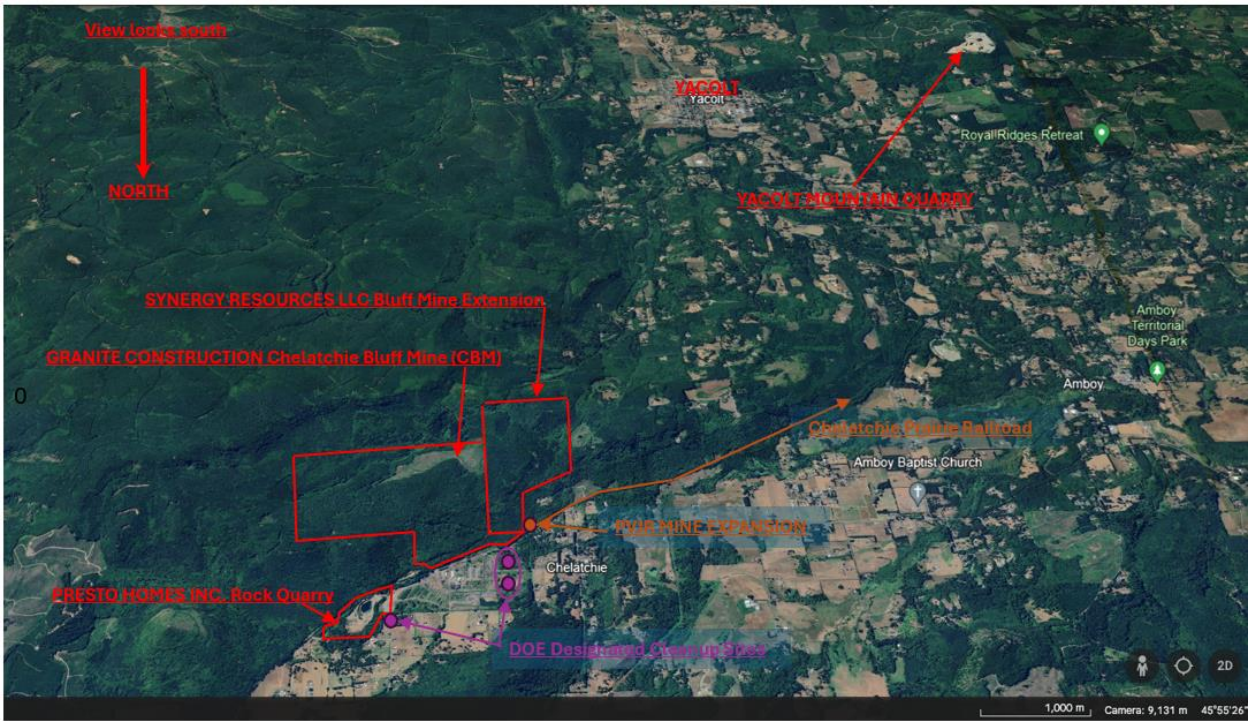
Chelatchie Bluff Mine and Surrounding Industrial Plan
Revised to Include 2024 Expansion



Turning paradise into an industrial dust bowl while destroying the water supply for Clark County, impacting endangered species, and destroying a community.

A Consolidated Report by John E. Nanney PMP
Chelatchie Prairie Resident
Jnanney56@gmail.com

Major Contributors and honorable mentions

Richard Dyrland
Retired Federal Regional Hydrologist and Federal Policy and Programs Analyst.

James Byrne
BS History and Anthropology, M.S. Aquaculture Science Retired Fish Biologist with the WA Dept of Fish and Wildlife.

Albert (Al) O'Connor
Retired Professional Civil Engineer and Geologist U.S. Army Corp of Engineers, Geologist, Hydraulic Engineer, US Forest Service. and Hydrologist Clark County, WA Stormwater Runoff.

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Forward

This is my final work consolidating information about the proposed heavy industrialization of Chelatchie Prairie[1]. I started this to organize the overwhelming amount of data surrounding the discussion. For transparency, I am not a scientist or an environmental expert. Because of this, I have been as cautious as possible to ensure every statement rests on solid evidence from reports, studies, in-field experts, emails, letters, and other substantiating data. In this effort, I have increased the supporting documents in this revision from around five to well over eighty in the footnotes and the bibliography of this report.

While I acknowledge diverse perspectives on this issue, my opinion opposes the proposed industrial development of Chelatchie Prairie. This view aligns with many of my neighbors- longtime residents (spanning generations) and newcomers. We all chose to live here for the rural lifestyle, nature's serenity, and responsible land management practices. As the saying goes, "What I do on my land is my business, until it affects yours." The development of recent forces strategically aimed at impacting my property represents such a concern.

This is not the case of moving into an industrial area and then complaining that corporations want to use their land according to existing zoning. Instead, this is a case of corporations, in affiliation with certain county officials, changing existing non-industrial zoning overlays to allow them to turn the area into a heavy industrial area after we were here and settled. Worse, the corporations working for this to occur are out-of-state and international multi-billion-dollar corporations that will place the bottom-line earnings ahead of any concerns for our community, environment, or way of life. This report will show this to have already begun to happen.

***You will also find that the planned industrialization of Chelatchie Prairie does absolutely nothing for our local Gravel and Sand companies. Further, it will introduce the counter-productive truth that these Big Corporations' competition, will harm our local gravel mining companies and their profits**. Let me say that again, this massive destruction of natural water, habitat, and our community does nothing to help our local businesses. Instead, it lines the pockets of out-of-state, international, and foreign registered corporations that have zero skin in the game as part of our community while impacting our already established locally owned and operated companies. These facts will be shown within this document.*

This brings the question, what are my biases?

1. *I am a property owner within 900 feet of the edge of the proposed Chelatchie Bluff Mine, 1,000 feet from the new proposed 4-spur-railroad loading station, and Kravas Properties LLC's cleanup sight respectively, and 1 mile from the proposed reopening of the Presto Homes Chelatchie Gravel Pit and the old Fuel Tank Farm cleanup site.*

2. *My water well, as well as my neighbors, are all shallow wells ranging from 30-foot hand-dug to 60-foot standard wells. The water that feeds these wells is through what is classified as unstable granular sedimentary rock, (facts to be shown later in this report). The direct concern is twofold:*
    a. *Nearby, the Washington Department of Ecology has identified contaminated sites containing carcinogenic materials. If these pollutants reach the water table, the damage would be severe and extremely difficult and expensive to fix, if fixing the issue at that point is possible at all.*
    b. *Even if the contaminants did not infiltrate our water system, the larger concern is a disruption to the water table, specifically the dropping of water levels. While an industry study will show later in this report that the amount of water drawn for this type of mine is usually minimal, we*

[1] *If new information becomes available later, I will publish separate companion papers as needed. This ensures this document stands as a complete summary currently. To check if additional whitepapers exist, please feel free to contact me directly.*

will see through this same industrial-sponsored study that fracturing of rock does disrupt water flow. This leads to concern due to the geographically unstable conditions in this area because of the high risk of water flow disruption should a massive 690-acre mining operation be allowed[2].

3. *Finally, raised by my Tlingit stepfather in Southeast Alaska, I wasn't native-born, but he fostered a deep connection to the salmon fisheries. Witnessing the industry's decline firsthand since the 1970s has been disheartening. Back then, the commercial fishing season lasted four to five months. Even then, we grappled with dwindling fish populations and new regulations. Regulations which chafed, but we followed the law and made ends meet. Looking back, it's clear the mistakes of the past took decades to manifest. Today, due to habitat destruction, overfishing, and neglect of headwaters, the season can be mere days long, dictated by fluctuating fish numbers. This is why I vehemently oppose industries that prioritize profit over an entire watershed's well-being. For the sake of the dollar, they ignore the devastating impact of their actions.*

I believe that our water and natural wildlife habitats are our one true treasure that must be protected from industrial attack. The industrialization of eastern Chelatchie Prairie is one such attack.

[2] This is the total average that is currently in discussion, as follows, Presto Homes – Chelatchie Gravel Quarry with 38 Acers, Granite Construction/BRP/NRP/ - Chelatchie Bluff Mine with 374 Acers, and Synergy Resources LLC – Chelatchie Bluff expansion with 276 Acers.

Purpose Statement

This document is a synthesis of current knowledge, through a review of existing reports, studies, and known facts surrounding the Chelatchie Prairie Industrialization Plan. More specifically, focused reviews of the Chelatchie Bluff Mine (CBM) and surrounding developments.

This work should be considered a starting point for further research on many topics. As Ronald Reagon said, “Trust but verify.” So many in our world are lemmings, following the rhetoric of talking heads, politicians, industrial giants, and other sources without research to verify the facts. In the case of environmental studies, Geology, Hydrology, Biology, Riparian Habitat, Wetlands, Headwaters, Stormwater, Aquifers, and many other sciences required for the understanding of Chelatchie Prairie are available and mostly free. Science that is not paid for by corporations although I have included some of those, but science that is paid for through work completed by the Washington Department of Ecology, National and Washington State Fish and Wildlife, the National Marine Fisheries Service, the US Army Corps of Engineers, and other agencies whose mandate is to safeguard our lands. Additionally, this report will draw on Industry paid for studies that show the industry does understand their impacts as they attempt to mitigate the impact of truth behind that work[3].

Quick Overview

Chelatchie Prairie is a rural valley, carved into the geology by volcanic actions thousands of years ago. Located in the southwest corner of Washington State in Clark County about 28 miles northeast of Vancouver WA, and 38 miles northeast of Portland OR.

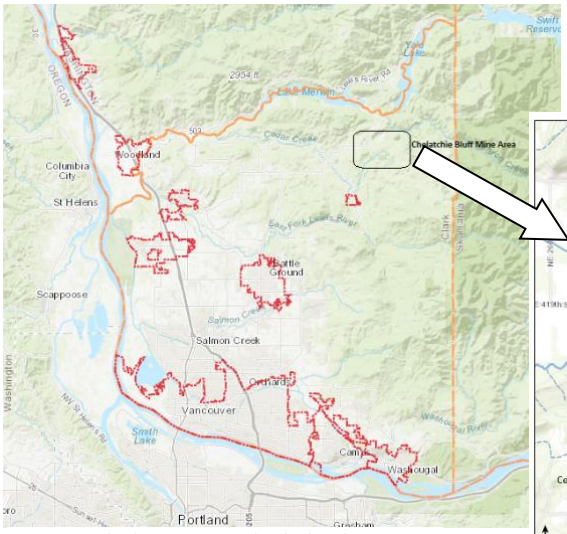

Figure 1 Clark County with Chelatchie Prairie

Chelatchie Bluff is at the eastern end of Chelatchie Prairie. Chelatchie Creek runs from the eastern end heading west, southwest, towards Amboy where it meets up as a main recharge for Cedar Creek. Chelatchie Creek is fed by hundreds of unnamed tributaries, streams, creeks, natural springs, and water seepage from surrounding hills and mountains. The interconnection of this system to the wider Clark County water supply will

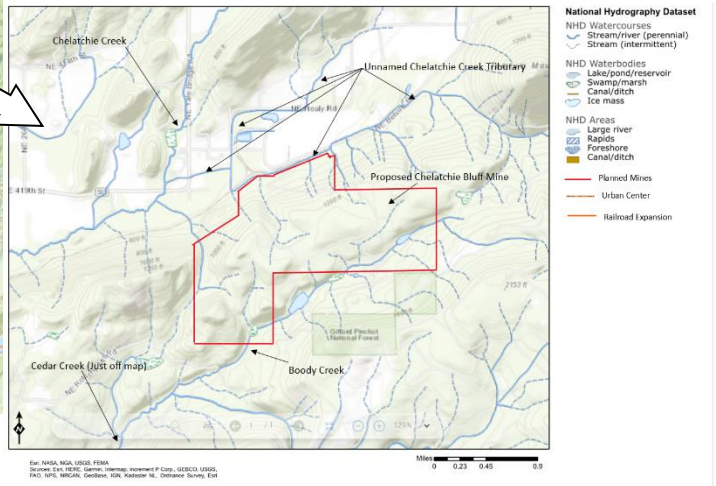

Figure 2 Chelatchie Bluff Mine overlay w/major Headwaters identified

[3] Ontario Stone, Sand & Gravel Association (OSSGA), a Golder Associates Ltd. study, "Water Consumption Study submitted to Ontario Stone, Sand & Gravel Association" and Ontario Stone, Sand & Gravel Association (OSSGA), a OSSGA Environmental Committee study, "Water Management in Quarries"

be shown[4]. As a point of reference, there are two major tributaries of importance to this discussion. A large unnamed tributary to Chelatchie Creek, and Boody Creek which is located to the south of Chelatchie and emanating out of the planned CBM site [Ref Fig 1 & 2]. Both are major contributors to the upper Cedar Creek, which is a main tributary fed by many smaller tributaries that feed the North Fork Lewis River, which feeds the Columbia River[5]. These tributaries are critical to federally designated protected species including chinook, coho, and steelhead Trout[6&7].

For about 40 years, the Chelatchie Prairie has been healing after more than a century of industrial damage. From 1960 to the late 1970s, logging, water rerouting, pollution, and habitat loss led to stricter laws protecting wildlife, clean water, and overall environmental health. A key turning point was the 1964 Wilderness Act[8], safeguarding millions of acres, including parts of Southwest Washington like Mount St. Helens[9] and the Columbia River Gorge National Scenic Area, which encompasses the entire Chelatchie Prairie.

However, the fight for balance between development and environmental protection isn't over. At stake is the future of our planet, endangered species like Coho salmon and Steelhead trout, and ultimately, our children. This document will delve into specific concerns surrounding the Chelatchie Prairie, referencing relevant sources.

While regulations exist to protect the environment, enforcing them can be challenging due to industry pressure. It's vital to strengthen enforcement and explore alternative solutions that meet society's needs for materials while safeguarding our environment.

Finding a balanced approach is key. Implementing new measures will likely encounter opposition from impacted businesses, driven by potential profit loss. However, relying on established environmental laws, grounded in scientific principles, is essential for protecting our land and water. These laws can guide cleanup and restoration efforts in areas already affected by industry and ensure long-term environmental protection for the future. Such as the Clean Water Act[10] which *established standards for water quality and prohibited the discharge of pollutants into waterways*. This act had a significant impact on industries that generate runoff that pollutes streams and rivers such as mines. The Endangered Species Act[11] *protects threatened and endangered species and their habitats*. This act has also had an impact on industries that can destroy habitat for endangered species, which includes Coho and Steelhead that spawn in Chelatchie Creek such as mines. And the Washington Forest Practices Act[12] which **supports "Good Land Stewardship".** *A comprehensive set of regulations that govern industrial activities on state and private lands*. These regulations were designed to protect water quality, fish and wildlife habitat, and other environmental resources.

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[4] Watershed Characterization and Analysis of Clark County, July 2009, Final. Washington State Department of Ecology, Shorelands & Environmental Assistance Program Publication #09-06-019.

[5] https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/recreation/lewis-river/Lewis_River_Trout_Regulations_Brochure.pdf

[6] Stream Surveys, WA Dept. F&WL, SW WA Office, Annual Stream Surveys.

[7] https://wdfw.wa.gov/species-habitats/at-risk/phs

[8] https://www.nps.gov/subjects/wilderness/law-and-policy.htm#

[9] Chelatchie Bluff Mine and surrounding areas are part of the Mount St. Helens National Volcanic Monument administrative boundaries.

[10] https://www.epa.gov/laws-regulations/summary-clean-water-act#

[11] https://www.fisheries.noaa.gov/national/endangered-species-conservation/endangered-species-act#

[12] https://www.dnr.wa.gov/about/boards-and-councils/forest-practices-board/rules-and-guidelines/forest-practices-rules

Millions have been spent by taxpayers to rejuvenate and recover Chelatchie Prairie and surrounding areas from the abuse caused by unregulated industries during the twentieth century[13]. Clearcutting, Steep Land Logging, splash dams, instream gravel mining, railroads along stream channels, and trucking roads[14] damaged thousands of acres of wilderness and the associated ecology in the state of Washington including much in this area[15].

Finally, in the 1970s, federal and state agencies began inspection and enforcement to ensure our lands were restored, our water protected, and our environment preserved for generations to come. During these efforts, the Washington Department of Ecology documented and designated three cleanup sites within the Chelatchie Bluff area. These sites are identified as follows.

- The Old Tank Farm is located on Parcel *281174000* as shown on the Washington Department of Ecology website as CSID**:** 2909, FSID: 30204[16]. These reports show suspected soil and groundwater contamination of Halogenated Organics - Polychlorinated biPhenyls (PCB), and *confirmed soil contamination* of Non-Halogenated Organics - Petroleum Products-Unspecified with *suspected groundwater contamination* of Non-Halogenated Organics - Petroleum Products-Unspecified. These areas remain unclean, and unregulated, and threaten our water.

- Kravas Properties LLC, *parcel 274352000* which is identified on the Department of Ecology website as CSID: 3264, FSID: 1031[17]. This report indicates *suspected contamination of soil* with Halogenated Organics - Polychlorinated biPhenyls (PCB), Non-Halogenated Organics - Petroleum Products-Unspecified, and Non-Halogenated Organics - Phenolic Compounds. In addition, DOE *confirmed surface water contamination* of Non-Halogenated Organics - Polycyclic Aromatic Hydrocarbons. Parcel *274403000* is identified on the Department of Ecology website as CSID: 3021, FSID**:** 1032[18], with *confirmed contamination of soil* with Halogenated Organics - Polychlorinated biPhenyls (PCB), and suspected contamination of Non-Halogenated Organics - Petroleum Products-Unspecified and Non-Halogenated Organics - Phenolic Compounds and *suspected contamination* of surface water with Non-Halogenated Organics - Polycyclic Aromatic Hydrocarbons. Again, these areas remain unclean, and unregulated, threatening our water.

On April 26, 2023, the DOE further connected the Chelatchie Bluff Mine operations to the Kravas Properties Cleanup Site[19]. In this letter, submitted by the Department of Ecology, Southwest Regional Office, states in part,

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[13] GPNF Land and Resource Management Plan, 1990, Final Environmental Impact Statement, Gifford Pinchot National Forest.

[14] These essential industries must adopt stricter regulations and best practices to ensure environmental sustainability.

[15] Another important development was the passage of the Forest and Rangeland Renewable Resources Planning Act (RPA) in 1974. This act required the U.S. Forest Service to develop comprehensive plans for managing national forests, including a focus on multiple uses and sustained yield. The RPA also required the Forest Service to consider the environmental impacts of its management activities.

[16] https://apps.ecology.wa.gov/cleanupsearch/site/2909

[17] https://apps.ecology.wa.gov/cleanupsearch/site/3264

[18] https://apps.ecology.wa.gov/cleanupsearch/site/3021

[19] https://clark.wa.gov/community-planning/cpz2021-00006, DS Scoping Comments.

"Thank you for the opportunity to comment on the determination of significance/scoping for the Chelatchie Bluff Surface Mine Overlay Annual Review Project (CPZ2021-00006) as proposed by Granite Construction Company. The Department of Ecology (Ecology) reviewed the environmental checklist and has the following comment(s):

IPC Solid Waste (Cleanup Site ID: 1032) and IPC Plywood Mill (Cleanup Site ID: 1031) cleanup sites are within a quarter mile from the project area. At the IPC Soild Waste Site, the surface may be impacted by polycyclic aromatic hydrocarbons (PAHs) and petroleum, phenolic compounds, and polychlorinated biphenyls (PCB) may have impacted the site soil. ***The contamination at the IPC Solid Waste Site is similar expect PCB in the soil has confirmed above its cleanup level. Both sites are waiting to be cleaned up****." [emphasis added]*

Studies indicated that this area is geologically unstable[20] and therefore, disturbances created by an aggressive mine operation as shown in the Granite Constructions proposal[21] could have a significant impact on adjacent properties. This is due to heavy ground vibrations created by heavy excavation machinery and the use of explosives that can disrupt water flow and allow the movement of toxic chemicals into the adjacent groundwater[22].

<u>Zoning and Rezoning of East Chelatchie Prairie</u>

It is the current plan of out-of-state and international companies with the support of state and local rail, trucking, concrete, and other heavy industrial businesses, to turn the Eastern end of Chelatchie Prairie into a Heavy Industries overly. The rezoning of the Holton-Anderson property of 320 acres was a monumental step toward the industrialization effort. More than a "foot in the door" this effort changes the entire dynamics of the eastern Chelatchie Prairie. A close look at the application submissions shows they relied on the already Heavy Industrial zoning for Kravas Property, Presto Homes LLC, and Weyerhaeuser Timber Holdings Inc. Emphasizing that this rezoning was in alignment with these properties. A position that ignores most surrounding property owners whose property is designated, Rural Center Residential-2.5 ac min (RC-2.5), Rural-10 (R-10), Forest-40 (FR-40), and Forest-80 (FR-80). In other words, most landowners are residential, agricultural, and farm-use lands not heavy industrial. Then in January 2024, Synergy Resources, LLC jumped on the bandwagon adding 275 acres of heavy industrial Surface Mine Overlay, making the overall mine size 650 acres large. Figure 3 provides a comparison in size to the largest SMO in this area, the Yacolt Mountain Quarry. Which is only 18% of the combined land mass of the now-proposed Chelatchie Bluff Mine.

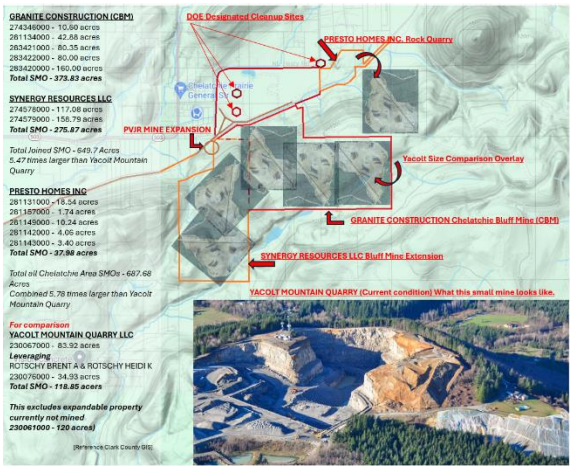


Figure 3 Heavy Industrialized Zone Plans

[20] Washington Department of Natural Resources, Division of Geology and Earth Resources, Vol. 21, No. 1, March 1993.

[21] CPZ2021-00006 Chelatchie Bluff Mineral Lands, 07 Supporting Documents [Public Records].

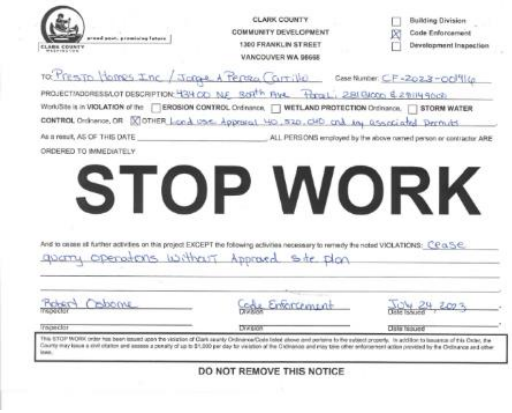
[22] Report on Water Consumption Study, Golder Associates Ltd. & Water Management in Quarries, both paid for by industry, Ontario Stone, Sand & Gravel Association (OSSGA) Canada.

By allowing the industry to ignore the majority property zoning in the area, it sets a dangerous precedent that once operations at CBM are approved, all surrounding land becomes vulnerable to rezoning pressures toward Heavy Industrial Land Use at the expense of the majority landowners. It would not be much of a stretch to expect a northeast, south, and southwest expansion towards Yacolt. A quick review of the adjoining lands on the Clark County GIS reveals several corporate and business-owned parcels that could be flipped to Heavy Industry.

These individuals and associated corporations have proven that they place a higher interest in profits than in responsible land use regulations. In at least two current ongoing cases, the applicants have been accused of violation of environmental laws[23]. We will discuss these in detail further in a moment because, in these early stages of the project, such actions may shed light on expectations of actions moving forward. The community is not wrong in making efforts to ensure laws are enforced, checklists are followed, and politics is repressed as much as possible.

<u>Chelatchie Prairie Mines (aka Chelatchie Rock Quarry)</u>

Presto Homes plans to mine a 34.72-acre area made up of five separate parcels with an existing Heavy Industrial Surface Mining Overlay [***274346000[24], 281134000[25], 283421000[26], 283422000[27], and 283420000[28]***]. Further, based on recent approvals made by Clark County Council, we can be sure they are poised to approve that work with very little concern for following either State Environmental Protection Studies (SEPA)[29] or Federal Environmental Protection Act (EPA)[30] requirements. A review of the current environmental considerations for these five parcels has a direct impact on many of the same concerns as the larger Granite Construction, Chelatchie Bluff Mine et al.


CLARK COUNTY
COMMUNITY DEVELOPMENT
1300 FRANKLIN STREET
VANCOUVER WA 98668

Building Division
☒ Code Enforcement
Development Inspection

TO: Presto Homes Inc / Jorge A Presto Cortiso Case Number: CE-2023-00916

PROJECT ADDRESS/LOT DESCRIPTION: 934 00 NE 50th Ave Parcel: 281149000 & 281142000

Work/Site is in VIOLATION of the ☐ EROSION CONTROL Ordinance, ☐ WETLAND PROTECTION Ordinance, ☐ STORM WATER CONTROL Ordinance, OR ☒ OTHER Land Use Approval 140-320.CMD and by associated Permits

As a result, AS OF THIS DATE _____ ALL PERSONS employed by the above named person or contractor ARE ORDERED TO IMMEDIATELY

STOP WORK

And to cease all further activities on this project EXCEPT the following activities necessary to remedy the noted VIOLATIONS: Cease quarry operations without Approved Site plan

Robert Osborne Code Enforcement July 24, 2023

DO NOT REMOVE THIS NOTICE

Figure 4 Stop Work Order for illegal operations

On May 12th, 2023, the DOE made a complaint to Clark Count Enforcement (CCE) about unpermitted mining operations on parcels owned by an out-of-state company <u>Presto Homes Inc</u>.[31] Yet this complaint from a State Agency was ignored for two months by CCE before they finally issued a stop work order on July 24th, 2023, that letter was sent to Presto Homes for the illegal activity[32].

[23] Stop and desist Order issued by Clark County Enforcement against Presto Homes LLC, for illegally operating a mine, and a Stop and Desist Order issued by the US Environmental Protection Agency against Portland Vancouver Junction Railroad (PVJR). Both are discussed in detail below.

[24] https://gis.clark.wa.gov/gishome/property/?pid=FindSN&account=274346000##

[25] https://gis.clark.wa.gov/gishome/property/?pid=FindSN&account=281134000#

[26] https://gis.clark.wa.gov/gishome/property/?pid=FindSN&account=283421000#

[27] https://gis.clark.wa.gov/gishome/property/?pid=FindSN&account=283422000#

[28] https://gis.clark.wa.gov/gishome/property/?pid=FindSN&account=283420000#

[29] https://ecology.wa.gov/regulations-permits/sepa/environmental-review

[30] https://www.epa.gov/laws-regulations/regulations

[31] Presto Homes Inc 15410 SE 94TH AVE CLACKAMAS OR, 97015. Parcels 281149000 [10.42 acres], 281142000 [4.02 acres], 281131000 [18.54 acres], 281157000 [1.74 acres].

[32] Records show that it has been cited multiple times for violation in 2014, 2015, and 2016, per records obtained through a Public Records Request to DOE by John Nanney, (records available on request).

Several emails have been sent asking about the checklist that this mine will need to follow to ensure EIS and/or SEPA requirements are met. All requests have been left unanswered[33]. This will demand diligence from those concerned to ensure at the Planning and Council Meetings to ensure the citizens are heard and concerns are addressed.

This is especially concerning because Presto Homes has now applied for a mining permit, that would be under the CCE oversite, a department that has proven a lax concern for our environment. This is not the case for the average citizen of the county, try building a barn without a permit and see how long that goes without notice and threat of a fine from the CCE. Yet Industry gets a free pass to operate even with the threat of harm to all of us? The main point is the CCE is chronically negligent, with very few rules enforced on corporations operating under Conditional Use Permits (CUP), although admittedly recent direct communication with CCE has begun[34]. An indication that they are getting the message.

Chelatchie Bluff Mine

Chelatchie Bluff Mine (CBM)[35] as defined by the following five listed parcels [274346000[36], 281134000[37], 283421000[38], 283422000[39], and 283422000[40]] is a 375-acre area that spreads over Chelatchie Creek tributary and Boody Creek and many of their tributaries. Chelatchie and Boody Creeks feed Cedar Creek, a major tributary to Lewis River. With substantial ties to the Upper Troutdale Aquifer[41].

The rezoning request by Granite Construction in 2021 was for four parcels of land owned by Per Holten-Anderson[42] and mineral mining rights from BRP LLC, a subsidiary of Natural Resource Partners (NRP). This rezoning was appealed by Friends of Clark County (FOCC) in which the State Growth Management Hearing Board (GMHP) ruled in March of 2023 that "the county failed to conduct an adequate State Environmental Policy Act (SEPA) analysis and improperly chose to defer a more in-depth review of impacts of the surface mining overlay until the project stage, despite the high level of detail provided by the applicant."[43] It also states that the lack of a comprehensive environmental review interfered with the Growth Management Act's goal to protect the environment. An appeal was made, and those proceedings are ongoing as of the date of this revision[44]. In the meantime, the illegal Surface Mine Overlay remains in place due to a vote by the sitting County Council to disregard the County Attorney's pointed advice to overturn that decision due to it being in clear violation of the law[45 & 46].

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[33] Emails and correspondence are all available through public records.

[34] The author received a direct phone call from Rob Osborn, Clark County Code Enforcement after a complaint regarding possible unauthorized work occurring on the Presto Homes parcels. He assured us he inspects every 90 days or so, and that nothing had changed on the property since his last inspection.

[35] https://clark.wa.gov/community-planning/cpz2021-00006

[36] https://gis.clark.wa.gov/gishome/property/?pid=FindSN&account=274346000

[37] https://gis.clark.wa.gov/gishome/property/?pid=FindSN&account=281134000

[38] https://gis.clark.wa.gov/gishome/property/?pid=FindSN&account=283421000

[39] https://gis.clark.wa.gov/gishome/property/?pid=FindSN&account=283422000

[40] https://gis.clark.wa.gov/gishome/property/?pid=FindSN&account=283420000

[41] Federal Register /Vol. 71, No. 172 /Wednesday, September 6, 2006 /Notices" Specifically "ENVIRONMENTAL PROTECTION AGENCY, [FRL–8217–2], Sole Source Aquifer Designation of the Troutdale Aquifer System; Clark County, WA. AGENCY: Environmental Protection Agency. ACTION: Notice of Final Determination.

[42] Reference, Clark County GIS.

[43] Friends of Clark County v. Clark County and Granite Construction Company, and BRP LLC Case No. 22-2-0002 Final Decision and Order.

[44] State of Washington Court of Appeals Case No. 58327-5

[45] https://clark.wa.gov/community-planning/cpz2021-00006

An interesting point of note, Cedar Creek enters the Lewis River directly adjacent to the Lewis River Fish Hatchery operated by the Washington Department of Fish and Wildlife.

The Washington Department of Fish and Wildlife issued a letter[47] signed by Mr. Holowatz describing the habitat fragmentation that already exists. In his letter he states,

> "The headwaters of Chelatchie and Cedar Creek are documented to have large areas of unstable slopes and allowing mining activities such as blasting, road construction, and deforestation would dramatically increase the potential of siltation downstream resulting in suffocation of juveniles, and redds. Both Cedar Creek and Chelatchie Creek streams have listed threatened chinook, coho and winter steelhead protected under the Endangered Species Act (ESA). They have been documented through adult and juvenile monitoring by WDFW as having spawning populations throughout the watershed and therefore must be protected. Juvenile monitoring studies of Cedar Creek have shown that this stream has the highest densities and abundance of natural origin coho in Southwest Washington in addition to significant returns of natural origin adults. This project poses a risk not only to Cedar Creek salmonids, but to recovery of ESA listed salmonids throughout the Lewis basin and the Lower Columbia."

Furthermore, Mr. Holowatz says,

> "Based on our new Riparian Management Recommendations, our suggested riparian setback for this site would be 215 feet based on the Site Potential Tree Height of 200 years (SPTH200) on all streams located within the site. WDFW no longer has a set buffer width for fish and non-fish bearing streams, and instead bases it on the Site Potential Tree Height of 200 years (SPTH200) to ensure the riparian ecosystem has the greatest functionality. These ecological functions outlined in Riparian Ecosystems, Volume 1: Science Synthesis and Management Implications (Quinn et al. 2020) include, but are not limited to: stream morphology, erosion and sedimentation process, fish and wildlife habitat availability, wood recruitment, stream temperature, shading, pollutant removal, and nutrient cycling."

Chelatchie Bluff Mine will be operated by Granite Construction a *Watsonville California-headquartered company*[48], which has no less than ***eight*** environmental-related offenses, among other questionable business practices[49] as of the date of this document. Now they plan to move into an area that is the headwater of Cedar Creek and dig into ground that is known to be a main source of the Troutdale Aquifer System, a Sole Source Aquifer[50]. Keep in mind that while the magnitude of water used in gravel mining[51] can be argued as low[52], the overlap into the

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[46] The Columbian, Saturday, November 11, 2023, Front Page, by Investigative Reporter, Shari Phiel.

[47] State of Washington Department of Fish and Wildlife, Southwest Region 5, 5525 South 11th St Ridgefield, WA 98642. Dated April 25, 2023, from Isaac Holowatz, Habitat Biologist, to Clark County Community Planning PO Box 9810 Vancouver WA 98666-9810 Attention Jose Alvarez.

[48] https://www.graniteconstruction.com/

[49] https://violationtracker.goodjobsfirst.org/parent/granite-construction

[50] Federal Register/Vol. 71, No. 172/Wednesday, September 6, 2006, page 52541, ENVIRONMENTAL PROTECTION AGENCY [FRL–8217–2], Sole Source Aquifer Designation of the Troutdale Aquifer System; Clark County, WA. AGENCY: Environmental Protection Agency. ACTION: Notice of Final Determination.

[51] "Hydraulic Impacts of Quarries and Gravel Pits" by the Minnesota Department of Natural Resources: https://www.dnr.state.mn.us/lands_minerals/index.html, & "Water Use in Sand and Gravel Mining Operations in the United States" by the U.S. Geological Survey (USGS): https://www.usgs.gov/

headwaters of Chelatchie and Cedar Creeks coupled with massive disturbance to the unstable geology of the area will undoubtedly have a major impact on the area water supply. This is of deep concern to local citizens, farmers, and ranchers who depend on well water. Many of these are wells that are less than 50' deep[53] and permitted by the county.

Granite Constructions Planes

According to their own submitted plans[54],

> "An initial, *conservative proposed* quarry outline is shown in Figure [5]. The preliminary quarry design has 45-degree overall slopes (1:1) down to a final floor elevation of *600 feet AMSL*. This design yields an estimated bulk *cut volume of 112 million cubic yards*. Of the 112 million cubic yards, approximately *8,000,000 cubic yards is anticipated to be overburden*. This equates to a stripping ratio of 0.07:1 assuming 100% of the overburden is waste. These volumes are gross. The mineable and saleable rock is anticipated to have a 5% - 10% waste factor. This considers fracture density and minimal breakdown from blasting and processing. The volumes represented herein are to be categorized as indicated mineral resources by definition and are subject to change with future data acquisition. Preliminary indications can presume *approximately 200 million tons of an extractable resource* is present based on limited interpreted geology, subsurface information, and outcrop investigation." [Emphasis added, and figure # changed to match this paper]

Conservative estimates that 112 million cubic yards of material will be removed from the area. 8 million cubic yards as overburden and 104 million cubic yards of product. This means we can expect (based on simple math) 5.2 million cubic yards per year over 20 years. Or about 19,000 tons a day.

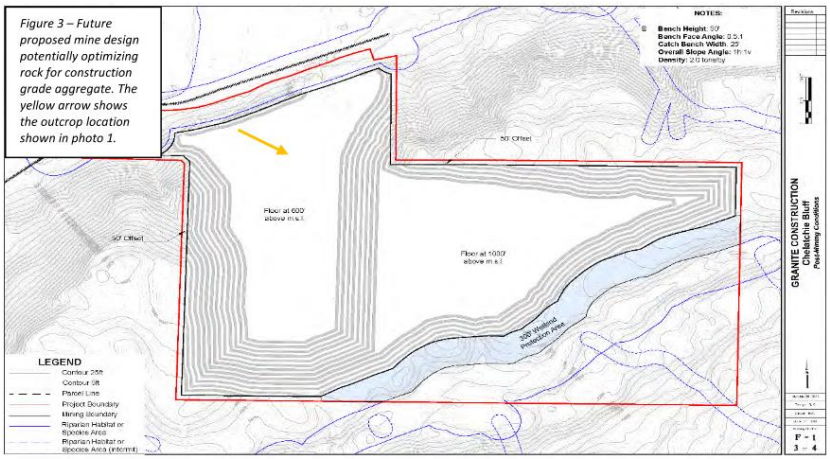

Figure 5 Proposed Mine Overlay directly from the application

These are their conservative estimates, which means, it could be deeper, it could be much larger, and the environmentally dangerous overburden much more extensive. It is also interesting to note how the creeks, runoff, and existing wetlands are conveniently downplayed on their map [Ref. Fig 5]. I would suspect they will need large pumps to keep the hole they dig dry and workable, yet there is no wastewater mitigation outlined on the map. Where will that go? We have a 12 to 18-inch water table, anyone in Chelatchie who has gardened knows this. Yet they want to dig a 700-foot-deep hole in wetlands. You can check the math, that depth is correct.

---

[52] Report on Water Consumption Study, Golder Associates Ltd. & Water Management in Quarries, both paid for by industry, Ontario Stone, Sand & Gravel Association (OSSGA) Canada.

[53] Many cases have been won brought by citizens whose well water/groundwater was contaminated with settlements ranging in the hundreds of thousands of dollars. https://cfpub.epa.gov/enforcement/cases/

[54] March 15, 2022 10 AM County Council hearing, Supporting Docs, https://clark.wa.gov/community-planning/cpz2021-00006

BRP LLC Mineral Rights and the Big Picture

Research into BRP LLC a company that shows up on many documents filed with our county regarding the Chelatchie Bluff Mine, reveals the Mineral Rights for this area, including Chelatchie Bluff Mine, is owned by their parent company Natural Resource Partners (NRP). Looking at their website[55] this international corporation has a large foothold in Chelatchie Prairie (and across Washinton state, and the nation), indicating possible expansion of mineral mining elsewhere within the county and state [Ref. Fig. 6].

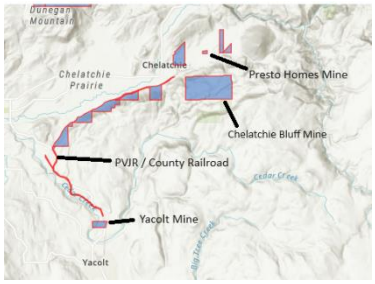

Figure 6 BRP LLC Mineral Rights

Synergy Resources, LLC Adjacent SMO

On January 17th, 2024, Synergy Resources, LLC submitted a request that their property be part of the comprehensive growth plan update[56], specifically parcels 274578000[57] and 274579000[58]. A total of 275 additional acres to a mine that is already ground zero of the headwaters of Chelatchie and Cedar Creeks.

> "*…on behalf of the owners of Synergy Resources, LLC. We are requesting, that as a part of the current comprehensive growth plan update process, the Clark County Council consider applying the Surface Mining Overlay (SMO) to parcels APN #274578000 and APN #274579000. Both parcels are owned by Synergy Resources, and both are designated FR-1 in the current comp plan and zoned FR-80. Parcel APN #274578000 abuts parcels to the east and north that are zoned FR-80 and within an existing SMO. Please refer to the attached exhibit showing the location of the parcels subject to this request.*"

This request is clearly in line with the overall expansion of the Chelatchie Bluff Mine which threatens to destroy Boody Creek completely, a major tributary to Cedar Creek, and directly impact tributaries to Cedar Creek [Ref Fig. 2 and 3].

Water Rights and Use

The State follows the legal 'doctrine of prior appropriation' established in historical Western Water Law in the 1800s. The doctrine states that persons with water rights issued to them before others will have the first right to use the water. This is also called, "first in time, first in right."[59] This may become a valuable tool in this fight.

Endangered Species

With over 25 years of *detailed professional/technical stream & watershed analysis & hydrologic/fisheries project teamwork on Cedar Creek and Chelatchie Creek (both North &*

[55] https://nrplp.com/business/#mineralRights

[56] Email from Mark Erickson – Rotchy Inc. to Cnty 2025 Comp Plan comp.plan@clark.wa.gov dated January 17, 2024. Part of Clark County Public records.

[57] https://gis.clark.wa.gov/gishome/property/?pid=FindSN&account=274578000

[58] https://gis.clark.wa.gov/gishome/property/?pid=FindSN&account=274579000

[59] https://www.dnr.wa.gov/geology-groundwater#water-rights

South) tributaries Richard Dyrland, Retired Federal Regional Hydrologist and Federal Policy and programs Analyst provided his insights on the impact of the Chelatchie Bluff Mine[60].

> *"… our team, which includes a retired very experienced fisheries biologist, a fluvial-geomorphic geologist, and myself (Regional Hydrologist-Western Federal Regions), discovered that a large proportion of the salmon and steelhead spawning and production of fry and juveniles came from spawning in tributaries high up in the sub-watersheds. These fish would migrate down to [the] lower Chelatchie mainstem and on into Cedar Creek later in the year or in some tributaries, stay in deep pools till the fall winter rains came and allowed them to migrate out into Cedar Creek, on to the North Fork below the dams, and out to the Columbia (Note that a study done by Bonneville Power recognizes this important process in the Columbia River Basin). Also note that Fish First over the last 25 years, has implemented extensive fish habitat restoration and support in Cedar Creek and in Chelatchie Creek stream system."*

He then discussed how the WA DFW ran an intensive survey to understand this cycle in high-elevation tributaries in Clark County validating this information.

> *"…[A] Wild Fish Rescue Team was going up high in Mason Creeks tributaries and rescuing between 3000 to 7000 steelhead and salmon fry/juveniles from pools that were drying up. The results of the summer study by the WD FW team indicated that between 25,000 to as many as 35,000 fry were produced in Mason Creek each year, even though the lower half and some of the upper reaches went dry later in the summer."*

This is in line with what we see on tributaries along the Chelatchie and Cedar Creeks and is backed by this research. He goes on to say,

> *"I personally over time have observed salmon & steelhead fry at higher elevations in both the north and south branches of Chelatchie Creek. An example of this is high up in the small tributary of North Chelatchie Creek near Protzman Road, where fry holds up in small deep pools till the fall rains come. In addition, there are WA DFW maps showing the location of active fisheries production in the Chelatchie Creek tributary system."*

Unsurprisingly, this is what we found on the Collins property[61]. Something that the heavy industry and its proponents are denying. Yet here a boots-on-the-ground expert is backing up what was witnessed by dozens of people, including representatives from the Departments of Ecology, Fish and Wildlife, and the US Army Corps of Engineers.

> *"…as pointed out in the USGS Watershed Water Supply Report 1600[62] Watershed most of the water (surface & subsurface) comes year-round from the upper 1/4th of the*

[60] Extracts from an email from Richard Dyrland, Retired Federal Regional Hydrologist and Federal Policy and Programs Analyst to John E. Nanney dated Nov 1, 2023. [Available on request with confidential information redacted].

[61] The Collins property is adjacent to the Chelatchie Railroad, and directly across from unpermitted work by PVJR, whose impact will be discussed further down in this report.

[62] GEOLOGICAL SURVEY WATER - SUPPLY PAPER 1600 "Geology and Ground-Water Conditions of Clark County Washington, with a Description of a Major Alluvial Aquifer Along the Columbia River". Prepared in cooperation with the State of Washington Department of Conservation, Division of Water Resources, and the U.S. Bureau of Reclamation. 1964

watershed due to the unusual geology. I personally have observed this and seen the network of both north and south drainage ditches in the old Plywood Mill area and near the railroad terminal running water into the Chelatchie Creek System. A similar situation exists to the south on the other side of the ridge in the Chelatchie Creek and Boody Creek tributary, which is associated with the proposed mining rezone/expansion area. And again, official WA FDW fish survey maps show these tributaries active for salmon and steelhead production."

His conclusion is on point with those of us who live in this area and know the land.

> *"My point is that disturbing these areas would have a high risk of causing a severe irreversible impact on key production of Threatened & Endangered species of salmonids as well as a risk of water pollution (possibly Clean Water Act related) and diminishing of surface and groundwater supply to the downstream residents in the Cedar Creek main stem."*
>
> *"The positive results of several years of restoration efforts in the Cedar Creek Watershed are reflected in the three WA WDF&W Fisheries Species Presence Maps (Chinook, Coho, and Steelhead) on Cedar Creek & it's tributary stream, Chelatchie Creek. All three are on the Federal Threatened & Endangered list."*

The Troutdale Aquifer Systems[63]

According to the Department of Natural Resources (DNR), 60% of all drinking water comes from groundwater[64] making the discussion of groundwater and the aquifers that we draw from a critical part of this review. The state has seven defined aquifers as defined in the United States Geological Survey's (USGS) Ground Water Atlas of the United States[65].

How aquifers receive their water is through slow movement of water from its source, sometimes taking tens and possibly hundreds of years for the process to occur[66]. This means that damage to a source may not be felt for years, and when it does finally impact the water system, the damage is difficult, if not impossible, to repair.

The Troutdale Aquifer is a Federally Registered major source of clean drinking water. The **Federal Register** /Vol. 71, No. 172[67] Section III of the *Final Determination* states,

> "The Troutdale aquifer system boundaries are represented by rivers and the geologic boundary between the aquifer system units and the older rocks unit. The Columbia River forms the southern and western boundaries of the proposed Troutdale aquifer system. The northern boundary follows the North Fork of the Lewis River from its confluence with the Columbia River, *east to the confluence of Cedar Creek.* ***Cedar Creek is used as the northeast boundary because its location is the closest geographic representation of the geologic boundary between the Troutdale unit and the older rocks unit, and the creek also most likely acts as a local groundwater divide for the upper parts of***

[63] What is an aquifer, https://www.dnr.wa.gov/geology-groundwater#what-is-an-aquifer?

[64] Groundwater, https://www.dnr.wa.gov/geology-groundwater

[65] United States Geological Survey's (USGS) Ground Water Atlas of the United States section 7, https://pubs.usgs.gov/publication/ha730

[66] International Atomic Energy Agency (IAEA) Vienna, The use of chlorofluorocarbons in hydrology Guidebook.

[67] **Federal Register** /Vol. 71, No. 172 /Wednesday, September 6, 2006 /Notices" Specifically "ENVIRONMENTAL PROTECTION AGENCY, [FRL–8217–2], Sole Source Aquifer Designation of the Troutdale Aquifer System; Clark County, WA. AGENCY: Environmental Protection Agency. ACTION: Notice of Final Determination

the aquifer system. The aquifer boundary follows Cedar Creek east where the boundary turns southeast and follows the mapped geologic contact between the Troutdale Formation and the older rocks unit." [emphasis added].

Further, groundwater-surface water flows in the Chelatchie and Cedar Creek watersheds are dependent on the unique Alluvial Fill (Qg) top geological layer in this watershed. It has a relatively high-water transmission rate compared to the rest of the underlying Troutdale Aquifer, and most of the (Qg) water comes from the upper part of the watershed, which is in the areas proposed for mining. Mining done in the Chelatchie Prairie area would seriously disrupt this vital flow of water to the watershed downstream and likely result in destroying T&E fisheries' survival. Also, the impact of the water supply for those living along the river cannot be over-emphasized. This unique (Qg) layer is explained in the USGS Geological Water Survey Paper 1600. Reference to Fig 7, USGS Geology Map[68].

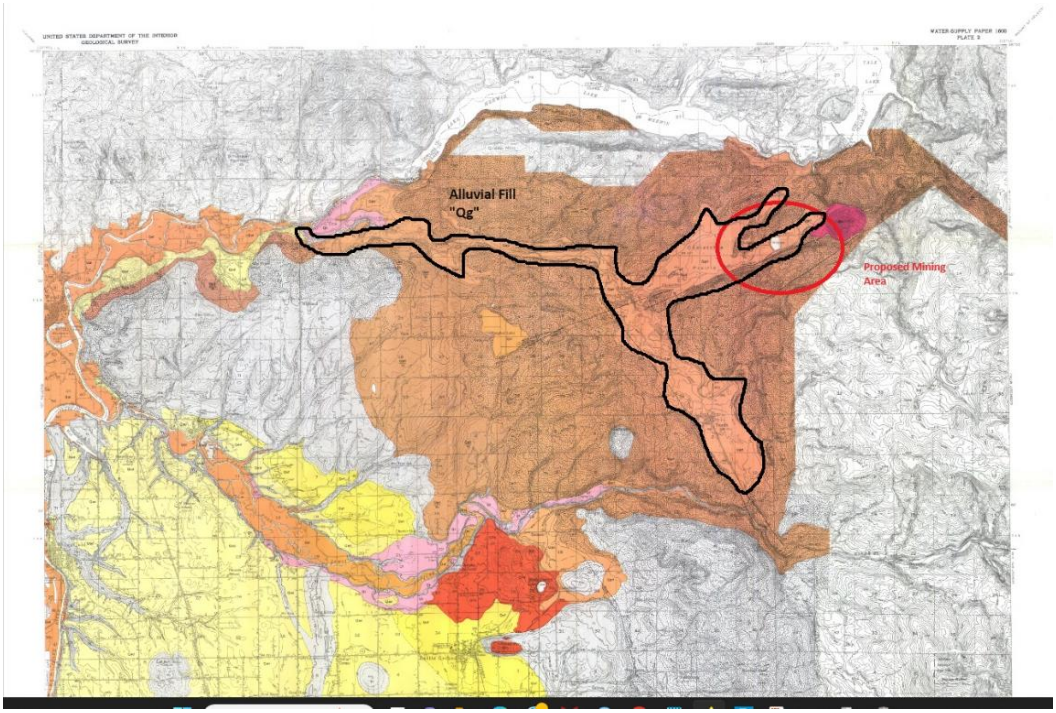

Figure 7 Chelatchie and Cedar Creek watersheds Alluvial Fill (Qg) top geological layer

The Upper Troutdale Aquifers[69] are a primary source of drinking water for much of Clark County, and its recharge is documented as coming from the Chelatchie Prairie's Cedar and Chelatchie Creek as major tributaries. The above-mentioned report defines Cedar Creek and by connection, Chelatchie and other tributaries as Critical Aquifer Recharging Area.

As described in USGS Report 90-4196, the unique top/surface geologic layer of the "Unconsolidated Sediment Aquifer" controls surface & groundwater in the Cedar and Chelatchie Creek watershed, Figure 7 is an additional indication of how important the 200 ft. deep formation is. Disturbing the upper part of it with mining would have a major negative impact (i.e. the plan to dig a 700-foot hole right at its head).

[68] USGS A Description of Hydrogeologic Units in The Portland Basin, Oregon and Washington U.S. Geological Survey Water-Resources Investigations Report 90-4196 Prepared in cooperation with City of Portland Bureau Of Water Works, Intergovernmental Resource Center and Oregon Water Resources Department 1993

[69] https://www.cityofvancouver.us/government/department/public-works/drinking-water/drinking-water-source/

The importance of Cedar Creek and by extension all the tributaries feeding Cedar Creek is further proven by a review of the U.S. Geological Survey (USGS) Water Supply Paper 2470–A[70].

According to the Environmental information provided in the Clark County GIS for the proposed Surface Mine parcels both have land designated as Critical Aquifer Recharge Areas, [Reference Clark County GIS[71] for the Old Rock Query (281131000, 281157000, 281142000, and 281143000), and Chelatchie Bluff Mine (281149000, 283421000, 281134000, and 274346000, and Synergy Resources LLC (274578000 and 274579000)].

This means that actions taken within the Chelatchie Prairie area hold the potential risk of impacting the greater Clark County clean water supply which is used for many private and civic wells for hundreds of thousands of families. The impact on the natural flow of tributaries can be seen in Figure 8 below taken from the Department of Ecology Water Quality Atlas[72].

It must be emphasized the importance of Cedar Creek to the ecosystem which receives a large amount of its water from Chelatchie Creek and hundreds of tributaries, streams, and natural runoff areas. Cedar Creek is rated with a high importance score of .91 with the highest Protected Restoration Development ranking of PR1[73].

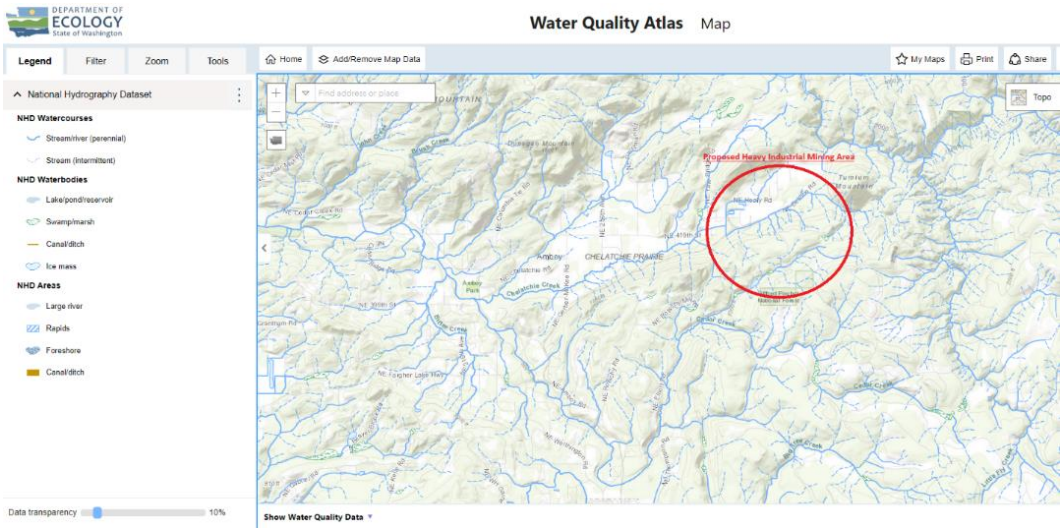

Figure 8 Clark County Tributaries, Creaks, and Wetland

Many protected species of fish depend on the clean free flow of Chelatchie, Boody, and Cedar Creeks. These creeks depend on the thousands of small natural springs and hillside seepage areas to sustain them. Figures 2, 3, and 8 show both Chelatchie and Boody creeks emerge from the areas of the proposed high industrial / mining area. Review of the Clark County GIS

[70] The Notice of Final determination relied heavily on the ‘‘Description of the Groundwater Flow System in the Portland Basin, Oregon, and Washington’’, U.S. Geological Survey (USGS) Water Supply Paper 2470–A, by McFarland, William D. and David S. Morgan, 1996A. [attached Paper 2470-A]. This study uses Cedar Creek extensively in the analysis of water flow.

[71] https://gis.clark.wa.gov/mapsonline/

[72] https://apps.ecology.wa.gov/waterqualityatlas/wqa/map

[73] Watershed Characterization and Analysis of Clark County, July 2009 Final, Washington State Department of Ecology Shorelands & Environmental Assistance Program Publication # 09-06-019.

Permitting and Site Plans site, under critical aquifer selections, the direct connection between Chelatchie, Boody, and Cedar Creek to the aquifer recharge area is clear, [Fig. 9].

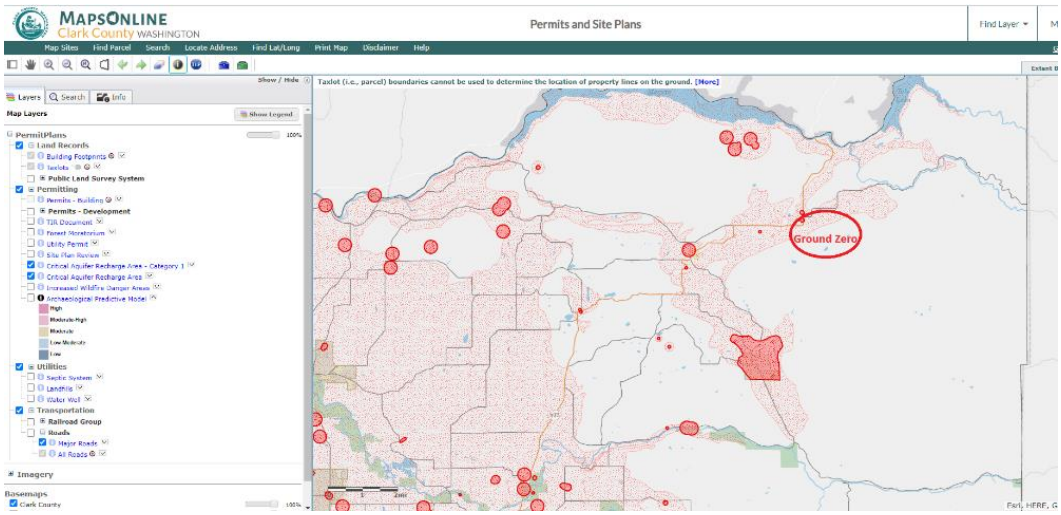

Figure 9 Critical Aquifer Recharge Area

This area is also noted for unstable slopes with severe erosion hazards and designated geological critical areas[74] on the county GIS as shown in Figure 10. With the impact directly on the surrounding riparian habitat emanating from the mining areas, [Fig. 11].

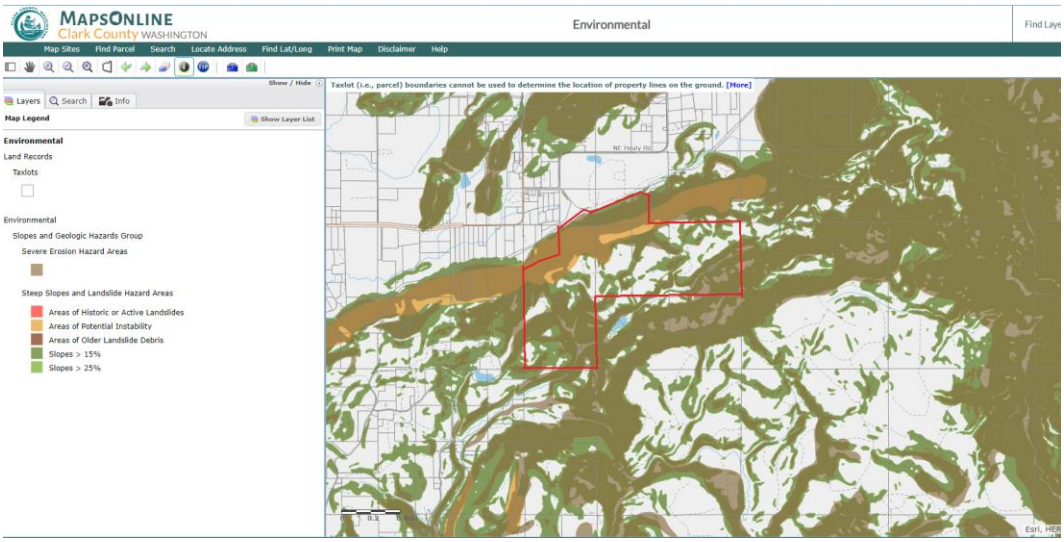

Figure 10 Areas of Potential Instability

[74] USGS Science for a Changing World, Geologic Map of the Amboy Quadrangle, Clark and Cowlitz, Counties, Washington. By Russell C. Evarts. Pamphlet to accompany Scientific Investigations Map 2885, 2005, U.S. Department of the Interior, U.S. Geological Survey

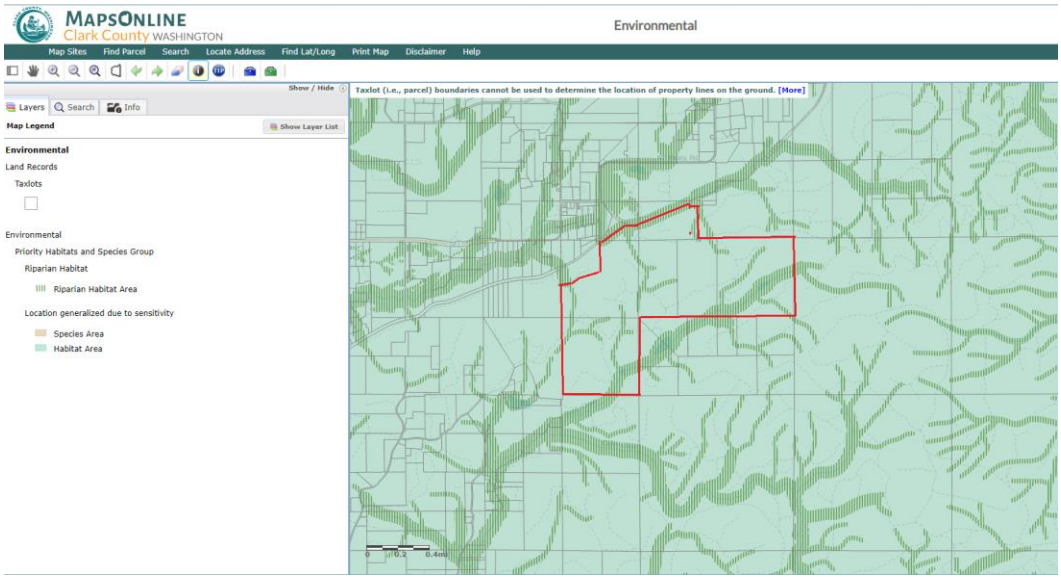

Figure 11 Priority Habitats and Species Group

And Figure 12, shows the entire area has been designated protected under the 2008 Stormwater Needs Assessment Program[75]. According to expert reports, there are no mitigation plans that can protect this vast and intertwined water resource if a Surface Mine is allowed to operate at the headwaters of the Chelatchie, Cedar Creeks, and the Troutdale Aquifer[76].

Keep in mind that our county is legally responsible for protecting our drinking water. They will be held accountable for the millions of losses in clean water should their decision to move forward with Heavy Industrial rezoning cause contaminates, water flow decreases, and other manmade disasters[77]. Especially with the plethora of scientific evidence warning them not to allow heavy industrial use, especially Surface Mining in this fragile ecosystem.

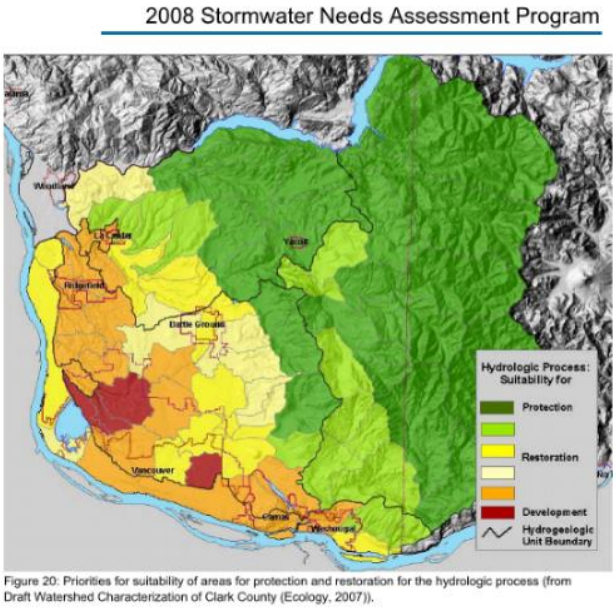

Figure 12 Protected Stormwater

[75] 2008 Stormwater Needs Assessment Program, Salmon Creek (RM 03.83)/Cougar Creek Sub watershed Needs Assessment Report. Clark County Public Works Clean Water Program, April 2009 [Public Record].

[76] Documentation available on request.

[77] Ashtabula County Board of Commissioners v. Ohio Environmental Protection Agency (1993), Citizens for Clean Water v. City and County of Denver (2002), Natural Resources Defense Council v. County of San Diego (2010), Clean Water Action Council v. County of Los Angeles (2016), Riverkeeper v. County of Westchester (2019) to name a few of the high-profile cases.

Cowlitz Indian Tribe

The locality of the mine also directly impacts archeological and historical significance for the local tribes, as stated in their letter to Clark County on April 26, 2023,[78] and signed by Patty Kinswa-Graiser, Cowlitz Trinal Chairwoman.

> "We are deeply concerned by the prospect of a future mine at this culturally and ecologically significant location. The site is east/southeast of downtown Chelatchie (in Cowlitz, čílačš means "five"), and Chelatchie Prairie is the fifth of five anthropogenically managed prairies that lie in a north-easterly line, starting at Fort Vancouver. The foot of Tumtum Mountain, another culturally significant location, is only 0.33 miles away. Surveys conducted for other development projects in the area have already recorded archaeological resources within 300 feet of the subject parcels, suggesting a high likelihood of encountering Cultural Resources within the project area.
>
> Ecologically, the site has mapped fish-bearing and non-fish-bearing streams, riparian habitat, wetlands, and severe erosion hazard areas. It is located at the headwaters of Cedar Creek, which supports multiple Endangered Species Act-listed salmon and steelhead populations. It is also in the vicinity of known western pond turtle and northern spotted owl occurrences and cave or cave-rich areas (as reported on the Washington Department of Fish and Wildlife's Priority Habitat and Species map)."

The tribe's concerns are justified, per Clark County GIS the area directly in the middle of the proposed SMO is designated at the highest level of probability of disturbing ancient Native areas. [Ref Fig. 13]

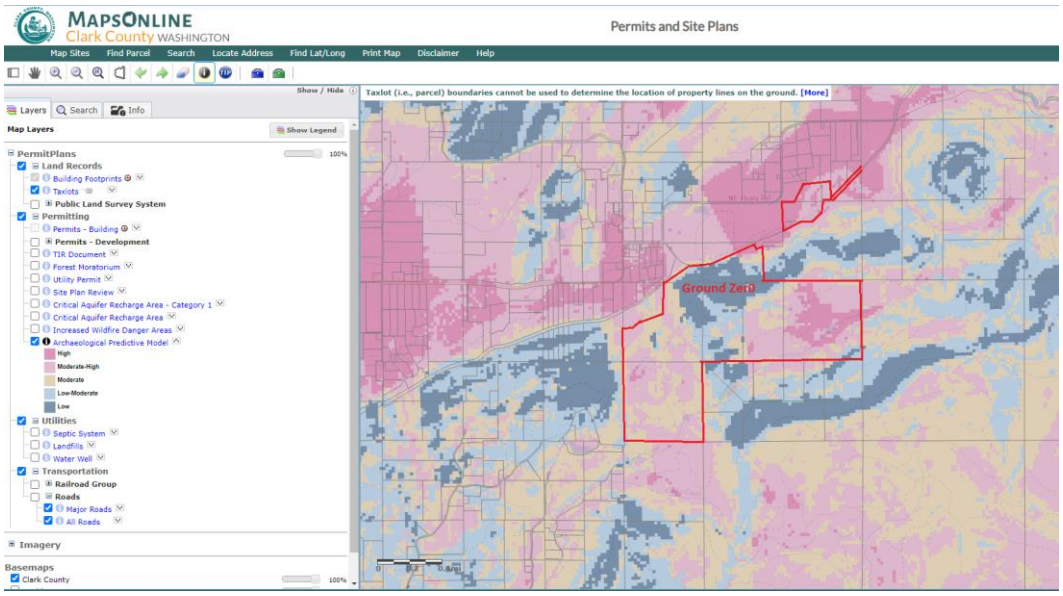

Figure 13 Clark County GIS Archaeological Predictive Map

[78] https://clark.wa.gov/community-planning/cpz2021-00006, DS Scoping Comments,

Sand and Gravel Mines facts

After all of this, do we need these mines? Washington is currently the seventh-highest producer of sand and gravel resources in the United States[79], with the current trends indicating that the state will continue its position[80]. However, according to an industry-paid-for study, reserves are trending downward, and if new mines are not opened to meet current and projected demands, the local reserves are estimated, to be exhausted within 7 and 20 years[81].

In discussion with Albert (Al) O'Connor, Retired Professional Civil Engineer and Geologist U.S. Army Corp of Engineers, Geologist, Hydraulic Engineer, US Forest Service. and Hydrologist Clark County, WA Stormwater Runoff. He provided the following information.

> *"I received the information on certification on a pit providing concrete aggregate for major highways/bridges and multi-level buildings, and the economic viability of barging concrete aggregate down the Columbia River from Pacific NW Aggregate [a subsidiary of Ross Island Sand and Gravel] at Wishram (Avery) upstream from The Dalles, OR. The pit is on Yakama Indian Tribal Land providing income for the Tribe and has been in operation for over twenty years and has been supplying concrete aggregate to the Portland Metro area. James Dean Construction, Big Fish Quarry (really an open pit) at Dallesport (WA side), also supplies concrete aggregate to the Vancouver area. They load (rehaul) trucks that hauled contaminated soil from this area to the nearby (OR side) hazardous waste site.*
>
> *According to the manager of Pacific NW Aggregate their pit consists of rounded rock and they have an almost unlimited supply. The aggregate for high density concrete for bridges, major highways and multilevel buildings must be produced from rounded rock. The aggregate specification for these concrete structures requires 50 % of the aggregate to be crushed with at least two angular faces on each stone. The remainder of the aggregate consists of graded three-quarter inch minus rounded stone per specification. If the concrete is to be pumped at the site the mix can only have 40 % crushed stone. Oregon Department of Transportation (ODOT) and Washington Department of Transportation (WDOT) are both standards for the construction industry on highways and bridges. Owners of multilevel buildings use the same standard.*
>
> *Gravel pits providing concrete aggregate are required to obtain certification from ODOT. The certification includes individual training to gain material technician certification, building an on-site materials laboratory for quality control (the laboratory must be approved by ODOT) and receive source approval from ODOT. Each gravel pit routinely submits results of quality control tests on materials used on ODOT projects. These tests are to insure pit materials meet ODOT specifications on the project. WDOT probably has the same requirements.*
>
> *Ross Island Sand Gravel barged concrete aggregate down to Portland Metro Area from their Pacific NW Aggregate Pit from 2001 to 2019 and were competitive with other local firms. They sold their aggregate barge. Knife River started barging concrete aggregate from Pacific NW Aggregate Pit from 2019 to present and off loads the concrete*

[79] USGS Mineral Industry Survey, Crushed Stone And Sand And Gravel In The Fourth Quarter, March 2022.

[80] Additional information can be found here: https://www.usgs.gov/centers/national-minerals-information-center/mineral-industry-surveys

[81] Summary: Study Of Permitted Aggregate Reserves of Clark County, Washington. Prepared by: GeoDesign Inc, on behalf of: J.L. Storedahl and Sons, Inc. 2018.

aggregate at Troutdale, Oregon. Knife River is also competitive in the Portland Metro aggregate market.

For other concrete projects such as driveways, sidewalks, curbs, storm drains, and foundations for homes, office buildings and warehouses three-quarter inch minus rounded stone (specification) is used. The three-quarter inch minus rounded stone is the industry construction standard.

A similar process is required for asphalt gravel by ODOT and WDOT. Asphalt aggregate is composed of angular stone and is generally crushed from angular quarry stone. Quarry stone is generated from drilling and blasting a natural rock mass. However, there are rock masses that can be ripped with a crawler tractor and the rock is fed into a crusher. Faces on gravel (asphalt) stones are fractured. Other construction rock such as gravel, subgrade ballast, and riprap are composed of angular rock and each stone face is also fractured.

I believe both gravel sources are excellent alternatives to opening a controversial gravel pit or quarry at Chelatchie Prairie. Both firms have an existing State permit to mine gravel and don't have the environmental issues Chelatchie Prairie has. If you recall this is like the issue of locating a solid waste disposal site in Clark County several years back and the final decision was to locate the waste site up near The Dalles. Aggregate from upriver is the best choice and it provides income for the Yakama Tribe, which is a plus.

Gravel pits are mining operations in alluvial deposits (rounded river rock) adjacent to streams or rivers. In general, the gravel is excavated by a hydraulic excavator and/or a cat with a dozer and ripper(s). The alluvial material is washed to remove silt and sand for concrete aggregate and drain rock. If the wash and/or runoff water is not properly managed it can flow into waterways. Rounded rock is recommended for concrete. During mixing, pouring, and compacting, round rock provides denser concrete which has a higher strength. The rounded rock rolls around in the concrete forms and prevents voids and better contact between the concrete and rebar.

Rock quarries generally require drilling and shooting with explosives. The explosive fractures the rock mass so it can be excavated with machinery. There are quarries where rock can be excavated with hydraulic excavators and/or cats with dozers and rippers without blasting but there is a small percentage. The broken rock is run through a crusher to reduce particle size. The rock from quarries is angular and used for asphalt pavement, gravel roads, riprap, and pit runs. This angular rock forms an interlocking system that is dense and has high strength. The interlocking system prevents the movement of individual aggregate fragments when the system is under load."

This information throws into serious doubt the doomsday reporting that the industry wants us to believe. Again, proving that we simply cannot believe what is being said, but dig in and ask questions from the experts. The reality is, yes, those gravel companies that have their entire investment in Clark County are running short on long-term gravel. But the interesting thing is that the Chelatchie Bluff Mine and the Old Gravel Pit do nothing for our local Gravel Companies and the multinational conglomerate will be in direct competition with our local businesses. This is bad for Clark County and does nothing to help our local industries, even if this was a good idea, something I think by now has been put into serious doubt.

The railroad

Due to a lack of need, in 1985 the railroad owner abandoned the RR and returned the land to its owners. Decades later, Clark County purchased the Chelatchie Prairie Railroad in stages over several years, primarily during the second half of the 1980s. The precise dates and sellers of each segment are not readily available (or relevant), but the overall timeline is as follows:

1981: Investors purchased the Chelatchie Prairie Railroad to abandon operations and sell the tracks, ties, and right-of-way.

Mid-1980s: Clark County began purchasing segments of the railroad to prevent its abandonment.

The late 1980s: Clark County completed the purchase of the entire Chelatchie Prairie Railroad.

The county's primary motivation for acquiring the railroad was to preserve it for commercial, tourist, and recreational purposes. Touting the Chelatchie Prairie Rails with Trails Project as the primary plan[82]. Many families made major life decisions in where to buy homes and raise their families based on the Rails to Trails promise by Clark County. Since then, the Chelatchie Prairie Railroad has been leased to various operators, including the Battle Ground, Yacolt, and Chelatchie Prairie Railroad Association (BYCX) and the Portland Vancouver Junction Railroad (PVJR).

In 2004 Eric Temple was selected to rejuvenate the operation, where he started the Portland Vancouver Junction Railroad (PVJR). Since record-keeping began in 2004 the average number of cars per year has been roughly 500[83]. Looking at the loads over the last nine years of operations, it appears that there have not been any real financial gains that have come to the county from PVJR. In the meantime, there are expenses associated with maintaining the railroad and required safety items such as crossing guards, etc.

Even with the new lease and anticipated movement of rock out of Chelatchie, the county is expected to only gross about $52,000 per year. The county has already spent more than $500,000 on maintenance costs. This RR is a money loser for the taxpayers of Clark County. In a letter provided to the Clark County Council from Oliver Orjiako, Director, he stated,

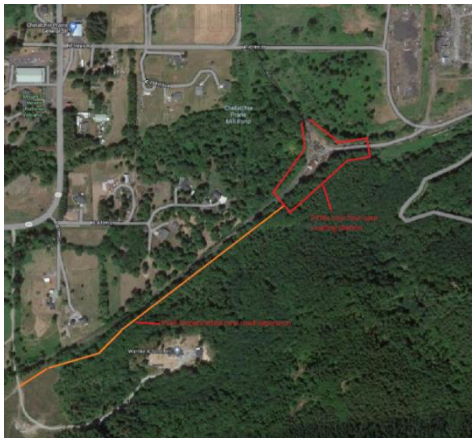

Figure 14 PVJRs Station Expansion (Estimated)

"More than 600 online surveys were submitted and of the respondents, 77% were dissatisfied with the proposed overlay area and 79% with the one-mile corridor area. Of the property owners who responded who have property located in the one-mile corridor area, 85% would prefer to have their property removed from the future expansion area. Of the respondents with property in the proposed overlay area, 84% would prefer to be removed from the overlay area. Approximately 80% of respondents were dissatisfied with permitting chemical manufacturing, asphalt paving mixture and block manufacturing, and plastics and rubber products manufacturing. In looking at the entire use list, over 70% of respondents were not

[82] https://clark.wa.gov/public-works/chelatchie-prairie-rail-trail-project

[83] Car number and earnings information supplied by the Coalition for Sustainable Land Management https://cslm.us/ .

satisfied with either the permitted or conditional uses as recommended. The majority of all surveys and comments showed a lack of support for the FRDUAC recommendations.[84]"

If a community opinion poll were run today considering actions by PVJR and its partners, it is predicted that an even higher level of rejection of the plan by Clark County residents would be found.

The county now, along with their out-of-county, out-of-state, and international corporations is promoting the expansion of the Portland Vancouver Junction Railroad in Chelatchie from a run-down inoperable rail to a four-spur heavy industrial loading station. This station will be designed to load millions of metric tons of gravel each year from the Chelatchie Bluff Mine, and possibly from Presto Homes Inc mine. It is also expected that they will secure contracts with Kravas Property Inc. for the transport of equipment and supplies, as well as take the opportunity to tap into the local logging industry provided by Weyerhaeuser Timber Holdings Inc. Securing the bigger plan of turning the whole east end of Chelatchie Prairie into a heavy industrial site.

PVJR railroad expansion. The expansion project [Fig. 14] at Chelatchie Bluff is designed to take the single-rail two-spur station and turn it into a four-spur station. This will position PVJR to take loads from the proposed gravel mines as discussed earlier. PVJRs leases the railroad from the County under specific terms and has already stated that they are not under any State or Local regulations and has made it clear that PVJR plans to run rip-shod over the land to create its rail system[85]. Just in 2023 alone PVJR has received stop orders, one from the Washington Department of Ecology[86], and one from the United States Army Corps of Engineers[87] specifically for environmental protection violations and working without a permit. However, all indications show that PVJR has a non-compliant culture that is comfortable ignoring local, state, and even federal law. PVJR is a bad actor, and has violated the lease as follows[88], as Kathleen Otto's email of Oct. 17th, 2023, to Eric Temple states,

> "…the lease between the County and PVJR states PVJR will adhere to all applicable, state, federal, and local laws. More specifically, in part, the lease states:
>
> - Section 5.1 "…PVJR covenants that… (3) it shall comply with all applicable federal, state, local, and police requirements, regulations, ordinances, and laws…"
> - Section 7.6 "PVJR agrees to comply in all material respects with all laws, ordinances, rules, regulations, final orders and decrees applicable to the Line of Railroad…"
> - Section 10 "PVJR shall be responsible for obtaining and maintaining any federal, state, or local regulatory agency… Any failure by PVJR to secure or maintain

[84] To: Clark County Council, From: Oliver Orjiako, Director, Prepared By: Jose Alvarez, Planner III, Date: September 18, 2018, Subject: FREIGHT RAIL-DEPENDENT USE PUBLIC COMMENT SUMMARY ON FRDUAC RECOMMENDATION. [Public Records available on request].

[85] Infamous Richardson Letter dated February 16, 2023, from Eric Temple President, Portland Junction Railroad, specifically the second paragraph, [Clark County Public Record].

[86] Department of Ecology Southwest Region Office Dated Oct. 23, 2023, to Eric Temple, [DOE Public Records].

[87] Department of the Army, U.S. Army Corps of Engineers, Seattle District Dated Oct. 23, 2023, to Eric Temple. [USACE Public Record]

[88] Public Records email excerpt dated October 17th, 2023, from Kathleen Otto, County Manager to Eric Temple Owner PVJR [Clark County Public Record].

appropriate federal, state, or local regulatory agency or department approvals, authorizations, or exemptions from approvals as required by this Section 10 is a material breach of this Agreement."

- Section 3.12.1.1 "A material breach of any of the terms and conditions of this Agreement, including but not limited to substantive noncompliance with all applicable federal, state, local and police requirements, regulations, ordinances, and laws, related to PVJR's operation, …"

Since then, the Environmental Protection Agency has taken the lead over the investigation into the conduct of PVJR, a process that is pending at the writing of this report[89].

There are additional issues surrounding the plan that PVJR is actively working on along the 33-mile County Owned (our) railroad. While this paper is focused on the Chelatchie Prairie issue, which I consider the head of this dragon, much support is needed in the greater Clark County area to fight these out-of-town tyrants enabled by our inept county. Additional resources in this effort can be found at the following websites.

- Friends of Clark County, https://friendsofclarkcounty.org/
- Friends of Central Vancouver, https://www.focv.info/
- Columbia River Keepers, https://www.columbiariverkeeper.org/
- Friends of East Fork Lewis River, https://eastforklewisriver.org/
- East Fork Lewis River Alternative Restoration Plan (Number of pages: 196) (Publication Size: 2749KB), https://apps.ecology.wa.gov/publications/summarypages/2110051.html.

We are not alone in recognizing the vital importance of our environment, and the need to be vigilant to those who wish to destroy it.

Summary

Despite claims by a study conducted and paid for by the gravel industry that screams scare tactics of a limited aggregate rock supply (which can be argued is incorrect by non-corporate paid experts on this subject) – environmental concerns and the future of our children must remain paramount. The Chelatchie Prairie faces multiple threats, including polluted ground from previous disregard for the environment and the potential for further industrialization in this geologically unstable area by a multipronged corporate attack. While most of us who live in this area support industry, we also recognize the need to be responsible land stewards. Opening hundreds of acres to surface mining in this clean water-rich area is a moral outrage and a direct attack on us as citizens and to future generations who rely on our decisions today.

While gravel may be needed for the advancement of our society, so is clean water, and so are the fish that feed us, and so are our children. Chelatchie Bluff is the worst place for a mine, science shows it, the experts prove it, and we need the County to listen.

Key takeaways.

- An Environmental Impact Statement (EIS) State and Federal needs to be done!

- Any heavy industrial operations that include moving or displacing soil must be avoided due to the impact on the environment. These impacts include our most valuable

[89] Letter United States Environmental Protection Agency, Region 10 Seattle WA, signed December 12, 2023, RE: In the Matter of the Portland Vancouver Junction Railroad, Chelatchie Site, Chelatchie, Washington (NWS-2023-784) and Vancouver Site, Vancouver, Washington (NWW-2022-00460) [Public Record]

resource water. Once groundwater becomes contaminated, rehabilitation becomes virtually impossible. The risk for contamination due to mining is extremely high for humans, animals, and other wildlife, for the greater Clark County[90]. This is the Achilles heel of the Chelatchie Bluff Industrialization plan that out-of-county, out-of-state, international corporations and Clark County want to ignore.

- The application for the operation comes from companies with proven disrespectful attitudes and non-compliance with the law. They cannot be trusted to place our community, land, and ecosystem ahead of corporate profits. They have already proven this in their actions as this paper has demonstrated.

- The Department of Fish and Wildlife, the Department of Ecology, and the US Army Corps of Engineers, all experts in their fields have expressed serious concerns with allowing the Chelatchie Bluff Mine, Premo Homes Mine, Railroad, and associated industrialization of Chelatchie Prairie. Instead, they are bullied or ignored as some of the corporations have already, without permits begun construction, plowing over wetlands, and ignoring streams. Our county officials are seemingly allowing it (and in some cases promoting this illegal activity[91]). Our county councilors enable further destruction through the passage of zoning changes Growth Management Plan revisions, and other assistance measures without proper State or Federal environmental studies. Like drug pushers, they provide our land to these corporate thugs showing no concern for the citizens of this country's future, life, liberty, or happiness.

In closing

The corporations have deep pockets, we are simply residents with limited funds and income. Chelatchie Prairie and surrounding areas are our sanctuary from the chaos of the world, it is quite peaceful, graced with deer, elk, bear, fish, and all the wonders of a peaceful world. I love to tell people, “I live where others go on vacation to camp”. Placing us in the position that to not fight is a moral outrage.

If you are interested in more information[92] or want to get involved with common sense land management, please contact John E. Nanney at jnanney56@gmail.com or 360-524-4014.

[90] https://www.mdpi.com/2073-4441/15/14/2654

[91] June 27th, 2023 County Council Meeting hearing on the final ruling that the Chelatchie Bluff Surface Mine Overlay (SMO) was ruled illegal by the county attorney, yet Councilors Karen Bowerman, Michelle Belkot, and Gary Medvigy voted to ignore the ruling and allow the county to remain in non-compliance due to illegal legislation… they passed, https://clark.wa.gov/community-planning/cpz2021-00006.

[92] If you disagree with information presented here, please let me know. I am always interested in learning and growing. In my 40-plus year career one thing has been constant, learning. I only ask that any argument be presented with documents that support your argument. Opinion is not worth my time, additionally, if name calling and inuendo is your only proof, please save your effort, once I see that, I will stop reading and hit the delete button. Such tactics are unacceptable, rude, and have no place in a proper debate. Thank you.

Bibliography

Agency/Publisher	*Author*	*Document Title*	*Type*
Date Published	*Brief Description/ Summary*		
Applied Geochemistry Volume 159, December 2023, 105834	https://www.sciencedirect.com/science/article/abs/pii/S0883292723002792	Identification of recharge processes and mixing patterns by using CFC's and isotopic multi-tracing (δ18O, δ2H) of groundwater in a stratified volcanoclastic aquifer of the semiarid Amazcala Basin in Central Mexico	Study
2023	Understanding groundwater flow is essential for quantifying recharge and identifying relevant processes in an aquifer. Hydrogeochemical models have proven to be successful in identifying origin and processes during water recharge. We integrated the hydrogeochemistry, environmental isotopes and CFC technique to develop a conceptual and a groundwater mixing model of the Amazcala aquifer in Central Mexico. Results demonstrate that groundwater recharge consists of local meteoric recharge and a regional geothermal input. The local resident groundwater component represents the primary source of groundwater contributing with an average of 56% (σ = 0.07). The second crucial component of groundwater is the contribution of the local meteoric component contribution with averages to 23% (σ = 0.05). The third component is the regional geothermal component, which on average contributes to 21% (σ = 0.03). Regional geothermal influence has been reported in several aquifers in volcanic regions. This geothermal input influences volcanic aquifers located in the Trans Mexican Volcanic Belt and should be considered in the water balance budget. Excessive groundwater extraction raises the vulnerability of the aquifer to natural and/or anthropogenic pollution, affecting the quality of water. Understanding the hydrogeological system offers a useful framework for developing and executing Managed Aquifer Recharge strategies (MAR).		
Clark County Coalition	Clark County Coalition	Appendix A EDT Recovery Scenario	Study
2013	Appendix A of Clark County Coalition SMP Update – Shoreline Monitoring & Adaptive Management Framework Grant No. G100059		
Clark County Environmental Services	Clark County Environmental Services	CRITICAL AREA PRE-DETERMINATIONS / DETERMINATIONS	Study
2012	A pre-determination is a service provided by the county to help landowners and applicants determine the extent to which Clark County critical area codes (CCC 40.450 Wetland Protection and CCC 40.440 Habitat Conservation), affect individual properties or apply to a proposed project. The pre-determination provides the applicant with the option to have a county biologist visit a project site without a pending development application.		

Clark County Public Works	Clark County Public Works	Critical Aquifer Recharge Areas (CARA)	Handout
2009	The CARA ordinance was established for preventing degradation, and where possible, enhancing the quality of groundwater for drinking water or business purposes. The CARA review is intended to limit potential contaminants within designated critical aquifer recharge areas. Groundwater provides 95% of our drinking water in the county. The CARA ordinance took effect August 1, 1997.		
Environmental Protection Agency (EPA)	Notice of Final Determination.	Sole Source Aquifer Designation of the Troutdale Aquifer System; Clark County, WAFederal Register /Vol. 71, No. 172 /Wednesday, September 6, 2006 /Notices	Reg
2006	Notice is hereby given that pursuant to Section 1424(e) of the Safe Drinking Water Act (42 U.S.C. 300h– 3(e), Pub. L. 93–523), and in response to a petition from a group of Clark County residents (two private groups and 8 individuals), the U.S. Environmental Protection Agency (EPA) Region 10 Administrator has determined that the Troutdale aquifer system, in Clark County, Washington, is a sole or principal source of drinking water, and that if contaminated, would create a significant hazard to public health. As a result of this action, all Federal financially-assisted projects proposed over the designated aquifer system will be subject to EPA review to ensure that they do not create a significant hazard to public health.		
Federal Emergency Management Agency (FEMA)	Federal Emergency Management Agency (FEMA)	Clark County Washington, and incorporated areas.	Map
2012	Flood Insurance Rate Map, Panel 125 of 600		
Gifford Pinchot National Forest (GPNF)	GPNF Land and Resource Management Plan, 1990	Land and Resource Management Plan Final Environmental Impact Statement Gifford Pinchot National Forest	Study
1990	The Forest Plan guides all natural resource management activities and establishes management Standards/Guidelines for the Gifford Pinchot National Forest. It describes resource management practices, levels of resource production and management, and the availability and suitability of lands for resource management.		
Journal of Hydrology: Regional Studies Volume 36, August 2021, 100858	https://www.sciencedirect.com/science/article/pii/S2214581821000872	Understanding Recharge Processes in Karst Aquifers Using Environmental Tracers: A Review	Study
2021	Time series of environmental tracers both in the groundwater recharge and discharge provide important insights into how a karst water system works. The aim of the present work was to study the response of discharging karst waters to recharge using time series of environmental tracers, such as tritium, stable water isotopes, noble gases and SF6.		

National Flood Insurance Program (FEMA)	FEMA	National Flood Insurance Program, Flood Insurance Rare Map. Clark County, Washington.	Map
2023	Panel 150 of 160		
Ontario Stone, Sand & Gravel Association (OSSGA)	Golder Associates Ltd.	Water Consumption Study submitted to Ontario Stone, Sand & Gravel Association	Study
2006	A team of hydrologists, hydrogeologists and materials engineers at Golder Associates Ltd. (Golder) were retained by the OSSGA to conduct an evaluatin of the water use at four sites considered as representatice of typical aggregate operations in Ontario. The four sites selected consisted of an above water table pit with aggregate washing, a partially below water table pit with aggregate washing, and a below water table pit without aggregate washing.		
The Global Groundwater Information System (GGIS)	https://ggis.un-igrac.org/	The Global Groundwater Information System (GGIS)	Website
Live Data	The GGIS is an interactive portal for sharing data and information on groundwater resources around the world. It gives access to map layers, documents, and well and monitoring data. It also contains several thematic map viewers.		
United States Department of Interior, Geological Survey (USGS)	Cheryl A. Dieter, Molly A. Maupin, Rodney R. Caldwell, Melissa A. Harris, Tamara I. Ivahnenko, John K. Lovelace, Nancy L. Barber, and Kristin S. Linsey	Water Availability and Use Science Program Estimated Use of Water in the United States in 2015Circular 1441 Supersedes USGS Open-File Report 2017–1131	Report
2017	Water use in the United States in 2015 was estimated to be about 322 billion gallons per day (Bgal/d), which was 9 percent less than in 2010. The 2015 estimates put total withdrawals at the lowest level since before 1970, following the same overall trend of decreasing total withdrawals observed from 2005 to 2010. Freshwater withdrawals were 281 Bgal/d, or 87 percent of total withdrawals, and saline-water withdrawals were 41.0 Bgal/d, or 13 percent of total withdrawals. Fresh surface-water withdrawals (198 Bgal/d) were 14 percent less than in 2010, and fresh groundwater withdrawals (82.3 Bgal/day) were about 8 percent greater than in 2010. Saline surface-water withdrawals were 38.6 Bgal/d, or 14 percent less than in 2010. Total saline groundwater withdrawals in 2015 were 2.34 Bgal/d, mostly for mining use.		
United States Department of Interior, Geological Survey (USGS)	M.J. Mundorff	Geology and Ground-Water Conditions of Clark County Washington, with a Description of a Major Alluvial Aquifer Along the Columbia River	Study
1964	The investigation of the ground-water resources in the Fourth Plains area of Clark County was undertaken at the request of the U.S. Bureau of Reclamation for the purpose of determining whether ground-water supplies were sufficient for irrigation of the area. In order to determine the lateral extent and continuity of the aquifers and to define the areas of recharge, it was necessary to extend the study somewhat beyond the irrigable area.		

United States Department of Interior, Geological Survey (USGS)	R.D. Swanson, W.D. McFarland, J.B. Gonthier, and J.M. Wilkinson	A DESCRIPTION OF HYDROGEOLOGIC UNITS IN THE PORTLAND BASIN, OREGON AND WASHINGTON Report 90-4196	Report
1993	The increasing reliance on ground-water resources in the Portland Basin has prompted a need to evaluate the capability of the ground-water system to meet present and future demands. Toward this goal, the U.S. Geological Survey conducted a hydrogeologic study of the basin and is constructing a ground-water flow model of the aquifer system. This report describes one component of the study which involved mapping the extent, thickness, and boundaries of hydrogeologic units (aquifers and confining units) in the basin.		
United States Department of Interior, Geological Survey (USGS)	Russell C. Evarts	Geologic Map of the Amboy Quadrangle, Clark and Cowlitz Counties, Washington	Map
2005	Geologic map of surficial Deposits of the Amboy and Surrounding Area		
United States Department of Interior, Geological Survey (USGS)	By Ian R. Waite, Steven Sobieszczyk, Kurt D. Carpenter, Andrew J. Arnsberg, Henry M. Johnson, Curt A. Hughes, Michael J. Sarantou, and Frank A. Rinella. Scientific Investigations Report 2006–5101–D	Effects of Urbanization on Stream Ecosystems in the Willamette River Basin and Surrounding Areas, Oregon and Washington Scientific Investigations Report 2006–5101–DU.	Report
2006	This report describes the effects of urbanization on physical, chemical, and biological characteristics of stream ecosystems in 28 watersheds along a gradient of urbanization in the Willamette River basin and surrounding area, Oregon and Washington, from 2003 through 2005. The study that generated the report is one of several urban-effects studies completed nationally by the U.S. Geological Survey National Water-Quality Assessment Program. Watersheds were selected to minimize natural variability caused by factors such as geology, elevation, and climate, and to maximize coverage of different stages of urban development among watersheds.		
Washington Department of Ecology (DOE)	Bill Yake	Impact of International Paper Comnpany's wood products mill effluent on the receiving waters of the Upper Chelatchie Creek Drainages	Study
1978	The purpose of this study was to characterize the effect of a wood products mill on the upper drainage waters of the South Fork of Chelatchie Creek under high flow conditions.		

Washington Department of Ecology (DOE)	Devan Rostorfer	East Fork Lewis River Alternative Restoration Plan A strategy to achieve bacteria and temperature water quality standards	Study
2021	The East Fork Lewis River (EFLR) watershed is home to one of the fastest growing cities in Washington State, and five high priority populations of Endangered Species Act (ESA) listed salmon and steelhead. The watershed has seen a 47 percent increase in human population between 2000 and 2018, and provides recreation, timber, agriculture, and water resources for the rapidly growingsouthwestregion of the State. At the same time, the watershed supports aquatic life and recreational uses and is key to the recovery of ESA-listed salmon and steelhead that rely on the mainstem and tributaries for critical spawning and rearing habitat. The diversity of functions the watershed supports has made the watershed a central focus of salmon recovery, water quality, water quantity management and planning in Southwest Washington. These planning efforts began in the early 2000's, but continue today as new partnerships have formed to support development of the East Fork Lewis River Alternative Restoration Plan.		
Washington Department of Ecology (DOE)	DOE	Water Resources Program Publication 20-11-027 September 2023 Page 1 WRIA 27 Lewis Watershed Water Availability Publication 20-11-027	Focus
2023	The Lewis Watershed or Water Resource Inventory Area (WRIA) 27 is defined as the area that drains to the Lewis River. It is located in southwest Washington, in south Cowlitz County, north Clark County, and a portion of Skamania County.		
Washington Department of Ecology (DOE)	Linton Wildrick, Tom Culhane, Don Davidson, and Kirk Sinclair	WATERSHED ASSESSMENT WATER RESOURCE INVENTORY AREA 28, SALMON-WASHOUGAL Technical Report 98-02	Report
1994	This report provides a compilation of hydrogeologic and hydrologic data and interpretations relevant to water management in the Salmon-Washougal Water Resource Inventory Area 28, a grouping of adjacent watersheds that are tributary to the Columbia River. The Washington Department of Ecology may use this information when processing water-rights applications, regulating permitted uses of water, and protecting water quality.		
Washington Department of Ecology (DOE)	Prepared for Ecology by Neil Aaland, Aaland Planning Services, Inc.	Summary of Watershed Characterization and Analysis Project for Clark County Publication No. 09-06-003	Study
2009	The Washington Department of Ecology (Ecology) has developed a “watershed characterization” tool. Watershed characterization is a method for assessing and understanding watershed processes at a broad scale. It allows communities to identify and prioritize areas within specific watersheds where aquatic resources can still be successfully restored or protected. To develop the tool, Ecology has been conducting watershed characterization pilot projects. The most recent pilot projects have been conducted in Clark, Jefferson, and Whatcom counties. Ecology wants to know how useful these watershed characterizations are in providing information that can help improve environmental mitigation.		

Washington Department of Ecology (DOE)	Thomas Hruby, PhD and Amy Yahnke, PhD	Washington State Wetland Rating System For Western Washington 2014 Update Version 2.0	Study
2023	The wetlands in Washington State differ widely in their functions and values. Some wetland types are common, while others are rare. Some are heavily disturbed, while others are still relatively undisturbed. All, however, provide some functions and resources that are valued. These may be ecological, economic, recreational, or aesthetic. Managers, planners, and citizens need tools to understand the resource value of individual wetlands in order to protect them effectively.		
Washington Department of Ecology (DOE)	Washington State Department of Ecology Shorelands & Environmental Assistance Program	Watershed Characterization and Analysis of Clark County Publication # 09-06-019	Study
2009	This effort will build on the County's existing Wetland Inventory and Identification of Mitigation Opportunity Areas (Clark County, 2004), and will result in a plan for the rural and urban areas in the western half of the county		
Washington Department of Ecology (DOE)	Water Quality Program	Stormwater Management Manual for Western Washington	Guidance
2019	The Stormwater Management Manual for Western Washington (SWMMWW) provides guidance on the measures necessary to control the quantity and quality of stormwater. Local municipalities use this manual to set stormwater requirements for new development and redevelopment projects. Land developers and development engineers use this manual to design permanent stormwater control plans, create construction stormwater pollution prevention plans, and determine stormwater infrastructure. Businesses use this manual to help design their stormwater pollution prevention plans.		
Washington Department of Natural Resources (DNR)	Allen J. Fiksdal	Slope Stability pf Clark County	Study
1975	The investigation of the slope stability and landslide hazards of Clark County was conducted in cooperation with the Clark County Regional Planning Council as part of a three-part study involving geologic hazards and sand and gravel resources within the county. The identification of landslides is included in this part of the study. Conditions were analyzed and the geologic properties controlling landslides were used to identify areas possibly susceptible to future landsliding. Base maps are U.S. Geological Survey and have scales of 1:24,000 or 1:62,500. Units shown on the maps are (1) stable areas (no color); (2) areas of potential instability (colored yellow), (3) recent landsliding (red); (4) older landslides (orange).		

Notes