW regional habitat and district wildlife biologists. Go to <http://arcg.is/1SgsHqk> to find the names and direct contact information for your local biologists, or call the regional office in your area:
  - Region 1 – Eastern: 509-892-1001
  - Region 2 – North Central: 509-754-4624
  - Region 3 – South Central: 509-575-2740
  - Region 4 – North Puget Sound: 425-775-1311
  - Region 5 – Southwest: 360-696-6211

- Region 6 – Coastal: 360-249-4628
- Salmon Recovery Lead Entities or Regional Fisheries Enhancement Groups
- Tribal natural resource departments
- Local [Conservation Districts](#)

#### 4.4 SUGGESTED RESTORATION PRACTICES

The following section provides a series of suggested restoration practices promoted by WDFW, other state and federal agencies, and conservation partners. We encourage consideration of these activities and others within and adjacent to the RMZ, as delineated in accordance with our recommendations in Chapter 2. Further, it is not unusual to find other types of Priority Habitats (e.g., wetlands, shrub-steppe) adjacent to riparian areas. In such cases, restoration practices should not degrade or disturb the adjacent habitat, but rather—if feasible—improve it in addition to improving the riparian habitat. The same approach should be used where riparian-adjacent Priority Species areas are present.

Like most restoration practices, the ones recommended below can range in complexity, both biologically and technically, so landowners are strongly encouraged to seek technical assistance from WDFW and other experts before taking any action: This will help save money, time, and greatly increase the likelihood of success for any restoration activity. Landowners should also be aware that many of these activities may require permits<sup>11, 12</sup> issued by one or more agencies such as WDFW for the [Hydraulic Code rules](#), and DNR for the [Forest Practices rules](#); as well as permits from the local jurisdiction.

1. Improve quality of vegetation for both aquatic and terrestrial wildlife by removing invasive species wherever present. Further, to avoid the likely return of invasive species, cleared areas should be replaced with native riparian vegetation: specifically, native vegetation that provides needed ecosystem functions as described in Volume 1 and throughout this document (e.g., shade, large wood, pollution removal).
2. Where riparian areas already possess some native vegetation, enhance them with a greater mixture of native plants that provide necessary habitat components (forage, cover, breeding, roosting, etc.) for a diversity of species and multiple riparian functions (e.g., streambank stability, wood recruitment, organic litter input, and pollutant removal). The specific mix of vegetation will vary by ecoregion and local needs, but likely includes conifers, grasses, and herbaceous plants.
3. Increase off-channel habitat and improve natural flow regimes by removing dikes or levees and restoring access to and within the floodplain.

---

<sup>11</sup> The Governor’s ORIA Office provides additional assistance for general permitting questions ([https://www.oria.wa.gov/site/alias\\_oria/347/Permitting.aspx](https://www.oria.wa.gov/site/alias_oria/347/Permitting.aspx))

<sup>12</sup> Larger projects may also trigger permit requirements with federal agencies, such as the U.S. Army Corps of Engineers (USACE).



4. In areas of incised channels, reintroduce beaver or construct beaver dam surrogates to store sediments, raise streambed elevation, raise water table elevation, and restore riparian vegetation.
5. Remove reed canary grass, which can greatly inhibit channel morphology and aquatic species movement. (Management techniques for reed canary grass vary and are often site-specific: contact your local WDFW regional habitat biologist for technical assistance.)
6. Through proper consultation with WDFW and tribal biologists, increase the presence of large wood in streams and rivers to improve habitat for salmon, resident fish species, and aquatic amphibians.
7. Increase connectivity through removal of non-fish passing culverts. If replacement culverts are needed, ensure they are adequately sized and climate-change-resilient; see WDFW's online resource on [Incorporating Climate Change into the Design of Water Crossing Structures](#) (Wilhere et al. 2016).
8. Reduce soil erosion by increasing vegetation complexity and density, excluding (or substantially minimizing) soil compacting activities, and implementing upland soil management techniques where applicable.
9. For agricultural operators: add and/or improve fencing structures to increase the amount of riparian area acreage from which livestock are excluded to reduce compaction, erosion, and overgrazing.

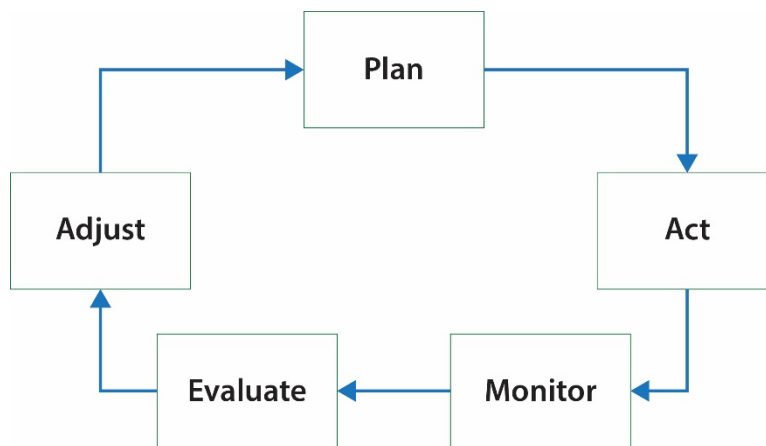


# CHAPTER 5. IMPROVING PROTECTION THROUGH ADAPTIVE MANAGEMENT

## 5.1 INTRODUCTION

Adaptive management is widely recognized as an essential component of effective natural resource management because it provides a systematic process for continually improving policies and management through outcome-based learning. The adaptive management process is a continual cycle of planning, acting, monitoring, evaluating, and adjusting (Figure 5.1). This feedback loop provides information for making adjustments that focus on improving decisions in all phases of resource management. The utility of adaptive management programs should be considered by conservation practitioners, landowners, and land use planners to ensure that conservation actions achieve desired outcomes: in the case of this document, that means preserving, protecting, and restoring healthy, intact, and fully functioning riparian areas. In addition to improving ecosystem outcomes, adaptive management should improve clarity of regulations—resulting in increased transparency to all stakeholders.

All cities and counties are currently protecting critical areas, including riparian ecosystems, through a variety of regulatory and non-regulatory mechanisms. One regulatory challenge is understanding how well these mechanisms meet their intent of protecting ecosystem functions and values and how to make improvements where they are falling short. This chapter was written in collaboration with the Washington Department of Commerce (Commerce) and relies heavily on the Commerce’s 2018 update of the [Critical Areas Ordinance Handbook](#) (Bonlender 2018), with one exception, as noted.



**Figure 5.1.** A simple depiction of the adaptive management cycle (modified from Bormann et al. 1994).

The process for monitoring we describe here supports both local and larger-scale actions that improve our collective efforts to protect riparian ecosystems throughout the state. For example, the Puget Sound Partnership (Partnership) uses “[Vital Signs](#)” of ecosystem health and recovery, such as riparian forest cover, to understand ecosystem condition, articulate shared goals and progress, and inspire action towards meeting those goals.

Adopting an adaptive management program can allow local governments to respond more quickly and meaningfully as new information become available. A willingness to address issues identified through this process is critical to the idea of adaptive management.

## 5.2 COMMON QUESTIONS ADDRESSED BY ADAPTIVE MANAGEMENT

Adaptive management does not have to be expensive or complicated to be useful. We believe local jurisdictions can maximize their investment in adaptive management by focusing on two types of monitoring related to their own regulatory process (explained in more detail in the next section).

We begin by discussing three basic types of monitoring because we have found it instructive to understand how different monitoring types can be hierarchically or sequentially staged, based on the types of questions they seek to answer: implementation monitoring, effectiveness monitoring<sup>13</sup>, and validation monitoring.

### 5.2.1 *Implementation Monitoring*

*Implementation monitoring* typically helps the permit issuer (permitter) answer the following questions about its permitting system, by looking at the outcomes of individual permits:

- Are permits consistent with regulations?
- Do permits contain all necessary conditions or provisions for a project?
- Does the permitter issue consistent permits (same requirements) for all permittees?

Implementation monitoring can also include:

- Permit *compliance monitoring*, which asks if the permittee followed or complied with each permit condition or provision and refrained from conducting unpermitted activities. Compliance monitoring usually takes place very soon after completion of permitted work.
- Keeping track of unpermitted activities; that is, finding changes in land use or management that require a permit but where no permit of any kind was issued.

---

Monitoring does not have to be complicated. Even if a city or county chooses to do only permit implementation monitoring, this will provide key information that can improve the permit process, and an individual landowner can check whether choices like enhancing native plantings produce the desired results.

---

### 5.2.2 *Effectiveness Monitoring*

In Commerce's 2018 Critical Areas Handbook, *effectiveness monitoring* is a form of long-term implementation monitoring. In other words, effectiveness monitoring looks at permit compliance as a while to determine whether permit conditions/provisions (e.g., buffer widths) are followed over time.

For the purposes of this document, we describe effectiveness monitoring a bit differently: Specifically, effectiveness monitoring is a way to determine whether permit conditions/provisions

---

<sup>13</sup> As explained further in Section 5.2.2, we describe and use the term effectiveness monitoring somewhat differently than how it is described in Commerce's 2018 Critical Areas Handbook.

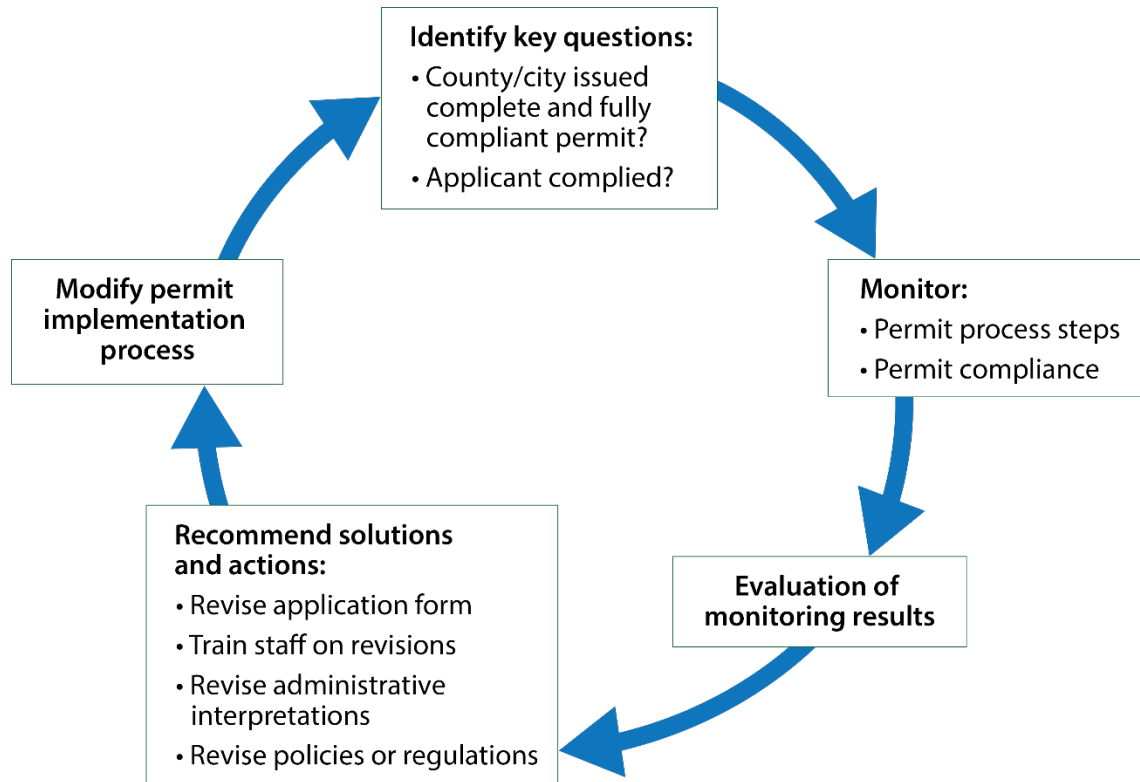
are working relative to intended environmental outcomes. For example, “Are permit conditions/provisions leading to the riparian function(s) (e.g., shade, bank stability) that they were intended to provide?” Effectiveness monitoring typically involves some on-the-ground measurement of environmental variables affected by land use activities.

### 5.2.3 Validation Monitoring

Research within the adaptive management framework is often referred to as *validation monitoring*. In the context of land use regulations, the questions relate to how management of critical areas (e.g., riparian) affects the specific environmental resource it was intended to protect (e.g., water quality, salmon). Validation monitoring may be beyond the fiscal means of most local governments. Moreover, it often involves questions that must be addressed over large spatial extents (e.g., at watershed or multi-watershed scale). In comparison, implementation and effectiveness monitoring are often tied to local jurisdiction’s regulatory processes at the site scale: For these reasons, the next two sections focus more on these two types of monitoring

## 5.3 RECOMMENDED IMPLEMENTATION MONITORING EFFORTS

We advise local governments to focus first on using implementation monitoring to evaluate their regulatory processes that affect riparian ecosystems. Implementation monitoring tracks execution of the permitting system from the perspective of both the permit issuer (permittor) and permit holder (permittee) (Figure 5.2). This effort can result in regular status reports that help demonstrate how well local governments and permittees are working together to meet resource objectives in a fair and consistent manner.



**Figure 5.2.** Depiction of the adaptive management cycle specific to permit compliance.

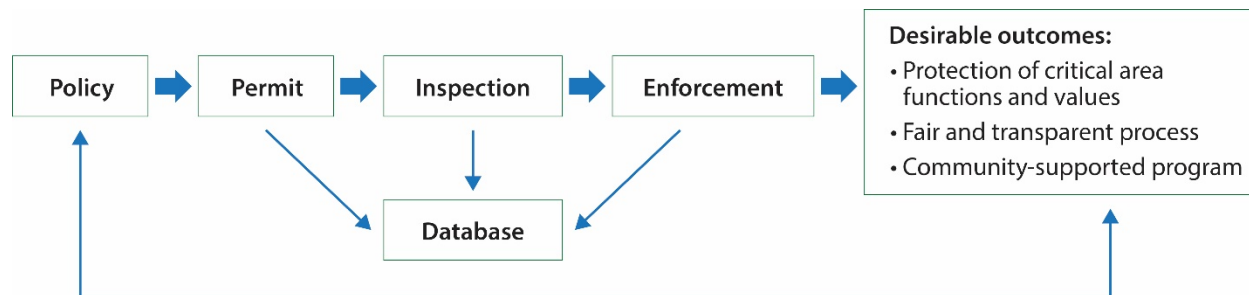
Implementation monitoring provides key information for permitting process improvement (**Error! Reference source not found.2**; Table 5.1). Even in situations where local governments cannot monitor all steps in their permitting process, monitoring any step—regulations to permit conditions/provisions, permit provisions to construction, construction to inspections, or inspections to enforcement—can provide valuable feedback about the quality of regulatory processes.

**Table 5.1.** Key questions for implementation monitoring during the Critical Areas permit review process.

Process Steps	Key study questions to evaluate permit implementation	Proposed metrics
Application	Was adequate information gathered from the permit applicant? Did the local government provide timely and necessary technical assistance to the permit applicant?	Number and percent of complete applications. i.e., include all information necessary to issue a permit. Number and percent by type of permit applications missing information
Permit	Do permit provisions follow the local government code?	Number and percent of permit provisions by type consistent with code.
Permit	Do permit provision identify intent of protection and how it can be accomplished? (e.g., area of tree retention, distance of structure from stream, clearing, grading, or storm water provisions, replanting requirements, extent of impervious surface.)	Number and percent of (complete) permits (i.e., include all provisions that enable a permittee to be fully compliant with the permit.) Number, percent, and type of missing provision/information
Permit (variance)	If a variance was granted, is the reason for the variance clearly stated?	Percent of variances by type justified by code or policy Percent of permits with variances by type.
Permit (mitigation)	If compensatory mitigation was required, were the unavoidable impacts clearly identified/quantified? Was the rationale clearly stated?	Number and percent of permits by type with unavoidable impacts Percent of permits by type with quantified mitigation requirements
Compliance	Post-Construction Visit: Did the permittee comply with the permit? (Requires field measurements of some or all the provisions in the permit. For riparian ecosystems, key provisions to inspect include RMZ width, retention of trees, replanting, structure distances from stream, area of impervious surface, and implementation of storm water provisions.)	Number and percent by type of provision that were out of compliance.
Enforcement	Are enforcement actions necessary to meet permit provisions and/or the regulations?	Number and percent by type of permit enforcement actions.

Because little or no fieldwork is required, the easiest and least expensive step to monitor is the link between regulations and permit provisions: that is, whether local land use regulations have been translated into permit provisions that can be understood easily by permittees. We recommend that some implementation monitoring become part of all local regulatory programs, even if it only on a relatively small subset of permits selected at random. A database for storing information on each

step (i.e., a permit tracking system—see Table 5.1, Figure 5.3) is a critical tool for creating a complete system of accountability.



**Figure 5.3.** One system of permit accountability that includes implementation monitoring of internal permit processes, inspection for permit compliance, a database from which to judge outcomes, and a feedback loop connecting outcomes with policy intent.

Long-term implementation monitoring can help answer additional questions, such as: “Are rules/regulations intended to provide long-term protection of critical areas (e.g., RMZs) actually followed or maintained over time?” One way to answer this is by looking at changes in land cover, which describes the type and amount of vegetation, roads, and buildings occurring on the landscape. By comparing high quality aerial photographs taken of the same locations over time, change can be quantified and attributed to specific activities, both from natural disturbances (e.g., wildfires, river channel migration) and human activities (e.g., timber harvesting, residential subdivision construction, highway widening). In Section 5.5, we describe one such process WDFW developed and for which information for many parts of the state are already available.

## 5.4 EFFECTIVENESS OF REGULATORY PROTECTIONS OF CRITICAL AREAS

Where implementation monitoring has been successful, that is, either documenting a highly functional permitting process or improving poorly performing permitting process, we encourage additional effort on effectiveness monitoring. As described above, our primary goal for effectiveness monitoring would focus on understanding how well the permit conditions/provisions lead to measurable outcomes on the ground (e.g., protection/restoration of one or more riparian functions or values) over an extended period.

## 5.5 USING LAND COVER CHANGE TO UNDERSTAND LONG-TERM REGULATORY PROTECTION

High Resolution Change Detection ([HRCD](#)) is a tool that is useful for detecting changes in two specific types of land cover (tree canopy and impervious surfaces) over set time periods. Land cover change analysis like HRCD can show jurisdictions the degree to which critical area regulations are maintaining RMZs as intended. This information can then help shape if, where, why, and how adjustments to permitting processes should occur. By combining land cover change analysis with targeted questions about permitting processes, jurisdictions can begin to adaptively manage changes to their overall regulatory system.

---

## Adaptive Management Framework in the Voluntary Stewardship Program

The Voluntary Stewardship Program (VSP) was authorized by the Legislature in 2011 through RCW 36.70A.705. The goals of VSP are to protect and enhance critical areas where agricultural activities are conducted, maintain and improve the long-term viability of agriculture in the State of Washington, and reduce conversion of farmland to other uses. The program provides counties with an alternative approach from traditional development regulations that require protection (and encourage enhancement) of critical areas at the individual parcel scale. Instead, VSP relies upon voluntary practices and incentive programs to protect (and enhance) at a watershed scale. Counties “opted-in” to VSP, and as of 2019, 27 of the state’s 39 counties are participating.

Under VSP, local workgroups created work plans that include benchmarks for protection and enhancement of critical areas designed to be achieved through voluntary and incentive-based actions. VSP requires monitoring and adaptive management to maintain and enhance critical areas, including riparian ecosystems, and directs workgroups to monitor at the watershed or sub-watershed scale. Key requirements for county-level programs include:

1. Establishing a durable system to track and report goals, benchmarks, and performance metrics.
2. Developing implementation and effectiveness monitoring programs and conducting monitoring on a pre-determined schedule.
3. Establishing an adaptive management program with (a) “triggers”; (b) subsequent actions to take; and (c) a process to review/update both the triggers and actions over time.
4. Reporting on the achievement of protection and enhancement goals and benchmarks at specified intervals.

Numerous counties have utilized WDFW’s recommended VSP Adaptive Management Matrix in approved VSP Work Plans. Examples include:

- Chelan County, Appendix I (Approved April 2017)
- Grant County, Tables 5-7 through 5-10 (Approved June 2017)
- Asotin County, Tables 5-3 through 5-5 (Approved May 2018)
- Okanogan County, Chapter 6 (Approved September 2018)
- Spokane County, Section 4 (Approved November 2018)

Jurisdictions can adapt matrices as templates for connecting goals, benchmarks, performance metrics, monitoring, and adaptive management for other uses beyond VSP. These matrices can be modified as frameworks to identify specific elements of any adaptive management plan.

---

The example in the following section is adapted from Commerce’s Critical Areas Handbook (Bonlender 2018). Chapter 7 of that document provides a number of similar monitoring program examples, nearly all of which were developed by cities or counties.

### 5.5.1 *Example: WDFW/Thurston County Shoreline Master Program*

In 2015, Thurston County and WDFW utilized a National Estuary Program grant to quantify shoreline vegetation, land cover change, and evaluate land use permit compliance. Specifically, Thurston County used WDFW’s HRCD data to monitor compliance within the County’s Shoreline Master Program (SMP) jurisdiction. This project developed a [protocol manual](#) for using HRCD for this purpose, available to all jurisdictions within the Puget Sound region.

One goal of the pilot project was to answer several related sets of questions:

For Thurston County:

- What land cover change is happening within designated SMP areas? What change is happening throughout the Deschutes River watershed (WRIA 13)?
- How does change known by permit records compare with detected changes by HRCD?
- What changes, if any, can be made to the land use permits or permitting process that could increase the relevancy or efficacy in utilizing the HRCD in compliance monitoring?

For WDFW:

- How well can HRCD detect changes relative to land use permit records?
- Using Thurston County's SMP area as an example test area, what land cover changes are happening which HRCD is not capturing?
- With the development of a HRCD user manual, can HRCD be successfully utilized by other entities in the absence of direct assistance by WDFW?

The pilot quantified increases in impervious surfaces and decrease in tree canopy within marine areas of the SMP jurisdiction and checked for relevant permits issued. It consisted of five phases:

*Phase 1: Initial SMP Change Analysis:* Staff from WDFW's Habitat Program and the County's Long-Range Planning Department intersected the HRCD dataset with the County's SMP area and tax parcel data within ArcGIS for three time periods of HRCD availability (2006 to 2009, 2009 to 2011, and 2011 to 2013). Staff compared known areas of change to those locations with the county's land use permit records to find locations of observed change via HRCD without any permit record. During this phase, land cover change statistics were also produced, including total area of change and discrete occurrences of land cover change events.

*Phase 2: Learning What the HRCD Misses:* Using the SMP area in the County, WDFW staff manually looked for land cover changes not captured by the HRCD analysis, to understand how accurate HRCD was in capturing all land cover change situations (rates of omission error).

*Phase 3: Developing a Standardized Method for Utilizing the HRCD:* A major goal of this project was to develop support materials for others to be able to utilize HRCD to answer land use management questions independent of WDFW staff assistance. Using lessons learned in Phases 1 and 2, WDFW and the County agreed upon a recommended method for applying HRCD to a specific management question, and collaboratively developed a "how-to" manual. In this phase, WDFW staff also developed a web-based service (<https://hrcd-wdfw.hub.arcgis.com>) where users can download the HRCD dataset, detail the methodology of HRCD construction, find WDFW contact information, and more.

*Phase 4: Testing the Manual through Remaining SMP Analysis in WRIA 13:* Using only the HRCD dataset and the manual produced in Phase 3, County staff examined land cover change within the remaining SMP areas within WRIA 13 successfully for the same three time periods that HRCD data was available and utilized in the earlier phase.

*Phase 5: Training and Outreach:* With the lessons learned and products derived from Phases 1 through 4 of the project, staff worked in conjunction with the [Coastal Training Program](#), managed by Ecology, to develop and deliver a workshop for planning staff within other state agencies, local



governments, and some non-governmental organizations. WDFW also used this opportunity to train internal staff on the benefits, limitations, and uses of HRCD.

The evaluators analyzed land cover change within Thurston County's SMP area between 2006 and 2013, pulling permit records from timeframes that corresponded with the available HRCD datasets. The project's findings were very helpful, not only because of the information collected, but also in providing proof of concept for several of the steps/tools.

For example: The utility of HRCD in analyzing patterns of land cover change in a specific geographic area of concern were well demonstrated. The HRCD analysis found that, from 2006 to 2013, less than half of one percent (0.39%) of the riparian area contained within the SMP had land cover change – approximately two-thirds of this was due to canopy loss, with one-third due to new impervious surfaces. The HRCD analysis did not find any permitted developments that were out of compliance, though it did find unpermitted events (e.g., tree removal) in each time period studied.

Furthermore, the HRCD dataset proved to be relatively simple to use. With the development of standard application methods, Thurston County was able to complete an analysis of their remaining SMP area without any further assistance from WDFW.

On the flip side, Thurston County found that comparing actual permit compliance with HRCD data was “tedious and difficult” because of limitations with the county's permit tracking database ([AMANDA](#)). For example, in many cases, land use permits did not include enough information to determine conclusively that a parcel with observed change via HRCD was out of compliance or determine that the parcel had a permit record during the study's timeframe in question.

Local governments can use HRCD analysis at the start to find land cover changes that are otherwise unknown; as they begin to understand patterns, HRCD analysis provides indications to identify locations that warrant closer investigation through other methods.

## 5.6 CONCLUSION

Implementation and effectiveness monitoring are important parts of adaptive management and can be undertaken relatively easily by local governments. Many of our riparian ecosystems are already degraded and stressed, so it is worth our while to investigate whether the actions put in place to protect them are being carried out as required and leading to the specific environmental responses that were intended. This is now more important than ever, because in spite of advances in science and efforts to improve regulatory processes, climate change and population pressures are increasingly confronting many parts of the state. Using monitoring and adaptive management to track successes and failures and then learning from both will make our challenges easier to overcome.



## LITERATURE CITED

Volume 1 serves as the primary source and citation for this document:

Quinn, T., G. Wilhere, and K. Krueger (managing editors). 2020. Riparian Ecosystems, Volume 1: Science Synthesis and Management Implications. Habitat Program, Washington Department of Fish and Wildlife, Olympia, Washington.

---

Anderson, P.S., S. Meyer, P. Olson, and E. Stockdale. 2016. Determining the ordinary high water mark for Shoreline Management Act compliance in Washington State. Publication No. 16-06-029. Washington State Department of Ecology, Olympia, Washington.

(<https://fortress.wa.gov/ecy/publications/documents/1606029.pdf>)

Arid Lands Initiative. 2014. The Arid Lands Initiative: shared priorities for conservation at a landscape scale. Summary prepared by S.A. Hall and the Arid Lands Initiative Core Team. SAH Ecologia LLC, Wenatchee, Washington. Available at

([https://www.sciencebase.gov/catalog/file/get/546d0a6ae4b0fc7976bf1db0?f=disk\\_ab%2Fd6%2F7d%2Fabd67df8a73f48f87922d184ffec6e9b8dac635c](https://www.sciencebase.gov/catalog/file/get/546d0a6ae4b0fc7976bf1db0?f=disk_ab%2Fd6%2F7d%2Fabd67df8a73f48f87922d184ffec6e9b8dac635c))

Ashcroft, M.B. 2010. Identifying refugia from climate change. *Journal of Biogeography* 37:1407-1413.

Azerrad, J., J. Carleton, J. Davis, T. Quinn, C. Sato, M. Tirhi, G. Wilhere, and S. Tomassi. 2009. Landscape planning for Washington's wildlife: managing for biodiversity in developing areas. Habitat Program, Washington Department of Fish and Wildlife. Olympia, Washington.

(<https://wdfw.wa.gov/publications/00023>)

Ballash, H. 2016. Building cities in the rain. Washington State Department of Commerce. Olympia, Washington. ([https://www.ezview.wa.gov/site/alias\\_1780/overview/34828/overview.aspx](https://www.ezview.wa.gov/site/alias_1780/overview/34828/overview.aspx))

Barnard, R. J., J. Johnson, P. Brooks, K. M. Bates, B. Heiner, J. P. Klavas, D.C. Ponder, P.D. Smith, and P. D. Powers. 2013. Water crossings design guidelines. Habitat Program, Washington Department of Fish and Wildlife, Olympia, Washington. (<https://wdfw.wa.gov/publications/01501>)

Berminham, B., C. Douglas, B. Floyd, D. Koellmann, P. Mugunthan, and J. Small. 2013. Final draft semi-arid riparian functions and associated regulatory protections to support shoreline master program updates. Anchor QEA LLC., Kennewick, Washington.

Bonlender, B. 2018. Critical area handbook: A handbook for reviewing critical areas regulation. Washington State Department of Commerce, Olympia, Washington. (<https://www.commerce.wa.gov/serving-communities/growth-management/growth-management-topics/critical-areas/>)

Bormann, B.T., P.G. Cunningham, M.H. Brookes, V.W. Manning, and M.W. Collopy. 1994. Adaptive ecosystem management in the Pacific Northwest. PNW-GTR-341. U.S. Forest Service, Pacific Northwest Research Station, Portland, Oregon.

BLM (Bureau of Land Management). 2015. Riparian area management: proper functioning condition assessment for lotic areas. Technical Reference 1737-15. BLM, National Operations Center, Denver, Colorado.

City of Redmond. 2013. City of Redmond, Washington citywide watershed management plan. Prepared by Herrera Environmental Consultants, Inc. Seattle, Washington.

(<https://www.redmond.gov/DocumentCenter/View/4055/Watershed-Management-Plan-2013-PDF>)

- Cordell, H. K., D. Murphy, K.H. Ritters, and J.E. Harvard III. 2005. The natural ecological value of wilderness. Pages 205-249 in H.K. Cordell, J.C. Bergstrom, J. M. Bowker (editors). *The Multiple Values of Wilderness*. Venture Publishing, State College, Pennsylvania.
- Cramer, M.L. (managing editor). 2012. Stream habitat restoration guidelines. Co-published by the Washington Departments of Fish and Wildlife, Natural Resources, Transportation, and Ecology, Washington State Recreation and Conservation Office, Puget Sound Partnership, and the U.S. Fish and Wildlife Service, Olympia, Washington.
- Cramer, M., K. Bates, D. Miller, K. Boyd, L. Fortherby, P. Skidmore, and T. Hoitsma. 2002. Integrated streambank protection guidelines. Washington Department of Fish and Wildlife, Olympia, Washington. (<https://wdfw.wa.gov/publications/00046>)
- DNR (Washington Department of Natural Resources). 2004. Forest Practices Board Manual, Section M2: standard methods for identifying bankfull channel features and channel migration zones. DNR, Forest Practices Division, Olympia, Washington. ([https://www.dnr.wa.gov/publications/fp\\_board\\_manual.pdf?amcgv](https://www.dnr.wa.gov/publications/fp_board_manual.pdf?amcgv))
- EnviroVision, Herrera Environmental, and Aquatic Habitat Guidelines Working Group. 2010. Protecting nearshore habitat and functions in Puget Sound, revised edition. Washington State Department of Fish and Wildlife, Olympia, Washington. (<https://wdfw.wa.gov/publications/00047>)
- Fetherston, K.L., R.J. Naiman, and R.E. Bilby. 1995. Large woody debris, physical process, and riparian forest succession in montane river networks of the Pacific Northwest. *Geomorphology* 13:133-144.
- Fox, M.J. 2003. Spatial organization, position, and source characteristics of large woody debris in 2485 natural systems. Ph.D. Dissertation. University of Washington, Seattle, Washington.
- Harris, R.R. 1987. Occurrence of vegetation on geomorphic surfaces in the active floodplain of a California alluvial stream. *American Midland Naturalist* 118:393-405.
- Hilty, J.A., and A.M. Merenlender. 2004. Use of riparian corridors and vineyards by mammalian predators in northern California. *Conservation Biology* 18:126-135.
- Johannessen, J., A. MacLennan, A. Blue, J. Waggoner, S. Williams, W. Gerstel, R. Barnard, R. Carman, and H. Shipman. 2014. Marine shoreline design guidelines. Washington Department of Fish and Wildlife, Olympia, Washington. (<https://wdfw.wa.gov/publications/01583>)
- Johnson, D.H., and T.A. O'Neil. 2001. *Wildlife Habitat Relationships in Oregon and Washington*. Oregon State University Press, Corvallis, Oregon.
- Keppel, G., K.P. Van Niel, G.W. Wardell-Johnson, C.J. Yates, M. Byrne, L. Mucina, A.G.T. Schut, S.D. Hopper, and S.E. Franklin. 2012. Refugia: identifying and understanding safe havens for biodiversity under climate change. *Global Ecology and Biogeography* 21:393-404.
- Knight, K. 2009. Land use planning for salmon, steelhead and trout: a land use planner's guide to salmonid habitat protection and recovery. Habitat Program, Washington Department of Fish and Wildlife, Olympia, Washington. (<https://wdfw.wa.gov/publications/00033>)
- Knutson, K.L., and V.L. Naef. 1997. Management recommendations for Washington's Priority Habitats: riparian. Habitat Program, Washington Department of Fish and Wildlife, Olympia, Washington. (<https://wdfw.wa.gov/publications/00029>)
- Krosby, M., D.M. Theobald, R. Norheim, and B.H. McRae. 2018. Identifying riparian climate corridors to inform climate adaptation planning. *PLOS ONE* 13(11): e0205156.

- Lacy, R.C., Williams, R., Ashe, E., Balcomb III, K.C., Brent, L.J., Clark, C.W., Croft, D.P., Giles, D.A., MacDuffee, M. and Paquet, P.C. (2017). Evaluating anthropogenic threats to endangered killer whales to inform effective recovery plans. *Scientific reports*, 7(1), 1-12.
- Legg, N.T., and P.L. Olson. 2015. Screening tools for identifying migrating stream channels in western Washington – geospatial data layers and visual assessments. Publication No. 15-06-003. Washington State Department of Ecology, Olympia, Washington. (<https://fortress.wa.gov/ecy/publications/documents/1506003.pdf>)
- Legg, N.T., and P.L. Olson. 2014. Channel migration processes and patterns in western Washington: A synthesis for floodplain management and restoration. Publication No. 14-06-028. Washington State Department of Ecology, Olympia, Washington. (<https://fortress.wa.gov/ecy/publications/documents/1406028.pdf>)
- Lichvar, R.W., N.C. Melvin, M.L Butterwick, and W.N Kirchner. 2012. National wetland plant list indicator rating definitions. ERCD/CRREL TN-12-1. U.S. Army Corps of Engineers, Washington, D.C.
- Murray, C.C., Hannah, L.C., Doniol-Valcroze, T., Wright, B., Stredulinsky, E., Locke, A., and R. Lacy. (2019). Cumulative Effects Assessment for Northern and Southern Resident Killer Whale Populations in the Northeast Pacific. Department of Fisheries and Oceans, Canadian Scientific Advisory Research Document 2019/056. x. + 88 pp.
- Naiman, R. J., and R. E. Bilby. 1998. (editors) *River ecology and management: lessons from the Pacific Coastal Ecoregion*. Springer Science & Business Media, New York.
- Naiman, R.J., H. Decamps, and M. Pollock. 1993. The role of riparian corridors in maintaining regional biodiversity. *Ecological Applications* 3:209-212.
- Nordland, B., and K. Bates. 2000. Draft fish protection and screen guidelines for Washington State. Habitat Program, Washington Department of Fish and Wildlife, Olympia, Washington. (<https://wdfw.wa.gov/publications/00050>)
- NRC (National Research Council). 2002. *Riparian areas: functions and strategies for management*. The National Academies Press, Washington, D.C. <https://doi.org/10.17226/10327>.
- Olson, P. L., N. T. Legg, T. B. Abbe, M. A. Reinhart, and J. K. Radloff. 2014. A methodology for delineating planning-level channel migration zones. Publication No. 14-06-025. Washington State Department of Ecology, Olympia, Washington. (<https://fortress.wa.gov/ecy/publications/documents/1406025.pdf>)
- Patten, D.T. 1998. Riparian ecosystems of semi-arid North America: diversity and human impacts. *Wetlands* 18:498-512. <https://doi.org/10.1007/BF03161668>.
- Puget Sound Partnership. 2020. Puget Sound Vital Signs. Available: <https://www.psp.wa.gov/evaluating-vital-signs.php> (December 2020).
- Quinn, T., et al. 1998. *Habitat Associations of the riparian-dependent amphibian, reptile, mammals, and mollusks in commercial forest lands of Washington State: a report to the Timber, Fish & Wildlife policy committee*. Washington Department of Natural Resources, Olympia, Washington.
- Rapp, C.F., and T.B. Abbe. 2003. A framework for delineating channel migration zones. Publication No. 03-06-027. Washington State Department of Ecology, Olympia, Washington. (<https://fortress.wa.gov/ecy/publications/documents/0306027.pdf>)
- RCO (Recreation and Conservation Office). 2019. *State of Salmon*. RCO, Olympia, Washington. <https://stateofsalmon.wa.gov/exec-summary/> Retrieved July 23, 2019.

- Richardson, J.S., R.J. Naiman, F.J. Swanson, and D.E. Hibbs. 2005. Riparian communities associated with Pacific Northwest headwater streams: assemblages, processes, and uniqueness. *Journal of American Water Resources Association* 41:935-947.
- Rogers, L.E., R.E. Fitzner, L.L. Cadwell, and B.E. Vaughan. 1988. Terrestrial animal habitats and population responses. Pages 182-257 in W.H. Rickard, L.E. Rogers, B.E. Vaughan, and S.F. Liebetrau (editors). *Shrub-steppe: balance and change in a semi-arid terrestrial ecosystem*. Elsevier, New York.
- Rosgen, D.L. 1996. *Applied river morphology: Second edition*. Wildland Hydrology Books, Fort Collins, Colorado.
- Seavy, N.E., T. Gardali, G.H. Golet, F.T. Griggs, C.A. Howell, R. Kelsey, S.L. Small, J.H. Viers, and J.F. Weigand. 2009. Why climate change makes riparian restoration more important than ever: recommendations for practice and research. *Ecological Restoration* 27:330-338.
- Shared Strategy Development Committee. 2007. Puget Sound salmon recovery plan. Shared Strategy for Puget Sound, Seattle, Washington.
- Smith, D. 2005. Off-channel habitat inventory and assessment for the upper Skagit River basin. Report to non-flow coordinating committee of the Skagit River Hydroelectric Project (FERC No. 553). Skagit River System Cooperative, La Conner, Washington.
- Thomas, F.M. 2014. Ecology of phreatophytes. *Progress in Botany* 75:335-375.
- Thomas, J.W. (technical editor)]. 1979. *Wildlife Habitats in Managed Forests: The Blue Mountains of Oregon and Washington*. Agriculture Handbook No. 553. U.S. Forest Service, Washington, D.C. ([https://www.srs.fs.usda.gov/pubs/gtr/uncaptured/gtr\\_pnw080.pdf](https://www.srs.fs.usda.gov/pubs/gtr/uncaptured/gtr_pnw080.pdf))
- Thomas, J.W., J.F. Franklin, J. Gordon, and K.N. Johnson. 2006. The Northwest Forest Plan: Origins, components, implementation experience and suggestions for change. *Conservation Biology* 20:277-87.
- USFS (U.S. Forest Service). 2008. Stream simulation: an ecological approach to providing passage for aquatic organisms at road-crossings. National Technology and Development Program, San Dimas, California.
- USFS (U.S. Forest Service). 2001. Selway and Middle Fork Clearwater Rivers Subbasin Assessment. Nez Perce, Clearwater, and Bitterroot National Forests, Idaho. Retrieved August 26, 2019.
- Vander Haegen, M.W. 2007. Fragmentation by agriculture influences reproductive success of birds in a shrub-steppe landscape. *Ecological Applications* 17: 934-947.
- Ward, J.V., and J.A. Stanford. 1995. Ecological connectivity in alluvial river ecosystems and its disruption by flow regulation. *Regulated Rivers: Research & Management* 11:105-119.
- Washington Sea Grant. 2009. Protection of marine riparian functions in Puget Sound, Washington. Washington Department of Fish and Wildlife, Olympia, Washington. (<https://wdfw.wa.gov/publications/00693>)
- WDFW (Washington Department of Fish and Wildlife). 2005. Washington's comprehensive wildlife conservation strategy, final draft. WDFW, Olympia, Washington.
- WDFW (Washington Department of Fish and Wildlife). 2016. Your marine waterfront: A guide to protecting your property while promoting healthy shorelines. WDFW, Olympia, Washington. (<https://wdfw.wa.gov/publications/01791>)

- Williams, P.B., E. Andrews, J.J. Opperman, S. Bozkurt, and P.B. Moyle. 2009. Quantifying activated floodplains on a lowland regulated river: its application to floodplain restoration in the Sacramento Valley. *San Francisco Estuary and Watershed Science* 7(1).
- Wolman, M.G., and L.B Leopold. 1957. River flood plains: some observations on their formation. Geological Survey Professional Paper 282-C. U.S. Government Printing Office, Washington, D.C.

## GLOSSARY OF TERMS

**Active channel:** The active channel is defined by the lower limit of continuous riparian vegetation (Naiman et al. 1998) and may be delineated by absence of both moss on rocks and rooted vegetation (USFS 2008). The upper most elevation of the active channel is sometimes equated with the ordinary high-water mark.

**Active floodplain:** Located between the active channel and adjacent terrace or hillslopes (Fetherston et al. 1995; Harris 1987). Depending on the watershed, the flood return interval of the active floodplain varies between 1 and 10 years (Wolman and Leopold 1957; Ward and Stanford 1995; Lichvar et al. 2006; Williams et al. 2009; BLM 2015).

**Adaptive management:** The systematic acquisition and application of reliable information to improve management over time. It often includes treating management decisions as experiments in order to address critical uncertainties and learn more quickly from experience. It involves setting objectives, monitoring conditions, and adjusting management based on results. Hallmarks of a sound adaptive management program include: (1) adequate funding for monitoring and research, (2) a willingness to change course when pre-established triggers are reached, and (3) a commitment to gather data and evaluate conditions at appropriate spatial extents and time scales. *See Ecosystem-based management and WAC 365-195-920(2).*

**Anadromous fisheries:** The commercial, recreational or subsistence harvest of fish that are born in freshwater, rear at sea, and return to freshwater to spawn. Anadromous fisheries of Washington include salmon (Chinook, coho, chum, sockeye, and pink), steelhead, bull trout, coastal cutthroat trout, green sturgeon, white sturgeon, eulachon, longfin smelt, and Pacific lamprey.

**Aquatic species:** Wildlife species that live in marine or freshwater including fish, shellfish (e.g., clams, snails, mussels), amphibians (e.g., frogs, salamanders), reptiles (e.g., turtles), crustaceans (e.g., crayfish), insects (e.g., larval mayflies, stoneflies, caddisflies, dragonflies) and various other invertebrates.

**Best Available Science:** Information produced through a valid scientific process that WDFW or another local, state or federal agency has determined represents the best available science consistent with criteria set out in WAC 365-195-900 through 365-195-925. (Volume 1 of this document is an example of Best Available Science regarding riparian ecosystems.)

**Biota:** The animal and plant life of a region, habitat, or geological period.

**Buffer:** The area around a critical area that separates the critical area from incompatible uses. For example, a 200m buffer may be established around a heron-nesting colony (the critical area) to keep suburban land uses from disrupting the colony. *See WAC 365-190-130(3)(a).* Riparian ecosystems are both buffers (for instream habitat) and critical areas on their own merit.

**Channel Migration Zone:** The area within which a river channel is likely to migrate and occupy over a specified time period (e.g., 100 years).

**Channel slope or gradient:** The average steepness of a stream segment measured as its change in elevation divided by its length. Typically, a segment's gradient is considered low if less than 2%, moderate between 2% and 4%, and high if greater than 4%.

**Classification** (critical area): Defining categories to which critical areas are assigned. The Priority Habitats and Species (PHS) program provides WDFW's recommended classification scheme for Fish and Wildlife Habitat Conservation Areas. Classification precedes designation in counties' and cities' effort to protect critical areas. *See* WAC 365-190-040(4).

**Complexity:** The complicated state seen in dynamic environments that contain multiple components and processes that interact with one another in a web of interactions whose outcomes are often unpredictable. Complexity can be described with conceptual models; outcomes of well-understood complex phenomena can be partially predicted using computer models.

**Connectivity:** Landscape connectivity is the physical relationship between landscape elements. Functional connectivity describes the degree to which landscapes facilitate or impede the movement of organisms between areas of habitat.

**Critical Aquifer Recharge Area:** Areas with an essential recharging effect on aquifers used for potable water. One of five types of Critical Areas identified in the Growth Management Act.

**Critical Area(s):** Places that the Growth Management Act requires all counties and cities to designate and protect, specifically, (1) Wetlands; (2) Critical Aquifer Recharge Areas; (3) Fish and Wildlife Habitat Conservation Areas (e.g., Riparian Management Zones); (4) Frequently Flooded Areas; and (5) Geologically Hazardous Areas. In developing policies and regulations to protect the functions and values of critical areas, counties and cities are required to include best available science and give special consideration to conservation or protection measures necessary to preserve or enhance anadromous fisheries. *See* RCW 36.70A.172(1). The presence of a critical area may limit some land development options. *See* WAC 365-190-040(6).

**Delineation** (critical area): The act of applying definitions or performance standards in the field to identify the boundary of a critical area.

**Designation** (critical area): Assigning critical areas into established categories and specifying their general distribution, location, and extent. Designation can be made by maps (which are useful for public awareness and for identifying if a proposal may affect a critical area) and by performance standards or definitions (which allow for specific identification and site-scale delineation during permit review). WDFW's Priority Habitats and Species (PHS) program provides the agency's recommended designation maps and performance standards/definitions for Fish and Wildlife Habitat Conservation Areas. Designation occurs after classification in counties' and cities' efforts to protect critical areas. *See* WAC 365-190-040(5).

**Disturbance regime:** The frequency, magnitude, and duration of disturbance events.

**Disturbance:** A pronounced, temporary change in environmental conditions within an ecosystem. Disturbances often act quickly and can alter ecosystem composition, structure, and function.

**Ecological (biological) integrity:** Ability of an ecological system to support and maintain a community of organism that has species composition, diversity, and functional organization comparable to those of natural habitats within a region. An ecological system has integrity when its dominant ecological characteristics (composition, structure, function, and processes) occur within their historical ranges of natural variability. *See* Historical condition and Range of natural variability.

**Ecosystem(s):** A spatially explicit unit of the Earth that includes all the organisms, along with all components of the abiotic (chemical and physical) environment. Ecosystems have composition, structure, and functions.

**Ecosystem composition** (or ecological composition): All living (biotic) and nonliving parts of an ecosystem.

**Ecosystem function(ing)** (or ecological function): (1) The process or cause and effect relationship underlying two or more interacting components, e.g., terrestrial plant material as food/substrate for aquatic invertebrates. (2) The sum of processes that sustain the system. (3) The capacity of natural processes and components to provide goods and services that satisfy human needs, either directly or indirectly. Ecosystem functions can be conceived as a subset of ecological processes (*See* Ecosystem process).

**Ecosystem process** (or ecological process): Interactions among components of an ecosystem, biotic (living organisms) and abiotic (chemical and physical) components. Many processes involve transfer, conversion, or storage of matter or energy (*See* Ecosystem function).

**Ecosystem structure** (or ecological structure): The arrangement of and relations among the parts or elements (components) of an ecosystem.

**Ecosystem-based management (EBM):** Management driven by explicit goals; executed by policies, protocols, and practices; and made adaptable by monitoring and research; based on our best understanding of the ecological interactions and processes necessary to sustain ecosystem composition, structure, and function. EBM acknowledges that humans are an important ecosystem component and focuses on managing human activities within ecosystems. EBM often involves balancing ecological, economic, and social objectives within the context of existing laws and policies.

**Enhance:** To improve a critical area's existing ecosystem processes, structure, and/or functions so that its ecological integrity is more like its historical condition.

**Erosion:** The loosening and transport of soil particles and other sediment by water. Terrestrial erosion includes raindrop splash erosion, overland flow sheet erosion, surface flow rill (shallow) and gully (deeper) erosion. Channel erosion includes streambank erosion and channel incision (gouging). Rill and gully erosion diminish the ability of the riparian area to trap sediment and pollutants and can often be avoided with intact riparian vegetation.

**Fish and Wildlife Habitat Conservation Areas (FWHCA):** A type of Critical Area specified in the Growth Management Act. The intent of FWHCAs are to maintain populations of species in suitable habitats within their natural geographic distribution so that (1) the habitat available is sufficient to support viable populations over the long term, and (2) isolated subpopulations are not created. FWHCAs come in a variety of types including waters of the state, places with which listed species have a primary association, habitats and species of local importance, and riparian ecosystems. *See* WAC 365-190-130.

**Flow regime** (stream): The distribution of stream flow through space and time. Flow regimes can be described by their magnitude (e.g., mean annual, hourly maximum), timing, frequency or return periodicity, duration, spatial distribution, and rate of change. The pathways that water takes to reach a stream (e.g., surface runoff) and within a stream exert a strong influence on the flow regime.



**Function:** Physical, chemical, or biological processes that occur within an ecosystem. WAC 365-196-830 says, “Functions are the conditions and processes that support the ecosystem. Conditions and processes operate on varying geographic scales ranging from site-specific to watershed and even regional scales.” See also Ecosystem function(ing) and Ecosystem process.

**Habitat:** The resources and conditions presented in an area that support the functional needs of a species (e.g., hiding, migration, resting, feeding, breeding, and rearing), and which are necessary for its survival and reproduction. Habitat is species-specific, scale dependent, and more than vegetation composition or structure.

**Hazard Tree:** A tree that a jurisdiction’s building official or other recognized professional (e.g., certified arborist, registered landscape architect, or certified forester) has determined poses a near-term hazard to public safety or to an existing permanent structure or public utility.

**Herbaceous:** Non-woody plants such as grasses and ferns.

**Historical condition:** See Ecological integrity and Range of natural variability.

**Hydrology:** Description of the properties, distribution, movement, and storage of water on and below the Earth’s surface.

**Impervious surface:** Ground surfaces that resist or prevent water infiltration, e.g., roofs of houses, roadways.

**Imputed:** estimated; a value assigned to missing data by inference from the values of data within the same dataset.

**Infiltration:** The rate or process by which water on the ground enters the soil.

**Instream:** Within flowing freshwater; also, the area waterward of the Ordinary High-Water Mark.

**Large Woody Debris:** Large dead woody material (such as fallen trees and branches) in various stages of decomposition that provide nutrient capital to forest and aquatic resources and serve as habitat in forest and riparian ecosystems. Large wood is usually defined as having diameter greater than 4 in (10 cm) and length greater than 6 ft ( $\approx$  2 m).

**Low Impact Development (LID):** A storm water and land-use management strategy that tries to mimic natural hydrologic conditions by emphasizing pre-disturbance hydrologic processes of infiltration, filtration, storage, evaporation, and transpiration.

**Mitigation:** General category of measures that a proponent may take to avoid, minimize, and compensate for impacts.

**Mitigation sequence:** The stepwise process of protecting a critical area through, first (1) avoiding harm to the critical area to the maximum extent practicable, then (2) minimizing unavoidable harm to the maximum extent practicable, and finally (3) providing compensation for all unavoidable harm by restoring, creating, enhancing, or preserving the critical area’s ecological functions and values to replace those impacted or lost through permitted activities.

**Monitoring:** The process of observing and checking the progress or quality environmental conditions for the purposes of adaptive management. Often described as having three types – implementation, effectiveness, and validation.

**Morphology** (stream channel, aka fluvial geomorphology): A stream channel's shape and how it changes over time. Channel morphology is influenced by the abundance and variation in sediment sources, the ability of water to transport sediment downstream, and interactions of sediment with riparian vegetation and woody debris.

**Off-Channel Habitat:** Overflow channels, sloughs, alcoves, wetlands, and small streams found within the floodplains of larger river channels. Off-channel habitat consists of waters connected to and draining into rivers and streams by inundation during peak flow events (Smith 2005; WAC 222-16-031). Off-channel habitat provides habitat for salmonids and other aquatic species which often afford (1) spawning habitat that does not experience scouring high flows; and (2) summer rearing habitat that does not experience loss of stream flow.

**Ordinary High Water Mark (OHWM):** (1) That mark that will be found by examining the bed and banks and ascertaining where the presence and action of waters are so common and usual, and so long continued in all ordinary years, as to mark upon the soil a character distinct from that of the abutting upland (Washington Department of Ecology 2016). (2) That line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas (U.S. Army Corps of Engineers, 2014).

**Organic litter:** Plant, leaf, tree, or soil litter, and duff are dead plant materials that have fallen to the ground. In this document, organic litter is referenced as available for contributions to the stream system.

**Passive Restoration:** Allowing natural succession to occur in an ecosystem after removing a source of disturbance.

**Population viability** (local): The likelihood that a population of a species will persist for some length of time.

**Precautionary principle:** Erring on the side of not harming resources when faced with uncertainty, especially for potential harm that is essentially irreversible. Utilizing a precautionary approach in land use planning involves: (1) taking preventive action (avoiding impacts); (2) shifting the burden of proof to the project proponents; (3) exploring a wide range of potential alternatives; and/or (4) including multiple stakeholders and disciplines in decision making.

**Priority Area:** The area within a Priority Species' natural geographic distribution within which protective measures and/or management actions are needed to (1) support viable populations over the long term and (2) avoid creating isolated subpopulations.

**Priority Habitat:** A State of Washington habitat type with unique or significant value to many species; an area with one or more of the following attributes: (1) comparatively high fish and wildlife density; (2) comparatively high species diversity; (3) important breeding habitat; (4) important seasonal ranges; (5) important movement corridors; (6) limited availability; (7) high vulnerability to habitat alteration; or (8) unique or dependent species. Examples of Priority Habitats include but are not limited to instream, riparian, shrub steppe, Oregon white oak woodlands, freshwater wetlands, and marine nearshore.

**Priority Habitats & Species (PHS):** WDFW's primary means of transferring fish and wildlife information from resource experts to local governments, landowners, and others for the protection of fish, wildlife, and habitat. Includes endangered, threatened, sensitive, candidate, and vulnerable species and habitats deemed priorities of WDFW and reflective of best available science. *See* WAC 365-190-130.

**Priority Species:** A State of Washington fish or wildlife species requiring protective measures and/or management actions to ensure its survival. A Priority Species fits one or more of the following criteria: (1) is a state-listed endangered, threatened, sensitive, or candidate species, (2) has vulnerable aggregations, or (3) is of recreational, commercial, and/or tribal importance. Examples of Priority Species include but are not limited to steelhead/rainbow trout, bull trout/Dolly Varden, great blue heron, cavity-nesting ducks, sage grouse, fisher, orca, and elk.

**Process:** *See* Ecosystem process.

**Protect:** To prevent the degradation of existing ecosystem functions and values.

**Range of natural variability** (or Historical range of natural variability): Refers to the range of ecological conditions (components, structures and functions) in a time period before widespread anthropogenic changes.

**Recruitment** (wood): The process of wood moving from a riparian area to the stream channel. Sources of recruitment include bank erosion, windthrow, landslides, debris flows, snow avalanches, and tree mortality due to, for example, fire, ice storms, beavers, insects, or disease. Dominant factors include, but are not limited to, channel width, slope steepness, slope stability, forest composition and structure, and local wind patterns.

**Refugia** (singular Refugium): sites to which biota retreat, persist in and potentially expand from under changing environmental conditions (Keppel et al. 2012).

**Riparian:** An adjective meaning alongside a waterbody: stream, river, lake, pond, bay, sea, and ocean. Riparian areas are sometimes referred to by different names: riparian ecosystems, riparian habitats, riparian corridors, or riparian zones. Depending on the contexts, these terms may have somewhat different meanings.

**Riparian area:** A defined area encompassing both sides of a water body, composed of aquatic ecosystems (i.e., the river or stream), riparian ecosystem, and riverine wetlands. Riparian areas are three dimensional: longitudinal up and down streams, lateral to the width of the riparian ecosystem, and vertical from below the water table to above the canopy of mature site-potential trees (NRC 2002).

**Riparian buffer:** Buffer refers to its purpose, which is to reduce or prevent adverse impacts to water quality, fisheries, and aquatic biodiversity from human activities occurring upslope of the buffer. Riparian buffers managed specifically for pollutant removal may also be called a vegetated filter strip.

**Riparian ecosystem:** Riparian areas are transitional between terrestrial and aquatic ecosystems and distinguished by gradients in biophysical conditions, ecological processes, and biota. They are areas through which surface and subsurface hydrology connect waterbodies with their adjacent uplands. They include those portions of the ecosystem distinguished by gradients (i.e., riparian

zones) and portions of terrestrial ecosystems that significantly influence exchanges of energy and matter with aquatic ecosystems (i.e., the Zone of Influence). Our definition of riparian ecosystem does not include adjacent waters (i.e., rivers or streams, but does include riverine wetlands) and recognizes the riparian zone as a distinctive area within riparian ecosystems.

**Riparian Management Zone:** A delineable area defined in a land use regulation; often synonymous with riparian buffer. For the purposes of this document, we define the RMZ as the area that has the potential to provide full riparian functions. In many forested regions of the state this area occurs within one 200-year site-potential tree height measured from the edge of the stream channel. In situations where a CMZ is present, this occurs within one site-potential tree height measured from the edges of the CMZ. In non-forest zones the RMZ is defined by the greater of the outermost point of the riparian vegetative community or the pollution removal function, at 100-feet.

**Riparian values:** The benefits that riparian ecosystems provide to society, including but not limited to flood damage reduction, water quality improvement, provision of harvestable populations of salmon, and provision of recreational opportunities. Riparian values have direct economic consequences to local communities through fishing opportunities, and flood and water quality protection, among others.

**Riparian zone:** A distinctive area within riparian ecosystems. The riparian zone contains wet or moist soils and plants adapted to growing conditions associated with periodically saturated soils. *See* Riparian ecosystem.

**Risk:** A situation involving exposure to danger, harm, or loss. Risk reflects the magnitude of the adverse impact and its probability of occurring. Risk is appropriately managed by applying the precautionary principle (especially for irreversible losses) and through adaptive management.

**Salmonid:** A family of fish comprised of salmon, trout and whitefish. Native salmonid species in Washington State include: Chinook Salmon (*Oncorhynchus tshawytscha*), Chum Salmon (*O. keta*), Coho Salmon (*O. kisutch*), Pink Salmon (*O. gorbuscha*), Sockeye Salmon/Kokanee (*O. nerka*), Steelhead/Rainbow Trout (*O. mykiss*), Cutthroat Trout (*O. clarki*), Bull Trout (*Salvelinus confluentus*), Dolly Varden (*S. malma*), Pygmy Whitefish (*Prosopium coulteri*), and Mountain Whitefish (*P. williamsoni*). This list does not include names of subspecies. (*See* anadromous fisheries).

**Site class:** The classification of a site based on the productivity of its dominant tree species. Site classes vary based on local differences in soil nutrients and moisture, light and temperature regimes, and topography. Site classes are typically described as most productive (I) through least productive (V).

**Site-Potential Tree Height:** The average maximum height of the tallest dominant trees for a given age and site class.

**Stronghold:** Habitat strongholds are refugia watersheds that contain high quality habitat with depressed or weak populations. The habitat in these areas has a high to very high potential to support these species. The population level in these areas is not considered to be a function of habitat, but other factors (USFS2001).

**Structure:** *See* Ecosystem structure.

**Succession:** Ecological succession is the process by which the biological community composition recovers over time following a disturbance event.

**Uncertainty** (scientific): The absence of information about the state of something or a relevant variable. Sources of uncertainty include, but are not limited to natural variation (i.e., because outcomes vary in difficult-to-predict ways through time and space), model uncertainty (i.e., we do not understand how things interact with each other), systematic error (e.g., poorly designed experiments or calibrated instruments), or measurement error. *See Risk.*

**Values:** The level of benefits that the space, water, minerals, biota, and all other factors that make up a natural ecosystem provide to support native life forms, including humans (Cordell et al. 2005).

**Vegetative filter strips:** A riparian buffer designed to capture nutrients, contaminant compounds, and sediment transported by run-off. Filter strips are sometimes synonymous with riparian buffers.

**Water quality:** Physical, chemical, and biological characteristics of water that describe its suitability to meet human needs or habitat requirements for fish and wildlife.

**Watershed processes:** The fluxes of energy (e.g., sunlight, wildfire) and materials (particularly water and sediment) that interact with biota (e.g., vegetative cover, salmon, beavers, soil microbes) to form a watershed's physical features and characteristics, which give rise to its instream physical and ecological conditions. These processes occur within a context that reflects the watershed's climate, geology, topography, and existing human land use. *See Ecosystem process.*

**Watershed:** A land area that drains to a common waterbody.

**Wetland:** Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support—and that under normal circumstances do support—a prevalence of vegetation typically adapted for life in saturated soil conditions. Examples include but are not limited to swamps, marshes, and bogs.

**Zone of Influence:** The portions of terrestrial ecosystems that significantly influence exchanges of energy (e.g., sunlight) and matter (e.g., large wood, sediment, nutrients) with aquatic ecosystems.

## APPENDIX. SITE-POTENTIAL TREE HEIGHT MAPPING TOOL

The Site-Potential Tree Height (SPTH) Mapping Tool helps users find information they need to conserve, protect, and restore riparian ecosystems within a project site. The SPTH mapping tool works on personal computers (PCs) and mobile devices (tablets and smartphones).

### SITE-POTENTIAL TREE HEIGHT MAP DATA

The SPTH mapping tool contains several GIS data layers, explained below:

1. Site-potential Tree Height at 200 Years (SPTH<sub>200</sub>),
2. Imputed<sup>14</sup> SPTH<sub>200</sub> Values for Urban areas,
3. Dryland Ecosystems – No SPTH Values, and
4. Other Lands – No SPTH Values.

#### *Site-potential Tree Height at 200 Years (SPTH<sub>200</sub>)*

WDFW derived the SPTH<sub>200</sub> values from forest productivity site index information using Natural Resource Conservation Service (NRCS) soil polygons and its Soil Data Viewer tool for ArcGIS. The NRCS-provided forest productivity site index values, in feet, were for ages 50 years in Western Washington and typically 100 years in Eastern Washington. WDFW determined SPTH<sub>200</sub> values using tree site index equations. Each soil polygon has one or more tree species records with associated SPTH<sub>200</sub>. When multiple tree species records with associated SPTH<sub>200</sub> are available, WDFW recommends using the largest SPTH<sub>200</sub> value of the tree species historically present at the site (such trees may currently be found on the site, but also may not). For example, if a project site contains mostly red alder but Douglas-fir is present (or was present prior to modern human alterations), use the Douglas-fir SPTH<sub>200</sub> for that soil polygon.

#### *Imputed SPTH<sub>200</sub> Values*

Four large urban areas (Seattle, Spokane, Tacoma, and Bellingham) lacked NRCS soil polygons; therefore, forest productivity information could not be mapped for most locations within those areas. Similarly, numerous soil polygons labelled as “Urban Land” lacked forest productivity information. For each of these four urban areas, WDFW calculated an imputed SPTH<sub>200</sub> by using an area-weighted average for 200-year site index values within a two-mile buffer around the perimeter. WDFW recommends the use of this imputed SPTH<sub>200</sub> as a guide for delineating RMZs in these urban areas. At the time of publication, WDFW had calculated imputed SPTH<sub>200</sub> information for those large urban areas. WDFW expects to continue to update the map.

#### *Dryland Ecosystems and Other Lands*

Not all soil polygons are forested, or have forest productivity information from NRCS; therefore, not all of them have associated SPTH<sub>200</sub> values. In addition, Benton, Franklin, Grant, and Adams counties had no forest productivity information in their NRCS soil polygons. These areas without SPTH<sub>200</sub> values were classified in one of two ways: as “dryland ecosystems”, or “other lands.”

---

<sup>14</sup> Imputed: estimated; a value assigned to something by inference from the value of the products or processes to which it contributes.

- WDFW approximated the area contained within “dryland ecosystems” using the Arid Lands Initiative study area boundary (Arid Lands Initiative, 2014) and have developed associated process steps that we recommend be used to derive RMZ widths (Volume 2, Section 2.2.3).
- The “other lands” comprise the remaining soil polygons and are small and dispersed across the landscape. These polygons include the NRCS soil map unit name, if applicable, and often represent soils that do not support tree growth, such as beaches and wetlands, as well as certain types of heavily modified sites like gravel pits. Please consult with a WDFW regional habitat biologist on deriving RMZs for “other lands” and consider following a similar process for delineation in dryland ecosystems.

## USING THE MAPPING TOOL

The mapping tool can be accessed from several locations:

- WDFW web site (<https://wdfw.wa.gov/species-habitats/at-risk/phs/recommendations>),
- Washington Geospatial Open Data Portal (<http://geo.wa.gov/>), and
- ArcGIS Online (AGOL) (<https://wdfw.maps.arcgis.com/apps/MapSeries/index.html?appid=919ea98204eb4f5fa70eca99cd5b0de1>).

The mapping tool consists of the statewide map with the four riparian datasets described above; user tools; and a sidebar explaining map contents, how to use the map, and links to supporting documents.

The four riparian datasets have unique colors indicating where the information occurs.

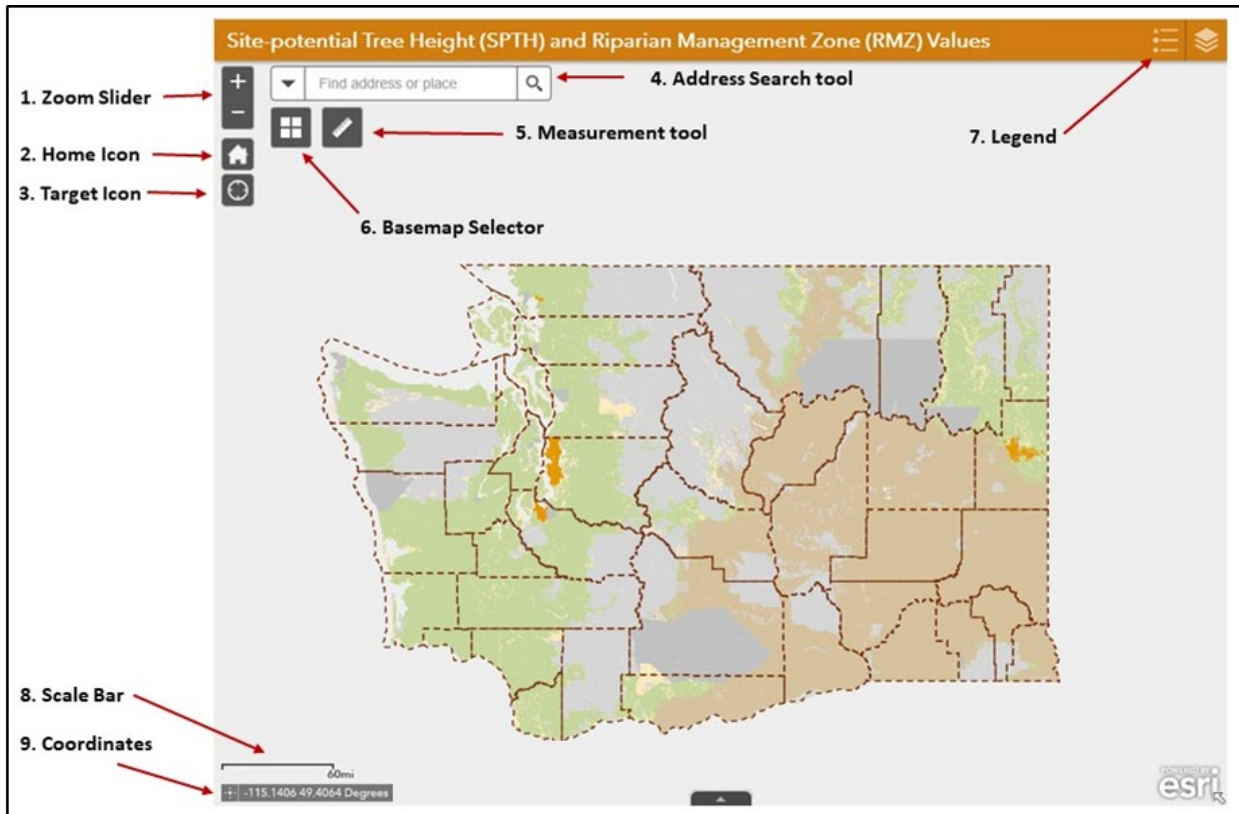
- Green: Area where SPTH<sub>200</sub> has been calculated.
- Orange: Areas where SPTH<sub>200</sub> values have been imputed.
- Pale brown: Dryland ecosystems where there is no tree height information.
- Beige: Places for which no SPTH site index information is available.

Tribal and publicly owned/managed lands federal and tribal lands are typically subject to different riparian regulations. Tribal, federal, and state lands are displayed in shades of grey. County-owned lands are shown in lavender, and city-owned lands are light blue.

The mapping tool contains the following tools (Figure A1):

1. **Zoom Slider:** zoom in or out on the center of the map.
2. **Home icon:** resets map to statewide extent.
3. **Target icon:** allows the user to zoom directly to their current location.
4. **Address Search:** zooms to a street address, place name, or latitude and longitude.
5. **Measurement:** use this to measure the distance between objects (e.g. edge of stream to another point), or to measure an area (square feet of an area surrounding a project site).
6. **Basemap Selector:** change the basemap to show a different view of the landscape: aerial imagery (default), topographic map, open street map, terrain with labels, and USGS national map.

7. **Legend:** displays the map layers currently visible. For example, map layers displayed at a site-specific scale will not appear in the legend when zoomed out to the statewide extent.
8. **Scale bar:** shows the scale that the map is zoomed to. At a statewide extent, the scale bar will show 0 to 60 miles. When zoomed to a scale where you can view the project area, the scale bar will show 0 to 100 feet or 200 feet.
9. **Coordinates:** latitude and longitude (decimal degrees) are shown where the cursor is located on the map.
10. **Panning:** move the map by placing the cursor over a desired location and dragging it to the center of the map display.



**Figure A1.** Tools available on the SPTH<sub>200</sub> and RMZ Online Map.

To zoom to a site location, use the Address Search tool or use a combination of the Zoom Slider and panning. (If using the Address Search tool, select the “ArcGIS World Geocoding Service” from the dropdown menu to the left of the search field for faster results.) Once the site is located, a click (on PCs) or tap (on mobile devices) of the cursor will open a popup window with information about that location. Be sure to review each window if multiple records are selected.

***The NRCS soil polygons form a complex mosaic across the landscape, so you must zoom in close enough to clearly see your project site.*** Clicking (or tapping, on mobile devices) on the map when it is zoomed out will result in erroneous returns of the SPTH<sub>200</sub> values. Below is an example of using these tools to obtain riparian information at a project site.



## MAPPING TOOL EXAMPLE #1

1. Start up the Online Map.
2. Type the project location into the Address Search tool (Figure A2). If the address is unknown, use a nearby place name or latitude and longitude.

This example uses 16018 Mill Creek Boulevard, Mill Creek, Washington.

3. Select the correct address from the drop-down menu or continue to enter manually. Click (on a **PC**) or tap (on a **mobile device**) the search button. The map will zoom to that location, shown as a small blue box and a popup titled "Search result" (Figure A3).

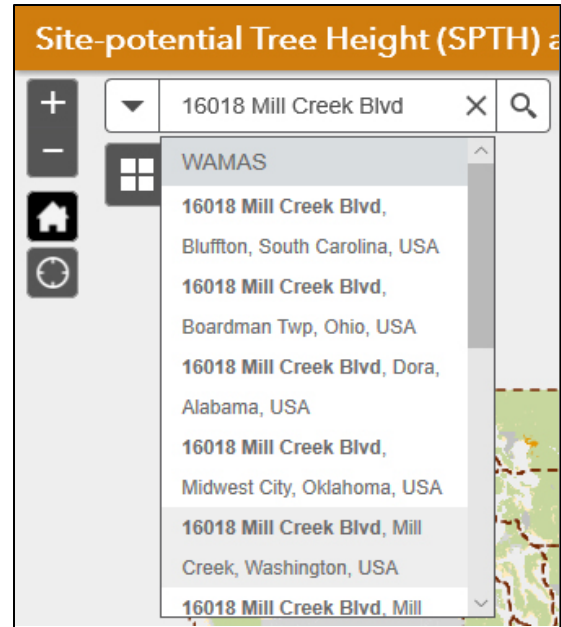
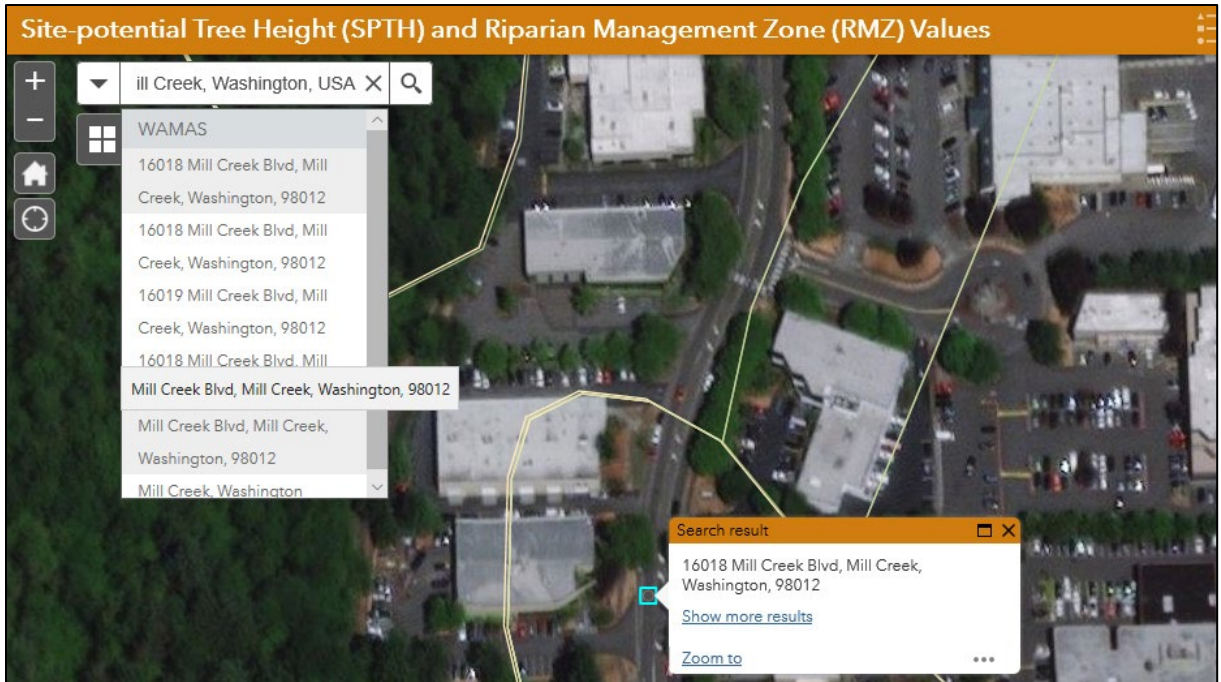


Figure A2. Using the Address Search tool.



**Figure A3.** Zoomed in aerial image of the site address.

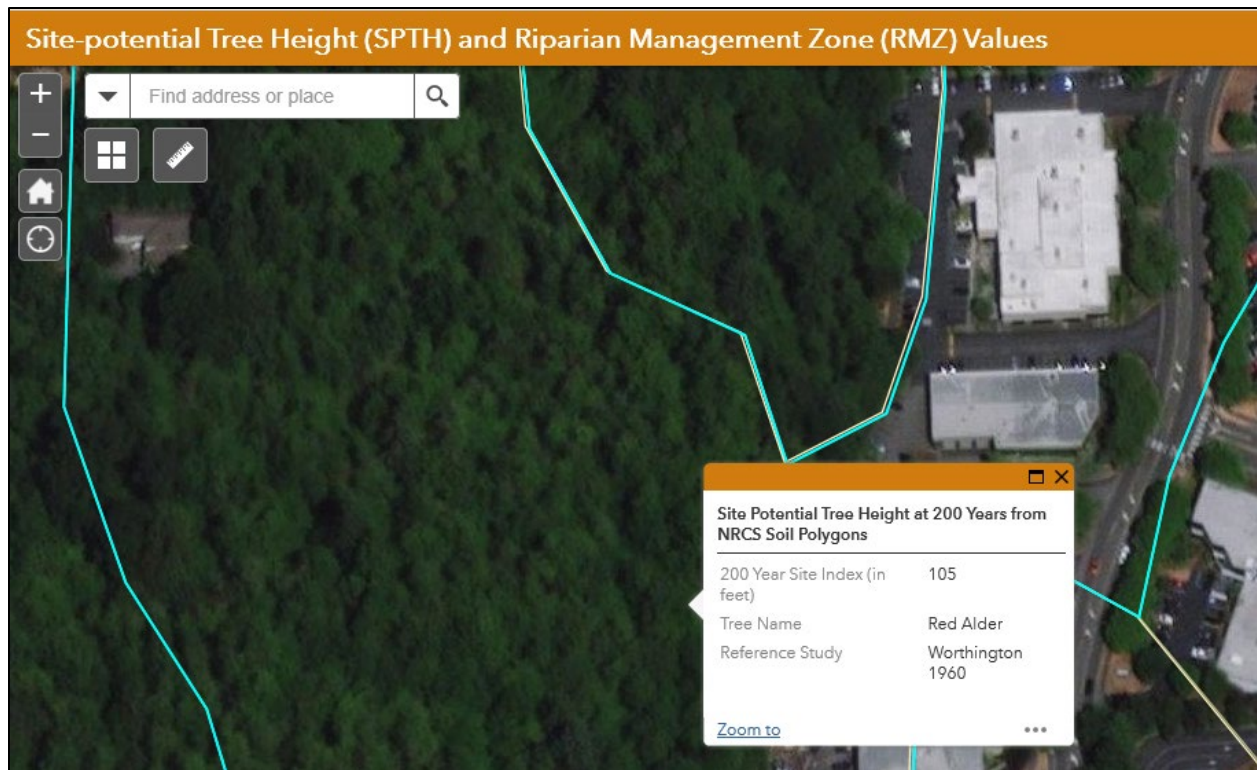
4. Click (or tap) on the “X” in the Address Search tool to close the popup. Zoom and pan until you can clearly see where the project site is on the landscape (Figure A4).

In this example, the project site lies in a wooded area to the west of the address selected in the previous screen. We panned west to center the map display over the project site. In this screen, you can see the outlines of the soil polygons.



**Figure A4.** Adjusting the map display over the project site.

5. Click (or tap) near a stream on the project site. The outline of the soil polygon selected will turn blue, and a popup window will provide information about the  $SPTH_{200}$  (Figure A5). On a PC, the popup should automatically show (1) the  $SPTH_{200}$  in feet, (2) the species of tree it is based on, and (3) the reference study used to derive the height value. On a mobile device, tap the arrow on the right side of the popup to display this information.



**Figure A5.** Bringing up the SPTH<sub>200</sub> information at the project site.

In Example #1, the soil polygon for the project site only showed one tree species: Red Alder. Sometimes soil polygons will list more than one tree species, as shown in Example #2.

## MAPPING TOOL EXAMPLE #2

Example #2, the project site was at a different location. Steps 1-3 in Example #1 were repeated to zoom to the project site. For this site, the popup window for the selected soil polygon looked different:

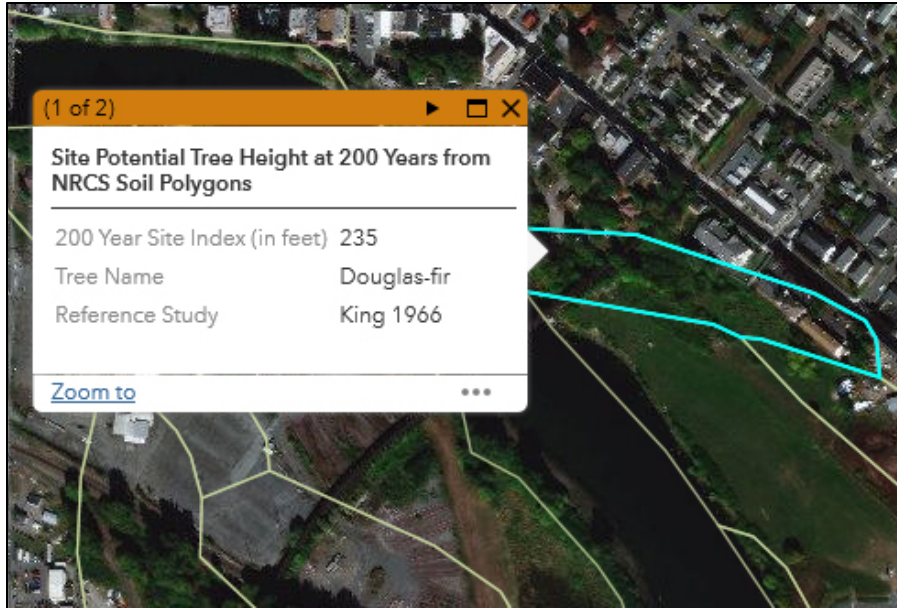
- The upper left corner of the popup window says "(1 of 2)"; and
- There is a small arrow near the upper right corner of the popup window.

This means that this soil polygon has two different associated tree species. The first is Douglas-fir (see Figure A6a).

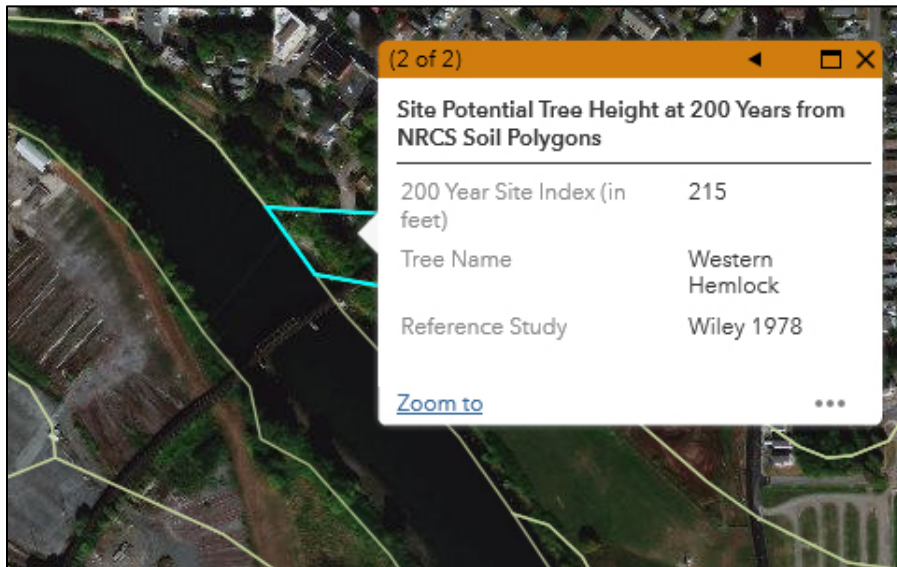
To view the information for the second tree species, click on the small arrow. The second tree species is western hemlock (see Figure A6b).

For project locations with multiple tree species, WDFW recommends using the largest SPTH<sub>200</sub> value, even if the largest tree species is not the most numerous (or even currently present) onsite.





**Figure A6a.** SPTH information for the first of multiple tree species at a given site.



**Figure A6b.** SPTH<sub>200</sub> information for the second of multiple tree species at a given site.

## APPENDIX REFERENCES: TREE SITE INDEX CURVES

The following twenty studies were used to determine  $SPTH_{200}$  throughout the state:

- Alexander, R.R. 1966. Site indexes for lodgepole pine, with corrections for stand density: instructions for field use. Research Paper RM-24. U.S., Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado.
- Alexander, R.R. 1967. Site indexes for Engelmann spruce. Research Paper RM-32. U.S., Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado.
- Baker, F.S. 1925. Aspen in the Central Rocky Mountain Region. Bulletin 1291. United States Department of Agriculture, Washington, D.C.
- Barnes, G.H. 1962. Yield of even-aged stands of western hemlock. Technical Bulletin 1273. U.S. Forest Service, Pacific Northwest Forest and Range Experiment Station, Portland, Oregon.
- British Columbia Forest Service (BCFS). 1977. Site index curves for cottonwood (as adapted by W.J. Sauerwein). pp. 852-853 in *Pocket Woodland Handbook*. U.S. Department of Agriculture, Soil Conservation Service, Portland, Oregon.
- Cochran, P.H. 1979a. Gross yields for even-aged stands of white or Douglas-fir and white or grand fir east of the Cascades in Oregon and Washington. Research Paper PNW-263. U.S. Forest Service, Pacific Northwest Forest and Range Experiment Station, Portland, Oregon.
- Cochran, P.H. 1979b. Site index and height growth curves for managed, even-aged stands of Douglas-fir east of the Cascades in Oregon and Washington. Research Paper PNW-251. U.S. Forest Service, Pacific Northwest Forest and Range Experiment Station, Portland, Oregon.
- Cochran, P.H. 1985. Site index, height growth, normal yields, and stocking levels for larch in Oregon and Washington. Research Note PNW-424. U.S. Forest Service, Pacific Northwest Forest and Range Experiment Station, Portland, Oregon.
- Haig, I.T. 1932. Second-growth yield, stand, and volume tables for the western white pine type. Technical Bulletin 323. United States Department of Agriculture, Washington, D.C.
- Hegy, F., J.J. Jelinek, J. Vizlai, and D.B. Carpenter. 1979. Site index equations and curves for the major tree species in British Columbia. Forest Inventory Report No. 1. Ministry of Forestry, Victoria, British Columbia.
- Herman, F.R., R.O. Curtis, and D.J. Demars. 1978. Height growth and site index estimates for noble fir in high-elevation forests of the Oregon-Washington Cascades. Research Paper PNW-243. U.S. Forest Service Pacific Northwest Forest and Range Experiment Station, Portland, Oregon.
- Hoyer, G.D., and F.R. Herman. 1989. Height-age and site index curves for Pacific silver fir in the Pacific Northwest. Research Paper RP-418. U.S., Forest Service. Pacific Northwest Research Station, Portland, Oregon.
- King, J.E. 1966. Site index curves for Douglas-fir in the Pacific Northwest. Forestry Paper 8. Weyerhaeuser Company, Forestry Research Center, Centralia, Washington.
- Kurucz, J.F. 1978. Preliminary, polymorphic site index curves for western red cedar (*Thuja plicata* Donn) in coastal British Columbia. Forest Research Note No. 3. MacMillan Bloedel, Nanaimo, British Columbia.
- Meyer, W.H. 1961. Yield of even-aged stands of ponderosa pine. Technical Bulletin 630 (revised 1961). United States Department of Agriculture, Washington, D.C.

- Meyer, W.H. 1937. Yield of even-aged stands of Sitka spruce and western hemlock. Technical Bulletin 544. United States Department of Agriculture, Washington, D.C.
- Monserud, R.A. 1985. Applying height growth and site index curves for inland Douglas-fir. Research Paper INT-347. U.S. Forest Service. Intermountain Research Station, Ogden, Utah.
- Schmidt, W.C., R.C. Shearer, and A.L. Roe. 1976. Ecology and silviculture of western larch forests. Technical Bulletin 1520. U.S. Forest Service, Washington, D.C.
- Wiley, K.N. 1978. Site index tables for western hemlock in the Pacific Northwest. Forestry Paper No. 17. Weyerhaeuser Company, Western Forestry Research Center, Centralia, Washington.
- Worthington, N.P., F.A. Johnson, G.R. Staebler, and W.J. Lloyd. 1960. Research Paper No. 36. Normal yield tables for red alder. U.S. Forest Service, Pacific Northwest Forest and Range Experiment Station, Portland, Oregon.



---

## Two items for your June 14th planning commission agenda

---

Pat Rice <easylivingpat@gmail.com>

Sun, Jun 6, 2021 at 4:27 PM

To: Valerie Hoy <Valerie.Hoy@ci.stevenson.wa.us>, David Ray <david.ray@ci.stevenson.wa.us>, Auguste Zettler <Auguste.Zettler@ci.stevenson.wa.us>, Jeff Breckel <Jeff.Breckel@ci.stevenson.wa.us>, Mike Beck <Mike.Beck@ci.stevenson.wa.us>

Cc: Ben Shumaker <ben@ci.stevenson.wa.us>, Leana Kinley <leana@ci.stevenson.wa.us>, Underwood Conservation District <info@ucdwa.org>, Emily Stevenson <estevenson@co.skamania.wa.us>, Cyndi Soliz <cyndi.soliz@gmail.com>, Rick May <Rick@mayandassociates.net>, Curt & Sherry Esch <cseesch@embarqmail.com>, tesmith729 <tesmith729@gmail.com>, Jan Thomas <jan@ucdwa.org>, Philip Watness <scpioneernews@gorge.net>

Dear Stevenson Planning Commission Members Valerie Hoy, David Ray, Mike Beck, Jeff Breckel and Auguste Zettler,

**RE:** Request for two issues to be placed on your June 14th meeting agenda

I am asking that the following two issues be put on your agenda for your June 14th meeting.

### **(1) Remove requirement that a permit be obtained when eradicating by hand invasive plants**

As has been explained to me by Ben, a permit is apparently needed to dig out by hand invasive plants within the city's critical area buffer zones. This means that I am guilty of breaking the law because of my efforts to eradicate invasive plants such as Himalayan blackberry bushes in the buffer zone of the drainage ditch that passes through my neighbors and my property.

Requiring a permit to implement the intent of your critical area codes doesn't make any sense. I ask you to recommend to the city council that this permit requirement be removed for people like me who are using hand tools to eradicate invasive plants from these areas.

This action on your part would be supported by the Washington Department of Fish and Wildlife. On page 26 of the attached report you will see this language:

4. Invasive and/or Noxious Plant Removal – **Many CAOs do not require a permit for control and removal of invasive and/or noxious weeds within riparian ecosystem.** We support this when weed control efforts (1) employ hand weeding with light equipment; (2) use only Ecology approved aquatic herbicides and adjuvants (a substance added to herbicides to improve application); avoid use of hazardous substances; and (3) do not result in soil compaction. Local governments should retain some oversight authority for more extensive invasive and/or noxious plant control projects to ensure adequate protections of riparian functions, especially water quality. Most communities issue an exemption letter or permit, which should include conditions to ensure impacts to fish, wildlife, and habitat are minimal.

### **(2) Revert the buffer for Ns streams back to 25 feet**

Through extensive research (*including public records requests, studying city codes up and down the gorge, etc.*) my neighbors and I have learned that when the Stevenson City Council doubled the protective buffer zones on the Ns drainage ditch that runs through our properties, that it failed to do its homework.

No on-site visits of any kind were done by anyone. No habitat biologists or other experts were consulted and asked to look at this drainage ditch, historically known as Owl Creek.

Under the guise of following the science, studies, research and best practices that applied to larger streams elsewhere were cited to justify the doubling of the buffer zones for Ns streams in the City of Stevenson. But this approach was nonsensical because the Washington Department of Fish and Wildlife practices cited, were intended to protect fish bearing and other streams, not non-fish bearing drainage areas that are dried up six months of the year.

When I broached the subject of putting the buffer zone back to 25 feet for the Owl Creek drainage ditch, I was told by Ben and others that a long and arduous review process would need to take place. It is apparent that the city council can be nilly-willy, arbitrary and capricious in its rulemaking, but us citizens are held to a different standard when we try to correct the city's error in judgment (*making a rule absent logic and basic good scientific practices*).



## **Bad rulemaking keeps family homeless longer**


The city's bad rulemaking behavior in this instance has mired the home building permit of Cesar Hernandez in red tape. Mr. Hernandez is trying to build his family a home approximately 37 feet away, out of the bank area entirely, from the Owl Creek drainage ditch. The new home will sit almost exactly where the old home existed (*a structure that was so badly dilapidated that it had to be demolished*).

Vancouver, Camas, North Bonneville and even Skamania County all have 25 foot buffer zones for Ns streams. These entities claim to have also followed science. When doing so, they came to a different conclusion than our small town did. I doubt we followed some great scientific principle that they somehow missed.

Thank you for considering the above two issues at your next planning commission meeting on June 14th.

Pat Rice

---

 **RIPARIAN ECOSYSTEMS, VOLUME 2.pdf**  
2892K



## Plans

Susan Krug <lvkrug30@yahoo.com>  
To: Ben Shumaker <ben@ci.stevenson.wa.us>

Tue, Jun 8, 2021 at 12:44 PM

So Ben was this subject ever brought up at a planning meeting?

On Thursday, April 15, 2021, 09:26:27 AM PDT, Susan Krug <lvkrug30@yahoo.com> wrote:

Ben,  
Thanks for the information. I was not thinking that the city would be responsible for a cemetery as we do have the cemetery district within the county, however I wanted to find out if any plans are in place for the future of the cemetery district to purchase property that the city planners would plan for our community. The two entities should be working together as we are all headed in the same direction and death is part of that so plans should be made as our city is growing in leaps and bounds and places to bury our loved ones should be included in those plans.  
Thanks again for your help and would ask that the planning board do more about finding out what or if any thing could be included in future plans for the city.  
Susan

On Wednesday, April 14, 2021, 04:57:46 PM PDT, Ben Shumaker <ben@ci.stevenson.wa.us> wrote:

Hi Susan-  
To my knowledge, the City has never considered establishing a city-run cemetery. As a result, I don't believe any specific site selection process has ever occurred.  
The extent of the future cemetery planning I am aware of is limited to:  
a) The Zoning Code's listing of "Cemetery or Mausoleum" as a contemplated use.  
[https://library.municode.com/wa/stevenson/codes/code\\_of\\_ordinances?nodeld=TIT17ZO\\_CH17.13USCLDE\\_17.13.060EDPUADHECAOTINUS](https://library.municode.com/wa/stevenson/codes/code_of_ordinances?nodeld=TIT17ZO_CH17.13USCLDE_17.13.060EDPUADHECAOTINUS)  
This use is then listed as Condition Use in the SR Suburban Residential.  
[https://library.municode.com/wa/stevenson/codes/code\\_of\\_ordinances?nodeld=TIT17ZO\\_CH17.15REDI\\_17.15.040US](https://library.municode.com/wa/stevenson/codes/code_of_ordinances?nodeld=TIT17ZO_CH17.15REDI_17.15.040US)  
[http://ci.stevenson.wa.us/wp-content/uploads/2013/02/Zoning\\_Stevenson\\_MapUpdate20161012.pdf](http://ci.stevenson.wa.us/wp-content/uploads/2013/02/Zoning_Stevenson_MapUpdate20161012.pdf)  
b) Similarly, our draft Shoreline Management Program, considered appropriate areas and suggests their prohibition in Aquatic and Natural areas, as Shoreline Conditional Uses in the Shoreline Residential, and as Permitted in the Urban Conservancy areas. See page 42 of this link for the draft use table and page 93 for the draft map.  
[http://ci.stevenson.wa.us/wp-content/uploads/2015/01/Resolution2018\\_322\\_Exhibit\\_D\\_SMP.pdf](http://ci.stevenson.wa.us/wp-content/uploads/2015/01/Resolution2018_322_Exhibit_D_SMP.pdf)  
Based on these restrictions, proponents seeking to create a cemetery would have some indication of where that would and would not be possible.  
Please let me know if you have other questions,

BEN SHUMAKER

-----Original Message-----

From: 'Susan Krug' via planning [mailto:planning@ci.stevenson.wa.us]  
Sent: Monday, April 12, 2021 11:27 AM  
To: [planning@ci.stevenson.wa.us](mailto:planning@ci.stevenson.wa.us)  
Subject: Plans

Question: Does the city have another cemetery site in the plans for the Stevenson area's future use? If not why not? Thank you.  
Susan Krug, Stevenson



---

## Critical Areas

---

Rick May <rick@mayandassociates.net>

Mon, Jun 14, 2021 at 1:22 PM

To: Robert Muth <robert.muth@ci.stevenson.wa.us>

Cc: Amy Weissfeld <amy.weissfeld@ci.stevenson.wa.us>, Paul Hendricks <paul.hendricks@ci.stevenson.wa.us>, "annie.mchale@ci.stevenson.wa.us" <annie.mchale@ci.stevenson.wa.us>, Dave Cox <dave.cox@ci.stevenson.wa.us>, "scott.anderson@ci.stevenson.wa.us" <scott.anderson@ci.stevenson.wa.us>, David Ray <david.ray@ci.stevenson.wa.us>, Mike Beck <mike.beck@ci.stevenson.wa.us>, Jeff Breckel <jeff.breckel@ci.stevenson.wa.us>, Valerie Hoy <valerie.hoy@ci.stevenson.wa.us>, Auguste Zettler <auguste.zettler@ci.stevenson.wa.us>, "Ben@ci.stevenson.wa.us" <Ben@ci.stevenson.wa.us>

Hello Robert,

Thank you for the efforts and the Ecologist comments. The problem is Stevenson has a number of ephemeral streams that do not attach to any other waterways. I have one on my acreage that starts at the north of our site, runs 160 feet and ends. As per Pacific Habitat Services, this is simply a dead-end seasonal stream covered with blackberry bushes on a gently sloping area. Yet it is still classified as a Ns stream and therefore has 18,000 square feet of setbacks. That is equivalent to three homesites in this R-1 zone. There is little to no useful scientific evidence that points toward significant ecological benefits from this type of ephemeral streams or streams running in manmade ditches found throughout Stevenson. My 160-foot dead end stream runs only during heavy rains, so it's simply not there long enough to be useful for inserts or amphibians. Due to the undergrowth, birds can't get to the water even if it's flowing.

Yet in Stevenson there is no mechanism to adjust setbacks considering what is actually happening on the ground. SMC 18.13.095 states a Critical Area is where "**overwhelming evidence** exists supporting the use of riparian buffers of adequate size to maintain healthy, productive fish and wildlife habitat." Does this overwhelming evidence exist for seasonal streams and ditches in Stevenson?

Streams and wetland boundaries have not been formally delineated and individual assessment of streams has not been done or hired out by the City of Stevenson. I agree with Dr. Laura McMullen comment sites "should definitely be evaluated case-by-case". However, this is not done in Stevenson. The City of Stevenson has classified all streams using the Washington Fish & Wildlife Conservation stream categories, whether the streams have significant ecological benefits or not. Using WFWC categories, all seasonal streams have 50-foot setbacks on each side, no matter what the facts are on the ground.

Rick May

[Quoted text hidden]

--

Rick May

[Rick@mayandassociates.net](mailto:Rick@mayandassociates.net)

503-341-2932



---

## Critical Areas

---

Robert Muth <robert.muth@ci.stevenson.wa.us>

Mon, Jun 14, 2021 at 11:53 AM

To: Rick May <rick@mayandassociates.net>

Cc: Amy Weissfeld <amy.weissfeld@ci.stevenson.wa.us>, Paul Hendricks <paul.hendricks@ci.stevenson.wa.us>, "annie.mchale@ci.stevenson.wa.us" <annie.mchale@ci.stevenson.wa.us>, Dave Cox <dave.cox@ci.stevenson.wa.us>, "scott.anderson@ci.stevenson.wa.us" <scott.anderson@ci.stevenson.wa.us>, David Ray <david.ray@ci.stevenson.wa.us>, Mike Beck <mike.beck@ci.stevenson.wa.us>, Jeff Breckel <jeff.breckel@ci.stevenson.wa.us>, Valerie Hoy <valerie.hoy@ci.stevenson.wa.us>, Auguste Zettler <auguste.zettler@ci.stevenson.wa.us>, "Ben@ci.stevenson.wa.us" <Ben@ci.stevenson.wa.us>

Rick - Thank you for the information you have provided to the Planning Commission and City Council. Admittedly, I am not an expert in the environmental issues raised in your email. I did stop to take the time to reach out to an expert in the field.

Below is the response I received from Dr. Laura McMullen whose expertise is in the area of discussion. Dr. McMullen is an Ecologist with ICF in the Portland, Oregon location. Full disclosure, Dr. McMullen is my cousin who received her PhD from Oregon State University.

Hi Robert,

No short answer to this one, but I'll give you some things to chew on. Quite relevant to my current work on an EIS for the ODF that mainly has to do w/ what/ when/ why/ where to buffer!

First off, buffer zones are important for more than salmon and resident fish populations. In fact, many amphibians and also a variety of insects depend upon fishless areas to successfully reproduce. Small mammals and birds can also benefit from buffers along any type of stream. See attached article including a study from Olympic peninsula on buffer importance- an older article but still relevant.

Another point to consider- climate change predictions not only show drier summers in the future in the PNW, but also much heavier rainfall and flooding in early spring. Tree and plant roots and riparian areas in general can help to stabilize soil. These areas in and around Stevenson that have ephemeral streams are likely on steep slopes and prone to landslide disturbance events- which are triggered by heavy rainfall. Buffers help protect against landslides and slope erosion. Development in these areas would be risky from a liability perspective of landslides and the soil and topography should definitely be evaluated case-by-case carefully before making any development decisions.

While it is true that currently ephemeral streams are not recognized federally as needing protection, this was a roll-back instigated just 2 years ago under the Trump administration and is not backed by sound science. In fact, Biden is trying to reverse these orders currently- be aware, there will soon be legal changes of some type about what types of streams require protection. It is not the right time to make a change for less protection in my opinion until we see what the current administration does. The fact that your colleague brings up this point right now, may be because he realized this also (that protection may be required soon again for these stream types) and is trying to act before that happens. See another article attached, and this one: <https://www.washingtonpost.com/climate-environment/2021/06/09/biden-epa-clean-water-act/>

It is certainly invalid to say these areas have "no ecological reasons to exist"- they currently have no legal reason, but certainly do ecologically- including protection for downstream areas from pollutants, infiltration and runoff- and that reduced landslide risk. While folks could "gain" a bit of land for development- are these areas really great to develop on anyhow? Would be good to see a map.

Happy to help more, or if Stevenson needs some actual contracted help on this one, our firm would be very well suited to assist.


-Laura

Laura E. McMullen, PhD  
[laurabethmcm@gmail.com](mailto:laurabethmcm@gmail.com)  
[Quoted text hidden]

---

### 2 attachments

 **SciFi.#53.pdf**  
325K

 **Opinion\_ The proposed change to the definition of "waters of the United States" flouts sound science.pdf**  
1297K

*Getting Into the Zone* .....2  
*A Landscape Revealed* .....3  
*Site Versus Landscape: Which Driver?* ....3  
*Disappearing Frogs and Salamanders* ....4  
*Complex Reactions from Birds, Fish,  
and Small Mammals* .....4  
*Clear Implications for Management?* .....5

# Science

F I N D I N G S

*“Science affects the way we think together.”*  
Lewis Thomas

## ARISE, AMPHIBIANS: STREAM BUFFERS AFFECT MORE THAN FISH

*“How tortoise-like,  
but not so slow,  
These rational amphibii go!”*

Andrew Marvell 1621-1678

When the Northwest Forest Plan was put in place on federal lands in 1994, one of its key foundations lay in streamside buffers, designed by the Forest Ecosystem Management Assessment Team (FEMAT) to support riparian habitat by providing functional stream and streamside ecosystems. Buffering of federal streams, from headwater and intermittent streams to large streams and rivers, combined with state-level conservation plans, and new management practices on private lands, affects a large portion of the land base. The quantity of buffered federal land alone ranges from 30 to 70 percent across the Pacific Northwest depending on the density of streams in a watershed.

“These buffers are meant to conserve habitat conditions not only for at-risk stocks of fish but also a diverse range of riparian-associated organisms including lichens, liverworts, fungi, vascular plants, invertebrates, and vertebrates,” says Martin Raphael, a research wildlife biologist with the Pacific Northwest Research Station.

The size of the buffers, determined during the forest ecosystem management assessment process in 1993, was determined from a thorough review of existing literature, he says. But few field data were available comparing the efficacy of alter-



Credit: L. Jones

▲ *Small steep streams make up the majority of the drainage network in Olympic Peninsula watersheds.*

native buffer designs. Raphael believes that understanding relations between biodiversity and watershed function and condition may lead to opportunities to better balance commodity production and protection of streamside habitat.

### I N S U M M A R Y

*Buffers along streams cover a tremendous proportion of the land base in the forested systems of the western Pacific Northwest. These buffers were designated primarily to conserve and restore habitat for salmon and trout, but conservation of habitat for a number of other organisms also has been implicit in their design.*



*Recent research evaluated the importance of buffers in providing habitat for other vertebrates, especially amphibians, whose decreasing numbers are raising concerns worldwide. Riparian buffers constrain management options along streams and encumber trees that might otherwise be harvested for commodity production. Thus understanding the importance of buffers for wildlife habitat is important in evaluating options for management.*

*Researchers examined small headwater streams on Washington’s Olympic Peninsula with buffers that were put in place prior to implementation of the Northwest Forest Plan. These riparian buffers were, for the most part, narrower than those prescribed by current guidelines. Preliminary results suggest closer attention needs to be paid to nonfish species in these locations, particularly the sensitive amphibians.*

Specifically, how does active management (that is, vegetation management within riparian zones) affect the stream and riparian species that are theoretically protected by buffers?

Many recent studies have shown that watersheds containing mostly young, managed forests have reduced diversity of aquatic and terrestrial vertebrate populations. As a result, the emerging practices of ecosystem management have embraced the idea of restoring riparian areas to conditions more like those created by natural processes explains Peter Bisson, a research fish biologist with the PNW Research Station .

“Virtually all aquatic species and many terrestrial plant and animal species closely associated with riparian zones are sensi-

 **KEY FINDINGS** 

- Bird, resident fish, and mammal community composition and structure are generally comparable between buffered and intact streamside forest, although responses to harvest are complex.

---

- Amphibian populations decline sharply after timber harvest, and with narrow streamside buffers. Furthermore, populations are slow to recover in second-growth forest, and different species do so at different rates.

---

- Amphibian recovery depends on recolonization of riparian areas as surrounding second-growth forests mature. Recolonization depends on retaining patches of uncut old forests as refugia or sources of dispersing amphibian populations.

tive to management-induced changes in riparian condition,” he says. “The way these species respond to anthropogenic disturbance is usually complex and strongly influenced by ecological

processes at a particular site. Thus it is difficult to predict how a particular ecosystem will change following a management activity.”

## GETTING INTO THE ZONE

**B**isson notes that despite the acknowledged importance of riparian zones to fish and wildlife, relatively few studies have examined the response of riparian systems to management alternatives for commodity production, riparian protection, or restoration. He and Raphael recently completed phase 1 of the riparian ecosystem management study (REMS) to explore these effects.

A number of key riparian buffer questions still need addressing. What buffer widths and configurations are needed to protect fish and wildlife habitat along different stream types? What proportion of riparian zones should remain in different forest growth and development stages over broad landscapes? Can riparian vegetation be deliberately managed for the benefit of aquatic or terrestrial wildlife?

It was the last question that informed the design of REMS. The study examined the effect of different streamside buffers on the major aquatic vertebrates, including fishes, amphibians, birds, and small mammals. Species included trout, sculpins, tailed frogs, salamanders, 20 species of birds, and five common species of shrews and mice.

Sixty-two streams and associated riparian zones were examined on Washington’s Olympic Peninsula from 1996 to 1999. Most study sites were located in small watersheds, with about one third too small or steep to support fishes.

“These small streams comprise a huge network in an area of high drainage, like the Olympic Peninsula,” says Raphael. “Probably 75 to 80 percent of the landscape is close to, or strongly associated with, the small-stream network.”

“Our study is one of the first to emphasize very small headwater streams. Most other studies have had a fish focus, and REMS has added many other species to the mix,” Bisson adds. “This is not least because of increasing interest in aquatic organisms other than fishes, particularly the declining numbers of amphibians, and the need to better understand riparian buffers as crucial landscape components for small mammals and birds.”

The researchers used a retrospective approach, involving comparisons of many sites, representing differing times since logging and different buffer characteristics. The retrospective approach (“substituting space for time”) provides a great deal of information fairly rapidly, but the

researchers acknowledge that it doesn’t offer true control over buffer size in relation to size of streams, topographic relief, and other landscape attributes. “We have to take what the landscape offers us and try to unravel the confounding effects of such things as topography and gradient,” Raphael says.

*Purpose of  
PNW Science Findings*


To provide scientific information to people who make and influence decisions about managing land.

*PNW Science Findings* is published monthly by:  
Pacific Northwest Research Station  
USDA Forest Service  
P.O. Box 3890  
Portland, Oregon 97208  
(503) 808-2137


Sherri Richardson Dodge, Editor  
srichardsondodge@fs.fed.us

Send new subscriptions and change of address information to  
pnw\_pnwpubs@fs.fed.us

Carlyn Mitas, Design & layout  
mitasc@cascadeaccess.com



United States  
Department of  
Agriculture



Forest Service

Science Findings is online at:

**<http://www.fs.fed.us/pnw>**

The site includes our new *Science Update*—scientific knowledge of pressing decisions about controversial natural resource and environmental issues.

## A LANDSCAPE REVEALED

Unexpectedly, when the researchers set out to locate study sites, they discovered that almost no sites on the peninsula offered the conditions proposed by the Northwest Forest Plan. So much of the landscape either had already been managed before that plan was in place or was kept out of the matrix lands available for management by supporting threatened or endangered species, that little was left in the buffered but managed category on federal lands.

“The result was that our study ended up looking at buffers that are more similar in nature to State and Private managed lands, from the times when smaller buffers were required,” says Bisson. “Within this investigation, we found no streams with large Northwest Forest Plan buffers—either one or two tree heights wide, so we were unable to evaluate that particular buffer treatment.”

Instead, virtually all study sites were in unmanaged watersheds or areas previously logged according to older buffer strip guidelines that permitted timber harvesting to within 10 to 30 meters of the channel. Most sites, even those on the Olympic National Forest, had been managed with a heavy emphasis on wood production. Nonetheless, the Olympic Peninsula uniquely offers a concentric series of landscape types around the largely wilderness

LAND MANAGEMENT IMPLICATIONS	
• Fish population densities are highly variable from site to site, probably influenced more by presence or absence of recent large disturbance events than adjacent forest barriers. In-stream disturbances are probably more influential to fish than buffer width.	
• Birds and mammals are relatively mobile and probably have a reasonable recolonization ability.	
• Amphibians are a good indicator of change in the environment. After timber harvest, numbers and diversity drop sharply; some species had not reestablished populations by the time next harvest was to occur. Where existing stream buffers of old forest were narrow, they did not ameliorate the effects of logging the adjacent stand.	
• Conservation of riparian forest helps maintain distribution of stream-associated amphibians; sources of refugia are essential. Evaluation of streamside forest at the scale of entire watersheds will help determine prospects for long-term persistence and local viability of amphibian population.	

core of Olympic National Park that are a microcosm of the western part of the Pacific Northwest, Bisson notes.

Six site conditions were represented: old sites (unmanaged with intact forest on both sides of the stream); buffered old sites (old forest with adjacent clearcuts leaving buffers of 10 to 30 meters); mature sites (second-growth stands 35 to 100 years old with no adjacent harvest); thinned mature sites (intact second growth with commer-

cial thinning); buffered mature sites (second growth with adjacent clearcuts leaving 10 to 30 meters of second-growth forest); young sites (cutover sites with no intact buffers, generally up to 35 years old).

Site types were not equally distributed across the study area because of differing ownerships and management practice histories.

## SITE VERSUS LANDSCAPE: WHICH DRIVER?

The REMS project was designed to evaluate vertebrate responses to riparian management at the site level—typically a 300-meter reach of stream and associated riparian area.

“But we could not ignore the possibility that fishes and amphibians may have been influenced by broad-scale characteristics of the watersheds they inhabited, irrespective of the condition of the immediately adjacent riparian zone,” Bisson says.

Initial analysis of the relationship between various vertebrates and site-level features such as channel type, number of pools and riffles, substrate, and gradient, left many unanswered questions about what environmental factors were most influential, he explains. So the researchers expanded the assessment to take in landscape-scale

factors such as forest age, drainage characteristics, elevation, road density, and disturbance history.

“We always thought the landscape level factors would have an influence on the riparian zone,” Raphael says. “The challenge comes in teasing those out from the site-level effects.”

Raphael and Bisson looked for statistical correlations among their array of variables, by using an approach that recognized the complexity of relationships between vertebrate population densities and the many variables in their data set. Because of the expense of examining these variables via field data, they designed a separate investigation of the data after the main study to determine cost effectiveness of various indicators as units of analysis.

“The thought was that some of this would be very useful for monitoring purposes, to find which kinds of site- or landscape-level factors might be inexpensive to track and yet provide a good ‘signal’ for effects in the riparian zone,” Raphael explains. “We sought factors that have a high signal-to-noise ratio to keep research or monitoring costs down.” This involved deriving the “information value” of various factors—looking at the relative cost of obtaining them and seeing which were most explanatory in terms of organism abundance. It provided a kind of menu of things you’d like to know, Bisson explains, and how much they can tell you, relative to the cost of finding them out.

## DISAPPEARING FROGS AND SALAMANDERS

**A**mphibians proved to be the most responsive to riparian forest condition and the amount of late-seral forest in their watersheds,” Raphael says. “While some seemed to be adaptive generalists, others were more sensitive to forest management in or near the stream zone. Our study suggested that stream-dwelling amphibians were negatively affected by management activity near small streams; their densities dropped sharply after timber harvest.”

Across the categories of sites, it appeared that riparian areas composed of young-early successional forests did not support amphibian populations at the densities observed in late-seral sites, he says. Generally, they were most numerous and diverse in old forests. This was not caused

by changes in stream temperature: most streams, regardless of previous forest management history, maintained temperatures within the critical thermal limits of even sensitive species.

“Overall, the key finding around amphibians is in regard to their recovery,” Raphael says. “While not all species respond the same way, there is typically a rapid decrease in population after management activity in the riparian zone, and recovery for some species can be quite slow. In some sites, the numbers are still low as much as 60 years after timber harvest.” In other words, around the time harvest might be considered again.

It is not clear whether the drop in numbers results from mortality or downstream dispersal, but recovery appears to depend

on several main factors, according to Raphael: retention of patches of uncut older forest to serve as refugia or sources of dispersal, and recolonization of riparian areas as surrounding second-growth forests mature.

“Potential for large-scale reduction in amphibian numbers is high, and indeed the focus on amphibian population decline worldwide is increasing. It seems clear that amphibian numbers should at least be considered as part of the buffer zone assessment and recommendation process,” he says.

Other vertebrate species showed less alarming trends, with variable responses reflecting the complexity both of the research question and the landscapes in which sites are nested.

## COMPLEX REACTIONS FROM BIRDS, FISH, AND SMALL MAMMALS

**F**ishes demonstrated the differences in response between site- and landscape-level factors. The study showed little association between species abundance and riparian forest age or the percentage of older forest in the watershed, according to Bisson. However, they tended to be strongly influenced by the condition of instream habitat.

“Although the riparian forest probably influenced in-stream habitat, our results suggested that the number and size of pools and other habitat parameters important to fishes was likely controlled by a number of other factors, including recruitment of logs and large boulders to the channels by bank erosion, landslides, debris flows, and other disturbance mechanisms,” Bisson says.

Other parameters affecting the local abundance of fishes in these headwater streams included elevation of the watershed, gradient of the channel, and the amount of primary production—aquatic plant production controlled by light and nutrients. Headwater streams on the Olympic Peninsula are typically disturbance prone, Bisson explains, as this was reflected by the variability in fish populations from site to site.



Credit: P. Bisson

▲ *Tailed frogs inhabit headwater streams and are sensitive to changes in riparian forests.*

In general, fish abundance did not differ significantly by buffer type, but differed among other site attributes except stream width. Bisson notes that abundance of fishes was affected significantly by elevation, and parent rock appeared to be more important for fishes than for other vertebrates.

“Thus, at the site level, we accepted the hypothesis that the characteristics of the riparian forest had no influence on fish abundance in these stream,” Bisson says.

Responses of birds to forest conditions along streams were also highly variable.



Credit: L. Jones

▲ *Cope's giant salamander is an important predator in headwater streams.*

Of the 20 species of birds whose abundances differed significantly among site conditions, a majority (13 species) reached their highest abundances in mature sites with buffers. In these sites, a diversity of habitats included large trees, brushy conditions, open ground, a forest edge, and a riparian to upland interface, Raphael explains. Abundance of birds was generally greater at lower elevation sites with flatter gradients and at higher elevations. An exception was the American dipper, which was more abundant in wider streams, and most abundant in cutover, young sites.

## WRITER'S PROFILE

*Sally Duncan is a science communications analyst and writer specializing in natural resource issues. She is currently a Ph.D. candidate in Environmental Sciences at Oregon State University in Corvallis.*



Among small mammals, significant differences among site conditions appeared only for the Pacific jumping mouse among the five common species surveyed. Slight variations according to elevation and

gradient were apparent, but correlations were weak. The researchers emphasize that their results should not be extended beyond the limited number of small mammal species they were able to capture.

“Our results indicate that fishes, birds, and mammals—at least the more common species that were abundant enough to make valid comparisons—persisted in sites after logging whether or not buffers were present,” Raphael says.

## CLEAR IMPLICATIONS FOR MANAGEMENT?

**P**redictable relationships between species abundance and management activities will require calibration with local data, Raphael points out, because local populations can be confined to small areas (resident headwater trout, amphibians with restricted distribution). Relations between management and species bounded on a very large scale (anadromous salmon, Neotropical migratory birds) are more difficult to establish.

Most headwater organisms are controlled by multiple biotic and abiotic factors, and changing a single variable, particularly at the landscape level, will not reliably result in a predictable response in vertebrate populations. Relying on an alternative approach of simulation modeling or landscape analysis often involves many untested and often incorrect assumptions, Raphael notes, but should continue alongside species investigations to keep building knowledge.

Despite REMS providing such variable results, and its being based on relatively narrower buffers than the Northwest Forest Plan imposed, there are still some indications for management flexibility, the researchers believe.

“Variable-width buffers, as opposed to fixed width, may be an option, provided

the planning begins with conservative buffers around small streams. Then you can practice some management within riparian zones depending on local conditions,” Bisson suggests. “I think some managers have come to regard the FEMAT-established buffers as more hard and fast than they were intended to be. With careful analysis, there are probably areas where you could formulate management prescriptions that depart from the default FEMAT recommendations.”

Bisson recalls that during the REMS study, it became clear in many ways just how little we know about what lives in these small headwater streams. At the beginning of inventory for phase 2 (experimental) of the study, a number of new species of millipede, and possibly a previously unknown genus, have been discovered by a collaborating researcher.

“The most useful outcome of our study may in fact be to bring more scientific attention to small, headwater, non-fish-bearing streams and their riparian areas,” he says.

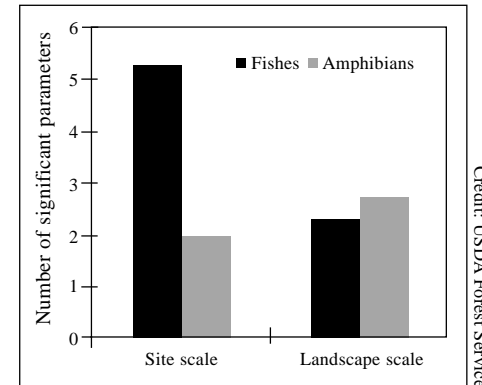
*“I don't see no p'intns about that frog that's any better'n any other frog.”*

Mark Twain,  
The Celebrated Jumping Frog, 1865

## FOR FURTHER READING

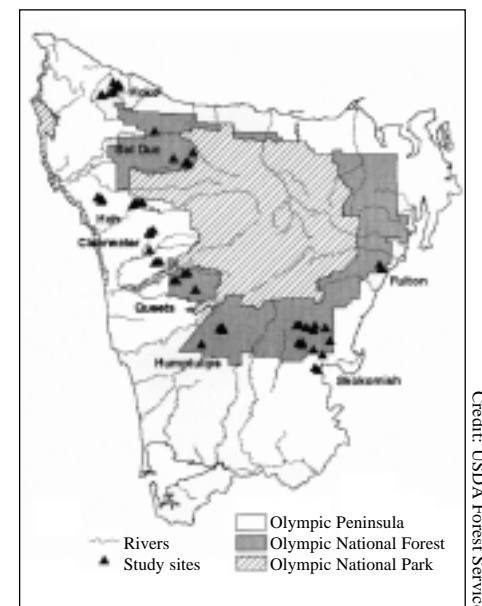
Bisson, P.A. [and others]. 2002. *Influence of site and landscape features on vertebrate assemblages in small streams*. In: Johnson, A; Haynes, R. eds. Proceedings of the Wood Compatibility Initiative workshop. Gen. Tech. Rep. PNW-GTR-563. Portland, OR: U.S. Department of Agriculture, Forest Service. Pacific Northwest Research Station.

Raphael, M.G. [and others]. 2002. *Effects of streamside forest management on the composition and abundance of stream and riparian fauna of the Olympic Peninsula*. In: Johnson, A.; Haynes, R. eds. Proceedings of the Wood Compatibility Initiative workshop. Gen. Tech. Rep. PNW-GTR-563. Portland, OR: U.S. Department of Agriculture, Forest Service. Pacific Northwest Research Station.



Credit: USDA Forest Service

▲ Comparison of the average number of site scale and landscape scale variables significantly influencing fish and amphibian species in headwater streams on the Olympic Peninsula.



Credit: USDA Forest Service

▲ Location of study sites on the Olympic Peninsula, Washington. Names of the major river basins (study sites) are indicated.





U.S. Department of Agriculture  
 Pacific Northwest Research Station  
 333 S.W. First Avenue  
 P.O. Box 3890  
 Portland, OR 97208-3890

Official Business  
 Penalty for Private Use, \$300

PRSR STD  
 US POSTAGE  
 PAID  
 PORTLAND OR  
 PERMIT NO G-40

## SCIENTIST PROFILES

MARTIN RAPHAEL is a research wildlife biologist in the Ecosystem Processes Program, Pacific Northwest Research Station. He is actively involved in the development of monitoring plans for the northern spotted owl and marbled murrelet in the Pacific Northwest. His research includes habitat relationships of forest wildlife, ecology of the marbled murrelet and American marten, and investigations into the roles of riparian habitat for terrestrial and aquatic organisms.

*Raphael can be reached at:*



Pacific Northwest Research Station/  
 USDA Forest Service  
 Forestry Sciences Laboratory  
 3625 93rd Avenue SW  
 Olympia, WA 98512-9193  
 Phone: (360) 753-7662  
 E-mail: mraphael@fs.fed.us

PETE BISSON is a research fish biologist in the Aquatic and Land Interactions Program, Pacific Northwest Research Station. From 1974 to 1995 he was an aquatic biologist for the

Weyerhaeuser Company in Tacoma, Washington. In 1995 he joined the Forest Service, where his studies have included fish populations, stream habitats and food webs, riparian zones, and a variety of management issues related to aquatic ecosystems. He has served on two National Research Council committees: one on Pacific salmon and the other on watershed management.

*Bisson can be reached at:*



Pacific Northwest Research Station/  
 USDA Forest Service  
 Forestry Sciences Laboratory  
 3625 93rd Avenue SW  
 Olympia, WA 98512-9193  
 Phone: (360) 753-7671  
 E-mail: pbisson@fs.fed.us

## COLLABORATORS

Kathy O'Halloran, Olympic National Forest  
 Scott Horton, Washington Department of Natural Resources  
 Phil Peterson, Simpson Timber

# The proposed change to the definition of “waters of the United States” flouts sound science

S. Mažeika P. Sullivan<sup>a,1</sup>, Mark C. Rains<sup>b</sup>, and Amanda D. Rodewald<sup>c,d</sup>

The U.S. Environmental Protection Agency (EPA) and Army Corps of Engineers (hereafter, “the agencies”) have issued a proposed rule (1) that would remove Clean Water Act (CWA) protections from more than half of wetlands and one-fifth of streams in the United States (2). This move sharply contrasts with reports indicating that US waters remain threatened by storms, droughts, contaminants, algal blooms, and other stressors. Even the EPA’s National Water Quality Inventory detected poor conditions in 46% of stream and river miles and 32% of wetlands (3). In short, the proposed rule does not reflect the best-available sci-

ence and, if enacted, will damage our nation’s water resources.

Despite the CWA’s mandate “to restore and maintain the chemical, physical, and biological integrity of the Nation’s waters” (4), controversy persists over jurisdiction. For decades, the protected “waters of the United States” (WOTUS) included traditionally navigable waters (TNWs), such as large rivers, lakes, and territorial seas, as well as waters meaningfully connected to or affecting the integrity of TNWs. Operationalizing this connection has become a flashpoint for the science and politics of water protection.



**A proposed rule under consideration by the US federal government does not reflect the best-available science and, if enacted, will damage the nation’s water resources. Image credit: Shutterstock/Martha Marks.**

<sup>a</sup>Schiermeier Olentangy River Wetland Research Park, School of Environment & Natural Resources, The Ohio State University, Columbus, OH 43202; <sup>b</sup>School of Geosciences, University of South Florida, Tampa, FL 33620; <sup>c</sup>Cornell Lab of Ornithology, Cornell University, Ithaca, NY 14850; and <sup>d</sup>Department of Natural Resources, Cornell University, Ithaca, NY 14850

The authors declare no conflict of interest.

Published under the [PNAS license](#).

Any opinions, findings, conclusions, or recommendations expressed in this work are those of the authors and have not been endorsed by the National Academy of Sciences.

<sup>1</sup>To whom correspondence may be addressed. Email: [sullivan.191@osu.edu](mailto:sullivan.191@osu.edu).

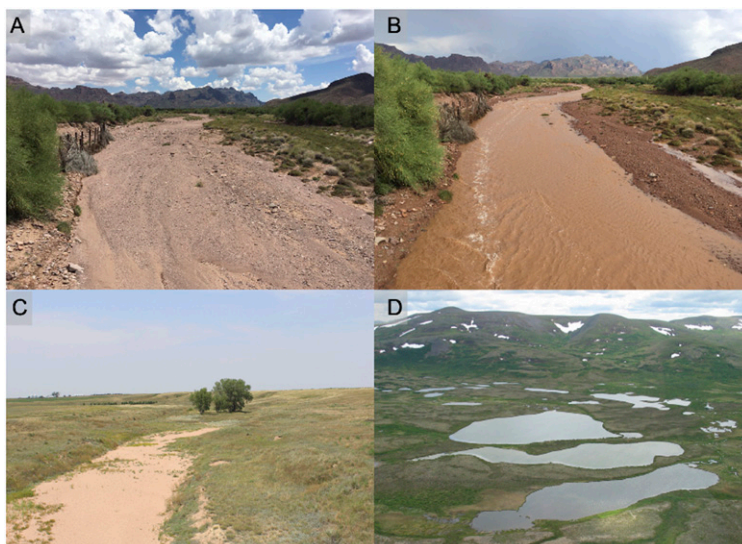
Connectivity among waterbodies was the cornerstone of the Obama administration's Clean Water Rule (CWR), which reflected a state-of-the-science synthesis of more than 1,200 scientific publications [known as the "Connectivity Report" (5)], input from 49 experts, and a rigorous review by a 25-member panel of the EPA's Scientific Advisory Board (SAB) (6). Since then, scientific evidence supporting the 2015 CWR, and hence contradicting the new proposal, has only accumulated, especially as related intermittent (i.e., flow seasonally) and ephemeral (i.e., flow periodically, after precipitation events) streams, riparian and floodplain zones, and non-floodplain wetlands (i.e., geographically isolated with no direct surface water connection to a navigable water) (Fig. 1) (7–9).

The Trump administration's proposed rule largely ignores or misrepresents several conclusions of the Connectivity Report and SAB review. In relying more upon case law than science, the proposed rule would remove protection for millions of stream miles and acres of wetlands that keep waters and watersheds healthy. Some of our most vulnerable waters will lose protection, including ephemeral streams, non-floodplain wetlands, and some floodplain wetlands. The proposed rule is inconsistent with the best-available science regarding scale, structural and functional connectivity, and consideration of multiple dimensions of connectivity.

### Delicate Balance

Clean water depends on complex and highly variable interactions among climate, geology, topography, land use–land cover, human perturbations, and ecosystem processes operating across multiple spatial and temporal scales. As such, the SAB cautioned that connectivity of any single waterbody must be evaluated from systems-level perspectives, such as watersheds and riverscapes, groundwater basins, and fluvial hydrosystems. Although the contribution of a single wetland or stream to water health may be small, the cumulative effects are striking. For example, ephemeral and intermittent streams constitute more than two-thirds of all streams in the conterminous United States (10), more than half of which feed public water systems supporting about a third of Americans (11). The proposed rule fails to consider watersheds from such a broad perspective, instead excluding the ephemeral streams and non-floodplain wetlands that maintain watershed integrity.

The proposed rule further deviates from science by improperly recognizing structural connectivity (i.e., how waterbodies are physically connected to one another) and functional connectivity (i.e., interactions among elements, such as the movement of sediments along river networks). Both mediate the movement of mass, energy, and biota among waterbodies (6, 10). Although streams are structurally connected to downstream waters through networks of continuous beds and banks, the proposed rule ignores the typical physical evidence (e.g., use of bed, banks, and an ordinary high-water mark) and suggests potentially



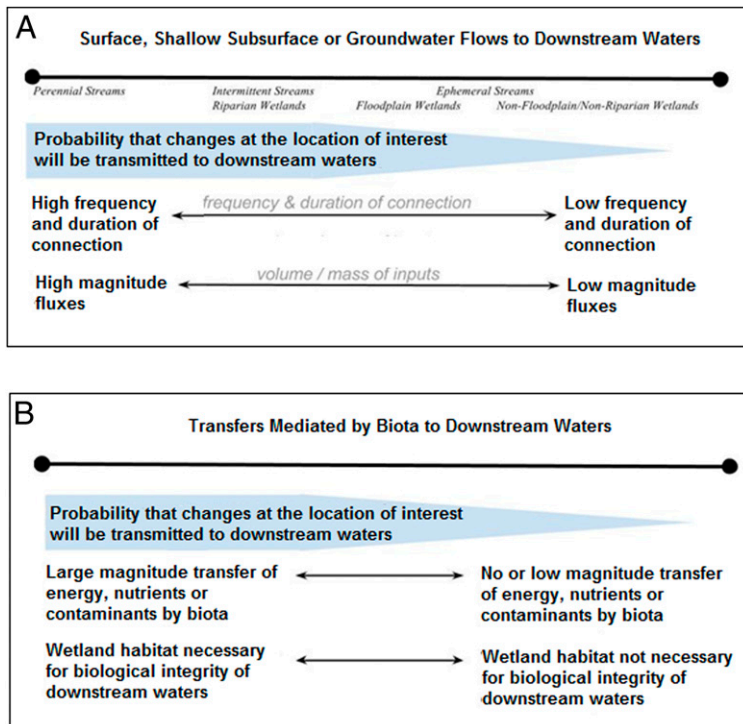
**Fig. 1.** The proposed WOTUS rule would remove protections for ephemeral streams, such as those seen here—dry and wet phases of a stream in Arizona (A and B), dry phase of a stream in Colorado (C)—as well as non-floodplain wetlands (D, in Alaska). Nonperennial streams comprise millions of stream miles, and non-floodplain wetlands encompass millions of acres in the United States. Image credits: A and B, Michael T. Bogan (University of Arizona, Tucson, AZ); C, Daniel C. Allen (University of Oklahoma, Norman, OK); and D, Mark Rains.

using blue-line streams on U.S. Geological Survey topographic or National Hydrology Dataset maps as a way to indicate a jurisdictional stream. Although the agencies indicate that combining this information with other measures (for example, with fieldwork and the relative size of a stream, also known as "stream order") will be important to avoid overestimating flow and erroneously concluding the presence of a jurisdictional tributary, they fail to recognize the opposite problem. In fact, the poor resolution of currently mapped drainage networks can miss one-third of stream lengths relative to higher-resolution data (e.g., Light Detection and Ranging [LIDAR]) and thus lead to a gross underestimation of presence of streams.

To the extent that the proposed rule improperly quantifies structural connectivity, it ignores functional connectivity entirely. Functional connectivity varies widely over time, partly as related to floodplain and river size and the propensity for overbank flooding. Indeed, the functional connectivity of a water to downstream waters may persist even without direct hydrologic surface connection "in a typical year," a criterion used by the proposed rule to establish jurisdiction of wetlands. Consistent with new science, the SAB recommended that functional gradients of connectivity are not binary in nature and, rather, should be viewed as a gradient of frequency, duration, magnitude, and predictability of connections (6). Yet the proposed rule uses that binary lens to eliminate protection from all ephemeral streams and non-floodplain wetlands, irrespective of connectivity and the consequences for downstream waters.

The near-exclusive emphasis of the proposed rule on hydrologic connectivity contradicts the CWA's mandate to protect chemical and biological connectivity as well.





**Fig. 2.** The agencies improperly used the above figure from the SAB review to support removing federal protection for ephemeral streams and non-floodplain wetlands. The conceptual figure is meant to convey that connectivity between streams and wetlands and downstream waters is more appropriately represented by a connectivity gradient (A and B); this is not a binary property. Aggregate effects and low levels of connectivity can be important. Reprinted from ref. 6.

Multiple lines of evidence point to the importance of chemical and biological connectivity. For instance, non-floodplain wetlands can be important chemical sources (e.g., nutrients, dissolved organic compounds, salts) and sinks (via a suite of physicochemical processes including denitrification, sedimentation, long-term storage in plant detritus, and ammonia volatilization) to downstream waters (8). Likewise, animals transport nutrients, energy, and other organisms between disparate locations at both local and landscape scales. Through these movements, biota also prevent inbreeding, escape stressors, locate mates, find food resources, and recolonize habitats, thus contributing to biodiversity and exchanging nutrients and carbon among waterbodies and serving as critical agents of connectivity and resiliency among streams, wetlands, and downstream waters (7).

The proposed rule also misinterprets and contradicts previous recommendations from the EPA's own scientists and SAB. The rule is not only inconsistent with the science of the Connectivity Report and the SAB review, but its exclusions are justified with information from the SAB review that has been misinterpreted or taken out of context. For instance, the proposed rule justifies the removal of federal protection for ephemeral streams and non-floodplain wetlands by improperly referencing a conceptual model developed by the SAB. The model in question

illustrates how connectivity gradients can facilitate the evaluation of the downstream impacts of changes to streams and wetlands (Fig. 2). Although the connectivity gradient does suggest that certain ephemeral streams and non-floodplain wetlands may be comparably less connected to downstream waters than perennial streams and floodplain wetlands, the SAB affirmed that even low levels of connectivity can be important relative to impacts on the chemical, physical, and biological integrity of downstream waters.

Indeed, the relative lack of connectivity between some wetlands and downstream waters is inversely related to their contribution to water quality (12). For instance, when non-floodplain wetlands capture water, materials, and nutrients from stormwater or agricultural runoff, pollution to downstream waters is prevented or reduced. Scientific advances since the development of this figure bolster the notion of a connectivity gradient, indicating that having no connectivity is unlikely, and that even habitat in non-floodplain wetlands is important for downstream waters.

Another shortcoming of the proposed rule is its departure from a critical recommendation from the SAB, which was that connectivity gradients must be contextualized within broader watershed processes, including the aggregate, collective effects of waterbodies. The cumulative effects of waterbodies are a particularly important consideration for non-floodplain wetlands, where the relative distance (compared with floodplain wetlands, for example) from a jurisdictional water may be greater and, thus, the impacts to downstream waters relatively lower. However, the cumulative effects of aggregated wetlands can strongly influence fluxes or transport of water, materials, and biota to downstream waters (8). Because of variability in the degree of connectivity between non-floodplain wetlands and downstream waters, the SAB recommended a case-by-case analysis to determine the degree of connection, which was adopted by the current CWR.

In addition to improperly using the science to justify summarily removing protections for all non-floodplain wetlands, the agencies go one step further by claiming that removing case-by-case evaluations of non-floodplain wetlands will help improve the clarity of the rule and ease of implementation. However, they propose case-by-case judgments in multiple other instances. For instance, the agencies suggest using a combination of methods to distinguish perennial and intermittent from ephemeral flows as defined by the proposed rule, including field visits and remote and field-based tools. Similarly, under the proposed rule, ditches that may have been constructed in a tributary would have to be evaluated on a case-by-case basis. Thus, the proposed rule selectively applies case-by-case consideration to waterbodies, for which such examination is likely to result in exclusion from CWA protections, and removes such consideration from waterbodies (i.e., non-floodplain wetlands) where a case-by-case examination may be more likely to afford protection.

## Dire Implications

If enacted, the proposed rule will erode protections for millions of miles of ephemeral and headwater streams (10, 13) and more than 16 million acres of wetlands in the conterminous United States, including many playa lakes, prairie potholes, Carolina and Delmarva Bays, pocosins, and vernal pools (14). As such, the rule increases the vulnerability of already sensitive waters that provide critical ecosystem services, such as protecting water quality, recharging aquifers, transporting organic material, safeguarding habitats for endangered species, and supporting recreational and commercial endeavors. Severe losses of wetland functions are likely under the proposed rule, with impacts to wetlands in arid and semi-arid regions particularly high. For instance, the Cimarron River Watershed in northeastern New Mexico is projected to lose between 18 and 69% of wetland acres under the proposed rule (15).

Particularly worrisome is that the proposed rule is likely to facilitate the removal of waters from protection in the future, given anticipated trends in human

activities and climate change. In some areas of the country, perennial streams are shifting to intermittent and ephemeral streams, presumably as a result of groundwater pumping accentuated by a changing climate (16). Under the proposed rule, these newly ephemeral streams will lose protection, setting a dangerous precedent by opening the door for further losses of protection.

Every nation's citizens need clean water to be healthy and productive—today and into the future. When carefully considered and integrated, science provides an evidence-based strategy to ensure clean water—as with the Obama administration's CWR. However, the current administration's proposed rule at once contradicts both the rich body of science about water connectivity and the clearly articulated mandate of CWA. Furthermore, it lacks the alleged clarity touted by the agencies. The apparent opposition to enacting science-based policies undermines decades of efforts—and investments by tax-paying Americans—to clean and protect our nation's waters.

- 1 Revised Definition of "Waters of the United States," 84 Fed. Reg. 4154 (14 February 2019) (To be codified at 33 CFR Part 328 and 40 CFR Parts 110, 112, 116, 117, 122, 230, 232, 300, 302, and 401).
- 2 A. Wittenberg, K. Bogardus, EPA claims 'no data' on impact of weakening water rule. But the numbers exist. *Science*, 11 December 2018. <https://www.sciencemag.org/news/2018/12/epa-claims-no-data-impact-weakening-water-rule-numbers-exist>. Accessed 3 May 2019.
- 3 U.S. Environmental Protection Agency, "National water quality inventory report to Congress" (Publication 841-R-16-011, EPA, 2017; <https://www.epa.gov/waterdata/national-water-quality-inventory-report-congress>).
- 4 Federal Water Pollution Control Act (Clean Water Act) 33 U.S.C. 1251 et seq. Sec. 101, 3 (1972).
- 5 U.S. Environmental Protection Agency, "Connectivity of streams and wetlands to downstream waters: A review and synthesis of the scientific evidence (final report)" (Publication 600/R-14/475F, EPA, 2015; <https://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=296414>).
- 6 U.S. Environmental Protection Agency, "Letter to Gina McCarthy. October 17, 2014. SAB review of the draft EPA report connectivity of streams and wetlands to downstream waters: A review and synthesis of the scientific evidence" National Service Center for Environmental Publications, 17 October 2014. <https://nepis.epa.gov/Exe/tiff2png.cgi/P100RO1Y.PNG?-r+75+-g+7+D%3A%5CZYFILES%5CINDEX%20DATA%5C11THRU15%5CTIFF%5C00001458%5CP100RO1Y.TIF>. Accessed 3 May 2019.
- 7 K. A. Schofield et al., Biota connect aquatic habitats throughout freshwater ecosystem mosaics. *J. Am. Water Resour. Assoc.* **54**, 372–399 (2018).
- 8 C. R. Lane, S. G. Leibowitz, B. C. Autrey, S. D. LeDuc, L. C. Alexander, Hydrological, physical, and chemical functions and connectivity of non-floodplain wetlands to downstream waters: A review. *J. Am. Water Resour. Assoc.* **54**, 346–371 (2018).
- 9 M. J. Cohen et al., Do geographically isolated wetlands influence landscape functions? *Proc. Natl. Acad. Sci. U.S.A.* **113**, 1978–1986 (2016).
- 10 T. L. Nadeau, M. C. Rains, Hydrological connectivity between headwater streams and downstream waters: How science can inform policy. *J. Am. Water Resour. Assoc.* **43**, 118–133 (2007).
- 11 U.S. Environmental Protection Agency, "Section 404 of the Clean Water Act. Geographic information systems analysis of the surface drinking water provided by intermittent, ephemeral, and headwater streams in the U.S." (2009) <https://www.epa.gov/cwa-404/geographic-information-systems-analysis-surface-drinking-water-provided-intermittent>. Accessed 3 May 2019.
- 12 J. M. Marton et al., Geographically isolated wetlands are important biogeochemical reactors on the landscape. *Bioscience* **65**, 408–418 (2015).
- 13 L. Levick et al., "The ecological and hydrological significance of ephemeral and intermittent streams in the arid and semi-arid American Southwest" (Publication 600/R-08/134, EPA 2008; [https://www.epa.gov/sites/production/files/2015-03/documents/ephemeral\\_streams\\_report\\_final\\_508-kepner.pdf](https://www.epa.gov/sites/production/files/2015-03/documents/ephemeral_streams_report_final_508-kepner.pdf)).
- 14 C. R. Lane, E. D'Amico, Identification of putative geographically isolated wetlands of the conterminous United States. *J. Am. Water Resour. Assoc.* **52**, 705–722 (2016).
- 15 Saint Mary's University of Minnesota, Modeling federally protected waters and wetlands. Saint Mary's University of Minnesota, GeoSpatial Services (2019). <https://www.arcgis.com/apps/Cascade/index.html?appid=f3de6b30c0454c15ac9d3d881f18ae33>. Accessed 9 February 2019.
- 16 J. S. Perkin et al., Groundwater declines are linked to changes in Great Plains stream fish assemblages. *Proc. Natl. Acad. Sci. U.S.A.* **114**, 7373–7378 (2017).



---

## Critical Areas

---

Rick May <rick@mayandassociates.net>

Fri, Jun 11, 2021 at 11:10 AM

To: Amy Weissfeld <amy.weissfeld@ci.stevenson.wa.us>, Paul Hendricks <paul.hendricks@ci.stevenson.wa.us>, "annie.mchale@ci.stevenson.wa.us" <annie.mchale@ci.stevenson.wa.us>, Dave Cox <dave.cox@ci.stevenson.wa.us>, "scott.anderson@ci.stevenson.wa.us" <scott.anderson@ci.stevenson.wa.us>, David Ray <david.ray@ci.stevenson.wa.us>, Mike Beck <mike.beck@ci.stevenson.wa.us>, Jeff Breckel <jeff.breckel@ci.stevenson.wa.us>, Valerie Hoy <valerie.hoy@ci.stevenson.wa.us>, Auguste Zettler <auguste.zettler@ci.stevenson.wa.us>, "Ben@ci.stevenson.wa.us" <Ben@ci.stevenson.wa.us>, Robert Muth <robert.muth@ci.stevenson.wa.us>

Dear City Council and Planning Commission,

It appears likely Planning will discuss critical area stream setbacks soon. It may be beneficial to bring folks up to speed on a few issues ahead of the discussions. First, what exactly is the purpose and intent of the critical area setbacks?

Stevenson code states "*The purpose of this section (critical areas) is to protect environmentally distinct, fragile, and valuable fish and wildlife habitat conservation areas.*" The intent section of the critical area code states "*This Chapter is intended to be administered with flexibility and attention to site-specific characteristics.*"

Recently the Army Corp of Engineers and the EPA noted "ephemeral streams" are not waters of the US and are not regulated by the EPA or the Army Corp of Engineers. The Stevenson Planning Department also noted there is no other known local or regional governmental entity with the authority to regulate development near ephemeral streams. Only the City of Stevenson currently has that authority through its own regulations.

FYI "An **ephemeral stream** is one that flows only in direct response to precipitation. It receives little or no water from springs and no long-continued supply from melting snow or other sources (Bryan, 1922)."

The City of Stevenson has classified all streams using the Washington Fish & Wildlife Conservation stream categories. The WFAW has no category for ephemeral or seasonal ditches. Since Stevenson uses only the WFAW categories, the City has no option but to classify an ephemeral stream or ditch as a Ns stream. Ns streams in Stevenson currently have 50-foot buffers. A significant number of regional jurisdictions have a separate classification of ephemeral streams and these streams have no critical area setbacks.

If the City cannot classify a seasonal ephemeral stream or ditch with no significant fish and wildlife function as something beside a Ns stream, then the City is creating setbacks that have no ecological reason to exist. There is a major difference between Ns streams with significant fish and wildlife habitat conservation areas and ditches and streams which run in the rainy season.

The City performed a critical area code update in 2018. This update relied on data from Jefferson County, the City of Woodinville and Bingen for the best available science. No data was found from these three sources discussing the environmental factors of ephemeral streams or seasonal streams in ditches. Woodville Municipal best science did lead them to completely exempt Ns waters not physically connected by an above ground channel system to other streams from any critical area regulations.

The purpose of the upcoming critical area discussion is to create an opportunity for the City to look at setbacks that have no or limited environmental benefits. It is an opportunity to bring land back into economic use, while continuing to protect the environment. The goal is to create a commonsense approach where unneeded critical area setbacks are adjusted or removed, while continuing to protect the environment. Thank you.

Rick May  
503-341-2932

**What is a critical area?** SMC 18.13.095 - Critical Area – Fish and wildlife conservation areas include riparian areas where **overwhelming evidence** exists supporting the use of riparian buffers of adequate size to maintain healthy, productive fish and wildlife habitat.

**What does "Fish and wildlife habitat conservation mean?"** RCW-365-190-130 states "Fish and wildlife habitat conservation" means land management for maintaining populations of species in suitable habitats within their natural geographic distribution so that the habitat available is sufficient to support viable populations over the long term and isolated subpopulations are not created. This does not mean maintaining all individuals of all species at all times, but it does mean not degrading or reducing populations or habitats so that they are no longer viable over the long term.





# City of Stevenson

Phone (509)427-5970  
FAX (509) 427-8202

7121 E Loop Road, PO Box 371  
Stevenson, Washington 98648

## Stevenson City Council Goals for 2022-2023

### Vision

Those citizens have now spoken, and their vision for the future is to proudly look out their window, walk down their street, or return for a visit in 2030 and honestly say:

“Stevenson is a friendly, welcoming community that values excellent schools and a small-town atmosphere. The natural beauty is enjoyed by residents and visitors through a network of recreational opportunities. The strength of Stevenson’s economy is built upon high quality infrastructure and a vibrant downtown that provides for residents’ daily needs. Stevenson takes advantage of our unique location on the Columbia River by balancing jobs, commerce, housing, and recreation along the waterfront.”

### Mission

Stevenson is committed to investing in improved infrastructure, stewardship, community & human development. We will adapt, evolve, and progress to maintain our resilient and inviting small-town feel in an agile/nimble and fiscally responsible way.

### Goals

The goals below are a list of priorities from council. Interwoven throughout these priorities is improved communication and engagement with the community, supporting community efforts for human development, maintaining and improving current infrastructure and assets, and incorporating additional goals such as aggressive undergrounding of utilities and broadband within capital projects where possible.

1. **Wastewater Upgrades:** The city will continue working toward lifting the commercial sewer connection moratorium, building efficient, sustainable, and affordable wastewater system upgrades with added BOD capacity by the spring of 2023.
  - a. Bid and begin construction on the WWTP by the end of 2021 with construction extending through spring of 2023.
  - b. Bid and construct Phase 2 of the Lift Station and collection system construction project by spring of 2022.
2. **Downtown Planning:** The downtown corridor will be thoughtfully planned to encourage utilization of the entire downtown, allow for safe and easy flow of traffic, and support mixed-use development by the end of 2024.
  - a. **Aesthetic Improvements** -Vacant/derelict/unkempt property ordinances will be in place by the end of 2022, a list of nuisance properties will be created in coordination with the Stevenson Downtown Association by the end of 2022 and nuisance properties will be enforced for a reduction of nuisances by 75% by 2024.

## Stevenson City Council Goals for 2022-2023 (cont.)

- b. **East-side Downtown Improvements** will be made to encourage development with an increase of developed or utilized properties of 25% by 2024.
        - i. First Street Overlook will be constructed in 2021.
        - ii. Columbia Street Realignment will move forward with conceptualization and planning for a complete path forward with funding partners by the end of 2022.
3. **Fire Hall:** The city will partner with Skamania County Fire District 2 and the Skamania County Department of Emergency Management to build a new fire hall that meets the needs of the agencies, is affordable to the community and is a valued asset of Rock Creek Drive.
  - a. **Design Completion**
  - b. Apply for and secure **Construction Funding**
  - c. Enter into interlocal agreements between various agencies for the funding and/or maintenance of the property.
  - d. Bid and construct new fire hall.
4. **Water System Continued Maintenance**
  - a. **Replace** most of the failing **AC Pipes**, about 30% of the city waterlines, by 2030. Projects outlined in the next few years include:
    - i. School Street
    - ii. Loop Rd
    - iii. Upper Russell (in conjunction with Park Plaza construction)
    - iv. Frank Johns
  - b. Water Treatment Plant Maintenance includes painting interior.
  - c. Establish Hegewald Well as a permanent water source.
5. **Develop Deliberate Growth Strategy** by the end of 2021.
  - a. Complete Capital Improvement Program
  - b. Complete a Strategic Plan for the Fire Department
  - c. **Explore Industrial Sites:** Apply for a CERB grant to evaluate the feasibility of additional industrial sites away from the Waterfront by the end of 2019.

### Remaining Uncompleted Goals from 2019-2024 Strategic Plan

6. **Housing Affordability:** The city will work with private and public partners to increase the availability of attainable housing by 20 units, reduce the unhoused population by 20% and increase temporary shelter availability by 75% by the end of 2024.
7. **Russell Ave Rebuild-Phase 2 from Second St. to Vancouver Ave** and tie in with the Courthouse Plaza project if funding allows.
8. **Broadband** - complete the Broadband Strategic Plan by the end of 2019 and collaborate with community partners to facilitate the completion and implementation of the Strategic Broadband Plan starting in 2020.
9. **Waterfront Development-**The City will work with the Port of Skamania to develop a waterfront development plan by the end of 2021.
10. **Parks Plan** Develop a park plan to include maintenance of current parks and standards by the end of 2020.
11. **Partner with School District on Workforce Education Development and Develop Youth Leadership Process** to include honorary student councilmembers by the end of 2020.

## Stevenson City Council Goals for 2022-2023 (cont.)

### Completed Goals from 2019-2024 Strategic Plan

1. **Road Diet** – Study, review and revised road standards to reduce required rights of way for street development by the end of 2020. **Completed April, 2019.**
2. **Remodel City Hall** – remove surplussed items by the end of 2019, reduce and organize city records by the end of 2022 to optimize the usable space for a remodel of city hall by the end of 2024. **Surplussed items removed, building permits relocated and records being organized.**
3. **Improve Financial Software System** Research new software options and ways to maximize current software with a recommendation to council on whether or not to change systems by the end of 2019. **Contracted with BIAS Software and implementation completed in 2019. Permitting module implementation in process.**
4. **Water System Continued Maintenance**
  - a. **SMART Meter Completion** – Select and install smart meters and begin monthly excess water usage charging by the end of 2019. **Commerce Grant signed and project substantially complete.**
  - b. Water Treatment Plant Maintenance includes reroof. **Reroof completed in 2021.**
5. **City Owned Facilities, ROW, Roads and Streets Continued Maintenance/Improvements:** the city will **be a leader in aesthetic improvements** and maintain facilities, property and Rights of Way.
  - a. Fill hole in front of high school and vegetate with trample-resistant, maroon and/or blue plantings that can survive without water by November 30, 2018. **Completed.**
  - b. Trim/Remove damage to all remaining city trees caused by the 2017 ice storms by March, 2019. **Completed.**
  - c. Replace dead plants from the Lodge Trail, Cascade Avenue and Kanaka Creek Road projects by March, 2020. **Completed.**
6. **Russell Ave Rebuild:** Russell Avenue will be rebuilt from the Waterfront to Vancouver Ave to underground utility lines, improve pedestrian safety and enhance the experience by installing landscaping with **irrigation** to include **trees and planter boxes, benches and wayfinding signs** and have a completed **maintenance plan** by the end of 2024.
  - a. Phase I of the project, Waterfront to Second Street will be completed by the end of 2019 with minimal impact to the downtown during the peak summer months, pending the acquisition of required easements. **Project substantially complete as of July 3, 2020!**
7. **Housing Affordability:** The city will work with private and public partners to increase the availability of attainable housing by 20 units, reduce the unhoused population by 20% and increase temporary shelter availability by 75% by the end of 2024.
  - a. **Homeless/Temporary Housing** funding initiatives will be explored to in 2019 to obtain resources to help fund the goal with funds being collected in 2020 and utilized by 2022. **Completed. Sales Tax measure on the November ballot, 2019 failed and HB 1406 funds implemented and will take effect 8/1/20.**
  - b. The city will partner with the EDC to complete a **Buildable Lands Inventory** by the end of 2019. **Project completed.**
  - c. The city will partner with other agencies to complete a **Housing Needs Assessment** by the end of 2020. **Project completed.**
  - d. Reconsider zoning standards for configuration of ADUs (attached vs unattached) by March, 2019. **Completed May, 2019.**

## Stevenson City Council Goals for 2022-2023 (cont.)

- 8. Wastewater Upgrades:** The city will continue working toward lifting the commercial sewer connection moratorium, building efficient, sustainable and affordable wastewater system upgrades with added BOD capacity by the end of 2021.
- a. **Complete CERB Feasibility Study** on the Alternatives Analysis by the end of Feb, 2019 and implementation of proposed alternatives by August, 2019. **Final CERB Report completed Dec. 2020.**
  - b. Contract with DOE for design funding by Jan 31, 2019. **Completed February, 2019**
  - c. Advertise for Design Engineer immediately upon contract with DOE. Phase Design Engineering contract as necessary to address collection system (including pump stations and geotechnical study) prior to performance on WWTP design. **Contract signed April, 2019**
  - d. **Complete Design** of the project to apply to DOE for construction funding by Oct, 2019. **Delayed until 2020 due to delay in DOE loan contract and CERB Study.**
  - e. **Update Facilities Plan** with the CERB Study and design work by Oct, 2019. **CERB Study included in revised facilities plan update, submitted for DOE approval February, 2019. Design work will be completed and submitted to DOE end of June, 2020.**
  - f. Plan for the relocation of Public Works equipment with the expansion of the WWTP to be implemented with construction of the upgrades by the end of 2021. **Alternatives sites researched and some relocation implemented.**
  - g. Continue with the **Sewer Lining** project to reduce Infiltration and Inflow at the wastewater treatment plant during rain events by inspecting 10% of the wastewater collection system each year and repairing as needed and as budget allows. Contract for Geotech report as identified in GSP before repairs are made in Montell neighborhood. **Ongoing. The final report on Geotech for Montell neighborhood stated it is more cost effective to treat Infiltration and Inflow at the plant than to fix the sewer lines and install French drains.**
  - h. Enter into agreements with all Significant Industrial Users for individual discharge limits and rates by the end of the second quarter 2019. **Signed agreement with Backwoods Brewing, draft with LDB remains in process.**
  - i. Update FOG program to improve compliance by 90% by the end of 2019 and 100% by 2020. Updates shall include clear instructions of how the proposed escalating fees/fines will be imposed. **FOG Ordinance updated March, 2019.**
  - j. Continue with minor improvements in both collection system and plant and encouraging BOD reduction to reach a goal of 0 NPDES effluent violations. **Ongoing. Coordinating with SIUs and Dirt Huggers for side stream material removal. Installed interim measures to improve plant performance and guide design.**
  - k. Complete funding package requirements for collection system and sign contracts by the end of 2020. **Completed.**
  - l. Continue with the **Sewer Lining** project to reduce Infiltration and Inflow at the wastewater treatment plant during rain events by inspecting 10% of the wastewater collection system each year and repairing as needed and as budget allows. **Completed in 2020 and scheduled for 2021.**

## Stevenson City Council Goals for 2022-2023 (cont.)

- m. Implement **updated rate structure** after completion of rate study by the end of 2020. **Rate study completed and the model will be updated in 2021 after funding streams are secured.**
  - n. **Relocate Public Works** equipment and materials with the expansion of the WWTP to be implemented with construction of the upgrades by the end of 2022. **Completed in 2021.**
  - o. **Continue with minor improvements** in both collection system and plant and encouraging BOD reduction to reach a goal of 0 NPDES effluent violations. **In process**
  - p. **Apply** for construction funding with DOE, USDA and others to maximize grants and leverage low-interest loans to reduce cost impact to residents. **In process**
  - q. Complete and sign finding contracts for WWTP funding by the fall of 2021. **In process**
  - r. Complete permitting requirements for construction by the fall of 2021. **In process.**
  - s. Bid Lift Station and collection system construction project by the summer of 2021. **In process and on track.**
  - t. Begin construction on the lift stations and collection system by fall of 2021. **In process.**
9. **City Property Security** - The city will evaluate security needs at all city facilities and begin implementing security enhancements in 2019. **An interior security door has been installed to prevent visitors from coming behind the counter without authorization. Plexiglass has been installed as well. Security cameras being discussed and researched for 2021 install.**
10. **Parks Plan** Develop a park plan to include maintenance of current parks and standards by the end of 2020.
- a. **Parks and Rec District** – Develop committee to research and evaluate interest for a park and recreation district by the end of 2020. Determine a way forward go/no go by 2021. **Pool district created in 2021 by voters.**
11. **Downtown Planning:** The downtown corridor will be thoughtfully planned to encourage utilization of the entire downtown, allow for safe and easy flow of traffic, and support mixed-use development by the end of 2024.
- a. A city-wide **Traffic Study** will be completed by the end of 2021. **In process.**
    - i. **Unimproved Street Plan:** The city will develop an unimproved street plan to include funding mechanisms and opportunities by the end of 2019 and begin construction on at least one project by the end of 2021. **Project may be incorporated into the city-wide traffic study.**
      - 1. **Del Ray** - The city will work property owners to determine development opportunities for public and private uses by the end of 2020.
      - 2. **Lotz Road Improvements** will be included in the unimproved street plan.
  - b. **Design Standards** outlined in the Downtown Plan will be reviewed and updated by the end of 2021. **In process.**
  - c. **Mixed-Use** – The city will reduce barriers to mixed use to encourage increase mixed use development by the end of 2024. **In process.**
12. **City Owned Facilities, ROW, Roads and Streets Continued Maintenance/Improvements:** the city will **be a leader in aesthetic improvements** and maintain facilities, property and Rights of Way.
- a. **Landscaping** – The city will create a plan for landscaping and maintenance for city property and rights of way, which may include agreements with adjacent property owners, by the end of 2020. **Tree management plan being created in 2021.**



## CHAPTER 3-GOALS & OBJECTIVES

The Stevenson Comprehensive Plan uses nine Goals to focus the community's Cornerstone Principles and refine the citizens' Vision. Like the Cornerstone Principles, the topics of these Goals closely relate to the community's day-to-day needs and desires. Like the Vision, these Goals are broad, general statements describing the ultimate endpoint where the actions taken on their behalf should lead.



### A Plan for Action

This Chapter's nine main sections correspond to the nine Goals. After a brief introduction, each Goal is followed by a six-column matrix containing information about how that Goal can be achieved. When viewed as a whole, the six columns serve as an Action Plan designating what, why, how, and when activities should be done and who should do them.

**FIGURE 3-1: PLAN GOALS**

#### Stevenson Comprehensive Plan Goals

**Goal 1—Community & Schools:** The Stevenson community is active and engaged and provides excellent schools and diverse activities for its youth.

**Goal 2—Urban Development:** Development within the Stevenson Urban Area wisely considers the long-term interests of the community.

**Goal 3—Housing:** A variety of housing options accommodates all residents.

**Goal 4—Downtown & Waterfront:** A vibrant and attractive downtown is home to diverse businesses and welcoming to residents and visitors.

**Goal 4A—Waterfront:** The waterfront is an extension of the downtown core and a place where people live, work, and play.

**Goal 5—Business & Industry:** Stevenson supports businesses that employ its residents and meet community needs.

**Goal 6—Tourism:** Stevenson attracts visitors by providing and promoting a variety of tourist amenities and activities.

**Goal 7—Transportation & Circulation:** Multi-modal transportation options provide people and goods with safe, efficient, and convenient options.

**Goal 8—Utilities & Services:** Reliable utilities and convenient services fulfill the needs of the current and future community.

**Goal 9—Parks & Recreation:** Residents and visitors enjoy access to a network of world-class parks, open spaces, and recreational opportunities.





## Objectives

The first column of the Goal matrices describes what should be done through a list of Objectives that are intended to bring each Goal to fruition. Objectives are action-oriented statements for the City to undertake when implementing the Comprehensive Plan.

## Tactics

Depending on the complexity of an Objective, specific Tactics may be listed in the second column of the Goal matrices. Tactics behave similarly to Objectives but are more detailed. Tactics listed in the matrices encapsulate ideas developed through the planning process, but they are not intended to be an exclusive or exhaustive list of actions that may lead to the accomplishment of each Objective over the course of plan implementation.

## Cornerstone Principles

The Cornerstone Principles listed in the third column justify why each Objective was included in the Comprehensive Plan to help users understand how important each Objective is to the community and prioritize them for future action.

## Responsible Department

The Responsible Department column describes who is expected to undertake an Objective by listing the name of one or more City departments. As lead, the departments listed in this column should ensure that each Objective is carried out in an appropriate manner.

## Likely Partners

The fifth column provides an initial understanding of how Objectives will be accomplished by listing the Likely Partners that will be engaged by the City while working on an Objective. Though this list of potential partners focuses on governmental agencies, organized groups of stakeholders, and specific types of property owners, the community at-large should always be considered a likely partner and engaged throughout plan implementation.

## Timeline

The final column, Timeline, acts as a guide for future City work plans by establishing priorities for implementation. The Timeline indicates when an Objective should be undertaken through four designations:

- Ongoing– These Objectives should be at the fore-front of City thought at all times and initiated when the opportunity or need arises;
- Short-Term– These Objectives are the highest priority, and should be undertaken within three years of plan adoption;
- Mid-Range– These Objectives are either of lesser importance than, or will not be as effective if undertaken before, the Short-Term Objectives. The timeline for accomplishing such activities ranges from three to eight years;
- Long-Term– These Objectives are even further out than Mid-Range Objectives and will not likely be a City priority in the immediate future. Such activities should be monitored for “ripeness” over the course of plan implementation, but generally will not be undertaken within the next eight years.



## Goal 1– Community & Schools



**“The Stevenson community is active and engaged and provides excellent schools and diverse activities for its youth.”**

The City of Stevenson can only be as strong as the community it serves. This Goal seeks to strengthen the Stevenson community by emphasizing the retention and development of community bonds that are built through active communication, governmental coordination, quality education, community attractiveness, and a diverse array of cultural opportunities.

Stevenson’s schools and youth are particularly important to the community. The location and quality of the schools have a significant impact on the City’s economic development initiatives, transportation system, utilities, and residential areas. While the City does not intend to take the primary role in providing educational and youth activities, the encouragement and development of such activities are vitally important to the community’s overall health.

The City’s actions leading to the fulfillment of this Goal acknowledge its sometimes limited involvement with its subject matter, but the Objectives and Tactics contain concrete methods by which the City can foster community development, improve educational and youth activities, and promote cultural opportunities and awareness.



OBJECTIVE	CORNERSTONE PRINCIPLES				RESPONSIBLE DEPARTMENT	LIKELY PARTNERS	TIMELINE
	HQL	NSB	HE	AW			
<b>Goal 1– Community &amp; Schools</b>							
1.1– Develop a high level of communication with the community regarding decisions and events affecting the city.					Administration	Chamber, SBA	Ongoing
1.1-1– Use media such as a City website, Facebook page, and newsletter in addition to the methods required by law.							
1.2– Provide opportunities for citizens to participate and express their views to City officials.					Administration		Ongoing
1.2-1– Solicit and use citizen knowledge and ideas in the development of City policies, goals, and objectives.							
1.3– Ensure that the monitoring reports contained in Appendix D are submitted to the Council annually prior to budget adoption.					All Departments		Ongoing
1.4– Develop a high level of coordination among all levels of government.					Administration		Ongoing
1.5– Ensure that the plans and actions related to land use by special districts, County, State, and federal agencies are consistent with the Stevenson Comprehensive Plan.					Planning		Ongoing
1.6– Coordinate activities such as school site selection and school building use to complement surrounding neighborhood and recreational uses.					Administration & Planning	SCSD	Ongoing
1.6-1– Encourage the use of schools for recreation, open space, and meeting rooms whenever their uses do not conflict with the primary educational purpose of the schools.							
1.7– Facilitate the school district's efforts to provide quality educational programs now and into the future.					Planning	SCSD, Parent Groups	Ongoing
1.7-1– Establish flexible zoning regulations for schools and related activities to ensure the schools' ability to enhance facilities.							
1.8– Support the school district's efforts to enhance community involvement in schools.					Administration	SBA, SCSD	Ongoing
1.8-1– Provide opportunities for student involvement and partnerships in City government, projects, and activities.							



OBJECTIVE	CORNERSTONE PRINCIPLES		RESPONSIBLE DEPARTMENT	LIKELY PARTNERS	TIMELINE
	TACTICS	HQL NSB HE AW			
<b>Goal 1– Community &amp; Schools</b>					
1.9– Support vocational and workforce training programs that build skills serving the needs of existing and future employment opportunities and businesses in the area, especially in the forestry and timber industries.			Administration	EDC, SBA, SCSD, Parent Groups, Work-Source	Short-Term
1.10– Facilitate and encourage the regional library system to maintain the high level of educational service to the community.			Administration	FVRL	Ongoing
1.11– Support the Columbia Gorge Interpretive Center, especially in their educational and children’s programming efforts.			Administration	CGIC	Ongoing
1.12– Develop and enhance cultural opportunities.	1.12-1– Facilitate and support development of a bricks-and-mortar performing arts center. 1.12-2– Develop a public art plan. 1.12-3– Install public art in key locations throughout the City, especially along the Columbia River waterfront. 1.12-4– Develop an interpretive signage plan. 1.12-5– Install interpretive signs in key locations through the City, especially highlighting Stevenson’s unique relationship with the Columbia River.		Administration & Planning	CGIC, Chamber, County, SBA, SPAF	Mid-Range
1.13– Support community-based activities and events that cater to residents of Stevenson, especially during the winter months.			Administration	Chamber, County, SBA	Ongoing

OBJECTIVE	CORNERSTONE PRINCIPLES			RESPONSIBLE DEPARTMENT	LIKELY PARTNERS	TIMELINE
	HQL	NSB	HE AW			
<b>Goal 1– Community &amp; Schools</b>						
1.14– Conduct an inventory of community assets.						
1.15– Preserve and protect historic and prehistoric cultural resources.				Administration	Chamber, EDC, Port	Short-Term
1.15-1– Conduct an inventory of known historic and prehistoric cultural resources.						
1.15-2– Establish design standards for land divisions to minimize the disturbance and/or removal of known historic and prehistoric cultural resources.				Planning		Mid-Range
1.15-3– Educate property owners on the appropriate protocols to use when cultural resources are inadvertently discovered.						
1.16– Encourage preservation and rehabilitation of areas and buildings of historic value.						
1.16-1– Consider developing a historic preservation plan for local historic buildings and sites.						
1.16-2– Encourage private enterprise and intergovernmental agreements that will preserve historic areas and buildings. Preservation of such spaces should not reduce the density which can be achieved on the site.				Planning		Mid-Range
1.17– Provide a clean, visually attractive community.						
1.17-1– Facilitate and support activities to beautify the community, such as a Community Beautification Day.					Chamber, Churches, SBA, Schools, Service Clubs	Short-Term
1.17-2– Establish a high enforcement area for nuisances in highly visited areas of the city, such as along Second and First streets, Cascade Avenue, and Rock Creek Drive.				Public Works		
1.17-3– Establish strategies to reduce noise and light pollution.						



## Goal 2– Urban Development



### **“Development within the Stevenson Urban Area wisely considers the long-term interests of the community.”**

From the banks of the Columbia River to timbered foothills; from a heavily travelled main street to seldom-seen clusters of housing, the Stevenson Urban Area offers opportunities and challenges for future expansion, redevelopment and improvement. This Goal emphasizes Stevenson’s ability to welcome new residents and businesses while integrating them into the diverse ecological and urban environments characteristic of the area.

The Urban Area boundary established by the Columbia River Gorge National Scenic Area places strict limits on Stevenson’s ability to expand, effectively creating an island of limited land base. Simultaneously, the Scenic Area’s own restrictions on the types and intensities of uses allowed outside of Urban Areas turns Stevenson into a target for industrial, commercial, and higher density residential development. In developing the actions leading to the fulfillment of this Goal, the City gave special consideration to the dynamics of these unique forces.

Welcoming these changes is not without its challenges. Much of the vacant land close to the urban core has been left vacant due to the presence of development constraints such as wetlands or steep slopes. Development of the vacant lands on the periphery is hindered by the presence of similar constraints and made more difficult by the lack of existing urban services.

The issue, however, is when, where, and how development should occur and not whether it should happen. Stevenson can fulfill its role as a target, as an island, and as a place for residents and visitors to live, work, and play. Development meeting these needs can be compatible with the natural features and resources of the area through orderly, efficient, healthy, pleasant, and smart growth. The Objectives and Tactics below focus on balancing economic forces of growth and change with the important functions and values of the natural environment, managing land use, and enhancing the natural and scenic qualities of Stevenson.

<p><b>OBJECTIVE</b></p> <p><b>Goal 2– Urban Development</b></p>	<p><b>TACTICS</b></p>	<p><b>CORNERSTONE PRINCIPLES</b> HQL NSB HE AW</p>	<p><b>RESPONSIBLE DEPARTMENT</b></p>	<p><b>LIKELY PARTNERS</b></p>	<p><b>TIMELINE</b></p>
<p>2.1– Protect the natural and scenic qualities of the area by regulating land use and carefully managing urban change.</p>	<p>2.2– Preserve, protect, and enhance the functions and values of ecologically sensitive areas (habitat areas, wetlands) with special consideration given to anadromous fisheries, as required by the Growth Management Act.</p>		<p>Planning</p>		<p>Ongoing</p>
	<p>2.2-1– Regulate land use within and adjacent to ecologically sensitive areas while allowing for the reasonable use of private property.</p> <p>2.2-2– Consider establishing a funding source to acquire ecologically sensitive areas.</p> <p>2.2-3– Conduct a Urban Area-wide inventory of ecologically sensitive areas.</p> <p>2.2-4– Encourage agreements that will preserve ecologically sensitive areas in appropriate proportions consistent with available resources. Provision of such open spaces should not reduce the density which can be achieved on the site</p> <p>2.2-5– Establish a stream corridor management plan and program.</p> <p>2.2-6– Consider stream corridors for multiple use in conformance with other plans.</p> <p>2.2-7– Regulate the use of fill in stream corridors.</p> <p>2.2-8– Maintain stream corridors in a natural state, preserving tree lines and vegetation wherever possible.</p>		<p>Administration &amp; Planning</p>		<p>Short-Term</p>



OBJECTIVE	CORNERSTONE PRINCIPLES		RESPONSIBLE DEPARTMENT	LIKELY PARTNERS	TIMELINE
	TACTICS	HQL NSB HE AW			
<b>Goal 2– Urban Development</b>  2.3– Establish a vegetation conservation and management plan and program for all areas of the city. The program should provide for the replacement, planting, preservation, and maintenance of trees and native vegetation.	2.3-1– Prefer, preserve, and encourage the use of native vegetation on City-owned land. 2.3-2– Educate property owners on the benefits of trees and native vegetation. 2.3-3– Establish design standards for land divisions to minimize removal of trees and native vegetation. 2.3-4– Establish design standards for land divisions requiring new plantings when trees and/or native vegetation are removed.		Public Works		Mid-Range
	2.4– Establish landscaping standards and guidelines.	2.4-1– Consider establishing landscaping standards in heavily travelled and commercial, industrial, and recreational areas. 2.4-2– Consider developing landscaping guidelines for residential areas.		Planning	
2.5– Manage outstanding scenic views and sites for the benefit of the community.	2.5-1– Consider acquiring highly prized scenic areas or viewsheds. 2.5-2– Establish design standards for land divisions to preserve scenic views.				
	2.5-3– Consider regulating building heights, tree plantings, and aboveground utility lines within scenic viewsheds. 2.5-4– Encourage agreements that will preserve scenic areas in appropriate proportions consistent with available resources. Provision of such scenic spaces should not reduce the density which can be achieved on the site.		Administration & Planning		Mid-Range

<p><b>OBJECTIVE</b></p> <p><b>Goal 2– Urban Development</b></p>	<p><b>TACTICS</b></p>	<p><b>CORNERSTONE PRINCIPLES</b> HQL NSB HE AW</p>	<p><b>RESPONSIBLE DEPARTMENT</b></p>	<p><b>LIKELY PARTNERS</b></p>	<p><b>TIMELINE</b></p>
<p>2.6– Protect public and private property and human safety from hazards such as critical aquifer pollution, frequent floods, geological hazards, and fire.</p>	<p>2.6-1– Establish development standards for lands known to have severe limitations. 2.6-2– Establish development standards for flood plains to minimize flood hazard vulnerability. 2.6-3– Establish standards for the Rock Creek slide to minimize soil movement. 2.6-4– Establish development standards to ensure safety near gas pipelines.</p>		<p>Planning</p>		<p>Short-Term</p>
<p>2.7– Periodically review and revise the Future Land Use and Zoning maps to accommodate changes in community needs.</p>	<p>2.7-1– Consider designating areas not served by the public sewer and/or water systems as an “urban reserve” until such systems are made available . 2.7-2– Balance the availability of sufficient land for various uses when designating Future Land Use and Zoning districts. 2.7-3– Consider infill potential when designating Future Land Use and Zoning districts, especially with regard to multi-family housing. 2.7-4– Consider redesignating lands currently designated for industrial use which are unlikely or undesirable to be developed for such uses. 2.7-5– Consider location and suitability of land for urban uses and established need when designating Future Land Uses and Zoning districts.</p>		<p>Administration &amp; Planning</p>		<p>Ongoing</p>
<p>2.8– Establish policies to review annexation proposals.</p>	<p>2.8-1– Prefer annexation of developed areas abutting the city.</p>		<p>Planning</p>		<p>Short-Term</p>





OBJECTIVE	TACTICS	CORNERSTONE PRINCIPLES			RESPONSIBLE DEPARTMENT	LIKELY PARTNERS	TIMELINE
		HQL	NSB	HE			
<b>Goal 2– Urban Development</b>							
2.9– Encourage the establishment of a subarea plan and land use regulations within the unincorporated Urban Area.	2.9-1– Encourage maintaining existing forest and farm uses within the unincorporated Urban Area. 2.9-2– Discourage development within the unincorporated Urban Area until suitable land within the City has been developed. 2.9-3– Ensure the highest and best use of riverfront properties within the unincorporated Urban Area by protecting them from development and redevelopment until urban utilities and services can be provided.					County	Short-Term
2.10– Use the type, location, and phasing of public facilities as a factor to guide urban expansion.	2.10-1– Manage urbanization through the expansion of public infrastructure such as the sewer and water systems.					Planning & Public Works	Ongoing
2.11– Manage lands bordering the National Scenic Area boundary to ensure habitat and recreational connectivity.						Planning	Ongoing
2.12– Facilitate and encourage the use of innovative building types and land development patterns that encourage conservation of energy and other resources.						Building & Planning	Ongoing
2.13– Establish standards for urban development that encourage mixtures of land uses and intensities.	2.13-1– Consider establishing incentives and/or special standards for infill projects.					Planning	Mid-Range
2.14– Ensure development review processes are prompt, predictable, open, and uncomplicated.						All Departments	Ongoing





OBJECTIVE	TACTICS	CORNERSTONE PRINCIPLES HQL NSB HE AW	RESPONSIBLE DEPARTMENT	LIKELY PARTNERS	TIMELINE
<p><b>Goal 2– Urban Development</b></p> <p>2.15– Minimize the impacts of abutting conflicting land uses by subjecting the more intensive land use or the site being developed to special site development standards.</p>			Planning		Ongoing



## Goal 3– Housing



**“A variety of housing options accommodates all residents.”**

Stevenson is home to a diverse array of individuals with broad differences in preference and financial capability. These differences are reflected in the size, type, density, and price ranges of the homes residents occupy. This Goal emphasizes the importance of Stevenson’s residential neighborhoods to the overall vitality of the city.

Over the past twenty years Stevenson has experienced shifting trends that greatly affect the housing its residents seek. It has shifted from a remote rural outpost to an outer-rim bedroom community for the Portland-Vancouver area. It has shifted from a year-round home of blue-collar millworkers to a center for tourism and seasonal occupants having a greater dependence on service industry workers. Housing affordability has been important throughout all of these shifts and will continue to be important during the shifts that are likely to occur over the next twenty years.

The City understands the importance of housing quality and affordability, and the Objectives and Tactics leading to this Housing Goal reflect this understanding through their focus on maintaining and improving existing residential areas and adding new residential areas to accommodate the mixed preferences and financial capabilities of the community.

OBJECTIVE	CORNERSTONE PRINCIPLES		RESPONSIBLE DEPARTMENT	LIKELY PARTNERS	TIMELINE
	HQL	NSB HE AW			
<b>Goal 3– Housing</b>					
3.1– Periodically review and revise land development regulations for residential areas to accommodate changing social and economic needs of residents.			Planning		Ongoing
3.2– Encourage a range of residential land uses, housing sizes, types, and price ranges and establish appropriate development criteria.			Planning	Realtors	Short-Term
3.3– Develop affordable housing goals.			Planning	CGHA	Short-Term
3.4– Establish property maintenance ordinances.			Administration		Ongoing
3.5– Consider establishing innovative taxing methods and development incentives to ensure vitality and preservation of established residential areas.			Administration & Planning		Ongoing
3.6– Review and carefully consider the immediate and long term effects of fees, charges, regulations, and standards on dwelling costs.			Administration & Planning	County	Short-Term



OBJECTIVE	CORNERSTONE PRINCIPLES		RESPONSIBLE DEPARTMENT	LIKELY PARTNERS	TIMELINE
	TACTICS	HQL NSB HE AW			
<b>Goal 3– Housing</b> 3.7– Ensure major residential developments and high density residential areas provide adequate open space and recreation areas.	3.7-1– Establish design standards for land divisions to provide open space and recreation areas. Provision of such open spaces should not reduce the density which can be achieved on the site. 3.7-2– Conduct an inventory of undeveloped areas to determine potential opportunities for provision of open space and recreation areas.	 	Planning		Ongoing
	3.8– Review all development proposals for compatibility with surrounding established residential areas. Policies related to land use, transportation, public facilities, and utilities should seek to maintain and enhance the quality of these areas.	3.8-1– Consider requiring special screening, landscaping, sound proofing, and fencing when appropriate to minimize noise, hazards, and glare for residential developments abutting designated major streets.	 	Planning	



**Page Intentionally Left Blank**





## Goal 4– Downtown & Waterfront



**“A vibrant and attractive downtown is home to diverse businesses and welcoming to residents and visitors.”**

Standing anywhere in downtown Stevenson and looking around, observers easily understand how enviable the setting is. The views change constantly as clouds and wisps of fog move in, out and through the mountainous terrain, as the sun moves daily from east to west and shifts seasonally to the south and north, and as the wind shifts the direction of the Columbia River’s waves. Functionally, the downtown area is kept compact by the boundaries of the Columbia River, Rock and Kanaka creeks, and the steep slopes rising as the Cascade foothills. This Goal emphasizes maintaining and enhancing the look, functionality, and vitality of the downtown core.

**“The waterfront is an extension of the downtown core and a place where people live, work, and play.”**

The Columbia River, Rock Creek, and Rock Cove waterfronts are key components to improving the look and function of downtown Stevenson and are acknowledged here as a Sub-Goal. The availability of land on Stevenson’s Columbia River waterfront is unique within the Gorge where railroads and highways either form barriers to waterfront property access or are the waterfront property owners themselves. The scenic assets of Rock Creek and Rock Cove add additional growth potential for development and redevelopment on their abutting lands. This growth, development, and change can be managed to benefit current and future residents and visitors.

The Objectives and Tactics selected to achieve this Goal and Sub-Goal focus on developing Area Plans, improving the appeal of the area through public and private activities, and ensuring the functionality of the area through proper infrastructure and uses.

OBJECTIVE	CORNERSTONE PRINCIPLES		RESPONSIBLE DEPARTMENT	LIKELY PARTNERS	TIMELINE
	HQL	NSB HE AW			
<b>Goal 4– Downtown &amp; Waterfront</b>					
4.1– Revise the “Downtown Plan” to encourage improving the downtown commercial area to support local needs and expand the recreation and tourist industry.			Planning	SBA	Mid-Range
4.2– Periodically review and revise the downtown commercial area boundary, basing the location, type and amount of commercial activity on community need.			Planning	EDC, SBA	Short-Term
4.3– Periodically review and revise zoning ordinances to diversify and enhance the downtown economy.			Planning	Chamber, EDC, SBA	Ongoing
4.4– Encourage more intensive use of existing commercial space.			Administration	Chamber, EDC, SBA	Ongoing
4.5– Retain government administrative facilities in the downtown commercial area.			Planning	County, DSHS, Port, USPS	Ongoing



OBJECTIVE	TACTICS	CORNERSTONE PRINCIPLES			RESPONSIBLE DEPARTMENT	LIKELY PARTNERS	TIMELINE
		HQL	NSB	HE			
<b>Goal 4– Downtown &amp; Waterfront</b>							
4.6– Encourage enhancing the Courthouse lawn as a more attractive community gathering space.					Administration	County	Short-Term
4.7– Ensure that both public and private properties located along entrances to Stevenson are attractively maintained.					Public Works	Private Property Owners	Ongoing
4.8– Establish standards to encourage relocation or burial of powerlines in the downtown commercial area and other areas where views are affected.					Planning & Public Works	Private Utilities, PUD,	Short-Term
4.9– Revise sidewalk construction programs to minimize the replacement of street trees.					Public Works		Mid-Range
4.10– Provide better connections between downtown and the waterfront.	4.10-1– Consider converting Russell Street into a pedestrian mall between Second and First streets. 4.10-2– Consider improving sidewalks and street crossings and installing public art and seating areas on Russell Street from downtown to the waterfront.				Planning & Public Works	Port, SBA	Mid-Range
4.11– Consider establishing a Parking and Business Improvement Area to support downtown improvements, such as a rehabilitation grant or loan program for downtown buildings or provision of visitor amenities.					Administration	Chamber, EDC, SBA	Short-Term
<b>Goal 4A– The waterfront is an extension of the downtown core and a place where people live, work, and play.</b>							
4A.1– Support development of improved river access in the Stevenson area.	4A.1-1– Improve waterfront access and control erosion through coordinated stabilization programs.				Public Works	County, Port	Short-Term



OBJECTIVE	TACTICS	CORNERSTONE PRINCIPLES			RESPONSIBLE DEPARTMENT	LIKELY PARTNERS	TIMELINE
		HQL	NSB	HE			
<b>Goal 4– Downtown &amp; Waterfront</b>							
4A.2– Establish a Shorelines Master Program to guide the balanced development of industrial, commercial, residential, recreational, and natural uses.	<p>4A.2-1– Encourage the use of the riverfront for commercial, residential, recreation, and open space purposes consistent with the Shorelines Management Act.</p> <p>4A.2-2– Protect, enhance, and maintain the natural, scenic, historic, architectural, and recreational qualities along the River.</p> <p>4A.2-3– Support recreational activities on the public lands and waters of the Columbia River, Rock Cove, and Rock Creek.</p>				Administration & Planning	CGIC, Chamber, County, Port, Property Owners, SBA	Short-Term
4A.3– Manage lands abutting the Columbia River and Rock Creek for the benefit of the community.	<p>4A.3-1– Review all proposals for shoreline use for compatibility with the goals and policies of the Skamania County Shoreline Management Master Program.</p> <p>4A.3-2– Review development proposals located on or near banks and floodway of the River and creeks to maintain the recreation and open space potential while promoting healthy and visually attractive environments.</p> <p>4A.3-3– Review land use policies to ensure compliance with the Shorelines Management Master Program.</p>				Planning & Public Works	County, Port, Property Owners	Ongoing
4A.4– Reduce impediments to attracting waterfront investors.	<p>4A.4-1– Enhance Cascade Avenue as the main waterfront street.</p> <p>4A.4-2– Use various marketing techniques to attract waterfront investors, such as a “Come on in, the water’s fine” slogan.</p>				Administration Public Works & Planning	Chamber, EDC, Port, Property Owners SBA	Short-Term



OBJECTIVE	TACTICS	CORNERSTONE PRINCIPLES			RESPONSIBLE DEPARTMENT	LIKELY PARTNERS	TIMELINE
		HQL	NSB	HE AW			
<b>Goal 4– Downtown &amp; Waterfront</b>							
4A.5– Consider repurposing the Tichenor Building for retail and lodging purposes.					Planning	EDC, Port	Long-Term
4A.6– Encourage development of a landscaping plan for the fairgrounds.					Planning	County	Ongoing
4A.7– Support development of a large waterfront gathering place, such as a amphitheater for community events.					Administration	Port, SBA	Long-Term



**Page Intentionally Left Blank**





## Goal 5– Business & Industry



### **“Stevenson supports businesses that employ its residents and meet community needs.”**

The mix of businesses and industries in Stevenson ranges from creative, locally-owned establishments, to regionally-respected firms, to nationally-recognized institutions. These businesses employ and serve Stevenson’s residents and contribute to the positive atmosphere of Stevenson’s commercial and industrial areas. This Goal seeks to contribute to the success of existing businesses, develop new economic opportunities, and ensure that the local business community remains a healthy component of Stevenson’s overall vitality.

Making productive use of Stevenson’s existing people, facilities, and resources is particularly important to the city’s economic future. This includes building on the forest industries so important to Stevenson’s early development, the high tech industries thriving in the region, and other as-yet unidentified resources which will put Stevenson on the cutting edge of the economic future of the Gorge and Pacific Northwest.

While the City recognizes the limited role government has in business conduct, it also recognizes the importance of businesses to the citizens, residents, and visitors. The Objectives and Tactics that will advance the City toward its economic goals seek to create an accommodating economic environment through consistent dialogue with the business community, support of targeted economic growth and diversity programs, and provision of appropriate land, facilities, infrastructure and services.

OBJECTIVE	CORNERSTONE PRINCIPLES		RESPONSIBLE DEPARTMENT	LIKELY PARTNERS	TIMELINE
	HQL	NSB HE AW			
<b>Goal 5– Business &amp; Industry</b>					
<p>5.1– Establish an economic program and strategy to support development of a healthy, diversified economy which will provide local employment and support for businesses and services.</p>			<p>Administration &amp; Planning</p>	<p>Chamber, County, EDC, MCEDD, Port, SBA</p>	<p>Short-Term</p>
	<p>5.1-1– Provide areas and incentives for development of non-polluting, light industrial activities.</p> <p>5.1-2– Designate additional areas for various types of industrial activity as needs change and demand develops. The designations should ensure the viability of and compatibility with surrounding properties.</p> <p>5.1-3– Consider establishing incentives for development that meets the City's economic development and diversification goals and objectives.</p>				
<p>5.2– Attract businesses that provide family-wage jobs to start-up, expand or locate in Stevenson.</p>			<p>Administration</p>	<p>Chamber, EDC, Port, SBA</p>	<p>Ongoing</p>
	<p>5.2-1– Support establishment of a recruitment program to attract industry to Stevenson.</p>				
	<p>5.2-2– Survey citizens to determine what additional services they need.</p>				
	<p>5.2-3– Facilitate and support business incubators, mentoring programs, and other strategies to assist start-up businesses.</p>				
	<p>5.2-4– Attract development of industries and companies that relate to existing local resources, such as the forestry and natural resource industries of the area.</p> <p>5.2-5– Conduct a cluster analysis to determine which businesses and industries would supplement and benefit from the industries currently in the region.</p>				



OBJECTIVE	TACTICS	CORNERSTONE PRINCIPLES			RESPONSIBLE DEPARTMENT	LIKELY PARTNERS	TIMELINE
		HQL	NSB	HE AW			
<b>Goal 5– Business &amp; Industry</b>							
5.3– Establish strategies to retain and grow existing businesses.	5.3-1– Conduct an annual inventory of local businesses. 5.3-2– Periodically survey local businesses to understand how the City can support their success and growth.				Administration	Chamber, EDC, Port, SBA	Ongoing
5.4– Support networking opportunities such as the “Chamber Breaks.”					Administration	Chamber	Ongoing
5.5– Facilitate and support provision of adequate utility, transportation, and communications infrastructure to meet the needs of Stevenson’s business community.					Administration	County, EDC	Ongoing
5.6– Support the development of industrial lands and buildings.					Administration	Count, EDC, Port	Ongoing
5.7– Promote Stevenson’s local resources and amenities (e.g., low energy costs, fiber optics) and location near the I-5, I-84, and railroad corridors to attract industry and commerce to ensure tax base stability.					Administration	Chamber, EDC, Port, SBA	Ongoing
5.8– Preserve lands designated for industrial use for that use, protect them from incompatible uses, and ensure access to good infrastructure.	5.8-1– Consider the feasibility and benefits of establishing industrial areas along Ryan Allen Road near the garbage transfer station. 5.8-2– Consider regional tax sharing programs as an alternative to developing industrial land in Stevenson.				Planning	EDC, Port	Ongoing
5.9– Establish standards for industrial land use to encourage nonpolluting, environmentally safe, light industries.					Planning	EDC, Port	Mid-Range



**Page Intentionally Left Blank**




















## Goal 6– Tourism



**“Stevenson attracts visitors by providing and promoting a variety of tourist amenities and activities.”**

The degree to which a community can capture outside financial resources is the key to how prosperous that community is and how competitive it is in relation to other communities. For the first 75 years of its existence, Stevenson’s prosperity was based on logging, mining, fishing, and other natural resource extraction industries. In the past quarter century however, the focus has shifted from the extraction of natural resources to the industries based on the amenities natural resources provide. By 2000 visitors and tourists enjoying Stevenson’s natural resources contributed almost 75 cents to every retail dollar spent in Skamania County. This Goal is included in the Comprehensive Plan as an acknowledgement of the tourist contribution to Stevenson’s overall prosperity.

While Stevenson has been a leader in tourism accommodation and promotion of innovative tourist and visitor amenities, more and more communities are gaining ground through the initiation of similar efforts. The Objectives and Tactics of this Goal seek to maintain and improve our status as a tourist destination through continued tourism promotional efforts and by encouraging businesses and amenities that will improve the experiences of Stevenson’s visitors.

OBJECTIVE	CORNERSTONE PRINCIPLES			RESPONSIBLE DEPARTMENT	LIKELY PARTNERS	TIMELINE
	HQL	NSB	HE AW			
<b>Goal 6– Tourism</b>						
6.1– Balance and manage tourism to benefit the local economy and yet protect Stevenson’s quality of life.				Administration		Ongoing
6.2– Promote the City’s attractions and activities through media such as websites, brochures and signage.				Administration	Beacon Rock, FoG Cascade Locks	Ongoing
6.3– Facilitate and encourage Stevenson to become the year-round recreation and tourist destination center of the County and Central Gorge.				Administration	County, Port, EDC, State Parks	Ongoing
6.4– Encourage cross-promotion of visitor-oriented businesses and services.				Administration	CGIC, Chamber, Port, SBA	Ongoing
6.5– Support development and enhancement of cultural and educational activities for citizen and visitor enjoyment.				Administration		Mid-Range
6.6– Provide access from the waterfront to other parts of town via safe, attractive, and convenient walkways.				Public Works		Ongoing



OBJECTIVE	CORNERSTONE PRINCIPLES			RESPONSIBLE DEPARTMENT	LIKELY PARTNERS	TIMELINE
	TACTICS	HQL	NSB			
<b>Goal 6– Tourism</b>						
6.7– Encourage development of mountain biking and hiking trails and other visitor amenities on the public lands immediately outside of Stevenson.				Administration	BPA, Bike groups, County, FoG, USFS, WaDNR,	Ongoing
6.8– Establish a quiet zone at railroad crossings within the city.				Public Works	BNSF, Chamber, SBA, Port	Short-Term



**Page Intentionally Left Blank**





## Goal 7– Transportation & Circulation



**“Multi-modal transportation options provide people and goods with safe, efficient, and convenient options.”**

The transportation system is probably the most visible and frequently used service provided by the City of Stevenson. Whether traveling to work, joy-riding through the Gorge, leisurely strolling through the neighborhood, or waiting for a delivery, the residents, visitors, and businesses of Stevenson rely on the City for a functional and convenient transportation and circulation system. This Goal emphasizes methods by which the City can ensure its transportation system meets community needs.

Stevenson’s existing transportation and circulation system has shifted modes and focuses over its long history. The original Plat of Stevenson was a gridiron pattern that enabled easy internal circulation for pedestrian and horse traffic and focused on the Columbia River and Stevenson Landing as the primary mode of external transportation. When the railroad came through town, the focus shifted from the river uphill to where the rail line met dirt streets and boardwalk sidewalks. As automobile use grew and the city expanded away from its original riverside terrace, this gridiron pattern had to be altered to accommodate the steep Gorge slopes, the many creekside canyons and ravines cutting through these slopes, and the existing oddly-intersecting logging roads on the then-periphery. With the continued dominance of the automobile, the focus again shifted uphill to the new paved state highway, cul-de-sacs and dead-ends became commonplace methods for dealing with the creekside ravines and canyons, and sidewalks waned in importance.

Stevenson plays the lead role in ensuring the continual shifts in transportation modes occur in a way that benefits residents, visitors and businesses. The Objectives and Tactics of this Goal allow the City to accommodate these changes by focusing on improving the function, management, and look of existing transportation options and increasing the nonautomotive aspects of the system.

OBJECTIVE	CORNERSTONE PRINCIPLES			RESPONSIBLE DEPARTMENT	LIKELY PARTNERS	TIMELINE	
	TACTICS	HQL	NSB				HE
<b>Goal 7 – Transportation &amp; Circulation</b>							
7.1– Develop a long range transportation plan.	<p>7.1-1– Consider the feasibility and benefits of establishing one-way couplets on 1<sup>st</sup> and 2<sup>nd</sup> Streets.</p> <p>7.1-2– Consider the feasibility and benefits of using roundabouts at intersections throughout the city.</p> <p>7.1-3– Develop improvement plans for existing rights-of-way.</p> <p>7.1-4– Consider traffic calming measures such as narrow streets.</p> <p>7.1-5– Minimize traffic congestion and facilitate the safe, efficient movement of people and commodities through the design of the transportation system.</p>				Public Works	BNSF, County	Short-Term
7.2– Establish and manage the transportation system in a manner which contributes to community appearance and livability, recognizes and respects the characteristics of natural features, and minimizes the effects on abutting land uses.					Public Works		Ongoing
7.3– Develop a transportation system that provides all citizens with transportation choices and alternatives	<p>7.3-1– Support establishment of a regional transit system.</p> <p>7.3-2– Support provision of safe and convenient transit stops.</p>				Public Works	BNSF, County	Mid-Range
7.4– Develop a plan for safe and convenient alternate forms of transportation, such as bikeways, walkways, and pathways.	<p>7.4-1– Consider separating pedestrian, bicycle, and auto traffic.</p> <p>7.4-2– Provide safe and accessible pedestrian crossings throughout the city.</p>				Public Works	Chamber, County, SBA	Mid-Range
7.5– Periodically review and revise standards for public and private roads.					Public Works	SBA	Mid-Range



OBJECTIVE	TACTICS	CORNERSTONE PRINCIPLES			RESPONSIBLE DEPARTMENT	LIKELY PARTNERS	TIMELINE
		HQL	NSB	HE AW			
<b>Goal 7 – Transportation &amp; Circulation</b>							
7.6– Reduce the effects of through traffic in the downtown commercial area while minimizing any negative impact on local businesses.	7.6-1– Manage road construction projects to minimize construction-related impacts on local businesses. 7.6-2– Facilitate and encourage alternative routing and/or usage of Highway 14 by truck traffic.				Public Works	Chamber, EDC, SBA	Ongoing
7.7– Establish a tree conservation and management program for City rights-of-way. This program should provide for the replacement, planting, preservation, and maintenance of trees.					Public Works		Short-Term
7.8– Facilitate and support safety at railroad crossings.					Public Works	BNSF	Ongoing
7.9– Establish a quiet zone at railroad crossings within the city.					Public Works	BNSF, Chamber, SBA, Port	Short-Term
7.10– Facilitate and support rail service for future transportation and commerce needs.					Public Works	BNSF, Chamber, SBA, Port	Long-Term
7.11– Manage on-street parking to permit the safe and efficient operation of the transportation system.					Public Works	County	Ongoing
7.12– Review and revise parking policies to facilitate efficient short-term parking and minimize off-street parking requirements.	7.12-1– Consider a shared parking program to utilize underused parking lots, such as the Courthouse, schools, and churches.				Public Works	Chamber, EDC, SBA	Short-Term
7.13– Provide wayfinding signage to aid traveler navigation and guide visitors to Stevenson attractions and amenities, especially east- and west-bound travelers on I-84.					Public Works	Chamber, ODOT, SBA, WSDOT	Short-Term



**Page Intentionally Left Blank**







## Goal 8– Utilities & Services



**“Reliable utilities and convenient services fulfill the needs of the current and future community.”**

City governments exist to serve their citizens. This Goal of the Comprehensive Plan emphasizes the aspects by which the City can serve its citizens through proper management and provision of utility services.









The City of Stevenson provides a number of services to its residents. Responsible management of tax- and rate-payer contributions tops the list, but the City also ensures buildings are inspected for safety, clean drinking water is provided to the tap, fires are suppressed before they can spread, sewage is collected and treated, justice is served through policing and the court system, and neighborhood nuisances are remedied. The City also coordinates with outside utility and service providers to ensure that its residents and visitors receive the services they require.

The Objectives and Tactics leading to the fulfillment of this Goal contain methods by which the City can manage and improve upon the services it provides and ensure that other utility and service providers do likewise.

OBJECTIVE	CORNERSTONE PRINCIPLES			RESPONSIBLE DEPARTMENT	LIKELY PARTNERS	TIMELINE
	HQ	NSB	HE AW			
<b>Goal 8– Utilities &amp; Services</b>						
8.1– Encourage City staff and officials to enhance their skills through training and continuing education on topics relevant to their job performance, such as management and communication.				All Departments		Ongoing
8.2– Develop a long-range financial plan.				Administration		Ongoing
8.3– Periodically review and revise the capital facilities plan.				Administration & Public Works		Ongoing
8.4– Identify and correct health and safety hazards within the Stevenson Urban Area.				Administration	County, Port	Ongoing
8.5– Establish maintenance programs to preserve the long-term viability of the City's capital facilities.				Administration & Public Works		Short-Term
8.6– Offset the costs of new development to existing city residents by establishing development charges.				Administration		Ongoing
8.7– Provide adequate easement and right-of-way widths for public and private utilities and emergency and other services.				Planning & Public Works		Ongoing
8.8– Base the provision for future public facilities and utilities upon financial cost and adequacy of desired levels of service.				Administration	County, PUD	Ongoing
8.8-1– Consider providing public facilities and utilities in advance of need.						
8.8-2– Coordinate urban development with private utility agencies to ensure the availability of services when needed.						
8.8-3– Continue to provide water and sewer services within the Urban Area.				Administration	County, PUD	Ongoing



OBJECTIVE	CORNERSTONE PRINCIPLES		RESPONSIBLE DEPARTMENT	LIKELY PARTNERS	TIMELINE
	TACTICS	HQL NSB HE AW			
<b>Goal 8– Utilities &amp; Services</b>					
8.9– Manage urbanization through the expansion of the sewer system.	8.9-1– Permit septic systems only when provision of sewer service is technically infeasible within the planning period. 8.9-2– Revise land development regulations to prohibit septic system installations in areas where provision of sewer service is feasible during the planning period.		Planning & Public Works		Ongoing
8.10– Consider alternative waste disposal systems for difficult sites and to encourage conservation of water.			Public Works		Ongoing
8.11– Coordinate the infrastructure improvement and maintenance projects of multiple utilities to reduce costs and disruptive impacts.			Public Works		Ongoing
8.12– Establish a stormwater utility to provide for the collection and treatment of stormwater runoff and the maintenance of stormwater facilities.	8.12-1– Establish standards for land development ordinances to provide for the collection and treatment of stormwater runoff.		Public Works		Short-Term
8.13– Consider alternative energy resources to benefit the community.	8.13-1– Facilitate and support local energy resource development and use, such as geothermal.		Administration	County, Port, PUD, State	Mid-Range
8.14– Facilitate and support the expansion of high-speed communication utilities such as broadband, fiber optics, and Wi-Fi.			Administration		Ongoing
8.15– Facilitate and support the burial of existing aboveground utility lines.			Administration & Public Works	Private Utilities, PUD	Ongoing

OBJECTIVE	CORNERSTONE PRINCIPLES			RESPONSIBLE DEPARTMENT	LIKELY PARTNERS	TIMELINE
	HQL	NSB	HE AW			
<b>Goal 8– Utilities &amp; Services</b>						
8.16– Require the burial of new utility lines.				Planning & Public Works	Private Utilities, PUD	Ongoing
8.17– Facilitate and encourage the collection, recycling, disposal, and reuse of solid waste within the Stevenson Urban Area.				Public Works	County Solid Waste	Short-Term
8.18– Periodically review and revise the City's law enforcement program.				Administration		Ongoing
8.19– Support Stevenson Fire Department and the Skamania County Hospital District to maintain high quality services.				Administration		Ongoing
8.20– Encourage establishment of county-wide mitigation and emergency action programs for spills, explosions and other disasters.				Administration	County, EMS, Fire	Mid-Range



## Goal 9– Parks & Recreation



Photo Credit: Julie Mayfield



Photo Credit: John McShary



Photo Credit: Ron Shumaker

**“Residents and visitors enjoy access to a network of world-class parks, open spaces, and recreational opportunities.”**

The need for recreation has been universally known to humans from their earliest beginnings. The magnitude of this recreational need has increased as more leisure time has become available and the availability of funds for recreational pursuits has increased. This Goal deals with improving the quality of life for Stevenson residents and visitors by enhancing the parks and recreational opportunities that are available.

As a Gorge town, some of the country’s premier hiking, hunting, mountain climbing, fishing, kayaking, and wind sports surround Stevenson on all sides. Many residents enjoy these activities, and many more visitors are drawn to the area for these relatively solitary activities. Inside Stevenson, a different, more gregarious variety of recreational opportunities exist, including festivals, fairs, and organized or pick-up sporting events. Balancing and connecting these gregarious and solitary varieties of recreation are of special importance to Stevenson. The Objectives and Tactics of this Goal seek to do so by ensuring the facilities we already have are properly maintained, new lands, facilities, and funding are available, and trails or pathways are developed as part of the park system.

OBJECTIVE	CORNERSTONE PRINCIPLES			RESPONSIBLE DEPARTMENT	LIKELY PARTNERS	TIMELINE
	TACTICS	HQL	NSB			
<b>Goal 9– Parks &amp; Recreation</b>						
9.1– Establish a parks and recreation plan that ensures Stevenson projects are eligible for State grant funds.	9.1-1– Consider potential park needs as additional land develops.			Administration		Short-Term
9.2– Preserve open space and recreational resources.	9.2-1– Establish cooperative agreements to ensure that recreation and open space lands and facilities will be provided. 9.2-2– Secure dedications and easements adequate for channel maintenance, public open space, and future recreational use along all natural, permanent stream corridors. 9.2-3– Encourage private enterprise and intergovernmental agreements that will provide open space for recreational lands and facilities. Provision of such open spaces should not reduce the density which can be achieved on the site.			Administration & Planning		Long-Term
9.3– Maintain parks and recreational lands and facilities.				Public Works		Ongoing
9.4– Consider establishing a permanent funding source for the acquisition, development, and maintenance of park and recreation lands and facilities.				Administration		Mid-Range
9.5– Develop a pathways and trails plan to highlight Stevenson’s recreational, historical, and commercial sites.	9.5-1– Consider using stream corridors as part of a parkway or greenway concept. 9.5-2– Include connections among the parks and trails of the City, its partner agencies, and private entities. 9.5-3– Include nature walks, scenic vistas, and connections to forests in the plan.			Planning & Public Works		Mid-Range



OBJECTIVE	TACTICS	CORNERSTONE PRINCIPLES				RESPONSIBLE DEPARTMENT	LIKELY PARTNERS	TIMELINE
		HQ	NSB	HE	AW			
<b>Goal 9– Parks &amp; Recreation</b>								
9.6– Provide pathways and trails that highlight Stevenson’s recreational, historical, and commercial sites.	<p>9.6-1– Use stream corridors as part of a parkway or greenway concept.</p> <p>9.6-2– Connect the parks and trails of the City, its partner agencies, and private entities.</p> <p>9.6-3– Include nature walks, scenic vistas, and connections to forests in the system of pathways.</p>					Public Works		Ongoing
9.7– Develop a balanced system of recreation facilities, lands and programs that meets the recreation needs of residents and visitors alike.	<p>9.7-1– Develop small parcels of land resulting from urbanization as mini-parks or landscaped areas.</p> <p>9.7-2– Facilitate and encourage the installation of lights and other improvements at the Hegewald Skateboard Park.</p> <p>9.7-3– Facilitate and support the development of major community recreation facilities for citizens, such as expanding the pool activity center, providing covered pavilion spaces, developing a youth center, and other spaces for recreation, physical fitness, and wellness classes.</p>					Administration		Ongoing
9.8– Promote Stevenson’s recreational opportunities through media such as websites, brochures, and signage.						Administration		Ongoing
9.9– Protect Rock Cove to improve habitat, water quality and ambiance.						Planning		Mid-Range



OBJECTIVE	TACTICS	CORNERSTONE PRINCIPLES HQL NSB HE AW	RESPONSIBLE DEPARTMENT	LIKELY PARTNERS	TIMELINE
<p><b>Goal 9– Parks &amp; Recreation</b></p> <p>9.10– Facilitate and support appropriate development and services for the Rock Creek and Rock Cove lands.</p>	<p>9.10-1– Facilitate and encourage recreational activities in the Rock Creek and Rock Cove area, such as access for small watercraft.</p> <p>9.10-2– Encourage relocation of the County shops at Rock Creek.</p> <p>9.10-3– Encourage rehabilitation and/or repurposing of the Grange.</p> <p>9.10-4– Facilitate and encourage enhancement of Rock Cove 's habitat, water quality, and ambiance.</p>		<p>Administration &amp; Planning</p>		<p>Ongoing</p>