Planning Commission Recommendations: RED
Pending Council Amendment = Yellow Highlight
Passed Council Amendment = Green Highlight

Chapter Ten
Environment

Introduction

Each person in Whatcom County has a fundamental right to a healthy~~ful~~ and safe environment in which to live and grow~~, including the Nooksack Tribe and Lummi Nation, which have treaty rights dependent on restoring and protecting the environment~~. In addition, the Nooksack Tribe and Lummi Nation have treaty rights that include taking fish, and hunting and gathering, at usual and accustomed grounds. With these~~is~~ rights comes a responsibility to contribute to the protection, conservation, and enhancement of our natural environment. ~~–~~Consequently, an important goal of the Whatcom County Comprehensive Plan is to protect or enhance the county's environmental quality. This means that, individually and collectively, we have the obligation to protect these resources for future generations~~our children and their children~~. Essential to this is ~~the~~ establishing~~ment of~~ safe development practices and patterns that do not ~~diminish the functions and values of existing critical areas, and allow for mitigated development and foster voluntary actions that promote active restoration of ecological function and net ecological gain.~~ diminish the functions and values of existing critical areas and~~significantly disrupt~~ ecosystems ~~and~~ that ensure ~~the continuation of ample amounts of~~ clean water, natural areas, farmlands, forest lands, and fish and wildlife habitat. Development practices and patterns should also allow for mitigated development and encourage voluntary actions that promote active restoration of ecological function and net ecological gain. It is also important to plan for sea level rise, changing ocean conditions, storm surges, and floods by preparing for impacts to coastal residential communities, marine fisheries, shellfish beds, coastal infrastructure, and recreation areas. (#1)

Chapter Organization

This chapter is composed of an introduction and four sections organized by topic heading. The first section, entitled "General Environmental Management," addresses general environmental goals and policies. The remaining three sections deal with Natural Hazards, Water Resources, and Ecosystems. Together, the sections of this chapter provide the direction necessary to ensure and promote ~~the~~ long-term sustainability of the natural environment in Whatcom County.

Purpose

Whatcom County's natural environment, with its ~~seasonally~~ seasonally abundant supply of water, timber, minerals, fish and wildlife, its beauty, and its other natural resources, has attracted people to our community for ~~generations~~millennia. This setting is important to our sense of well-being, to our health, to our economic well-being, and to our future. Sustaining these assets in the face of increasingly intense human activity becomes more difficult each year. As resource-scarce and

climate impacted regions within our county, state and nation face growing challenges, we must plan for increased pressures to sustain our natural assets and balance growth and resource use responsibly. The challenge of protecting ~~and restoring~~ and restoring th~~is~~e environment while accommodating growth requires maintaining guidelines for development so that growth does not ultimately overrun ~~the very~~natural assets ~~that brought most of us here~~. The purpose of this chapter is to create such balance and (#2) guidelines.

GMA Goals and Countywide Planning Policies

GMA Planning Goal 10, "Environment" (RCW 36.70A.020(10)), provides the directive for much of this chapter. It requires Whatcom County to "protect the environment and enhance the state's high quality of life, including air and water quality, and the availability of water." In addition, some of the goals and policies of this chapter support Planning Goal 9, "Open Space and Recreation" (RCW 36.70A.020(9), which directs the county to "conserve fish and wildlife habitat."

Relative to environmental protection, Whatcom County's Countywide Planning Policies (CWPP) give the most attention to water issues. They state, "Jurisdictions shall cooperate to protect and restore water resources and fish habitat within UGAs and across jurisdictional boundaries to maintain quality of life, economic health, and protect treaty natural resources in Whatcom County~~The quality of life and economic health of Whatcom County communities depend on the maintenance of a safe and reliable water supply. All jurisdictions and water purveyors should cooperate to ensure the protection and quality of the area's water resources~~." (#3) Specific policies address water, promoting inter-jurisdictional cooperation in conserving, protecting, and managing water resources, and in reducing water pollution (CWPP Policies N.1 – 6). The CWPPs also support protecting wildlife habitat and corridors, natural drainage features, and "other environmental, cultural and scenic resources."

GMA Requirements

In designating and protecting critical areas under this chapter, RCW 36.70A.172 requires that counties and cities shall include the best available science in developing policies and development regulations to protect the functions and values of critical areas. In addition, counties and cities shall give special consideration to conservation or protection measures necessary to preserve or enhance anadromous fisheries."~~The GMA requires Whatcom County to identify and manage critical areas by protecting the functions and values of critical areas and the ecological process that sustain them, while allowing for appropriate economically beneficial or productive use of land and property in such a manner .~~ The GMA has identified Critical Areas to include the following areas and ecosystems:

- Wetlands
- Critical Aquifer Recharge Areas
- Fish and wildlife habitat conservation areas
- Frequently flooded areas
- Geologically hazardous areas

Environmental Setting

Whatcom County ~~bedrock geology~~ can be divided into five geographic geologic provinces. From east to west these provinces are the Methow terrain, the Cascade Crystalline Core, the Northwest Cascades System, the Fraser Lowland, and the San Juan Island system. Tectonic activity over the past 15 million years has created the present North Cascades and Mount Baker, a 10,000-foot high composite volcano.

The mountains of Whatcom County, as well as the streams, lakes, valleys, hills, and shoreline features are the result of millions of years of geologic events. Over 2.5 million years ago, during the Ice Ages, glacial ice invaded the Puget Sound lowlands from the north at least four times, with the last major glacial event, the Fraser Glaciation, ending approximately 12,000 years ago. A minor advance of glacial ice, the Sumas Advance, ended approximately 10,000 years ago. The ice formed from the accumulation of snow in the British Columbia Coast Range and interior of British Columbia. Numerous glaciers are still present within the mountains of Whatcom County, and some of these glaciers formerly extended far down the mountain valleys of the County. The underlying bedrock was deeply eroded during these glacial events creating very steep mountainsides, and in some areas, particularly in northwestern Whatcom County, a thick sequence of related sediments was deposited. The glacial ice was approximately 6,000 feet thick in the vicinity of Bellingham.

Two main glacial advances are the most important to our area, the Salmon Springs glaciation and the later Vashon glaciation. Each time the massive glacier advanced, it dammed up the Puget lowlands to form a huge lake. As the floating ice melted, sand, gravel, clay and occasional boulders would melt out of the ice and fall to the sea floor. This deposit, the Bellingham Drift, covers the ground surface over a large area of western Whatcom County. Each time the Ice Age glacier advanced, it also compacted underlying sediments with its great weight. It created a concrete-like material called "till" (also known as "hardpan") beneath it. Because the Bellingham Drift consists primarily of clay and silt, it is relatively impermeable; water tends to accumulate on the ground surface. Wetlands are common on the Bellingham Drift.

On the bottom of the lake, "rock flour~~,~~" ~~,~~ the finely ground remains of rocks pulverized by glacial action, settled out. These deposits became the familiar "blue clays" of the Puget lowland. The milky color of the Nooksack River is due to the same kind of rock flour, created by glacial activity on the slopes of Mount Baker.

Additionally, each time the glacier retreated, water from the melting ice deposited thick layers of sand and gravel known as "outwash." The outwash areas are typically where we find our most productive aquifers, since these loose sands and gravel are porous and drain rapidly. While these areas absorb rainwater for our later use from wells, they are also vulnerable to contamination. An example of this phenomenon is found in the outwash sands and gravels resulting from the Sumas Advance. Large meltwater streams and rivers flowed from this glacier depositing the Sumas Outwash sands and gravels. The Sumas Outwash sands and gravels make up the best non-floodplain farmland in the County and some of the highest quality construction gravel deposits. Abandoned outwash channels were formerly used as sources of peat.

Each of these glacial sediments, lake bed deposits, till~~,~~ and outwash is present in various places and ~~in~~ varied combinations in Whatcom County. These sediments

provide both the formations that hold the groundwater for many of the area's wells, and provide the parent material for most of the different soils.

Out of these long physical processes a complex natural ecology has emerged that supports a diversity of fish and wildlife. All of ~~Many of~~ our lakes, rivers, and streams support fish~~,~~ including, but not limited to, native salmonid (salmon, trout and char) species such as the five pacific salmon (Chinook, c~~C~~oho, s~~S~~ockeye, c~~C~~hum, p~~P~~ink) as well as s~~S~~teelhead, r~~R~~ainbow ~~T~~trout, c~~C~~utthroat trout (coastal and resident), and native char (~~B~~bull t~~T~~rout~~,~~ and Dolly Varden). Chinook salmon, steelhead, and bull trout are all listed as "Threatened" under the Federal Endangered Species Act (ESA), are subject to federal protection and recovery planning, and are a critical component of the WRIA 1 Salmonid Recovery Plan and recovery efforts in the Nooksack Basin. Every year each of these salmonid species ~~salmon~~ return from the ocean to spawn in the streams and rivers of Whatcom County with the juveniles of some species remaining in freshwater for one or more years before migrating to marine waters.

Whatcom County is located within the Pacific Migratory Flyway and serves as a stopover and critical habitat area for many migratory birds. Bufflehead and goldeneye ducks winter here. Additionally, numerous bird species including scoters, snow geese, trumpeter swans, canvasbacks, cormorants, grebes, loons, and other migrating waterfowl pass through every spring and fall as they travel between their breeding grounds in Alaska and Canada and their wintering grounds in California and Mexico. Mallards, Canada geese, great blue herons, and numerous songbirds live in the county year-round. Maintaining these unique resources is a high priority for both present and future county residents. Whatcom County is home to a distinct subspecies of the Great Blue Heron, which has the third largest colony in the Puget Sound area. The wetlands, fields, streams, and nearshore habitat in the county support many birds of special concern, such as the bald eagle (protected under the Bald and Golden Eagle Protection Act) and the marbled murrelet (ESA threated list and State endanger list), ~~the pileated woodpecker (candidate for State threatened list), and the peregrine falcon (ESA candidate species).~~ The National Audubon Society has designated Semiahmoo, Drayton Harbor, and Birch Bay as "Important Bird Areas."

Whatcom County is home to a diversity of ecosystems ranging from coastal mudflats, eelgrass beds and feeder bluffs, through forested lowlands with abundant wetland, stream and lakes to temperate rain forests and high alpine meadows. This ecosystem diversity supports a wide range of diverse plants and animals, many of the wildlife species abundance and survival are currently under threat from a growing list of challenges. Human growth and climate change are driving the factors of landscape change impacting biodiversity in Whatcom County. Direct threats to biodiversity include habitat loss, degradation and isolation, invasive species, wildlife disease, overutilization and phenology disruptions from a changing environment.

Whatcom County CAO (Article 7) define Habitat Conservation Areas as areas that are identified as critical importance to the maintenance of certain fish, wildlife and /or plant species. The purpose of identifying these species and habitats is to; protect, restore and maintain fish and wildlife populations by protecting and conserving fish and wildlife habitat, protecting ecological processes that sustain these resources and

biodiversity, and manage development so that isolated populations of species are not created and habitat degradation and fragmentation are minimized, and maintaining the natural geographic distribution, connectivity, quality of fish and wildlife habitat and ensure no net loss to important habitats.

County governments rela~~a~~y on state and federal agencies to provide the identification and categorical listings of rare and threatened species, that require special protections to prevent further declines in abundance, distribution or survival. The state of Washington has many conservation programs that support the goals of the Growth Management Act through the implementation of Critical Area Ordinance aimed at protecting and enhancing fish and wildlife habitats. Federal agencies also have the Endangered Species Act to guide the identification and habitat recovery plans for federally listed threated and endanger species. Whatcom County also has authorities in the CAO to identify species and habitats of local importance (16.16.710 C #14). Whatcom County's two habitats of local importance currently include: the marine nearshore habitat from the extreme low tide to the upper limits of the shoreline jurisdiction, and the Chuckanut Wildlife corridor which extends east from Chuckanut Bay to Mount Baker Snoqualmie National Forest Boundary. In addition, the CAO code allows for adding additional regulated wildlife corridors. In 2023 the Whatcom County Wildlife Advisory Committee commissioned a study to use novel geospatial connectivity analysis to provide information about the current state of wildlife habitat connectivity in Whatcom County. The information was intended to support Whatcom County's efforts to identify important areas for wildlife habitat connectivity and designate critical connectivity areas for incorporation into the CAO.

Environmental Management

Introduction

General environmental goals and policies are intended to provide guidance for environmental management that will promote environmental protection and good stewardship practices through a balance of public education and involvement; incentives, acquisition, and voluntary programs; land use planning, ~~and~~ regulations and enforcement; environmental monitoring; and intergovernmental cooperation. These goals and policies are also intended to ~~provide guidance to guide~~ guide County government as it assists ~~its citizens~~the public in maintaining a balance between individual property rights, economic development, and environmental protection.

Background Summary

Development in the last 150 years has had a significant impact on the natural environment in Whatcom County. At the turn of the 20th century, some areas surrounding Lynden, Sumas, and Ferndale were already logged, drained, and converted to agricultural land and other types of development. In the intervening years, many of the remaining forests were logged, many streams re-routed and channelized, and much of the native vegetation removed and replaced with a wide variety of introduced vegetative types. Roads now crisscross the county, with homes, farms, businesses, and industries scattered throughout the county.

The overarching goals of the WRIA 1 Salmonid Recovery Plan and WRIA 1 Watershed Management Plan, which have been approved by Whatcom County, and the integration of which are identified in Whatcom County Council Resolution #2022-036 Exhibit A include:

- Recover self-sustaining salmonid runs to harvestable levels through the restoration of healthy rivers and natural stream processes, careful use of hatcheries, and responsible harvest, and with the active participation and support of local landowners, businesses, and the larger community (WRIA 1 Salmonid Recovery Plan).
- Water of sufficient quantity and quality to meet the needs of current and future human generations, including the restoration of salmon, steelhead, and trout populations to healthy harvestable levels, and the improvement of habitat on which fish and shellfish rely. (WRIA 1 Watershed Management Plan).

Issues, Goals, and Policies

There are designated lands in Whatcom County that can still accommodate development. Whatcom County also has areas that are sensitive to human activity, including wetlands, streams, lakes, and marine shorelines, and lands that can pose a hazard to the community, including floodplains, unstable slopes, naturally occurring asbestos and alluvial fans. In these areas development must be carefully planned or limited to maintain environmental quality and public safety. This can be done through the creation and implementation of goals and ~~identify (#4)~~ policies that seek to reduce hazards and prevent adverse environmental impacts.

Community and Environmental Protection

~~The~~ ~~e~~Elements of the natural environment such as: water, air, soil, plants, and animals are interconnected and interdependent, functioning as one dynamic ecosystem. Environmental resources within this ecosystem are extensive and, in some cases, irreplaceable. They provide important beneficial uses to the community such as: the supply of clean drinking water; food supply, sustainable resource extraction, management of stormwater run-off and flood hazard management; support for a wide variety of fish and wildlife ~~-~~populations, recreation~~fresh air~~; and a sense of place in which residents invest, enjoy, and expect.

Some of these same resources result in serious environmental constraints or pose a hazard to development and a danger to the community. ~~Flooding in t~~The Nooksack River and along the County's marine coastlines ~~is~~ frequently floods, ~~and~~ impact~~s~~ing much of the valley floor~~, so too is much of county's marine coastline (#5)~~. There are numerous wetlands and hydric soils throughout the lowlands that provide critical wetland functions and are generally unsuitable for development. The steep gradient and geologic structure of the mountain ranges in conjunction with heavy annual precipitation can contribute to slope instability (i.e. landslides), sediment-laden flood events on alluvial fans, ~~-~~and flooding of streams and the floodplains of the Nooksack and Sumas Rivers. ~~-prone drainage basins.~~

Much of the environmental degradation and destruction to property occurs as a result of a lack of information or understanding rather than willful action. Ecosystems are

subtle and complex. Too often both their benefits and hazards are not readily apparent to the community. Additionally, baseline information is not always available to help identify the real costs or hazards of building in Whatcom County. There is a need for further research, ~~and~~ education, and disclosure to enhance the public understanding of the natural and climate(#5) hazards present and the risks they pose.

Goal 10A: **Protect natural resources and systems, life, and property from potential hazards.**

Policy 10A-1: Support good stewardship of Whatcom County lands, and apply this principle to the management of public lands.

Policy 10A-2: Protect the environment through a comprehensive program that includes voluntary activity, education, incentives, regulation, enforcement, restoration, monitoring, acquisition, mitigation, and intergovernmental coordination. Ensure sustain funding and staffing resources to support the successful implementation of these strategies. (#6)

Policy 10A-3: Continue to identify, designate, ~~and~~ protect and enhance Critical Areas and other important environmental features.

Policy 10A-4: Manage designated Critical Areas ~~as needed,~~ to minimize or protect against environmental degradation, encourage restoration of ecological functions~~,~~ and reduce the potential for losses to property and human life.

Policy 10A-5: Actively pursue voluntary, cooperative, and mutually beneficial efforts aimed at advancing ~~c~~County environmental goals.

Policy 10A-6: Aim to meet or exceed national, state, and regional air quality standards. Work with the Northwest Clean Air Agency to ensure compliance with applicable air quality standards.

Policy 10A-7: Using Best Available Science, support efforts to educate and inform the public as to the benefits of a healthy and viable environment, ecologically fragile areas, and their economic and social value.

Policy 10A-8: Lead and/or coordinate efforts with property owners, ~~citizen~~community ~~-~~groups, businesses and local, state, federal, and tribal governmentsal ~~(local, state, tribal, and federal), including tribal,~~(#7) and non-governmental agencies in furthering Whatcom County's environmental goals and policies.

Policy 10A-9: Cooperate with state and federal agencies, tribal governments, and neighboring jurisdictions to identify and protect threatened and endangered fish and wildlife species and restore their habitats.

Policy 10A-10: Cooperate with tribal governments, state and federal agencies and neighboring jurisdictions to identify and implement protective measures and programs to support Washington State's Priority

Habitat and Species List, Washington DNR's Natural Heritage Program for rare plant species, and Whatcom County's Species & Habitats of Local Importance (WC CAO 16.16.710 C.14.).

Policy 10A-110: Define and adopt criteria for the Conservation Futures Ffund and other county programs that will Ssupport actively pursuing opportunities for (#8) acquisition, conservation easements, open space, and other such programs to protect and provide restoration opportunities to high-value natural areas as identified through the GMA planning process, the Natural Heritage Plan, the state Priority Habitats and Species (PHS) program, the Lake Whatcom Management Program, WRIA 1 Salmon Recovery Plan, and other sources.

Policy 10A-121: Use the plans listed in Policy 10A-110 to Ddesignate high-value open space and natural areas for acquisition, conservation easements, open space, and other such programs to protect these natural areas upon request or consent of the property owner.

Policy 10A-132: ~~Broadly inform the people of Whatcom County of the locations of potential development constraints associated with natural conditions. Information should include known natural hazards and an assessment of the potential danger to both the property owner and the public.~~ Ensure that information related to development constraints in natural hazard areas and areas vulnerable to climate impacts is regularly updated with best available science and made readily available to the public.

Administration and Regulation

There are currently a multitude of regulations and administrative processes at the federal, state~~,~~ and local level that, together, have become ~~excessive duplicative and/or~~ difficult to understand and implement (#9). Conflicting regulations and complicated administrative processes can create undue hardship on community members and result in reduced levels of environmental protection.

Goal 10B: **Maintain regulations relating to the identification, delineation, and protection of environmental features.**

Policy: 10B-1: Develop, as a significant component of a comprehensive environmental management program, non-regulatory measures that include voluntary activity, education, incentives, restoration, acquisition, advanced mitigation (i.e., mitigation done in advance of impacts), and intergovernmental coordination.

Policy 10B-2: Provide incentives for good stewardship of the land through the use of non-regulatory and innovative land use management techniques.

Policy 10B-3: Support education as an important tool in developing public appreciation for the value of ecosystems and provide the public

with informational materials and presentations relating to natural system functions, regulations, and issues.

Policy 10B-4: Promote cooperation and coordination among involved government agencies when multiple agencies have jurisdiction over aspects of a ~~single~~ project.

Policy 10B-5: Process the environmental review of building and development permit applications within an established timeframe that is predictable and expeditious.

Policy 10B-6: Provide clear, timely, appropriate, and understandable direction to ~~citizens~~the public, developers, and property owners.

Policy 10B-7: Establish a regulatory backstop to support and incentivize voluntary stewardship, conservation, and restoration and to ensure compliance in an effort to avoid regulatory consequences. Such a regulatory approach would come into effect if voluntary programs are not achieving environmental and restoration goals. (#10)

Policy 10B-~~8~~7: Ensure regulations and review processes are as simple and easy to understand as possible and maintain effective inspection, compliance, and enforcement measures ~~as necessary~~.

Policy 10B-~~9~~8: Regulations should be adaptively managed and regularly updated using Best Available Science and effectiveness data collected and maintained by the County.

Policy 10B-~~10~~9: Avoid delays and uncertainty caused by the imposition of environmental policies, conditions or requirements that are not specifically required by the WCC and state and federal law.

Policy 10B-~~10~~11: Encourage net ecological gain through public and privately ~~non-taxpayer~~ funded incentives and policy options (#11) such as regulatory flexibility provided in proportion to the degree the project exceeds the minimum protective or mitigation requirements of the WCC.

Policy 10B-12: Ensure sustain funding and staffing resources to support the successful implementation and enforcement of regulatory policies. (#12)

The Environment and Property Rights

Prior to the 1970s, growth in Whatcom County was relatively slow and received little management. As a result, private property owners were left to their own resources as they determined how best to use their land. However, as increasing numbers of people moved to this area and settled, a greater demand was placed on Whatcom County's natural resources.

The problems that arise from this situation have caused many to realize what one person may or may not does with ~~his/her~~their property may have an impact on the larger environmental system that sustains us as a community and on the rights of other property owners.

Land use decisions can ~~not~~ ~~longer~~longer ~~be~~ considered exclusively private matters. ~~We are aware p~~Public actions inevitably impact every ~~private citizen~~resident in Whatcom County and private actions may have public consequences as well. To that end, the law must protect the public good from detrimental private actions. Nevertheless, the right of the individual to use ~~his or her~~their (#13) property, within the bounds permitted by law, is a value supported by law and the community and must be recognized when making land use decisions ~~in Whatcom County~~.

Goal 10C: **In implementing environmental policies~~, provide for protection of~~ consider possible impact to (#14) private property rights, incorporate environmental justice, economic opportunities, and plan appropriately for growth.**

Policy 10C-1: Cooperatively engage jurisdictions and stakeholders in ~~A~~actively pursuing~~e~~ voluntary and cooperative efforts that advance Whatcom County's goals in a mutually beneficial manner.

Policy 10C-2: When adopting new environmental protection programs, consider multiple economic parameters including development objectives~~,~~ ~~(particularly the critical need for housing)~~ (#15), impacts, and the economic benefits of the natural environment as ~~both~~ a resource, ~~and~~ an amenity, and a Treaty protected resource ~~with inherent property rights~~.

Policy 10C-3: Emphasize an approach to environmental protection ~~by~~ that encourages~~ing~~ the use of conservation easements, open space taxation, land acquisition, purchase/voluntary, workable transfer of development rights, and other mechanisms that assist affected property owners.

Policy 10C-4: Avoid standards and procedures likely to require compensation to property owners or invalidation of such rules.

Policy 10C-5~~4~~: Ensure that permitting and development decisions by the County do not disproportionately impact vulnerable communities and promote equitable application of environmental justice principals and distribution of resources.

Policy 10C-6: Ensure that environmental permitting and development regulations by the County are rigorous enough to minimize and mitigate against impact on natural environments while being (#16) applied in a manner that facilitates housing construction consistent with RCW 36.70A.020(4). *"To plan for and accommodate housing affordable to all economic segments of the population of this state, promote a variety of residential*

densities and housing types, and encourage preservation of existing housing stock."

Policy 10C-7: Support the blue-green, marine, and maritime economy, such as fisheries, boat building, and maritime technology industries, while balancing protection of the marine environment and resources such industry depends upon. Support a sustainable working waterfront in collaboration with the Port of Bellingham, Working Waterfront Coalition, and other relevant stakeholders. Address and mitigate against any potential ecological risks associated with industrial activities. (#17)

~~**Climate Change**~~

~~Climate change is a global phenomenon that has the potential for significant local impacts to natural resources, and ecosystem functions, as well as human health, infrastructure, and the economy. In Washington State, the Climate Impacts Group (CIG), a consortium of scientists at the University of Washington, has done the most extensive analysis of potential local climate change impacts in the Pacific Northwest. Based on a range of climate change model projections, as well as peer-reviewed scientific publications, the CIG concludes that during the next 20-40 years the Pacific Northwest climate may change significantly. See *Climate Change Impacts and Adaptation in Washington State: Technical Summaries for Decision Makers, Climate Impacts Group, University of Washington, December 2013*. The CIG confirms that global climate models project mid-21st century temperatures in the Pacific Northwest higher than the natural range of temperature observed in the 20th century. The CIG reports that as a result of likely climate change, causing slightly higher average annual temperature, impacts to the Pacific Northwest will likely affect a broad spectrum of the natural environment, but most notably changes to water resources, including:~~

~~More precipitation falls as rain rather than snowfall in the Cascades due to an increased snow-line elevation;~~

~~Decreased (winter) mountain snowpack and earlier (spring) snowmelt;~~

~~Higher winter streamflow in rivers that depend on snowmelt;~~

~~Higher winter streamflow in rain-fed river basins resulting in scouring floods that negatively affect salmon populations if winter precipitation and rain-on-snow events increases in the future as projected;~~

~~Earlier peak (spring) streamflow in rivers that depend on snowmelt;~~

~~Lower summer streamflow in rivers and streams; and,~~

~~Decreased water in summer for irrigation, fish, human consumption and recreational use (more drought-like conditions).~~

~~Climate change impacts are likely to include longer-term shifts in forest types and species, potentially increasing wildfire risk and greater exposure to insects and disease. Nearshore and riverine fisheries may be subjected to increased stress due to even lower average summer stream flows (and higher summer stream temperatures) and increased acidity in Puget Sound. Agricultural sector concerns include the cost of climate adaptation, development of more climate-resilient technologies, and management and availability of adequate water supplies. Susceptibility to natural hazards is also expected to intensify due to climate change, including increased landslides, erosion, and coastal and riverine flooding due to more winter rainfall, and potential rising sea levels.~~

~~In 2007, Whatcom County completed a Climate Protection and Energy Conservation Action Plan that laid out specific actions and targets for reducing greenhouse gas emissions and increasing energy conservation efforts in response to potential climate change.~~

~~In addition, many insurance industry experts are now factoring in the costs of climate change into insurance premiums as the increase in the frequency and severity of extreme weather events around the world results in a corresponding increase in claims costs.~~

~~Local government, residents, and businesses must anticipate that as the climate changes, more frequent and severe damage to private and public infrastructure will occur. Maintenance costs and insurance premiums can be expected to increase accordingly.~~

~~Goal 10D: Strengthen the sustainability of Whatcom County's economy, natural environment, and built communities by responding and adapting to the impacts of climate change.~~

~~Policy 10D-1: Whatcom County's natural resource-based economic sectors, ecosystems, water resources, infrastructure, emergency management, and public health all face climate change related risks in the future. The County should consider potential long-range climate change implications into its on-going functional planning and implementation actions. The County should:~~

~~Study the resilience of its natural and built environments to the potential impacts of climate change;~~

~~Identify the relative vulnerability of these sectors to climate change; and,~~

~~Examine the adaptive capacity of these sectors to cope with or mitigate climate change and take advantage of any beneficial opportunities.~~

~~Policy 10D-2: Develop strategies that encourage a diversified and sustainable economy that is resilient to the impacts of climate change.~~

~~Policy 10D-3: Promote the efficient use, conservation, and protection of water resources.~~

~~Policy 10D-4: Pursue strategies to reduce the vehicle miles traveled (VMT) in the county by encouraging expanded availability and use of public transportation, carpooling, and non-vehicular modes of transportation.~~

~~Policy 10D-5: Establish land use patterns that minimize transportation-related greenhouse gas emissions and encourage preservation of natural resource lands and the protection of water resources.~~

~~Policy 10D-6: Convene a climate impact advisory committee by 2017. The advisory committee should consist of (but not be limited to) experts in energy efficiency and carbon emission reduction, representatives from Whatcom County, and interested community members. The committee will be tasked with:~~

- ~~Evaluating Whatcom County's compliance with meeting targets set forth in the 2007 Climate Plan;~~
- ~~Establishing new targets that meet or exceed state and federal climate impact goals;~~
- ~~Updating the Climate Plan, at minimum every five years, or as needed to meet targets;~~
- ~~Recommending updates to the Whatcom County Comprehensive Plan in accordance with meeting Whatcom County's emission reduction goals;~~
- ~~Ensuring that Whatcom County government facilities and operations are designed to meet or exceed goals and standards resolved in the current Climate Protection and Energy Conservation Action Plan; and~~
- ~~Recommend updates to Whatcom County land use policies and development regulations to support renewable energy development goals.~~

~~Policy 10D-7: Encourage sustainability by developing strategies and practices to increase the use of renewable, net-neutral carbon energy in Whatcom County facilities and County vehicles, with a goal of net zero man-made carbon emission by 2050.~~

~~Policy 10D-8: Encourage sustainability by developing strategies and practices to reduce landfill waste from Whatcom County government facilities to near zero.~~

~~Policy 10D-9: Identify responsible parties and agencies and encourage them to identify and properly seal and/or burn methane that is escaping into the atmosphere from wells.~~

~~Policy 10D-10: Create updates to Whatcom County land use policies and development regulations to support renewable energy development goals.~~

Natural and Climate Hazards~~1~~

Introduction

The location, climate, and geology of Whatcom County combine to create many natural and climate hazards to people and their property ~~developments~~. Earthquakes, volcanoes, landslides, ~~and~~ flooding, sea level rise, droughts, and wildfires are some of the major natural and climate hazards found in our region. Additionally, old mines are scattered around the county that could be dangerous to the community. Natural and climate ~~H~~hazards goals and policies are intended to provide guidance to c~~c~~County

[1] For more in-depth information on these hazards, please refer to Whatcom County's 2021 Natural Hazards Mitigation Plan at https://www.whatcomcounty.us/3914/2021-Natural-Hazards-Mitigation-Plan

government as it assists its residents ~~citizens~~ in effectively managing risks from natural and climate (#18) hazards in a manner that minimizes the danger to each member of this community, while continuing to provide for economic opportunities.

Background Summary

Natural Hazards include the following (**Map 10-4**):

Landslide Hazards – The geologically recent retreat of glaciers from the Whatcom County landscape and associated isostatic rebound, ~~succeed by~~ ongoing ~~contemporaneous~~ geomorphic processes of erosion, sediment transport, deposition, ~~isostatic rebound~~ and tectonic uplift, and geologic structures ha~~s~~ve left many hillsides over-steepened or weakened and susceptible to naturally occurring and human-triggered slope failures and erosion. Several large, well-known deep-seated landslides are presently active in Whatcom County, such as the Swift Creek Landslide ~~Slide~~ on Sumas Mountain. In addition, numerous large-scale, pre-historic slope failure deposits have been mapped ~~by past workers~~ and are readily identified in ~~more recently available~~ lidar imagery and mapped in a Washington Geological Survey deep-seated landslide inventory. Areas of current instability are present within the boundaries of these older features.

Multiple~~Various~~ slope failure processes contribute to the mosaic of landslide hazards present on the landscape and the associated risks they present to public and private infrastructure and natural resources. Examples of landslide types may include~~present in the county and the potential exists for a multitude of impacts ranging from periodic small- to large-scale~~ rockfall and rock avalanches~~slides~~, ~~massive debris slides and avalanches,~~ shallow landslides that can enter steep stream channels and route downstream as destructive debris flows and debris floods, and deep-seated earth flows, slumps and rotational slides within bedrock. These landslide processes act on large- and small-scales. ~~, and though much less catastrophic in nature, s~~Smaller landslides may occur more frequently in response to individual rainfall events while deep-seated landslides may respond to seasonal trends in precipitation more than individual storms. Both ~~and~~ pose a significant and continual risk~~hazard~~ to county residents and infrastructure.

Certain ~~types of~~ geomorphic landforms and geologic ~~conditions and~~ formations and features, such as fault zones, commonly create conditions conducive to ~~cause~~ landslides. These include, but are not limited to, namely the Chuckanut Formation and the Darrington Phyllite, are known for generating multiple landslide types, but landslides are also frequently observed in unconsolidated glacial sediments. Other factors such as ~~, in~~ the presence of day-lighting groundwater at seams and springs, ~~on~~ slopes in excess of 35% ~~percent~~, ~~along~~ coastal bluffs subject to wave erosion, and ~~in~~ areas of fluvial erosion that may over-steepen hillslopes through lateral erosion are all indictors of potential slope instability.

Alluvial Fan Hazards – Alluvial fan hazards areas exist where steep mountain streams flow onto floodplains or into lakes and deposit debris and sediment. Because these streams are steep and flow in confined canyons, they can carry more sediment and debris than a similar-sized stream flowing over flat land. During a large storm or if landslides are initiated in a stream's upper watershed during a storm, ~~streams on alluvial fans can create~~ catastrophic flooding and debris floods can occur on the

streams alluvial fan. Temporary damming of a stream by a landslide can produce flood events that are orders of magnitude larger than events driven solely by rainfall and must be considered outside standard hydrologic analysis. Alluvial fan hazard and risk assessments, such as those done for Canyon Creek and Jones Creek document recent events, the damage they caused, and describe the risks to private property and infrastructures posed by future alluvial fan flood events. Historic events, such as the 1983 Lake Whatcom landslides and associated alluvial fan flooding demonstrate the risks associated with development on alluvial fans~~, such as were experienced in 1983 in the Lake Whatcom area. During this storm event, the Sudden Valley development on Lake Whatcom incurred significant damage to property from flooding and debris flows on the Austin Creek alluvial fan.~~ Landslide-driven alluvial fan flood events represent one of the major threats to infrastructure and life-safety in Whatcom County.

Flood Hazards – Heavy winter rains and melting of a transient snowpack combined with the steep and sometimes unstable slopes of Whatcom County's foothills create conditions ideal for flooding and debris floods ~~flows~~ along many of our rivers and streams. The Nooksack River floodplain alone covers 38,000 acres in Whatcom County. ~~In 1989 and 1990, t~~The Nooksack River overtops its banks in some locations almost annually sending water into the floodplain. There have been more than 10 major floods since 1951 that have caused more extensive flooding and damage. A unique feature of the Nooksack is that even moderate floods can overtop its north bank near Everson impacting the communities of Everson, Nooksack and Sumas as the overflow follows a historic Nooksack River flow path to Sumas and into the Abbotsford area in British Columbia where the floodwaters drain to the Fraser River. Recent monitoring efforts demonstrate that sediment accumulation upstream of the Everson Bridge has increased the risk of overtopping of the bank at Everson, which initiates the flooding ~~in to~~into the Everson-Sumas overflow corridor. This also has implications downstream in years to come. The historic November 2021 floods resulted in a fatality, caused hundreds of millions of dollars of damage and displaced hundreds of families in Whatcom County and many times that financial and human impact in British Columbia as a result of the overflow combined with floodwater from of streams flowing off Sumas and Vedder Mountains. Flooding in the lower Nooksack river with sea level rise is of particular concern because it will create a backwater effect that will compound riverine flooding ~~verflowed and flooded lowland Whatcom County causing millions ..~~ Whatcom County is also undertaking ~~a~~ floodplain integrated planning (FLIP) that engages multiple entities in a floodplain planning process.

Coastal areas are also subject to flooding, especially during winter storms and king tide events. It is projected that climate change will increase flood risk~~,~~ due to increased sea level and changes in rainfall patterns. Significant damage may result from such floods. In 1991, Whatcom County formed a countywide Flood Control Zone District to address the major flooding issues in the county and subsequently in 1999 developed a Comprehensive Flood Hazard Management Plan for the Lower Nooksack Basin.

Volcanic Hazards – The presence of Mt. Baker is an asset to our region. Its 10,778-foot peak is one of the dominant features of Whatcom County's landscape. However, Mt. Baker is also considered one of the most active volcanoes in the Cascade Range, and of the six major volcanoes in the range, Mt. Baker is considered by geologists to be very hazardous during and after an eruption. Pyroclastic flows, ash flows, and especially volcanic mudflows, also known as lahars, are believed to be the greatest dangers to human life and development in Whatcom County. Geologic evidence indicates that an eruption on Mt. Baker caused a major lahar about 6,600 years ago that inundated the Middle Fork Nooksack Valley from its headwaters downstream past the confluence with the North Fork at Welcome. The same lahar is now known to have been over 300 feet deep in the upper reaches of the Middle Fork and extended as far west as Nugent's Corner. A major lahar along the Nooksack would divert the river from its channel and cause massive flooding. Smaller events have also occurred off the southeast side of the mountain sending material into what is now Baker Lake. Given the southeastern crest of the mountain may have more current activity, portions of Whatcom County ~~the~~that drain to the Skagit River, and Skagit County itself, may be at considerable risk.

Fortunately, volcanic eruptions are infrequent with periods of hundreds ~~and~~ or thousands of years between events with the ability to forecast a potential eruption being dependent on the ability to continuously monitor the mountain for signs that volcanic activity is increasing. ~~, but this infrequency also makes forecasting a volcanic eruption extremely difficult.~~ None the less~~However~~, a major eruption of Mt. Baker would pose a serious threat to human life and property. Even without an eruption, ~~T~~the deeply weathered nature of the rocks forming Mt. Baker may also fail, triggering a mudflow that would travel rapidly down the stream channels ringing the volcano and result in damage similar to that triggered by ~~from~~ a volcanic eruption t~~rigger~~. Mapping over the past decade has documented ~~of other Cascade volcanoes has demonstrated~~ massive mudflows originating from Mount Rainer and Glacier Peak document the deposits extending from the volcanoes to Puget Sound indicating the potential to impact Whatcom County many miles from the mountain itself. ~~, and from Mount Rainier and Glacier Peak.~~

Earthquake Hazards – Whatcom County lies within the influence of the convergent plate margin between the Plate of Juan de Fuca ~~Pacific~~ and North American Plate termed the Cascadia Subduction Zone. Regionally-extensive and damaging earthquakes, termed mega-thrusts, are possible when stress generated between the subducting Pacific Plate and over-riding North American Plate is released. A mega-thrust, full-rip earthquake is capable of generating an earthquake of magnitude 9~~,~~ or greater, and research has indicated an approximate recurrence interval of ~~5~~300-~~600~~ 500 years.

Associated with the stresses generated at the convergent plate margin are shallow, crustal faults that are mapped throughout Whatcom County. Earthquake activity on these fault systems is much more frequent than that observed at the Cascadia Subduction Zone, and the Deming area is considered one of the most seismically active areas in Washington. ~~–~~Earthquakes on these faults are capable of causing considerable damage~~Recent research has shown these crustal faults are capable of generating a magnitude 7 earthquake with an average recurrence interval of 30 to 50 years~~.

While all buildings are susceptible to damage from seismic-shaking, structures built on peat soils, large areas of non-structural fill, or liquefiable soils are prone to more severe shaking during an earthquake. If the shaking is strong enough~~,~~ or of sufficient duration, structures may collapse or become damaged due to building fatigue, ground settlement/liquefaction, and/or lateral spreading. In addition to seismic hazards posed by the Cascadia Subduction Zone, a significant mega-thrust earthquake has the potential to generate a large and destructive tsunami that has the potential to affect most low-bank areas of the County.

Mine Hazards – Mine hazard areas are sites of abandoned underground mine shafts, adits, and mine tailings. Coal mining was a major industry in Whatcom County in the early part of the 20th century, and several major mines were developed in various parts of the county. All of the formerly active mines are now no longer worked and are abandoned. For the most part these mine locations are known and mapped, such as the extensive coal mines under the northern part of the City of Bellingham and in the Blue Canyon area of South Lake Whatcom.

Wildland Fire Hazards -Wildland fire is a serious and growing hazard over much of the United States, posing a great threat to life and property, particularly when it moves from forest or rangeland into developed areas. ~~An image of a wildland fire can be seen to the left~~. However, wildland fire is also a natural process, and its suppression is now recognized to have created a larger fire hazard, as live and dead vegetation accumulates in areas where fire has been excluded. In addition, the absence of fire has altered or disrupted the cycle of natural plant succession and wildlife habitat in many areas. Consequently, United States land management agencies are committed to finding ways, such as prescribed burning, to reintroduce fire into natural ecosystems, while recognizing that firefighting and suppression are still important. USGS conducts fire-related research to meet the varied needs of the fire management community and to understand the role of fire in the landscape; this research includes fire management support, studies of postfire effects, and a wide range of studies on fire history and ecology. Whatcom County's evolution over the years has resulted in greater numbers of residents either living in or immediately adjacent to wildlands.

Whatcom County's population has grown from 81,293 in 1970 to over 229,000 in 2020. While most of the growth has occurred in Whatcom County's cities, a significant number of homes and businesses have been built in a wildland interface or intermix fashion. Large tracts of forest either abut or surround communities increasing the risk that an uncontrolled wildland fire will result in significant or even catastrophic loss. With few roads for ingress or egress, certain areas could be cutoff rather quickly.

Severe Storms – Severe storm weather comes in many forms, the most common for Whatcom County being heavy rain and wind during the winter months. Several wind storms have occurred in late summer with trees still retaining their full complement of leaves resulting in toppled trees and broken branches interrupting power to tens of thousands. Whatcom County experiences blizzards periodically, though not as commonly as unfrozen or partially frozen precipitation. Two types of winds primarily affect Western Washington: westerlies and easterlies. Westerly wind storms originate from the Pacific Ocean and are caused by pressure differences between deep oceanic storms and adjacent upland areas. This wind pattern is typical

for fall and winter. Easterly winds are caused by high pressure systems in eastern Washington, causing strong winds to form west of the Cascade mountain range that occur in late summer and early fall.

Issues, Goals, and Policies

Landslides – Siting human development on or adjacent to known landslide hazard areas can create health and safety risks. The risks can be elevated due to extreme weather events and earthquakes, but landslides may ~~also~~ occur with little or no warning. ~~In the case of the Swift Creek Landslide, the release of asbestos-laden sediment poses an additional risk to public health.~~ Development activity can de-stabilize naturally unstable slopes and impact ecosystems. However, predicting the exact timing, location, or extent of a damaging landslide is difficult, and in ~~particular some~~ areas of the county landslide hazards are not possible to completely mitigate or avoid. In some circumstances, the development of upland properties may place downslope neighbors and ecosystems at risk from rockfall or landslide types. A similar relationship holds true for development at the toe of a potentially unstable slope or on alluvial fans where landslide-supplied sediment and debris may deposit. In the case of the Swift Creek Landslide, the release of asbestos-laden sediment poses an additional risk to public health that is a unique hazard.~~In either event, d~~ Development in proximity to landslide hazards must proceed in consideration of potential impacts in order to ensure life safety, ~~and~~ preserve and protect public and private infrastructure. Landslides can also pose a hazard to natural systems, including damming streams, which can lead to an outbreak flood.

Naturally Occurring Asbestos (NOA)

Naturally occurring asbestos (NOA) is the common name for a group of fibrous silicate minerals that occur naturally in some rocks. It has been documented in some areas of Whatcom County. The most well-known location is the Sumas Mountain landslide zone in the Swift Creek watershed. Asbestos fibers can cause health problems if inhaled, including lung disease and various cancers; especially at risk are children, the elderly, and tobacco smokers(#74). If rock containing naturally occurring asbestos is left intact and undisturbed, risk of human exposure is low. However, NOA fibers can be released to the environment if the rock that contains it is broken or crushed. When NOA is disturbed, the risk of human exposure to asbestos fibers increases.

Whatcom County is undertaking the Swift Creek Sediment Management Action Plan (SCSMAP) to mitigate for the presence and potential impacts of NOA emissions in the Swift Creek watershed. The plan includes construction of a large sediment repository to store a maximum of 2.5 million cubic yards of Swift Creek sediment over a 20-year period. The repository will be periodically covered to prevent wind and water erosion of the sediment. Upon reaching capacity, the repository would be capped with clean topsoil and revegetated. Periodically, the Washington State Department of Health checks for asbestos-related health issues in people living around Swift Creek and Sumas Mountain. The latest report issued in 2021 found no evidence of increased risk of lung disease among local residents. These findings are consistent with previous

studies of this area that have also not found any evidence of asbestos-related health issues.

For individuals living in areas of naturally occurring asbestos, there are several potential pathways for airborne exposure. Exposures to soil dust containing asbestos can occur under a variety of scenarios, including dust raised from unpaved roads and driveways covered with crushed serpentine, rock quarrying activities, grading and construction associated with development of new housing, or other human activities.

Alluvial Fans – Because alluvial fan areas are formed by ~~associated with~~ streams, are generally gently sloping and elevated above the adjacent floodplain, and are located at the base of mountains, they have historically been popular places to develop. However, the processes that formed the alluvial fan making it an attractive place for development, also make it hazardous to that development and human life. Any storm of significance has the potential to cause flooding or debris floods on alluvial fans with the potential to flood ~~once every 10-25 years, a large storm event occurs in our area and streams flood~~ homes and developments, endangering lives, and cause~~ing~~ damage to property~~, and~~ ecosystems~~, and sometimes loss of lives~~.

Flooding – Floodwaters from the Nooksack River can endanger lives and cause damage to homes, agricultural areas, businesses, and industries in the floodplain~~small cities situated along the river~~; fish and wildlife habitat and other ecosystems; and disrupt transportation and utility corridors. Storm tides can flood homes and roads along low, exposed marine shorelines in the Birch Bay, Sandy Point, Point Roberts, and Gooseberry Point areas. It is anticipated that sea level rise will magnify coastal flooding in the coming years. Homes along Lake Whatcom, Lake Samish, and Cain/Reed Lakes have also been impacted by flooding during large~~extreme~~ storm events. Property and public safety are also impacted by rapid channel morphology events.

Volcanos – A volcanic eruption or volcanic mudflow (lahar) at Mount Baker could potentially route large volumes of sediment and water down ~~severely affect river flow on~~ the Nooksack River or Baker River and cause severe property damage extending from near the volcanoes or many miles downstream along the river corridors~~along lahar routes~~. A lahar is an extremely rare and unpredictable occurrence but potentially many times larger and more damaging than any rainfall generated flood event. Evacuation routes should be planned, clearly marked and made public. Development should be regulated according to the Critical Areas ~~Ordinance~~regulations.

Earthquakes – A major earthquake may likely and significantly affect Whatcom County. If the shaking is strong enough, buildings may collapse, roads and bridges could be damaged, ~~and/or~~ communications, power, and utilities could be severely disrupted, landslides ~~mud and rock slides~~ could occur on unstable slopes, and local ~~sea levels~~shorelines may be raised or lowered ~~may change~~ as they ~~shorelines~~ assume altered post-quake elevations.

Wildland Fire Hazards – Should a large wildland or wildland-urban interface fire occur in Whatcom County, the effects of such an event would not be limited to loss

of property, valuable timber, wildlife and habitat, or recreational areas. The loss of large amounts of timber on steep slopes would increase the risk of landslides and mudslides during the winter months and the depositing of large amounts of mud and debris in streams and river channels could threaten valuable fish habitat for many years. In addition, the loss of timber would severely impact the watershed of the Nooksack River and could drastically increase the vulnerability to flooding for many years. A fire in the Lake Whatcom watershed could also threaten the drinking water source for over 120,000 residents in Whatcom County. (#19)

Severe Storms – Severe storms can result in costly hazards, due primarily to their frequent occurrence and ability to disrupt lifelines such as arteries of transportation and above-ground electric lines. Because the worst storms typically occur during winter, loss of power/heating can be dangerous, especially for homes with children or elderly residents. Severe weather also poses additional risks resulting from tree fall to both structures and humans.

Mines – Some abandoned mine areas may pose a risk of ground subsidence from the collapse of abandoned mine tunnels and shafts. Air and water pollution may also be hazards associated with abandoned mine tailings and trapped toxic gases. Development on or near mine hazards could be adversely impacted.

Gas wells – Several exploratory oil & gas wells have been drilled around the county over the last 70+ years. Some of these present potential environmental hazards due to ongoing leakage of gas due to improper sealing of the well upon abandonment.

Old Landfills – There are known—and possibly some unknown—abandoned landfills in the County ~~and possibly some that are unknown~~. There are also several sites around the County that contain large numbers of abandoned vehicles and other debris. As with most landfills these locations pose some degree of risk of hazardous substances leaking into local aquifers.

Balanced Management – A central issue common to all development in natural hazard areas is the need ~~for Whatcom County~~ to balance the responsibility of local government to protect the public interest and provide for a safe and healthy environment while safeguarding the rights of private property owners.

Economic Impact – Damage to private and public property resulting from the siting of human development in areas of natural hazards is significant to the people of Whatcom County. The 2021 Nooksack River flood caused over $1 billion dollars in cross border damage to roads, bridges, buildings, and farmland. Disaster relief efforts are expensive and dangerous to conduct during an emergency. Public efforts to reduce hazards, such as implementation of the Comprehensive Flood Hazard Management, are also expensive.

Goal 10E: **Minimize potential loss of life, damage to property, the expenditure of public funds, and degradation of ecosystems resulting from development in hazardous areas prone to~~such as~~ flood~~ingplains~~, sea level rise, landslide~~s prone areas~~, wildfires, seismic hazards ~~areas~~, volcanic impact~~s areas~~, as well as (#20) abandoned mine and exploratory gas well locations, potentially dangerous**

alluvial fans, and other known natural hazards by advocating the use of land acquisition, open space taxation, conservation easements, growth planning, regulations, and other options to discourage or minimize development, or prohibit inappropriate development in such areas.

Policy 10E-1: Avoid or minimize public investments for future infrastructure development on known natural and climate hazard areas.~~,~~ Identify opportunities and further develop capacity to encourage strategies such as relocation of existing development and infrastructure outside of known hazards areas, and restrict future development on ~~known~~ current and future natural and climate (#21) hazard areas.

Policy 10E-2: Use Best Available Science ~~and data~~ to research and investigate the nature and extent of known natural and climate (#22) hazards in the county and make this information available to the general public and policy makers in an accessible and understandable form.

Policy 10E-3: Broadly inform the people of Whatcom County of the locations of known natural and climate (#23) hazards~~,~~ and the potential for adverse impacts of such ~~natural~~ hazards to the health, safety, and welfare of people and their properties.

~~Policy 10E-4: Establish acceptable levels of public risk for development in known natural hazard areas based upon the nature of the natural hazard and levels of public risk, and maintain regulatory criteria for approving, disapproving, conditioning, or mitigating development activity.~~

Policy 10E-~~5~~4: Prohibit the siting of critical public facilities in known natural hazard areas unless the siting of the facility can be shown to have a public benefit that outweighs the risk of siting in the particular hazard area. Incorporate future climate scenarios using best available science into evaluation of hazard."~~Incorporate future climate scenarios into evaluation of hazards.~~

Policy 10E-~~6~~5: Maintain a comprehensive program of regulatory and non-regulatory mechanisms to achieve Natural Hazard goals and policies. This program should include such mechanisms as education, tax incentives, zoning, land use regulations, conservation easements, purchase of development rights, transfer of development rights, and public acquisition.

Policy 10E-~~7~~6: Be consistent with the Natural Hazard goals and policies and consider the locations of Natural Hazard Areas when establishing or changing zoning patterns and densities.

Policy 10E-~~8~~7: ~~To address the causes of flooding and avoid expensive and maintenance-intensive bank protection measures, the County~~

~~should~~ To reduce flood risk, avoid high maintenance costs, and restore storage capacity, the County should prioritize and ~~i~~implement the ~~prioritize its~~ floodplain property acquisition program to remove homes from flood-prone areas, provide temporary areas to store flood water, and reduce expensive and maintenance-intensive bank protection measures.

Policy 10E-8~~99~~: Use land use and zoning designations and purchase or transfer of development rights to direct development away from locations at risk of current and future natural and climate hazards such as flood~~plain~~s, sea level rise, wildfire, unstable slopes, etc (#24). ~~Discourage new development in the floodplain.~~

Policy 10E-~~10~~9: Require applicants for development permits located in natural hazard areas to provide development plans that prioritize preventing and avoiding impacts ~~to~~from natural ~~systems~~hazards, and where not possible, designed to minimize the potential to exacerbate the natural hazard as well as the risk of damage to property or threats to human health and safety. In natural hazard areas where engineering solutions cannot be designed to withstand the forces expected to occur under the design event of a particular natural hazard, or off-site adverse impacts to adjacent properties or ecosystems cannot be adequately mitigated, Whatcom County may deny development permits intended for permanent or seasonal human habitation as described in the Critical Areas Ordinance.

Policy 10E-1~~0~~1: Consider c~~C~~onducting a public process with ~~affected citizens~~the public, technical experts, and decision-makers to establish acceptable ~~recommended~~ levels of public risk for each of the identified natural hazards. In developing recommended levels of public risk for natural hazards, consider the appropriate variables affecting developments in hazardous areas. These variables may include:

- Specific types of risk associated with the particular hazard area;
- The gradation of hazards associated with a particular geo-hazard;
- Level of detail necessary to map hazard areas and to determine the associated level of risk;
- ~~~~
- Different levels of risk associated with different ownership classes (e.g. public ownership versus private ownership);
- Forecasted impacts due to climate change.
- Different levels of risk associated with different types of land uses; and,

- Mitigation measures related to specific adverse impacts of development in hazard areas.

Once a set of risk levels has been identified, propose these risk levels for adoption of legislation by the County Council as the level to which future development must be designed.

Policy 10E-1~~1~~2: ~~Consider e~~Establish~~ing~~ acceptable levels of public risk for use in approving and conditioning development activity in or adjacent to known natural hazard areas. The established level of risk may be expressed as the hazard potential ~~hazard posed~~ as determined by scientific and historical methods applicable to each specific natural hazard and the consequences should that hazard be realized.

Policy 10E-1~~2~~3: Review the findings and recommendations of alluvial fan hazard evaluations and make appropriate recommendations for~~to~~ land use and zoning regulations to the County Council to assist in reducing the hazards posed on ~~these~~ alluvial fans.

Policy 10E-1~~3~~4: To reduce hazards posed by current and future floodplain impacts, and in coordination with the cities, r~~R~~eview the findings and recommendations of the Comprehensive Flood Hazard Management Plan (CFHMP) and make appropriate recommendations for land use and zoning regulations to the County Council to assist in the implementation of the CFHMP.

Policy 10E-1~~4~~5: Identify known locations of abandoned oil and gas wells that could produce methane and/or other hazardous substances and where immediate danger of methane and hazardous substance leaking exists, condition development approvals on affected parcels to mitigate those impacts.

Policy 10E-15: Work with state and federal agencies to i~~I~~dentify locations of Naturally Occurring Asbestos in Whatcom County and assess the associated health hazards. Coordinate with the s~~S~~tate to map asbestos deposits and condition development approvals on affected parcels to mitigate those impacts.

Policy 10E-16: Consider adopting National Fire Protection Association wildfire safety construction standards for new construction in forested and wildfire hazard areas to reduce risk to current and future development and loss of life and property. (#25)

Policy 10E-17: Support increasing capacity of programs like Firewise to facilitate voluntary retrofitting and hardening of existing homes, businesses, and other infrastructure consistent with best practices for Western Washington conditions. (#26)

X

Water Resources

Introduction

Water resources refer to the numerous surface waters such as lakes, streams, ~~and~~ wetlands; groundwater; estuaries; and marine waterbodies within Whatcom County (**Map 10-1**). These water~~-~~bodies are ~~often~~ integrally linked through the complex network referred to as the water cycle. The water cycle describes the series of transformations that occur in the circulation of water from the atmosphere onto the surface and into the subsurface regions of the earth, and then back from the surface to the atmosphere. Water resources of Whatcom County provide~~:~~ natural beauty; recreation; habitat for fish and wildlife; water for drinking, agriculture, aquaculture and industry; and other benefits essential to the quality of life and economic health of the community. The quality of life and economic health of our county's communities depend on the maintenance of a safe and reliable water supply. Decisions affecting any element of the water environment must be based on consideration of the effects on other elements.

Background Summary

Whatcom County has 16 major freshwater lakes, 3,012 miles of rivers and streams, over 37,000 acres of wetlands, 134 miles of marine shoreline, and aquifers containing an undetermined amount of groundwater. These water resources serve multiple uses, including providing ~~a source of~~ drinking water for the people of Whatcom County. Surface water sources such as Lake Whatcom, the Nooksack River, ~~and~~ Lake Samish, Dickinson Lake, Razer Hone Creek and Hozomeen Creek provide water to more than half the county residents, with the remainder relying on groundwater and rain catchment systems.~~,~~ These drinking water sources are accessed through ~~either from~~ individual, catchment systems, wells or from over~~about~~ 300 ~~public~~ water systems. Agriculture relies on both ground and surface water for a variety of uses, including irrigation and drinking water for livestock. Businesses and industries may also require water, sometimes in substantial quantities, from non-potable and potable supplies. Water is also essential to meet many of what are referred to as "instream" uses, such as recreation, shellfish growing and harvesting, fish and wildlife habitat, aesthetics, and other uses and benefits.

Groundwater is contained in aquifers, which are subterranean layers of porous rock or soil. Most of the surficial aquifers in Whatcom County are replenished by rainwater. Aquifers are often integrally linked with surface water systems and are essential for meeting in~~-~~stream and out-of-stream water needs such as for drinking water, agriculture, industry, and other uses.

Rainfall that runs into drainage courses such as ditches, streams, wetlands, rivers, lakes, and the Strait of Georgia supports local surface and marine waters. Natural drainage systems have many important functions, including storing excess water flow, purifying surface water, recharging groundwater, conveying water, and supporting important biological activities. As more areas in Whatcom County are being urbanized, natural water resource systems are being replaced with built systems, leading to permanent changes in hydrology.

Whatcom County government has a major role in helping to maintain these benefits through its many responsibilities and programs, particularly in the areas of health, safety, land use, and development. The intent of the following goals and policies is to provide guidance to Whatcom County government as it assists ~~its citizens~~the ~~public~~ in effectively managing our water resources in a manner that ensures that the benefits of those resources are maintained far into the future. The water resource section focuses primarily on groundwater and surface water management. Surface water management relates generally to watershed protection and stormwater/ drainage systems. However, some policy direction may indirectly be provided for areas such as wetlands, estuaries, streams, and marine waterbodies within the Water Resource section. Some of these areas are covered in more detail in other sections within the Environment Chapter.

Water Quality and Quantity

Water is essential to every aspect of life and thus is managed carefully. Whatcom County, in the past 25 years, has made tremendous progress towards improvement of water quality and in the protection and recovery of aquatic resources. In 2009, the Lighthouse Point Water Reclamation Facility in Blaine significantly reduced wastewater loading to Drayton Harbor. Agricultural runoff has been significantly reduced by ongoing outreach efforts to assist the agricultural community in implementing best practices to control nutrient runoff and protect riparian habitat. Improvements in stormwater infrastructure and enforcement have also reduced the impacts of nonpoint pollution. Extensive water quality monitoring of freshwater and marine water bodies in the county has shown this improvement, and has highlighted where additional efforts need to be focused. All of these efforts have been expended at great cost. Unfortunately, recent trends in monitoring show that these improvements of the past may be at risk. All the efforts to protect and restore water quality and aquatic resources could be undone by the threats of aging or inadequate sewer and stormwater infrastructure, population growth in environmentally sensitive areas, and the effects of climate change on precipitation, flooding, elevated water temperature, and coastal sea level rise. (#27)

Whatcom County Water Resource Programs

Whatcom County has and/or participates in numerous water resource programs aimed at protecting and enhancing water quality and quantity, including:

- WRIA 1 Watershed Management ~~Planning Project~~;
- Drinking Water Management
- Lake Whatcom Watershed Management;
- Groundwater Protection & Management;
- Whatcom County Clean Water Program
- Flood Hazard Management; and,
- Stormwater Management.

WRIA 1 Watershed Management Project

Watershed planning was formally initiated in Whatcom County when the Water Resource Inventory Area (WRIA 1) Watershed Management Project was developed under ~~is the result of~~ the 1998 Washington State Watershed Management Act. The goal of the project was ~~–~~to address water quantity, ~~with the option of addressing~~ water quality, instream flows, and fish habitat to meet human needs, restore fish populations, and improve habitat through the development of a watershed management plan. The WRIA 1 Watershed Management Project ~~has~~ brought together ~~citizens~~ community members, local governments, tribes, ~~and~~ state and federal agencies, and other stakeholders (#28) to address these issues.

~~The framework for watershed management in the state is based on geographic areas known as Water Resource Inventory Areas (WRIAs). WRIA 1 includes the Nooksack River basin and several adjoining smaller watersheds, such as the coastal drainages of Dakota and California Creeks, as well as Lake Whatcom.~~

The Watershed Management Project was initiated ~~planning in WRIA 1 started in 1998~~ with the signing of a Memorandum of Agreement (MOA) between the *Initiating Governments*~~. In the WRIA 1 the Initiating Governments are~~ Whatcom County, City of Bellingham, Public Utility District No. 1, Lummi Nation, and Nooksack Tribe (the latter joining slightly later through a Letter of Agreement). The initiating governments went on the form the WRIA 1 Watershed Management Joint Board which in in 2016 was consolidated with the WRIA 1 Salmon Recovery Board to form the WRIA 1 Watershed Management Board. The role of the Initiating Governments was to review a recommended Watershed Management ~~Plan and~~Plan and submit ~~take~~ it to their ~~governments'~~ respective ~~councils~~ legislative bodies for adoption. The WRIA 1 Watershed Management Plan – Phase 1 was approved in 2005.

The overarching goals of the WRIA 1 program plans that are a component of the WRIA 1 Watershed Management Board functions include:

- Recover self-sustaining salmonid runs to harvestable levels through the restoration of healthy rivers and natural stream processes, careful use of hatcheries, and responsible harvest, and with the active participation and support of local landowners, businesses, and the larger community. (WRIA 1 Salmonid Recovery Plan).
- Water of sufficient quantity and quality to meet the needs of current and future human generations, including the restoration of salmon, steelhead, and trout populations to healthy harvestable levels, and the improvement of habitats on which fish and shellfish rely. (WRIA 1 Watershed Management Plan).
- Integrate traditional resource-based culture, local ecosystem priorities, valued ecosystem goods and services, community vitality, and support regional Puget Sound recovery goals. (Whatcom LIO Ecosystem Recovery Plan).

WRIA 1 Watershed Management Board

-In 2016, the 1999 Interlocal Agreement establishing the Watershed Management Project Joint Board and the 2004 Interlocal Agreement establishing the WRIA 1 Salmon Recovery Board were terminated and the duties, functions, and representatives under those agreements combined under the 2016 Interlocal Agreement establishing the WRIA 1 Watershed Management Board. The primary functions of the WRIA 1 Watershed Management Board are to facilitate implementation and adaptive management of the WRIA 1 Watershed Management Plan, coordinate implementation and adaptive management of the WRIA 1 Salmonid Recovery Plan and serve as the WRIA 1 Lead Entity for salmon recovery, and coordinate planning, implementation, and adaptive management of ecosystem recovery as the WRIA 1 Local Integrating Organization. Five-year work plans are developed to achieve the goals associated with these functions. Information about the functions of the WRIA 1 Watershed Management Board, the collaborative planning process, and the work plans are located on the WRIA 1 Project website (https://WRIA~~wria~~1project.whatcomcounty.org).

~~*Historical Organization (1999-2016)*~~

Water Rights ~~*WRIA 1 Joint Board*~~

~~In 1999, an Interlocal Agreement further formalized the government-to-government relationship essential to the tribes' participation in the process by creating a *Joint Board*. The Joint Board is comprised of the Initiating Governments, including the mayor of the City of Bellingham, executive for Whatcom County, manager of Public Utility District No. 1, and designated policy representatives of the Lummi Nation and Nooksack Tribe. The Board manages the project's administrative functions such as contracts and budgets. Members of the Joint Board also sit on the Joint Policy Boards.~~

~~*WRIA 1 Joint Policy Boards*~~

~~The WRIA 1 Joint Policy Boards are comprised of members of the WRIA 1 Joint Board and Salmon Recovery Board. This organizational level interacts with federal, tribal, state, and regional organizations at a policy-level to coordinate the implementation and management of the WRIA 1 Watershed Management Plan – Phase 1, the WRIA 1 Salmonid Recovery Plan, and other related activities.~~

~~*Local Integrating Organization (LIO)*~~

~~The Whatcom Local Integrating Organization (LIO) is a function of the WRIA 1 Watershed Joint Board and WRIA 1 Salmon Recovery Board (Joint Policy Boards). Local integrating organizations are designated by the Puget Sound Partnership. The two WRIA 1 Boards accepted the function of the Whatcom LIO in October 2010 under the integrated program structure, and was officially recognized by the Puget Sound Partnership's Leadership Council in November 2010. The purpose of the Whatcom LIO is to coordinate implementation of Puget Sound Action Agenda priorities that are consistent with or complement local priorities. One of its functions is to provide a local update to the Action Agenda for Puget Sound. Local updates are intended to~~

~~identify local priorities in the form of near-term actions (NTAs), which are priority actions with measurable outcomes that can be implemented in the next two years and that align with strategies in the Action Agenda for Puget Sound.~~

~~*WRIA 1 Planning Unit*~~

~~The Initiating Governments established the Planning Unit to ensure representation of a broad range of water resource interests. The Planning Unit's role is to recommend actions for a Watershed Plan and to contribute knowledge, interests, technical expertise, and other resources to its development. The Planning Unit is made up of representatives from the Initiating Governments, other governments, and various caucuses. There are 16 total caucuses on the WRIA 1 Planning Unit.~~

~~*Organizational Update (2016)*~~

~~Through an interlocal agreement entered into in 2016, the Watershed Management Project Joint Board and the WRIA 1 Salmon Recovery Board were dissolved and the duties and functions of those boards were assumed by the new WRIA 1 Watershed Management Board, consisting of one representative from the Lummi Nation, the Nooksack Tribe, the Washington State Department of Fish and Wildlife, Whatcom County, Whatcom County PUD No. 1, and the cities of Bellingham, Blaine, Everson, Ferndale, Lynden, Nooksack, and Sumas.~~

~~The primary functions of the WRIA 1 Watershed Management Board are to:~~

- ~~Facilitate implementation and adaptive management of the WRIA 1 Watershed Management Plan-Phase 1 as currently constituted or subsequently amended;~~
- ~~Coordinate the implementation and adaptive management of the WRIA 1 Salmonid Recovery Plan and associated implementation documents,~~
- ~~Serve as the WRIA 1 Salmon Recovery Lead Entity pursuant to RCW 77.85,~~
- ~~Coordinate participation in Puget Sound salmon recovery efforts,~~
- ~~Coordinate the development, implementation and adaptive management of WRIA 1 watershed chapters of recovery plans for ESA listed salmonids and other salmonid species as warranted;~~
- ~~Coordinate planning, implementation, monitoring and adaptive management of ecosystem recovery actions in WRIA 1 consistent with agreed local goals and objectives,~~
- ~~Serve as the WRIA 1 Local Integrating Organization and a partner in the Puget Sound Partnership in representing WRIA 1 goals and priorities; and~~
- ~~Participate in other related activities as agreed to by the Board.~~

~~The roles of the Local Integrating Organization and Planning Unit did not change.~~

~~From 1999 to 2016, the WRIA 1 Watershed Management Project was governed by various boards, including the Joint Board, Joint Policy Boards, and the Local Integrating Organization (LIO). The Joint Board managed administrative functions, while the Joint Policy Boards coordinated policy-level activities. The LIO served as a local representative for the Puget Sound Partnership.~~

~~*Organizational Update*~~*Update (2016)*

Adjudication

A water rights adjudication is a legal process that will validate, quantify, and prioritize water rights in WRIA 1, the Nooksack Basin, including the entire Nooksack River watershed and nearby areas. The Washington Department of Ecology initiated this process in May 2024, and it is expected to last at least a decade. All those who directly withdraw water from a well or divert water from a waterbody in WRIA 1 will be included in the adjudication. People that are customers of a water system will not be participants. Evidence collection and submission will follow, culminating in a court-ordered inventory of all legal water rights.

~~In 2016, the WRIA 1 Watershed Management Board was formed to consolidate the responsibilities of previous boards. This new board is responsible for implementing the WRIA 1 Watershed Management Plan and Salmonid Recovery Plan, coordinating with other organizations, and serving as the local representative for the Puget Sound Partnership.. The roles of the LIO and Planning Unit remained unchanged.~~

~~*2005 WRIA 1 Watershed Management Plan – Phase 1*~~

~~The 2005 WRIA 1 Watershed Management Plan and its 2007 Detailed Implementation Plan outline strategies for improving water quantity, quality, instream flow, and fish habitat. The goals are to meet human needs, restore fish populations, and improve habitats. The Lower Nooksack Strategy, adopted in 2010, focuses on negotiating water rights, updating water budgets, determining user needs, and advancing water resource allocation tools. In 2023, the WRIA 1 Management Board adopted a five year work plan addressing water quantity, water quality, fish habitats, and instream flows. The 2005 WRIA 1 Watershed Management Plan was approved in 2005 by the Joint Administrative Board, Planning Unit (by consensus), and the County Council. Pursuant to subsequent state requirements, a WRIA 1 Watershed Detailed Implementation Plan was approved by the Joint Administrative Board, Planning Unit, and County Council in 2007. It provides a roadmap for addressing water quantity, water quality, instream flow, and fish habitat challenges. The goals of the WRIA 1 Watershed Management Project are: water of sufficient quantity and quality to meet the needs of current and future human generations; restoration of salmon, steelhead, and trout populations to healthy harvestable levels; and the improvement of habitats on which fish and shellfish rely. These goals are addressed more specifically below:~~

~~**Water Quantity** – To assess water supply and use, and develop strategies to meet current and future needs. The strategies should retain or provide adequate amounts of water to protect and restore fish habitat, provide water for future out-of-stream uses, and ensure adequate water supplies are available for agriculture, energy production, and population and economic growth under the requirements of the state's Growth Management Act.~~

~~**Water Quality** – To ensure the quality of our water is sufficient for current and future uses, including restoring and protecting water quality to meet the needs of salmon and shellfish, recreational uses, cultural uses, protection of wildlife, providing affordable and safe domestic water supplies, and other beneficial uses. The initial objectives of the water quality management strategy will be to meet the water quality standards.~~

Instream Flow – To supply water in sufficient quantities to restore salmon, steelhead, and trout populations to healthy and harvestable levels and improve habitats on which fish rely.

Fish Habitat – To protect or enhance fish habitat in the management area and to restore salmon, steelhead, and trout populations to healthy and harvestable levels and improve habitats on which fish rely.

In 2010, the WRIA 1 Joint Board adopted a work plan, budget, and financing strategy, called the Lower Nooksack Strategy, to advance a negotiated settlement of Tribal and state instream flow water rights on the mainstem of the Nooksack River, while maximizing the economic and environmental benefits of out-of-stream water use in the Lower Nooksack sub-basin. The Joint Board adopted the Lower Nooksack Strategy consistent with WRIA 1 Watershed Management Plan priorities.

Lower Nooksack Strategy Objectives:

- Develop and implement a process for negotiating settlement of water rights on the Mainstem Nooksack River.
- Update and verify the Lower Nooksack River sub-basin water budget and develop a groundwater model.
- Determine out-of-stream water user needs:
  - Public water system needs determined by updated the Whatcom County Coordinated Water System Plan (CWSP).
  - Other out-of-stream user needs (e.g., agriculture, private domestic wells, industrial, etc.) determined through a regional water supply planning process.
- Continue and, if appropriate, enhance targeted streamflow and water quality sampling.
- Advance work on tools that foster water resource allocations consistent with long-term economic and environmental land-use goals for implementation in five years.
- Streamflow Restoration Act (ESSB 6091)
- The Streamflow Restoration Act (ESSB 6091), enacted by the Washington State Legislature on January 18, 2018 and effective on January 19, 2018, directs the Department of Ecology to work with the initiation governments (i.e., the WRIA I Watershed Management Board), in collaboration with the planning unit established pursuant to chapter 90.82 RCW, on updating the *WRIA 1 Watershed Management Plan* for approval by the Whatcom County Council by February 1, 2019 and the *WRIA 1 Watershed Management Board 5-Year Work Plan* adopted by County Council March 8, 2023.
- The Act requires that the updated plan include recommendations for projects and actions that will measure, protect, and enhance instream resources and improve watershed functions that support the recovery of threatened and endangered salmonids. Such recommendations may include, but are not limited to, acquiring senior water rights, water conservation, water reuse,

~~stream gaging, groundwater monitoring, and developing natural and constructed infrastructure, which includes, but is not limited to, such projects as floodplain restoration, off-channel storage, and aquifer recharge. Qualifying projects must be specifically designed to enhance streamflows and not result in negative impacts to ecological functions or critical habitat.~~

- ~~At a minimum, the watershed plan must include those actions determined to be necessary to offset potential impacts to instream flows associated with permit-exempt domestic water use. The highest priority recommendations must include replacing the quantity of consumptive water use during the same time as the impact and in the same basin or tributary. Lower priority projects include projects not in the same basin or tributary and projects that replace consumptive water supply impacts only during critical flow periods. The watershed plan may include projects that protect or improve instream resources without replacing the consumptive quantity of water where such projects are in addition to those actions determined to be necessary to offset potential consumptive impacts to instream flows associated with permit-exempt domestic water use.~~

~~Until the updated watershed plan is approved and rules are adopted by the Department of Ecology, the County, in issuing building permits under RCW 19.27.097(1)(c) or approving subdivisions under chapter 58.17 RCW in WRIA 1, will comply with all of the specific requirements of ESSB 6091.~~

~~*Water Rights Adjudication*~~

~~A water rights adjudication is a legal process toto quantify and prioritize water rights in WRIA 1, the Nooksack Basin, including the entire Nooksack River watershed and nearby areas. The Washington Department of Ecology initiated this process in May 2024, and it is expected to last over a decade. All those who withdraw water from a well or divert water from a waterbody in WRIA 1 are involved, but not those who solely rely on water received from a city, a water district, or a water association. Evidence collection and submission will follow, culminating in a court-ordered inventory of all legal water rights. This adjudication is a result of the Water Resources Adjudication Assessment, which identified WRIA 1 as a priority area due to its water resource challenge~~

Drinking Water Management

The County's drinking water program aims to minimize risks to human health and promoting access to an adequate quantity and quality of safe water. This is accomplished by activities such as but not limited to well site inspections, complaint and illness investigation, emergency response, permit and water availability review, well decommissioning observations, well drilling observations, and community education and outreach.

Pertinent Documents

Coordinated Water System Plan (CWSP)

A Coordinated Water System Plan (CWSP) is a plan for public water systems within a defined area that identifies the present and future needs of the systems and sets forth means of meeting those needs in the most efficient manner possible. The

defined area is noted in County Resolution 1991-075 and is referred to as the Critical Water Supply Service Area (CWSSA). In 1993, the county adopted the first plan and an update is currently progress. The CWSP update is prepared under the direction of the Water Utility Coordinating Committee (WUCC). The CWSP updates are conducted with the primary objective of supporting the public drinking water supply needs of the county and achieving coordination between water services, the Growth Management Act (GMA), and the update of Whatcom County's Comprehensive Plan.

Lake Whatcom Watershed Management

Lake Whatcom is a large multi-purpose reservoir the source of drinking water for the City of Bellingham, Lake Whatcom Water and Sewer District, several other smaller water districts/associations, and about 250 homes that draw water directly from the lake. The lake provides water to about half the population of Whatcom County. Lake Whatcom is periodically supplemented by the City of Bellingham with water from the Middle Fork Nooksack River through a pipeline that extends from a diversion structure on the river to the Lake Whatcom watershed.

In addition to providing water for drinking, commercial, and industrial uses, the lake is used for boating, swimming, and fishing. The majority of the watershed is forested, mainly surrounding the large southernmost portion of the lake. Other land uses include residential development (approximately ~~5,300~~7,200 homes are located within the watershed as of 2023), limited agriculture and commercial development, parks, and other public facilities. The on-going management challenge is trying to determine the extent to which these practices can occur while maintaining safe, clean drinking water. ~~The challenge is further complicated by possible requirements related to the Endangered Species Act, tribal water rights, and the potential impact these issues may have on how the City's diversion from the Nooksack River is operated.~~

The watershed contains four developed areas: The City of Bellingham, which straddles the upper portion of the northern-most basin of the lake; Geneva, which is immediately south and east of Bellingham's city limits and is part of the city's urban growth area; Hillsdale, which is immediately north and east of Bellingham's city limits and is also part of the city's urban growth areas; and the Sudden Valley Rural Community. In addition, it includes a variety of other zones, including resource, rural, and residential rural zones. Outside the Bellingham City limits, approximately 70% of the watershed is in Forestry zoning and more than 75% of the current land use is forestry.

~~Water and sewer service are provided by the Lake Whatcom Water and Sewer District. Capacity problems in the district's sewer line, which serves Geneva and Sudden Valley, have caused overflows into the lake in the past. An aggressive program to preclude stormwater infiltration has reduced the overflow problems to a large extent. In addition, the district has a contractually limited flow capacity to Bellingham. The Lake Louise Road sewage interceptor was constructed in January 2003 to carry waste water from Sudden Valley and Geneva and serves as a complement to the Lake Whatcom Boulevard trunk line. The interceptor was designed to service full build-out of Sudden Valley and Geneva.~~

Water and sewer service is provided throughout much of unincorporated portions of the watershed by the Lake Whatcom Water and Sewer District. The District operates

three water systems: the South Shore system serving Geneva and Sudden Valley, and two smaller systems serving the Eagleridge and Agate Heights neighborhoods. The District collects and conveys wastewater generated in the watershed to the City of Bellingham for treatment at the City's Post Point facility. The District's sewage collection and conveyance system has the capacity to serve full build-out of Sudden Valley and Geneva.

Lake Whatcom serves as a reservoir. Lake Whatcom provides drinking water for the City of Bellingham, Lake Whatcom Water and Sewer District, several smaller water districts and associations, and homes that draw water directly from the lake. The City of Bellingham and Lake Whatcom Water and Sewer District are responsible for ensuring drinking water standards are met for their customers. To date~~,~~ water supplies have consistently met standards. The ability to continue to economically meet drinking water standards requires maintaining source water that requires minimal treatment. For this reason~~,~~ the City of Bellingham maintains an on~~-~~going source water-monitoring program. Other agencies~~,~~ including Western Washington University, Washington Department of Natural Resources, Washington Department of Fish and Wildlife, Washington Department of Ecology, Lake Whatcom Water and Sewer District, and Whatcom County, have also conducted monitoring, studies, and/or evaluations of the lake and watershed.

Studies on Lake Whatcom conducted over a number of years indicate water quality in the lake has declined. In 1998, the Washington State Department of Ecology listed Lake Whatcom as an impaired water body and placed Lake Whatcom on the Federal Clean Water Act 303(d) list because of low oxygen levels in the ~~Lake~~ lake ~~-~~and high bacteria levels in streams that flow into the Lake. The 303(d) listing require~~d~~s the establishment of a Total Maximum Daily Loads (TMDLs). The Department of Ecology issued the "Lake Whatcom Watershed Total Phosphorus and Bacteria Total Maximum Daily Loads: Volume 1, Water Quality Study Findings" in 2008. This study documented Lake Whatcom is impaired for dissolved oxygen due to phosphorus loading and that streams flowing into Lake Whatcom do not meet fecal coliform bacteria standards. Loading capacities for total phosphorus and bacteria reduction targets were set forth in this document. In 2013~~,~~ ~~Tt~~The Department of Ecology ~~issued a draftpublished~~published "Lake Whatcom Watershed Total Phosphorus and Bacteria Total Maximum Daily Loads: Volume 2, Water Quality Improvement Report and Implementation Strategy." This report identifies how much phosphorus can be discharged to the Lake and identifies how the bacteria load should be allocated between the County and City of Bellingham~~,~~ in order to meet water quality standards. The U.S. Environmental Protection Agency adopted the Lake Whatcom TMDL in 2016.

A significant cause of declining oxygen levels has been from residential development, forest management, and recreation in the watershed. Past development ~~permitted by the City of Bellingham and Whatcom County~~ has led to increased phosphorus loading into the lake, which stimulates algae growth. Bacteria that consume the dying algae deplete the dissolved oxygen, leading to lower oxygen levels ~~in the lake~~. Past ~~poorly managed~~ forest practices ~~may~~ have ~~also~~ also led to significant increases in phosphorus loading to the lake.

Whatcom County has taken a number of actions to reduce phosphorus and otherwise address Lake Whatcom water quality through the Lake Whatcom Management

Program. These include rezoning land to allow less development in the watershed, adoption of the Lake Whatcom Comprehensive Stormwater Management Plan, revising stormwater management standards for private development to significantly reduce potential phosphorus runoff, construction of stormwater capital improvement projects, and adoption of regulations that restrict the application of commercial fertilizers.

~~In 2004, the Department of Natural Resources' (DNR) Board onf Natural Resources adopted the *Lake Whatcom Landscape Plan*. This plan provides additional protections on remaining state managed lands within the Lake Whatcom watershed. The plan provides additional protections on streams and potentially unstable slopes not normally included in forest practices in Washington State.~~ In 2004, the Department of Natural Resources' (DNR) Board of Natural Resources adopted the *Lake Whatcom Landscape Plan*. This plan provides additional protections on remaining state managed lands within the Lake Whatcom watershed. The plan provides additional protections on streams and potentially unstable slopes not normally included in forest practices in Washington State. While still in effect, the Landscape Plan has not been updated since its initial drafting and would benefit from an update using best available science and integration of climate change impacts. (#29)

In 2014, approximately 8,800 acres of forest lands around Lake Whatcom were transferred to Whatcom County from the Washington Department of Natural Resources through reconveyance. These lands provide passive recreation opportunities with hiking and biking trails connecting various communities, neighborhoods, and parks throughout the watershed. Whatcom County is developing a forest management plan for these lands that will establish how these forests should be managed to provide recreation while protecting and enhancing water quality.~~Under County ownership, the forests will be allowed to mature to an older growth environment benefiting the watershed and helping to stabilize steep slopes that surround the lake.~~

The Whatcom County Council created the Lake Whatcom Stormwater Utility Service Area in 2017 to fund additional efforts to protect Lake Whatcom's water quality, as existing funding sources were insufficient to meet state and federal environmental regulations.

Lake Whatcom Watershed Management Program

A variety of agencies, organizations, and individuals play a role in managing and protecting Lake Whatcom. In an effort to coordinate efforts of these various players, in 1990, the City of Bellingham, Whatcom County, and Water District 10 (now known as the Lake Whatcom Water and Sewer District) began meeting to develop a joint management strategy for the Lake Whatcom watershed.

The Lake Whatcom Management Program had its beginnings in the 1980s and early 1990s, when the cumulative deterioration of Lake Whatcom's water quality from historic and ongoing land use in the watershed was documented and brought to the attention of agencies and the community. In response, a Joint Resolution was passed by the City of Bellingham, Whatcom County, and the Lake Whatcom Water and Sewer District in 1992 to organize efforts to address the most serious threats to the

watershed. This comprehensive approach to managing the lake became the basis of the LWMP, which was established by Interlocal Agreement in 1998.

The work of the Lake Whatcom Management Program is guided by the general goals established in the 1992 joint resolution:

- Recognizing and managing Lake Whatcom and its watershed as the major drinking water reservoir for Whatcom County
- Protecting, preserving, and enhancing water quality and managing water quantity to ensure long-term sustainable supplies for a variety of uses
- Prioritizing protection over treatment in managing Lake Whatcom and its watersheds Managing water quantity to sustain long-term efficient use of the water
- Ensuring there are opportunities for public comment and participation in policy and management program development
- Promoting public awareness and responsible individual actions

Promoting learning, research, and information opportunities which better our understanding of the watershed system, the impacts of activities, and benefits of potential policies implemented.

~~In November/December 1992, a joint resolution was passed by the Bellingham City Council, Whatcom County Council, and the Lake Whatcom Water and Sewer District (formerly Water District 10) Commissioners, which reaffirmed this position with six general goal statements and a set of specific goal statements in various categories. The specific goal statements for urbanization were the following:~~

~~Prevent water quality degradation associated with development within the watershed.~~

~~Review and recommend changes in zoning and development potential that are compatible with a drinking water reservoir environment.~~

~~In addition to zoning, identify and promote other actions to minimize potential for increased development in the watershed (i.e. land trust, development rights, cost incentives, etc.).~~

~~Develop specific standards which reduce the impacts of urbanization, such as minimal lot clearing; clustered development to reduce infrastructure; collection and treatment of stormwater before entering the lake.~~

~~Develop appropriate interlocal agreements with governing agencies to prohibit the potential for additional development once an agreed upon level is set.~~

~~The joint resolution included goals for watershed management that extended beyond urbanization. Goals were included for stormwater management, on-site waste systems, conservation, forest management, spill response, hazardous materials transport and handling, data/information management, education/public involvement, and other topics. A joint strategy was approved for developing specific plans to meet the adopted goals. Eight high priority goals were selected first and plans have been completed and jointly adopted for each of the goals.~~

~~In 1998, the City, County, and District 10 formalized their joint commitment to protect and manage the lake through the joint adoption of an interlocal agreement~~

~~and allocation of funding toward protection and management efforts in the watershed. A five-year program plan was developed for ten program areas. Specific priority was placed on activities related to watershed ownership, stormwater management, and urbanization/land development.~~

The ~~resulting~~ Lake Whatcom Management Program develops five year work plans to guide~~s~~ actions to protect Lake Whatcom water quality.~~as a long-term supply of drinking water for the City of Bellingham and portions of Whatcom County. The program emphasizes protection over treatment in managing Lake Whatcom and its watershed. The structure of the Lake Whatcom Management Program includes legislative bodies, a management team, an inter-jurisdictional coordinating team, agency staff, and advisory committees.~~

The Lake Whatcom Watershed Management Program website (http://www.lakewhatcom.whatcomcounty.org/resources) contains the most recent work plans, progress reports, water quality monitoring reports, and other documents related to Lake Whatcom management programs.

Sudden Valley

Sudden Valley is a community within the Lake Whatcom Watershed. It was established in the early 1970s as a recreation/resort area but over the last thirty years has developed into a significant residential area.

Since 1985, Sudden Valley has mandated the use of appropriate stormwater best management practices through standards for individual stormwater detention for all new construction. Any new building permits on existing lots must be able to demonstrate that stormwater detention is included in the plan as a precondition to issuance of a permit. Sudden Valley is also subject to additional regulatory protections that apply to the Lake Whatcom Watershed under the Water Resource Protection Overlay District, Stormwater Special District, and Water Resource Special Management Area requirements. Under the provisions of these special districts, potential impacts from impervious surfaces, stormwater runoff, and clearing activities are required to be addressed either on-site or through a community-wide process.

Groundwater Protection & Management

Groundwater is contained in aquifers, which are subterranean layers of porous rock or soil. Most aquifers are replenished by rainwater, though some may contain water trapped during glacial periods. Aquifers are often integrally linked with surface water systems and are essential for maintaining stream flows that meet~~ing~~ instream and out-of-stream water needs, such as maintaining flows for fish, drinking water, agriculture, and industry. Whatcom County residents rely heavily on groundwater for drinking water, agriculture, and commercial and industrial needs. ~~Groundwater also plays an important role in maintaining stream flows.~~

Many studies have been conducted related to groundwater quality in Whatcom County documenting water quality issues, such as exceedances of standards for nitrate, ethylene dibromide (EDB) and 1,2-dichloropropane (1,2-D), pesticides, iron~~,~~ and other agricultural-related contaminates, particularly in the northern portion of the County. In general, groundwater in Whatcom County is very vulnerable to contamination because much of the County's groundwater lies within a shallow

unconfined aquifer. Activities that occur on the surface of the ground directly affect groundwater quality. Shallow wells that draw water from unconfined water table aquifers are at highest risk.

Whatcom County's Critical Areas Regulations protect Critical Aquifer Recharge Areas (CARAs) during the development process, by precluding certain uses in CARAs and/or requiring certain precautions be taken in handling certain chemicals.

To protect groundwater resources, Whatcom County implements multiple management strategies. The County's critical areas regulations protect Critical Aquifer Recharge Areas (CARAs) during development by precluding certain land uses or requiring precautions in handling certain chemicals. Additionally, onsite sewage systems (OSS) play a role in groundwater recharge and protection. The Whatcom County Health & Community Services (WCHCS) Onsite Sewage (OSS) Program is vital to ensuring the waste from these systems is designed to treat sewage adequately and maintained to continue functioning as designed. This ensures the safety and reliability of nearly 30,000 on-site sewage systems in the county. These activities include:

- Permitting new construction, expansion, and repairs of OSS to meet current design standards that protect public health.
- Educating and assisting homeowners in proper OSS operation and maintenance.
- Regulating and overseeing OSS installers, pumping companies, and operations and maintenance professionals.
- Investigating complaints and enforcing code compliance under WCC 24.05.
- Reviewing land use proposals such as subdivisions, boundary line adjustments, and conditional use applications supported by OSS.
- Surveying OSS in sensitive areas and collaborating with pollution identification and control teams, further strengthening the resilience of local groundwater resources.

Flood Hazard Management

A comprehensive approach to flood hazard management planning provides a better understanding of the river and floodplain system. It also ensures flooding and channel dynamics are understood, that risk is not transferred and ~~morphology~~ problems ~~are not simply transferred to another location within the basin, but~~ are addressed in a comprehensive, basin-wide manner. This approach directs future flood hazard management expenditures in the most efficient and cost-effective manner.

The Floodplain Integrated Planning (FLIP) Team ~~Whatcom County Public Works (through the Flood Control Zone District)~~ coordinates with and reports to the Flood Control Zone District Advisory Committee (FCZDAC) to identify and characterize flooding problems and provide recommendations for achieving consistent, long-term flood hazard reduction strategies. Some activities typically involved in developing a Comprehensive Flood Hazard Management Plan (CFHMP) include data collection, hydraulic modeling, alternatives analysis, floodplain mapping, and meander limit identification. In addition to the technical components in comprehensive flood planning, extensive coordination with the public and other agencies is required throughout the planning process.

Other County flood management programs include:

Early Flood Warning – Explore new ways to increase warning time for the cities in Whatcom County. Work with the United States Geological Survey (USGS) to maintain a network of early flood warning stations to help ~~citizens~~ prepare and take appropriate measures to protect lives and property from flood damages.

Flood Hazard Reduction Program – Implement projects to reduce future flood damages and public expenditures to repair damaged areas. Examples include construction of setback levees and overtopping levee sections ~~flow spillways~~, and designation of overflow corridors in overbank areas and acquisition of repetitive flood loss properties. Furthermore, two alluvial fan hazard and risk assessment ~~mitigation projects studies~~ studies have been completed for Jones Creek and Canyon Creek and serve as models for future assessments. ~~For Jones Creek, review of potential mitigation measures and concept design of a preferred approach has also been completed.~~

Comprehensive Flood Hazard Management Planning – Identify flooding problems and provide recommendations for achieving long-term flood hazard reduction strategies. The Lower Nooksack River Comprehensive Flood Hazard Management Plan was adopted in 1999. Future CFHMP updates will be incorporated into this plan. Implementation of the plan is ongoing, including the adoption of the Nooksack River System-Wide Improvement Framework (SWIF) adopted in 2017.

Floodplain Integrated Planning – In 2017, Whatcom County initiated a collaborative floodplain integrated planning (FLIP) process to update the CHFMP. This process includes extensive participation by state agencies, cities, Tribes, and the agricultural community.

Preparedness and Response – Plan for and implement a coordinated response during flood events to ensure public safety and minimize flood damages.

National Flood Insurance Program – Participate in the ~~Congress-initiatedinitiated~~ National Flood Insurance Program (NFIP)~~ of 1968~~, to make affordable flood insurance available to citizens of communities that adopt approved flood management regulations.

Repair and Maintenance Program – Address problem areas with rivers, streams, and coastlines of Whatcom County, and mitigate future flood damages in a proactive and cost-effective manner.

Technical Assistance – Provide technical assistance regarding drainage and flood issues to private citizens and businesses located along the many waterbodies within Whatcom County.

Organization

Flood Control Zone District (FCZD)

Following the severe floods of 1989 and 1990, ~~in 1992~~ Whatcom County created the countywide Flood Control Zone District (FCZD~~),~~) in 1992 that covers, ~~, including~~ both incorporated and unincorporated areas of the County. The FCZD is a quasi-municipal corporation that is a separate legal entity from Whatcom County government. Even though this legal separation exists, the Whatcom County Council and the County

Executive (Board of Supervisors) and the Public Works Department (staff) perform the governance and administrative support for the district.

The primary purpose of the FCZD is flood hazard management. Revenue is generated ~~to for this purpose is accomplished~~ in two ways: (1) a county~~-~~wide uniformly applied tax; and, (2) supplemental revenue generated within localized Diking Districts and Sub-Flood Districts where specific local project activity is planned.

While the primary purpose of the FCZD is flood hazard management, the district is allowed to address a wide variety of water resource issues. Due to this ability, revenue generated by the district is currently used to finance additional water supply and water-quality related improvement projects.

Pertinent Documents

Lower Nooksack River Comprehensive Flood Hazard Management Plan (CFHMP)

In 1999, the Whatcom County Flood Control Zone ~~adopted~~District adopted the Lower Nooksack River Comprehensive Flood Hazard Management Plan (CFHMP). The CFHMP identifies projects, programs, and other recommendations aimed at reducing future flood damages along the Lower Nooksack River. Since development of the CFHMP, several studies have been completed to advance specific project components recommended in the plan. ~~In 2017, the County adopted a follow up plan known as the Nooksack River System-Wide Improvement Framework to resolve deficiencies identified in the CFHMP.~~

Critical Areas Regulations (WCC 16.16)

Whatcom County's Critical Areas Regulations aim to protect people and property in Frequently Flooded Area (FFAs) by requiring development in these areas conform~~s~~ to WCC Title 17, Flood Damage Prevention.

Stormwater Management

Stormwater runoff occurs when precipitation from rain or snowmelt flows over the land surface. The addition of roads, driveways, parking lots, rooftops, and other surfaces that prevent water from soaking into the ground greatly increases the runoff volume created during storms. This runoff is swiftly carried to our local streams, lakes, wetlands~~,~~ and rivers and can cause flooding and erosion. Stormwater runoff also picks up and carries with it many different pollutants that are found on paved surfaces, such as sediment, nitrogen, phosphorus, bacteria, oil and grease, microplastics, tire dust including 6PPD-quinone, trash, pesticides, and metals. Pollutants from road runoff, especially in urban and high traffic areas, such as tire wear particles including 6PPD-q are toxic and lethal to salmon and other aquatic species and should be managed and mitigated appropriately. (#30)

County Stormwater Management Programs

National Pollutant Discharge and Elimination System (NPDES) Phase II Permit[2]

Stormwater runoff picks up pollutants as it travels over our developed landscapes and is a major source of water quality problems. In 1987, the Federal Clean Water Act was amended to address stormwater pollution. As a result, the United States Environmental Protection Agency (EPA) created the National Pollutant Discharge Elimination System (NPDES) to address stormwater runoff. States are required to administer permits to local jurisdictions to regulate runoff as part of the NPDES Program. The Permit is referred to as the "NPDES Phase II Permit" or "Phase II Municipal Stormwater Permit".

In February of 2007, the Washington State Department of Ecology issued Whatcom County's Phase II Municipal Stormwater Permit. This permit regulates discharges from Small Municipal Separate Storm Sewers, and is part of the National Pollutant Discharge and Elimination System (NPDES) and State Waste Discharge General Permit. It sets forth requirements of municipalities to address stormwater runoff in areas determined to have population densities reaching urban standards. Whatcom County is required to implement various stormwater management strategies to comply with this State permit that are reported to the Department of Ecology on an annual basis.

The current Permit boundary covers approximately 15,000 acres and generally includes the following areas (Figure 1):

- Bellingham Urban Growth Area
- Sudden Valley
- Portions of the Hillsdale and Emerald Lake area
- Portions along North Shore Drive on Lake Whatcom and Lake Whatcom Boulevard
- Ferndale Urban Growth Area
- Portions along Chuckanut Drive and Chuckanut Bay
- Birch Bay Urban Growth Area

Additionally, though not within the NP~~E~~DES permit area, the County has made the entire Lake Whatcom watershed ~~is~~ subject to the illicit discharge detection and elimination requirements of the Permit through ordinance and agreement with the Department of Ecology.

~~Jurisdictions are allowed to discharge runoff into waterbodies of the State (such as rivers, lakes, and streams) as long as they implement programs that protect water quality by reducing pollutants to the maximum extent possible through requirements of the NPDES Phase II Permit. Those requirements are reported and submitted to the Department of Ecology through the Stormwater Management Program (SWMP) and the Annual Compliance Report.~~

[2] https://www.whatcomcounty.us/981/National-Pollutant-Discharge-Elimination

The Western Washington Phase II Municipal Stormwater Permit is required by the State of Washington Water Pollution Control Law Chapter 90.48 RCW, and the Federal Water Pollution Control Act Title 33 United States Code (Clean Water Act). The Permit is administered by the Washington State Department of Ecology.

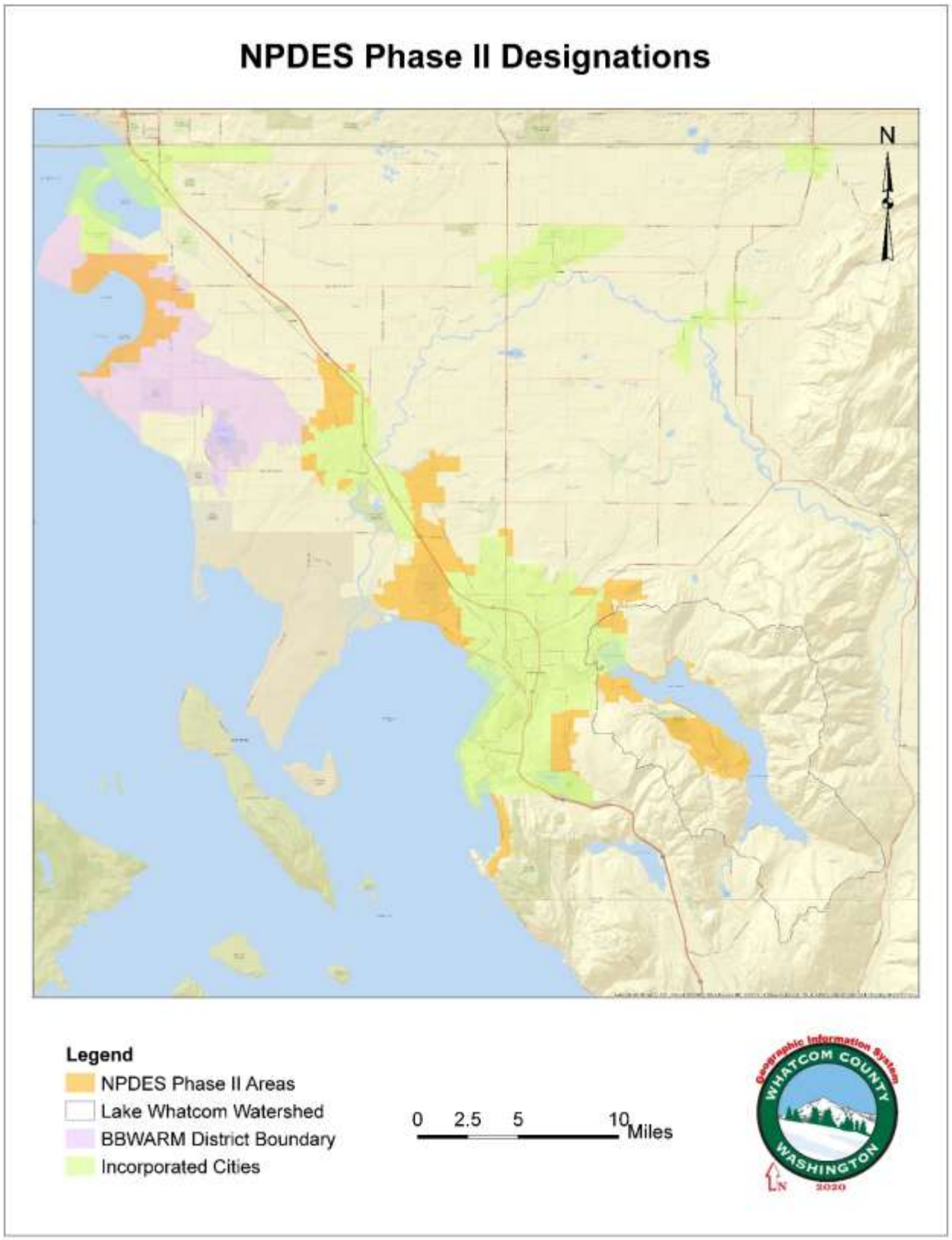

Figure 1. NPDES Phase II Boundaries

Pollution Identification and Correction (PIC) Program[3]

Whatcom County's Pollution Identification and Correction (PIC) Program focuses on finding and eliminating sources of fecal bacteria pollution in waterways draining to shellfish growing areas in cooperation with local, state, tribal, and federal partners in the Whatcom Clean Water Program. ~~Clean water supports healthy drinking water, safe recreational uses, quality water for irrigation and livestock, healthy fish, and shellfish that are safe to consume. Currently, many streams in Whatcom County do not meet water quality standards for fecal coliform bacteria.~~ Fecal ~~coliform~~ bacteria are found in the intestinal tract of warm-blooded animals. When there is too much fecal bacteria in surface water, it indicates that there are likely disease-causing organisms present that can make people sick. Waterways like ditches, creeks, and rivers connect our land and sources of fecal bacteria to the marine waters. Shellfish beds in the marine waters are closed to harvesting when bacteria levels are too high., ~~and when found in streams are an indicator of human or animal waste in the water. The higher the bacteria level, the greater the public health risk to people drinking water, wading, fishing, or consuming shellfish.~~

The ~~Pollution Identification and Correction (PIC)~~ PIC Program was created to help implement community solutions to clean water and meet Shellfish Protection District objectives of reopening closed shellfish beds. Program components include:

- Water quality monitoring at over 90 sites to identify possible pollution sources. Key potential sources of bacteria are from (1) animal waste from agricultural operations, domestic pets, waterfowl, and wildlife, and (2) human sewage from failing on-site sewage systems (OSS or septic systems), leaking sewers or cross-connections, and open defecation.
- Community outreach and engagement to encourage adoption of pollution prevention behaviors like picking up pet waste, maintaining septic systems, and following farming best management practices.
- Providing technical and financial assistance to reduce barriers to adoption of pollution prevention behaviors.
- Enforcing water quality regulations when voluntary actions are not sufficient to protect water quality.

~~**Pollution** – The key potential sources of bacteria that have been identified in Whatcom County coastal drainages are (1) **animal waste** from agricultural operations, domestic pets, waterfowl, and wildlife, and (2) **human sewage** from failing on-site sewage systems (OSS), leaking sewers, or cross-connections, and open defecation.~~

~~**Identification** – Whatcom County coordinates a routine water quality monitoring program at approximately 90 stations in watersheds that discharge to marine waters. Samples are collected on at least a monthly basis and analyzed for fecal coliform bacteria. Results are evaluated annually to identify focus areas with the largest~~

[3] https://www.whatcomcounty.us/1072/Water-Quality

~~bacteria problems. Within the focus areas, stream segments are monitored and potential bacteria sources are identified.~~

~~**Correction** – Technical and financial resources are offered to landowners to identify and implement solutions on their property. Residents can help improve the community's water quality by inspecting and maintaining septic systems and by fencing animals out of streams, ditches, and swales. By actively managing pastures, creating protected heavy use areas, and covering manure storage areas, residents can prevent manure-contaminated mud from polluting surface water. Planting shrubs and trees along stream banks and picking up after dogs also contributes to better water quality.~~

Issues, Goals, and Policies

Watershed Planning and Management

Goal 10F: **Protect and enhance water quantity and quality to meet the needs of current and future human generations and recovery of salmon, steelhead, and trout populations to self-sustaining harvestable levels, and the improvement and protection of habitats on which fish and shellfish rely~~and promote sustainable and efficient use of water resources~~.**

Policy 10F-1: Maintain as a high priority the protection of water quality and quantity. Prioritize the protection of water quality and quantity through the development and implementation of a watershed management framework that includes periodic water quality assessments, reduction targets for pollutant loads, and conservation metrics. High-priority actions will focus on protecting critical recharge areas, controlling sources of contamination, and enhancing water conservation efforts across residential, agricultural, and industrial sectors. Success will be measured by achieving a minimum 10% reduction in pollutant levels within identified priority watersheds every five years, along with documented improvements in water flow stability and water conservation compliance rates across sectors.

Policy 10F-2: Actively participate in and support efforts of the WRIA 1 Watershed Management Board established under a 2016 Interlocal Agreement for collaborative planning to coordinate local, federal, tribal, and state agencies to achieve integration and/or consistency between the various levels of environmental regulations relating to the County.

Policy 10F-3: Work cooperatively with Federal, State, and local jurisdictions, Tribal governments, municipal corporations, and the public to implement the goals and policies of the Comprehensive Plan, WRIA 1 Watershed Management Plan, WRIA 1 Salmonid Recovery Plan, integrated floodplain management plan, and WRIA 1

Watershed Management Board multi-year work plan, as well as state water resources and water quality laws.

Policy 10F-4: Participate in the coordination of all local water and land management efforts, plans, and data to ensure adequate oversight of water quantity and quality issues.

Policy 10F-5: Support and facilitate the management of water resources for multiple instream and out-of-stream beneficial uses by coordinating with state and local agencies, tribal governments, and water management entities. While not serving as a direct water manager, Whatcom County will actively support water management efforts by providing regulatory oversight, facilitating stakeholder collaboration, and contributing technical and financial resources where appropriate. Implementation will include organizing regular coordination meetings, developing frameworks for information-sharing across agencies, and ensuring that county land-use and environmental policies align with regional water conservation and development goals. ~~while supporting the construction of new housing throughout the County (#31).~~ ~~"Manage water resources for multiple instream and out-of-stream beneficial uses, including instream flows set by the State Department of Ecology.~~

Policy 10F-6: Require the use of low-impact sustainable development strategies to ensure water quality and quantity. Strategies may include installing water catchment systems.(#32)

Policy 10F-~~7~~6: Actively promote and participate in education, research, and information opportunities that improve our understanding of the county's complex water resource systems. New information should be considered in the development and evaluation of management actions.

Policy 10F-~~8~~7: Pursue the most effective methods for protecting water quantity and quality, through both regulatory (e.g. zoning, enforcement, fines) and non-regulatory ~~approaches~~ (education, incentives, and technical/financial assistance) approaches. ~~Emphasis shall be placed on non-regulatory approaches where possible and effective.~~

Policy 10F-~~9~~8: Track the development of policies and regulations at the local, state, and federal level. Provide input to those regulations and policies as necessary to ensure that the interests of Whatcom County are considered.

Policy 10F-~~10~~9: In conjunction with all jurisdictions, develop and adopt programs to protect water quality and quantity within watersheds, aquifers, and marine waterbodies that cross jurisdictional boundaries.

Policy 10F-1110: Promote awareness and participation in management and protection efforts by individual citizens and the community as a whole.

Policy 10F-1211: Pursuant to ESSB 6091, Whatcom County will work through the Planning Unit and WRIA 1 Watershed Management Board and its established processes to address insufficient instream flows.update the WRIA 1 Watershed Management Plan, consistent with ESSB 6091, for approval by the Whatcom County Council by February 1, 2019. The updated plan shall include recommendations for projects and actions that will measure, protect, and enhance instream resources and improve watershed functions that support the recovery of threatened and endangered salmonids.

At a minimum, the watershed plan must include those actions determined to be necessary to offset potential impacts to instream flows associated with permit-exempt domestic water use. The highest priority recommendations must include replacing the quantity of consumptive water use during the same time as the impact and in the same basin or tributary. Lower priority projects include projects not in the same basin or tributary and projects that replace consumptive water supply impacts only during critical flow periods. The watershed plan may include projects that protect or improve instream resources without replacing the consumptive quantity of water where such projects are in addition to those actions determined to be necessary to offset potential consumptive impacts to instream flows associated with permit-exempt domestic water use.

Watershed plan recommendations may include, but are not limited to, acquiring senior water rights, water conservation, water reuse, stream gaging, groundwater monitoring, and developing natural and constructed infrastructure, which includes, but is not limited to, such projects as floodplain restoration, off-channel storage, and aquifer recharge. Qualifying projects must be specifically designed to enhance streamflows and not result in negative impacts to ecological functions or critical habitat.

Until the updated watershed plan is approved and rules are adopted, the County, in issuing building permits under RCW 19.27.097(1)(c) or approving subdivisions under chapter 58.17 RCW in WRIA 1 will comply with all of the specific requirements of ESSB 6091.

Policy 10F-1312: Subject to adequate funding and staffing resources, Eestablish a program for collecting and compiling data to monitor the effectiveness of Whatcom County water resource protection efforts to support adaptive management of regulatory and non-regulatory approaches.

Policy 10F-1413: Engage, as appropriate, the, WRIA 1 Watershed Management Board in review and recommendation of updates to Whatcom County regulations, plans, and programs that have implications for water resources.

Policy 10F-1514: Support assessments of water availability including groundwater modeling and cooperative planning, design, implementation, and monitoring of streamflow and other water resource restoration projects, including natural storage projects, through the WRIA 1 Watershed Management Board.

Surface Water and Groundwater

Goal 10G: **Protect and enhance Whatcom County's surface water and groundwater quality and quantity for current and future generations.**

Policy 10G-1: Manage surface water systems on a watershed basis.

Policy 10-2G: Coordinate efforts to bring all water users in Whatcom County into compliance with state and federal water laws, while advancing solutions that provide adequate water to support treaty rights, agriculture, drinking water, and other water needs.~~in a way that enhances stream flows, water quality, and fish and wildlife habitat while advocating for adequate water for existing agriculture~~.

Policy 10G-3: In conjunction with the public and appropriate local, state, Tribal, and federal jurisdictions, define, identify, and develop management strategies for watershed basins and subbasins that may require special protection. These areas may include aquifers, Critical Aquifer Recharge Areas~~ as defined under the Growth Management Act~~, Groundwater Management Areas, wellhead protection areas, and high priority watersheds such as those specified under WAC 400 (Local Planning and Management of Non-point Source Pollution), WRIA Watershed Management Planning, and under legislative policy direction (e.g. Nooksack Basin, floodplains of the Nooksack River and Nooksack Forks, Lake Whatcom, Lake Samish and Drayton Harbor).

Policy 10G-4: Management efforts should consider both water quality and quantity. Water quality efforts should help reduce the likelihood that potential contaminant sources will pollute water supplies and understand how water quality has changed over time. Water quantity efforts should include consideration and protection of recharge areas and potential effects on stream flow.

Policy 10G-5: Support the implementation of~~ local and state Watershed Management Plans, the Lower Nooksack Strategy~~, the Lake Whatcom Management Program, NPDES Phase II Permitting, and the WRIA 1Watershed Management plans~~Board Projects~~.

Policy 10G-6: Pursue the adoption and implementation of ground and/or surface water management plans and their integration into local comprehensive plans. Designate the Lake Whatcom, Birch Bay, and Lake Samish ~~Watersheds~~ watersheds as high priorities in this effort.

Policy 10G-7: Oppose the use of hydraulic fracturing in oil and gas wells (also known as "fracking") to avoid the potential degradation of water quality in aquifers and other groundwater.

Policy 10G-8: Monitor, prevent, and reduce the establishment of invasive species in Whatcom County waterbodies. Work across jurisdictions to implement the Aquatic Invasive Species program and enforce and penalize noncompliance. (#33)

Policy 10G-9: ~~Identify and/or update~~Maintain a publicly available inventory of wellhead protection areas and Critical Aquifer Recharge Areas and protect them through ~~incorporate into~~ the Critical Areas ~~Ordinance~~regulations regulations (#34). ~~This information should be available to the public.~~

Stormwater and Drainage

Goal 10H: ~~**Protect water resources and natural drainage systems by controlling the quality and quantity of stormwater runoff.**~~ **Protect, enhance, and restore Whatcom County's water resources and natural drainage systems by managing the quality and quantity of stormwater runoff, actively restoring freshwater and marine habitats, and advancing ecosystem functions critical to water quality and salmon recovery**

Policy 10H-1: Manage stormwater runoff to minimize surface water quality and quantity impacts and downstream impacts on channel morphology, property owners, and aquatic species and habitats.

Policy 10H-2: Maintain or enhance, when appropriate, natural drainage systems and natural water storage sites in order to better protect water quality, moderate water quantity, minimize environmental degradation, and reduce public costs. Utilize bioengineered stormwater solutions and vegetative buffers, update obsolete infrastructure, and implement overflow stormwater catchments county-wide (#35).

Policy 10H-3: Limit the alteration of natural drainage systems and natural water storage sites without mitigating measures. Such measures should not degrade water quality or fish and wildlife habitat and should not increase hazards to the community.

Policy 10H-4: Support the use by resource industries—such as agriculture, forestry, and mineral resource extraction—of best management

practices that minimize erosion and sedimentation, and significantly reduce pollutants.

Policy 10H-5: ~~Evaluate~~ Acknowledge the role of watersheds in the maintenance of water quality and quantity and determine what cumulative impacts development activity may have on watershed hydrology.

Policy 10H-6: ~~Develop~~ Maintain specific stormwater management programs for each drainage basin within the ~~c~~County's jurisdiction that may be impacted by urban levels of development. Recognize the Lake Whatcom ~~Watershed~~, Birch Bay, Lake Samish, and Drayton Harbor watersheds as high priorities in this effort. Coordinate efforts with the Lake Whatcom Policy Group, the various shellfish protection districts, and other watershed management entities.

Policy 10H-7: Establish, as a high priority, a stormwater system maintenance program that ensures that stormwater systems are adequately maintained and function at or near design capacity.

Policy 10H-8: ~~Create incentives for~~~~Strongly incentivize~~ Require the use of low-impact sustainable development strategies to ensure increased development does not lead to increased impermeable services and increased stormwater runoff. Minimize the amount of impervious surface ~~whenever practicable~~ by using natural engineering design methods such as the use of open, grassed, street swales~~,~~ and rain gardens instead of curbs and gutters and vegetative buffers to reduce harmful stormwater runoff (#36). Where feasible, encourage alternate surfacing options and other techniques associated with Low Impact Development ~~(see Glossary)~~.

Policy 10H-9: ~~Develop and~~Continue to administer stormwater management standards as required by the NPDES Phase II Permit.

Policy 10H-10: ~~Develop and administer regulations and incentives such that there is no net loss of ecological functions and values of regulated wetlands and fish and wildlife habitats.~~ Continue to administer the critical areas regulations and incentives to ~~achieve~~encourage ~~a net gain in~~ a net gain ~~no net loss~~ of ecological function~~s~~ and value~~s~~(#37) of regulated wetlands and fish and wildlife habitats. Restoration efforts and proactive enhancements will be prioritized to support water quality improvements, habitat connectivity, and resilience against climate impacts.

Policy 10H-11: Place a high priority on integrating impervious surface reduction incentives into policies, regulations, and standards.

Policy 10H-12: Continue to ~~D~~develop and implement comprehensive stormwater management programs and strategies designed to address runoff from all private and public developments and facilities within regulated and sensitive watersheds.

1. Implement the Western Washington Phase II Municipal Stormwater Permit as part of the National Pollutant Discharge Elimination System (NPDES) Program. Incorporate watershed considerations into the development of a comprehensive stormwater management strategy for designated areas.
2. Review Stormwater Special Districts Standards, Watershed Protection Districts, and other related codes that address runoff treatment from potentially polluting surfaces for their applicability to other sensitive watersheds with the Technical Advisory Committee and other appropriate agencies. Coordinate efforts for ongoing monitoring and evaluation within the sensitive watersheds and NPDES areas.
3. ~~Amend~~ Maintain subdivision, zoning, and other land use regulations and design standards to encourage land use activities that minimize the amount of impervious surface.
4. Identify and implement a long-term funding source to provide for water resource protection services, including non-point source identification and enforcement of applicable county regulations.
5. Focus on the Lake Whatcom watershed as a high priority in developing a stormwater management program, including inspections of private stormwater systems (#38). Develop a stormwater management plan that achieves a uniform level of protection throughout the Lake Whatcom watershed. Ensure coordination and communication with the public and affected jurisdictions, such as the Lake Whatcom Water and Sewer District, the Sudden Valley Community Association, and the City of Bellingham.
6. Ensure ~~existing~~ stormwater standards are adequately enforced within Stormwater Special Districts, Watershed Protection Districts, and the NPDES areas.
7. Prioritize stormwater polluting areas and develop retrofits for areas most likely to impact sensitive waters.

Policy 10H-13: Develop cooperative relationships with institutions with technical experience in toxics monitoring such as the NW Indian College, WWU, and non-governmental organizations to help monitor surface water and other possible sources of toxic pollution. Monitor stormwater discharge and septic systems along marine shorelines and within watersheds to prevent declines in water quality. (#39)

Policy 10H-~~14~~13: Subject to adequate funding and staffing resources, establish a program for collecting and compiling data to monitor effectiveness of the Critical Areas regulations and incentives to

support adaptive management of regulatory and non-regulatory approaches.

Policy 10H-~~15~~14: Adopt and implement tree canopy goals and policies to support stormwater management in the NPDES area by December 31, 2028 per requirement S5.C1.c.iii of the NPDES Phase II Permit.

Water Conservation

Goal 10-I: **Support water conservation, reclamation, reuse ~~measures~~, natural storage options, and education as essential strategies to ensure sufficient water supplies, improve instream flows, and support the recovery of salmon populations ~~as a means to ensure sufficient water supplies in the future.~~**

Policy 10I-1: Support and assist water users in the development of cost-effective means of improving efficiency of water use.

Policy 10I-2: Support efforts to establish and protect sustainable water supplies to meet existing and future demands for water in the county.

Policy 10I-3: Develop and implement plans to comply with the Department of Ecology's instream flow and water management rules and water resources management programs including efforts by Ecology in water resources management and compliance and associated efforts (i.e., data collection, funding, etc.).

Policy 10I-4: Coordinate local water and land management efforts, plans, and data to ensure adequate oversight of water quality and quantity issues.

Policy 10I-5: ~~Encourage water users and purveyors to quantify water use and make the data publicly available to promote conservationQuantify water use to promote conservation.~~ Require water users and purveyors to quantify water use and make the data publicly available to promote conservation. (#40)

Policy 10I-6: Use water use data to encourage conservation and maintain availability of water for agriculture and instream flow.

Policy 10I-7: Encourage the Department of Ecology to provide flexibility in the application of the water relinquishment rule simultaneous with establishing a water bank/water exchange program in Whatcom County in cooperation with stakeholders.

Policy 10I-8: Promote natural water storage projects and forest management practices focused on environmental services and ecological functions.

Policy 10I-9: Support efforts to improve irrigation efficiency.

Lake Whatcom Watershed

Goal 10-J: **Prioritize the Lake Whatcom watershed as an area in which to minimize development, repair existing stormwater problems (specifically for phosphorus), and ensure forestry practices do not negatively impact water quality. Provide sufficient funding and support to be successful.**

Policy 10J-1: Work with property owners to find acceptable development solutions at lower overall densities than the present zoning allows.

Policy 10J-2: ~~Develop and~~Continue to implement the Lake Whatcom Stormwater Utility ~~the fair and equitable funding mechanisms called for in the 2008 Lake Whatcom Comprehensive Stormwater Plan and Final Lake Whatcom Capital Project Plan~~ to support lake water quality protections to meet the requirements set forth in the Lake Whatcom TMDL. ~~by 2018 for Lake Whatcom.~~

Policy 10J-3: Recognize that all users of Lake Whatcom water have an interest in the resource and should share in the cost of its protection.

Policy 10J-4: Work cooperatively with the City of Bellingham, the Lake Whatcom Water and Sewer District, and applicable associations and organizations to identify, review, and, as appropriate, recommend changes to existing monitoring programs to better improve lake water quality.

Policy 10J-5: Evaluate and pursue, as appropriate, the use of incentives to encourage voluntary lot consolidation, transfer or purchase of development rights, current use taxation, and participation in open space conservation programs.

Policy 10J-6: Do not allow density bonuses within the Lake Whatcom Watershed.

Policy 10J-7: Work cooperatively with the City of Bellingham and the Lake Whatcom Water and Sewer District to develop and track benchmarks to determine: the effectiveness of management options; when goals have been achieved; and/or when additional actions are necessary.

Policy 10J-8: Continue to develop and refine structural and non-structural best management practices (BMPs), both voluntary and required, to minimize development impacts within the Lake Whatcom watershed.

Policy 10J-9: Update County phosphorus neutral development code in the Lake Whatcom watershed, with a goal of meeting or exceeding the standards set by the corresponding City of Bellingham policies. (#41)

Policy 10J-10: Ensure efficacy of BMPs designed to minimize development impacts within the Lake Whatcom watershed through regular

monitoring and inspections of public and private stormwater systems. (#42)

Policy 10J-119: ~~Work to keep~~ Support acquisition and retention of publicly-owned forest lands within the Lake Whatcom watershed ~~in public ownership~~, and support managing forestry on these lands consistent with the Lake Whatcom Forest Management Plan and (#43) in a manner that minimizes sediment and phosphorus yields from streams, and is consistent with Best Available Science (BAS) data, in order to protect and enhance water quality.

Policy 10J-1210: Encourage the location of public services, such as schools, libraries, parks/open space, and post offices within Sudden Valley in an attempt to reduce the vehicle miles traveled within the watershed.

Policy 10J-1311: Continue to work with Bellingham and Lake Whatcom Water and Sewer District to protect and manage the Lake Whatcom watershed in accordance with the 1998 jointly ~~–~~adopted interlocal agreement. Focus on continued implementation of the 5-Year Work Plans of the Lake Whatcom Management Program. In addition, work with the affected jurisdictions and secure funding for programs that protect and enhance water quality.

Policy 10J-1412: Review and modify (as needed) the current development review process for projects in the Lake Whatcom Watershed to ensure coordination with other jurisdictions to streamline regulations that improve and protect water quality.

Policy 10J-1513: The existence of sewer lines in the Rural and Rural Forestry comprehensive plan designations will not be used to justify rezoning property in the Lake Whatcom watershed to allow higher density land uses.

Policy 10J-1614: Existing Urban Growth Areas shall not be expanded nor new Urban Growth Areas designated within the Lake Whatcom Watershed, and rezones that allow greater residential densities will not be allowed.

Ecosystems

Introduction

Ecological systems, or ecosystems, refer to the natural systems that have developed within ~~the~~ a geologic and geographic setting ~~of Whatcom County~~. Whatcom County contains a significant number of distinct ecosystem types, with associated soil types, fish, wildlife, and plant species, as well as many other living organisms. This biodiversity has evolved and adapted according to the specific physical and climatic conditions of the county (Map 10-2, Map 10-3). Ecosystem goals and policies are intended to provide guidance to ~~c~~County government as it assists people ~~to~~ in manag~~e~~ing and protect~~ing~~ these ecosystems. Additionally~~,~~ they ensure other benefits are maintained far into the future.

Background Summary

Whatcom County encompasses ~~provides~~ ~~contains~~ a wide variety of natural habitats that support and shelter a diverse array of fish and wildlife species. The county's wildlife is particularly varied and abundant when compared to many other areas of Washington State. ~~There are a number of factors that have contributed to this: abundant water resources, rich soils, mild climate conditions, and a moderate degree of urbanization are among the most important.~~ Among the habitats of importance to fish and wildlife are the following:

- Rivers, floodplains, wetlands, lakes, and streams;
- nearshore, intertidal, estuarine habitats, and marine habitats including, but not limited to, kelp and eelgrass beds;
- riparian areas and other travel corridors;
- snags and downed logs;
- forested habitats in a variety of successional stages;
- caves, cliffs, rocky balds, and talus ~~slopes~~;
- grasslands and cultivated fields; and,
- thickets and fence rows.

Aquatic habitats include intertidal zone through the marine nearshore, and open water of the Salish Sea rivers, streams, wetlands, ponds, lakes, and their riparian borders. Together, these habitats are essential to Whatcom County's fish and wildlife. Twenty-six species of fish—including ten different species of native salmonids (salmon, trout, and char) that are ~~twelve~~ economically and culturally important ~~stocks of salmon and trout~~ inhabit the marine nearshore and fresh water habitats of ~~in~~ Whatcom County for all or part of their life cycles. Healthy flowing streams and rivers, as well as connected off-channel wetland habitats, are essential to the survival of the majority of these fish. ~~Connected Wetlands and ponds, especially beaver ponds, provide optimal habitats for rearing and over-wintering of young fish, particularly juvenile cCoho salmon and rainbow and cutthroat trout juveniles.~~

Most wildlife species regularly use aquatic and riparian habitats for breeding, feeding, shelter, and migratory activities. Of this large grouping, over half are dependent upon wetland habitats at some point in their life cycles, and would decline or disappear in the~~ir~~ absence ~~of wetlands~~. Wetlands also contain unique vegetative communities that ~~can~~ harbor many species of rare and unusual plants.

Fish and Wildlife Populations and Habitat

Optimum habitat for Pacific Northwest salmon and other fish is one that resembles the riparian landscape of pre-settlement times: ~~braided~~ streams wandering freely through nearly continuous forest; trees overhanging and partly fallen into streams; stream beds with abundant logs, step waterfalls, pools, and cutbanks; and vegetated marine and estuarine communities. Habitat degradation among other factors has led to salmon declines and the listing of early Chinook, bull trout, and steelhead populations on the Endangered Species Act. In most cases, it is not realistic to fully return to that state. However, measures can be taken to achieve properly functioning conditions, salmon recovery goals and habitat targets by implementing the WRIA 1

Salmonid Recovery Plan. ~~retain or regain those features that provide the minimum requirements of a viable fishery.~~

The best habitat for native wildlife includes native plants and clean water, which are more closely matched to local soils, climate, and wildlife. They provide the right kinds of food, shelter, and diversity needed by wildlife. Native plants frequently need less watering, spraying, pruning, fertilizing, or other maintenance than do exotic or imported plants. Loss of native vegetation through conversion to ornamental vegetation and non-native or invasive species can result in loss of wildlife habitat, increased competition to native wildlife from introduced species, such as starlings, and increased maintenance needs. Loss of native vegetation also can occur through invasions of non-native species, such as the spread of *Spartina*, which can drastically displace important native eelgrass and mudflat communities. Honoring treaty rights includes supporting protection and restoration of treaty resources sufficient to support meaningful harvest and collection, including salmon, shellfish, wildlife, and plant species.

Salmon Recovery Program

The decline of salmonids throughout Washington and the Pacific Northwest over the past century is well established. Since 1991, numerous evolutionarily significant units (ESUs) of Pacific salmonids have been listed as endangered or threatened under the Endangered Species Act (ESA), regionally including those of chinook, coho, chum, sockeye, and steelhead. Decline in wild salmonid ~~abundances~~ populations have been attributed to widespread loss and degradation of habitat and habitat connectivity~~,~~ due to hydropower, residential and urban development, agriculture, forestry, and over fishing~~, and hatchery production~~.

In the Nooksack basin, ~~abundances of~~ several salmonid stocks have diminished substantially from historical levels. The declines in local salmonid stocks, especially Chinook salmon, have had profound economic, cultural, and social impacts on the greater WRIA 1 community. Direct impacts include reduced jobs and income for commercial fisherman, elimination or severe curtailment of tribal and subsistence catch, and loss of ~~tourism associated with~~ recreational fishing opportunity for the community and visitors alike. In addition, ESA listings impose constraints on the activities of local and tribal governments, businesses, the agricultural community, and ~~citizens~~the public the public, all of whom must seek to avoid or minimize ~~the~~ the take of listed species as well as limiting fishing opportunities as far away as southeast Alaska in order to protect these weak stocks. Nonetheless, salmon remain an integral part of the natural, cultural and social landscape of Whatcom County and the Nooksack River Watershed. ~~Recent~~ WwWatershed recovery planning and restoration efforts by federal, state, local, and tribal governments, non-profit organizations, businesses, and ~~private citizens~~ individuals demonstrate a commitment to salmon recovery in WRIA 1.

The WRIA 1 Salmon Recovery Program is (#44) coordinated through the WRIA 1 Watershed Management Board ~~is a multi-government planning effort~~ with a WRIA-wide scope to address salmon recovery and protection of ESA and non-ESA listed salmonids.

WRIA 1 Salmon~~id~~ Recovery Program~~Plan~~

The ultimate goal for salmon recovery in WRIA 1 is to recover self-sustaining salmonid runs to harvestable levels through the restoration of healthy rivers and natural stream, river, estuarine, and nearshore marine processes; careful use of hatcheries; and responsible harvest, with the active participation and support of local landowners, businesses, and the larger community. The purpose of the 2005 *WRIA 1 Salmonid Recovery Plan* and its associated implementation strategies is to identify the actions necessary to recover WRIA 1 salmonid populations, especially listed species, and to outline the framework for implementation of recommended actions that have been agreed to by local, state, tribal, and federal governments and stakeholders in WRIA 1. In the near term, the objectives are to:

1. Focus and prioritize salmon recovery efforts to maximize benefit to the two Nooksack early chinook populations;
2. Address late-timed Chinook through adaptive management, focusing in the near-term on identifying hatchery versus naturally-produced population components;
3. Facilitate recovery of WRIA 1 bull trout and steelhead by implementing actions with mutual benefit to early chinook, bull trout, and steelhead~~,~~ by removing fish passage barriers in presumed bull trout and steelhead spawning and rearing habitats in throughout WRIA 1~~the upper Nooksack River watershed~~; and
4. Address other salmonid populations by (a) protecting and restoring WRIA 1 salmonid habitats and habitat-forming processes through regulatory and incentive~~–~~based programs; and (b) encouraging and supporting voluntary actions that benefit other WRIA 1 salmonid populations without diverting attention from early chinook recovery.

Focusing efforts on early chinook is consistent with regional salmon recovery~~;~~, current abundance and productivity for the two populations is very low and recovery of both populations is critical to delisting and recovery of the Puget Sound Evolutionarily Significant Unit (ESU) for Chinook salmon.

WRIA 1Watershed Management Board~~Salmon Recovery Board (SRB)~~(WMB)

Development and adoption of the WRIA 1 Salmonid Recovery Plan was guided by the WRIA 1 Watershed Management ~~Salmon Recovery~~ Board whose membership includes the County Executive, ~~Bellingham Mayor,~~ Mayors of the ~~Small~~ seven Cities of Whatcom County, Commissioner of Public Utility District No. 1 of Whatcom County, the regional director of the Washington Department of Fish and Wildlife, and policy representatives from ~~the~~ Lummi Nation and Nooksack Indian Tribe. In 2016, the Salmon Recovery Board was incorporated into the WRIA 1 Watershed Management Board to provide coordinated oversight of both salmon recovery and watershed plans implementation.

The WRIA 1 Salmonid Recovery Plan (2005), a chapter of the Puget Sound Salmon Recovery Plan, guides restoration in the Nooksack River and adjacent watersheds. This plan was developed in partnership with ~~the~~ Nooksack Tribe, Lummi Nation,

Washington Department of Fish and Wildlife, Bellingham, Whatcom County Government, ~~and~~ the small cities of Whatcom County, and a ~~citizen~~ community advisory committee. Chinook salmon populations (listed as threatened with extinction under the Federal Endangered Species Act) are prioritized, yet the plan also provides the template for recovery of threatened steelhead and bull trout and the other salmon and trout populations native to Whatcom County. Data collection and updates to plan sections are ongoing since initial plan adoption and guide adaptive management of restoration project identification, implementation and effectiveness monitoring. The 2005 plan is being updated ~~and will be completed in 2025~~ along with an updated 10-year implementation strategy.

~~The salmon plan was developed in parallel with the WRIA 1 Watershed Management Plan.~~ Salmon habitat is intricately linked to watershed management; salmon recovery will be most successful when fish habitat objectives are carefully coordinated with watershed management objectives. ~~I~~ (#45) Whatcom County's responsibilities in implementing the salmon recovery plan are focused in 3 primary areas: integrated floodplain management (integrate salmon recovery into flood hazard management) through the FLIP planning process, restoring fish passage under County roads consistent with the Whatcom County Culvert MOA, and managing land use through regulations and planning. Monitoring and adaptively managing work in these areas, in coordination with the WRIA 1 Watershed Management Board, is important to ensure effectiveness.~~ntegrating salmon recovery with flood hazard management, and restoring fish passage under County roads are wo primary areas of focus.~~

Marine Resources Management

Marine habitats include all saltwater bodies and their shorelines, kelp and macro-algae beds, eelgrass meadows, salt marshes, beaches, and mudflats. These habitats play a vital role in the health of the local environment, as well as of the broader Puget Sound region. They provide spawning, rearing, and feeding grounds for a wide variety of marine life, as well as refuge for juvenile and adult fish, birds, and shellfish. The vegetation on back-shore marshes and within estuaries buffers adjacent upland areas by absorbing wave energy and slowing erosion.

Symptoms of ecosystem stress include: declining stocks of salmon, bottom-fish, and forage fish; closures of recreational and commercial shellfish beds; degradation and losses of eelgrass beds, kelp forests, and other marine habitats; and dwindling populations of seabirds and marine mammals.

The Northwest Straits Marine Conservation Initiative was authorized by Congress in 1998. The Initiative established the Northwest Straits Commission and Marine Resources Committees (MRCs) in seven western Washington counties, including Whatcom County. The MRCs' main purpose is to guide local communities, using ~~up-to-date information~~Best Available Science and scientific expertise, to achieve the important goals of resource conservation and habitat protection within the Northwest Straits. The Whatcom County MRC acts as an advisory committee to the Whatcom County Council.

Shellfish Recovery[4]

Many of the marine waterbodies in Whatcom County support natural and cultured bivalve shellfish, including oysters and many species of clams. The warm, nutrient-rich tide flats in and around Lummi, Portage, and Birch Bays; Drayton Harbor; and Eliza and Lummi Islands represent unique water resources in this regard. Commercial shellfish growers, recreational clam and oyster harvesters, and Native Americans have used this resource for many years. It is an important part of our community's heritage. These shellfish-growing ecosystems not only provide valuable resources but also play a crucial role in maintaining water quality by filtering pollutants, further highlighting the need to steward and support these resources as their role supports additional blue economies.

Our ability to grow and harvest shellfish ~~that is~~ safe for human consumption is directly linked to surface water quality and the influence it has on marine waters. The primary measure of water quality for shellfish harvesting is fecal bacterial contamination. There are many potential sources of fecal bacteria, such as human waste,~~municipal sewage treatment plants, on-site sewage systems~~ boat waste, farm animals, pets, and wildlife.

Since 1995, valuable shellfish beds in Whatcom County have had harvest areas downgraded ~~Portage Bay and Drayton Harbor have been downgraded~~ (harvest prohibited) due to non-point fecal bacteria pollution. RCW Chapter 90.72 requires that the county legislative authority create a shellfish protection district within 180 days after the Washington State Department of Health closes or downgrades a shellfish growing area due to a degradation of water quality. Whatcom County has three shellfish protection districts established to protect and restore shellfish growing areas in Drayton Harbor, Portage Bay (Nooksack River watershed), and Birch Bay. Birch Bay is important to the Nooksack Tribe for shellfish harvesting.

Each shellfish protection district has a ~~citizen~~ community (#46) advisory committee who provides recommendations to County Council on actions and operations relating to the restoration of water quality in their respective watersheds. Shellfish Recovery Plans for each district outline the primary sources of bacteria and recommended actions to improve water quality. ~~:~~

Whatcom County's Pollution Identification and Correction (PIC) Program focuses on finding and eliminating sources of bacteria pollution in these watersheds as an important component of shellfish recovery.

~~*Shellfish Protection Advisory Boards*~~

~~Whatcom County has three Shellfish Protection District Advisory Committees, one for each of the Shellfish Protection Districts: Birch Bay, Drayton Harbor, and Portage Bay. Each advises the County Council on proposed actions and operations relating to the restoration of water quality in their respective watersheds.~~

~~*Shellfish Recovery Plans*~~

- ~~Drayton Harbor Shellfish Recovery Plan (2007) and Protection Plan (2024)~~

[4] For more info see https://www.whatcomcounty.us/1101/Shellfish-Protection-District

- ~~Portage Bay Shellfish Recovery Plan (2014), Portage Bay Initial Closure Response Strategy (1998)~~
- ~~Birch Bay Initial Closure Response Strategy (2009)~~

~~*Pertinent Documents*~~

- ~~Whatcom Marine Resources Committee 2011 – 2015 Strategic Plan (2010).~~
- ~~This document outlines the MRC's mission, vision, values, goals, objectives, and strategies for achieving them.~~

Issues, Goals, and Policies

General – Ecosystems

Development and urbanization of the land base have and may continue to result in the degradation and reduction of ecosystem functions. Wetlands and estuaries continue to be lost incrementally. Streams and their adjacent riparian habitat are affected by land clearing, ditching, erosion, and road building. Lakeshore development degrades the foreshore environment for waterfowl and other species, as well as negatively affecting water quality. It is estimated that Washington has also lost approximately one-third of its historic eelgrass beds from a variety of causes, including dredging, shading, and filling. Large-diameter snags and downed logs, an essential feature for dozens of wildlife species, are lost during clearing or intensive forest management. Forested habitats are lost to a number of development processes including urbanization, agriculture, increased rural/~~–~~suburban housing density, and timber harvesting. The delicate environment of cliffs and caves may be affected by housing development, mining, and other activities. Conversely, grasslands, thickets, fields, and fence rows are habitats largely provided and enhanced by human activities, and are thus fairly abundant and stable within the developing county. The existence of farms, in particular, has contributed to an abundance of these more open, pastoral habitats.

Many stream systems in Whatcom County have been altered by agriculture, forestry, development, and flood control practices, contributing to low stream flows, fisheries loss, water pollution, sedimentation and other problems. These impacts can directly affect the fish~~eries~~ resources by depositing silt and debris into spawning beds~~,~~ by removing trees that shade and cool the water, loss of native bank cover through bank armoring that in turn interferes ~~, interfering~~ with the recruitment and establishment of large ~~instream~~ woody debris (LWD) instream (#47), ~~by~~ obstructing fish passage with culverts~~, and~~ roads and levees, ~~by~~ altering natural channels through filling, bank hardening, and channelizing. In addition, the physical processes that create functional habitats for fish life stages are altered by increasing flows through stormwater runoff or consuming water volume for ~~other~~ out-of-stream uses.

Finally, a healthy and functioning ecosystem, including forests, floodplains, wetlands, fish, wildlife, and native plants they harbor, is an identified resource. A healthy ecosystem ~~is necessary as it~~ supports diverse and abundant wildlife, fish, and plant populations~~, and is necessary~~. The gathering of fish, game, and other natural resources forms a central aspect of many cultures in Whatcom County. Salmon,

shellfish, wildlife, and plant species are important in honoring treaty rights. The mere presence of these natural resources constitutes a community amenity that is a substantial part of our local economic base.

Goal 10K: **Protect and enhance ecosystems, which provide economic, ecological, aesthetic, and cultural benefit.**

Policy 10K-1: Define and identify species, habitats, and habitat features important to a balanced and sustainable web of life, biodiversity, and especially important to fish, native plants, and wildlife. Create, and regularly update an Ecosystem Report.

Policy 10K-2: ~~Develop and adopt programs that protect habitats essential to the conservation of species that have been identified as endangered, threatened, or sensitive by the state or federal government as well as habitats identified as necessary in the Ecosystem Report. These programs should maintain and encourage restoration of habitat conditions for listed species of concern, as well as habitats identified as having significant biodiversity, connectivity, and other important features and functions.~~Develop and adopt programs that protect and restore habitats essential for conservation in areas identified as critical for endangered, threatened, or sensitive species. Prioritize currently undeveloped areas with high ecological value or potential for future development to ensure the preservation of habitat connectivity and resilience. Actions that provide for restoration opportunities and prevent future damage to riparian and stream habitats may include acquisition, conservation easements, and reduced development intensity.

Policy 10K-3: ~~Develop incentives for protection of environmentally fragile areas or critical plant and wildlife habitats as well as habitats that provide connectivity (corridors).~~Create incentives and funding mechanisms to support the acquisition and preservation of environmentally fragile areas, critical plant and wildlife habitats, and habitat corridors. Emphasize conservation easements and purchase of development rights in high-risk areas for future development, ensuring the long-term protection of riparian and stream habitats.

Policy 10K-4: Where feasible, incorporate fish and wildlife habitats into public capital improvement projects.

Policy 10K-5: Provide measures to mitigate negative water quality and quantity impacts from both public and private alterations of natural drainage systems. ~~Implement~~Support and incentivize voluntary measures that go beyond mitigating negative impacts by actively restoring and enhancing water quality and habitat functions in riparian and stream systems affected by both public and private alternations. Restoration efforts should focus on reestablishing

natural flow regimes, increasing native vegetation, and improving aquatic habitat to support biodiversity and ecological resilience.

Policy 10K-6: ~~Consider~~ Prioritize (#48) sensitive fish, shellfish, and wildlife species and their habitats when establishing zoning densities and patterns.

Policy 10K-7: Promote voluntary fish and wildlife habitat enhancement projects through educational and incentive programs, such as purchase of development rights or habitat conservation easements. These projects, which can be done by individuals, organizations, and businesses, will buffer and expand fish, plant, and wildlife habitat.

Policy 10K-8: Discourage development within and adjacent to critical areas and along shorelines that support feeder bluffs or impact shoreline processes. ~~Give careful consideration to the siting of industrial, commercial, residential, and other land use designations when located near important marine, terrestrial, or other critical habitats.~~ Give careful consideration to the siting of industrial, commercial, residential, and other land use designations when located near important marine, terrestrial, or other critical habitats. Ensure development does not degrade water quality and aquatic resources, while also considering the cumulative impacts of development. (#49)

Policy 10K-9: Reevaluate and strengthen the SEPA cumulative impacts analysis, especially when considering the impacts of multiple developments along the same shoreline. (#50)

Policy 10K-10~~9~~: Protect, retain, and enhance the beneficial uses and functions of streams, ~~and~~ rivers, and aquifers. ~~Define and identify the beneficial uses and functions of streams and rivers, including wildlife and fisheries habitat, water quality, open space, aesthetics, and recreation.~~ Coordinate with the WRIA 1 Watershed Management Board teams that have a role in facilitating implementation of WRIA 1 programs including watershed management and salmon recovery as outlined in the 2016 Interlocal Agreement.

Policy 10K-11~~10~~: Develop integrated floodplain management actions that incorporate flood risk reduction and salmon habitat restoration. ~~Protect and enhance ecosystem functions when flood hazard management measures are used.~~

Policy 10K-12~~11~~: Support FLIP for identifying floodplain management actions and r~~R~~egulate the operation of river sediment management~~gravel extraction~~ activities in such a manner so as to provide long-term protection of fish and wildlife habitat and water quality.

Policy 10K-13~~12~~: Ensure the design and development of ~~residential and industrial development~~ land avoids or minimizes disturbance to marine shorelines, rivers, streams, floodplains, and functioning riparian

areas to preserve their natural function, processes, and ecosystem benefits. (#51)

Policy 10K-1413: In making land use decisions that may impact fish habitat, Eevaluate the full value of the fishery, including its cultural and economic value; ,in land use decisions that may impact that fishery. Unavoidable impacts to an individual habitat or fishery shall be mitigated.

Policy 10K-1514: Continue to consider the value of wildlife populations for which habitat conservation areas have been identified in PDS's wildlife habitat mapping, their associated habitats, and connectivity in land use planning that may impact them. This is not intended to require landowners to pay for any additional studies.

Policy 10K-1615: Mitigation to Habitat Conservation Areas should be tracked and monitored to ensure no net loss to natural area or function.

Policy 10K-1716: Habitat Conservation Areas, to obtain Subject to adequate funding and staff resources, obtain a baseline of current conditions in Habitat Conservation Areas and monitor them so as to ensure no net loss and avoidance of cumulative impacts.

Policy 10K-1817: Apply a sequence of "avoid, minimize, mitigate" to public and private alterations of natural drainage systems to reduce or eliminate negative water quality and quantity impacts and minimize the need for mitigation.

Policy 10K-1918: Support WRIA 1 Watershed Management Board monitoring of salmon habitat status and trends and implementation status and effectiveness of salmon recovery actions, and monitor County salmon recovery actions (i.e., integrated floodplain management, land use regulations and planning, fish passage restoration).

Fish and Wildlife Populations and Habitat

Goal 10L: **Protect and enhance ecosystems that support native fish and wildlife populations and habitat. Provide sufficient funding and support to be successful. (#52)**

Policy 10L-1: Strongly discourage any activity that might cause significant degradation of the fishery resource or habitat. Discourage activities that might degrade a salmon habitat as specified in the salmon recovery plan habitat status and trend indicators, with a focus on protecting freshwater, estuarine, and nearshore habitats for early Chinook and other salmonids.

Policy 10L-2: Support the protection and enhancement of significant fish spawning and rearing habitat, food resources, refugia (shelter), and longitudinal and lateral connectivity of habitats travel passages in riverine, estuary nearshore environments, fish migratory corridors along marine shorelines, and eelgrass and kelp beds. (#53)

Policy 10L-3: Establish non-regulatory mechanisms and incentives for development that accommodates the habitat needs of fish and wildlife and encourages good stewardship practices.

Policy 10L-4: Support protection and enhancement of fish and wildlife habitat through site design in new development.

Policy 10L-5: Native vegetation and soils on streambanks and shorelines should not be disturbed ~~as little as possible~~. In situations where re-vegetation is necessary to mitigate and (#54) restore streambank or shoreline stability and provide shading, site-specific native plants should be used. Retention of vegetated riparian areas on all lake and marine shorelines shall also be required~~encouraged~~.

Policy 10L-6: ~~Discourage shoreline armoring.~~ Shoreline armoring falls under the Shoreline Management Program and is only allowed in very limited circumstances. Restrict new hard armoring and require soft shore techniques or other less impactful solutions for new development and when armor is degraded and in need of replacement.(#55) Use resources such as the Shore Friendly Program (shorefriendly.org) that provide guidance on options for protection shoreline properties while promoting healthy shorelines along with ~~Instead, encouraginge~~requiring setbacks from the shoreline and natural or bio-engineering solutions such as planting native vegetation, engineered log jams/LWD, wing dams, and beach nourishment along eroding banks to address stream and shoreline bank erosion problems. Riparian buffers should be replanted with suitable native vegetation as a part of all bank stabilization projects.

Policy 10L-7: Update mapping of shoreline armoring and create a formal process for determining permit compliance. (#56)

Policy 10L-8: Ensure that amendments to the Shoreline Master Program and Critical Areas Ordinances protect marine shorelines. Reduce existing shoreline armoring, prevent expansion that would impact forage fish spawning and salmonid migratory pathways, and seek ways to re-establish or widen intertidal corridors for migrating juvenile salmon that have been lost due to shoreline armoring. (#57)

Policy 10L-9~~7~~: Encourage native vegetation and soil retention and plantings that provide or maintain the beneficial uses and functions of streams, rivers, lakes, and marine shorelines.

Policy 10L-10~~8~~: Maintain and encourage restoration of habitat functions for threatened and endangered fish species and to reduce threats to other species.

Policy 10L-11~~9~~: Through the WRIA 1 Salmonid Recovery Plan, establish program goals (i.e., salmon habitat goals) and, subject to adequate

funding and staffing resources, incorporate ~~Use~~ Best Available Science into a monitoring and adaptive management program to ensure goals are met and to inform ~~the creation of~~updating and maintaining regulations to mitigate adverse impacts of development adjacent to rivers, streams, and marine shorelines.

Policy 10L-12~~10~~: Encourage landowners to ~~voluntarily~~ protect surface water quality with filter strips or other appropriate water cleansing mechanisms installed between lawns, landscaping, livestock pens, or agricultural fields and water~~-~~bodies.

Policy 10L-13~~11~~: Subject to adequate funding and staffing resources, f~~F~~ormulate~~, and~~ implement and maintain a comprehensive, landscape-based, environmental management program to protect fish and wildlife. The program should include the following:

1. Formulate an administrative approach to the review of development and planning proposals that consider natural system policies;
2. Investigate~~, and~~ develop, and seek funding ~~programs~~ for the acquisition and restoration of important fish and wildlife habitat areas;
3. Develop and enter into cooperative agreements with cities, State~~, and~~ Federal, and Tribal agencies and neighboring jurisdictions, including jurisdictions in British Columbia, (#58) to identify and protect ecosystems;
4. Identify and map important habitat corridors and connectivity throughout the county; and,
5. Support the development of educational materials ~~which~~ ~~that~~ list, describe, and characterize the appropriate use of native vegetation to enhance ecosystem functions in Whatcom County.

Policy 10L-14~~12~~: ~~Consider establishing~~In coordination with FLIP, consider establishing formal channel migration zones ~~s~~ ~~meander limits~~ for the Nooksack River, precluding additional development within ~~this~~ these zones, actively pursue voluntary acquisitions to promote flood risk reduction and riverine and marine shoreline restoration~~and promote the River and Flood property acquisition program within these areas~~. Ensure any levee setbacks provide more flood storage and improve natural river processes and meandering, riparian buffers, and salmon habitat. (#59)

Policy 10L-15: During and after emergency flood repairs, ensure that any repair is fully mitigated to reduce impacts to salmon habitat. (#60)

Policy 10L-16~~13~~: Diligently work to prevent and/or reduce the establishment and/or spread of invasive species.

Policy 10L-17~~14~~: As a member of the WRIA 1 Watershed Management Board, the County should adopt salmon recovery plan habitat goals and monitor and adaptively manage county programs to meet those goals. ~~Actively participate in and support WRIA 1 Salmon Recovery efforts to return self-sustaining salmonid runs to harvestable levels through: the restoration of healthy rivers, marine shorelines, and natural processes; the careful use of hatcheries; and responsible harvest.~~

Policy 10L-18~~15~~: Participate in protecti~~o~~ng and improving~~ement of~~ biodiversity.

Policy 10L-19~~16~~: Consider establishing important habitat areas as sending areas after creating a voluntary, workable transfer of development rights (TDR) program.

Policy 10L-20~~17~~: Subject to adequate funding and staffing resources, mitigation of wetlands and Habitat Conservation Areas should be ~~reviewed and tracked~~ monitored over time to ensure no net loss of ~~wetland~~ function.

Policy 10L-21~~18~~: Subject to adequate funding and staffing resources, a~~A~~ baseline inventory of wetland~~s~~ and Habitat Conservation Areas identification and function should be made to track and prevent net loss and avoid cumulative impacts.

Policy 10L-22~~19~~: ~~The County will s~~Support the ~~work of the~~ Salmon Fishery~~ies~~ Co-managers (Lummi Nation, Nooksack Indian Tribe, and the State Department of Fish and Wildlife) hatchery and fisheries harvest goals ~~and stakeholders to establish a sustainable salmon harvest goal~~ for the Nooksack Basin.

Policy 10l-23~~20~~: Subject to adequate funding, maintain and implement a fish barrier removal program to improve fish passage under County roads and other infrastructure in cooperation with the Salmon Fishery Co-Managers.

Policy 10L-24~~21~~: Support streamlined permitting of salmon habitat restoration projects (including floodplain reconnection) to minimum necessary to uphold federal mandates (e.g., National Flood Insurance Program).

Policy 10L-25~~22~~: Support the design and implementation of natural water storage projects.

Policy 10L-26~~23~~: As a member of the WRIA 1 Watershed Management Board, the County will support the salmon recovery and habitat goals adopted in the 2005 Salmonid Recovery Plan and that will be included in the latest update.

Wetlands

Wetlands are crucial environmental features in Whatcom County. Wetlands provide invaluable functions in aquifer recharge, groundwater storage, floodwater detention, pollutant removal and purification of water supplies, as well as provision of fish and

wildlife habitat. Loss of wetlands has been due to many factors, including urbanization, agricultural development, and drainage projects.

A plethora of complex and often confusing laws govern the definition, delineation, and protection of wetlands. These laws originate at national, state, and county levels. Land managers and ~~private citizens~~ community members (#61) often experience difficulty in interpreting, synthesizing, and applying wetland regulations. In general, however, state regulations must comply with federal standards and local regulations must comply with both federal and state standards.

Goal 10M: Conserve and enhance regulated wetlands.

Policy 10M-1: ~~Recognize~~ Protect and enhance natural wetlands ~~such as~~ including ~~—~~swamps, bogs, saltwater marshes, and ponds~~,~~ recognizing ~~for~~ their value in cleaning water, reducing flood damage, providing valuable habitat for plants, fish and wildlife, and as sites for groundwater recharge.

Policy 10M-2: ~~Develop and adopt~~Maintain in the critical areas regulations criteria to identify and evaluate wetland functions that meet the Best Available Science standard and that are consistent with state and federal guidelines.

Policy 10M-3: Biological functions of wetlands are complex and interwoven. In making land use decisions that impact wetlands, ~~E~~e~~e~~valuate the full range of potential and immediate ~~economic~~ (#62) impacts~~, in land use decisions relating to wetlands,~~ including fisheries, wildlife, recreation, farmlands, sustainable resources, air and water quality, flood hazard management, real estate, cultural attributes, and other uses.

Policy 10M-4: ~~Encourage land development to avoids~~ Minimize wetland impacts. Impacts to regulated wetlands should be ~~contingent~~ conditioned on~~upon full mitigation~~ measures that ~~equitably compensate~~fully mitigate ~~for wetlands~~such impacts~~, on a case-by-case basis~~, and ~~. Approved mitigation measures~~ shall include requirements ~~resources~~ for ~~long-term~~5-year monitoring and adaptive management of mitigation outcomes to assure effectiveness. Strongly discourage alteration of land that results in the degradation of category~~type~~ 1 and 2 wetlands, except as provided in Policy 10M-5.

Policy 10M-5: Property rights and public services are essential components of our political and economic system. Where such rights and public services are significantly compromised by the goal of wetland preservation, adverse wetland impacts may be permitted ~~through standardized~~when mitigated~~ion~~. This may include avoidance, impact minimization, restoration, enhancement, creation, or off-site compensation for loss of wetland functions in accordance with mitigation sequencing.

Policy 10M-6: Recognize beneficial wetland uses, functions, and values. Support protection of fish and wildlife habitat, water quality, plant diversity, flood attenuation and low-flow contribution, and water storage through planning, acquisition, incentive programs, and mitigation.

Policy 10M-7: Development applications should be assessed on a case-by-case basis so that marginal wetlands are not preserved at the expense of upland areas with higher habitat value.

Policy 10M-8: Create county owned wetland mitigation banks that sells credits to both private and public entities, with enough credit capacity for the 20-year planning period. Support effective mitigation banking to assist in habitat mitigation for wetland, riparian, and nearshore habitats throughout Whatcom County. Ensure mitigation is conservative, effective, and monitored. (#63)

Marine Habitat

Goal 10N: Protect and enhance marine ecosystems and resources in Whatcom County. Provide sufficient funding and support to be successful. (#64)

Policy 10N-1: Support the Whatcom County Marine Resources Committee in its pursuit of the Northwest Straits Commission benchmarks as follows:

- Broad ccCounty participation in ~~MRC~~Marine Resources Committees;
- A net gain in high-value habitat and ecosystem functions;
- A net reduction in shellfish bed closures;
- Measurable increases in factors supporting bottomfish recovery;
- Population increases in other key indicator species;
- Coordination of scientific data;
- Successful public education and outreach efforts; and,
- The establishment of a regional system of Marine Protected Areas (MPA's).
- Protection and restoration of forage fish and their habitats.

Policy 10N-2: Incorporate Whatcom County Marine Resources Committee's projects and data collection in county planning processes. Projects and data include: kelp and eelgrass monitoring, forage fish monitoring, Olympia oyster restoration, water quality monitoring, harmful algal bloom monitoring, beach cleanups, mussel watch, and European green crab monitoring. (#65)

Policy 10N-~~32~~: Promote naturalized shoreline buffers and restoration of riparian vegetation.

Policy 10N-4: Conserve kelp and eelgrass as critical marine resources, recognizing their importance in providing diverse and productive ecosystems, contribute to carbon and nutrient sequestration, and help protect and stabilize coastal environments. Ensure any potential commercial opportunities are pursued responsibly. (#66)

Policy 10N-5: Prioritize mapping Whatcom County eelgrass and kelp beds to establish a baseline dataset, and add this data to statewide maps used in planning and development. (#67)

Policy 10N-6: Protect shoreline access points so that recreational access does not negatively impact marine resources, with special considerations for eelgrass and kelp beds. (#68)

Policy 10N-7: Monitor current trends for population growth, aging infrastructure, decreasing water quality, and climate change, and how these factors impact the state of marine resources and reduced populations of salmon, forage fish, kelp, and eelgrass, Measure county progress towards restoration. (#69)

Policy 10N-8: Address the issue of derelict vessels and change the current language in code to hold owners more accountable. Ensure that resources are available to fund established policies designed to address this issue. (#70)

Policy 10N-9: Provide adequate toxicity testing of crab and bottomfish that dwell in areas of contaminated sediments to demonstrate that public health is protected. Determine mercury levels in edible tissues of juvenile Dungeness crab collected from Whatcom Waterway and create realistic models of consumption for populations and age groups most at risk. (#71)

Goal 10P: Protect and enhance shellfish habitat in commercial and recreational areas to ensure a productive resource base for long-term use.

Policy 10P-1: Identify and designate marine shellfish habitat for commercial and recreational uses.

Policy 10P-2: Restore degraded waters within the drainage basins of shellfish growing areas to a level that allows/supports shellfish harvesting, ~~by w~~Work with the Department of Ecology, Tribes, Department of Health, Department of Fish and Wildlife, and affected property owners to improve water quality.

Policy 10P-3: Protect shellfish resources by means of pollution prevention and enforcement when necessary. This should include surface and

groundwater monitoring for early detection of pollution to minimize the damage and cost of resource restoration.

Policy 10P-4: Improve knowledge of the importance of protecting, preserving, and improving the quality of shellfish habitat within the County. Seek out valuable partnerships that will raise awareness, provide education, and enhance shellfish habitat.

Policy 10P-5: ~~Develop~~ Promote Low Impact Development standards in shellfish habitat areas and the lands upstream from them.

Policy 10P-6: Identify and encourage the use of stormwater treatment systems and Best Management Practices to reduce fecal coliform bacteria levels in stormwater discharging directly into shellfish habitat areas.

Policy 10P-7: Solicit input from the Shellfish Protection District advisory committees and appropriate state, federal, and tribal agencies when considering updates to the Comprehensive Plan that relate to shellfish protection.

Policy 10P-8: Identify and restore functions, selected through best available landscape-based science, of key wetland areas.

Policy 10P-9: ~~Modify~~ Maintain ~~c~~County roadside ditch maintenance procedures to protect water quality.

Policy 10P-10: Continue to partner with jurisdictions in British Columbia to minimize impacts on water quality, including what affects shellfish habitat.

Policy 10P-11: Work within the structure of ~~County~~ local programs such as the WRIA 1 Watershed Management Planning process to achieve improvements in land use Best Management Practices and using best available science (#72) that will positively affect change in marine water quality.

Policy 10P-12: Continue to develop programs that identify potential pollution sources and ensure timely and science-based approaches are used in ~~response to problems as~~preventing adverse water quality impacts before they arise.

Policy 10P-13: Develop educational tools and opportunities to raise public awareness of marine issues and to inform them of how they can have a positive impact by helping preserve these marine resources.

Policy 10P-14: Identify areas (such as wetlands and the nearshore environment) that are important to shellfish habitat preservation. Also identify river and stream processes that adversely impact shellfish habitat. Use this information when making land use management and preservation decisions.

Policy 10P-15: ~~Create a tracking mechanism to d~~Document progress made toward improving downgraded shellfish areas. This information

will be useful not only in supporting an upgrade when water quality shows improvement, but also in preventing degradation in currently approved shellfish areas~~.~~

Policy 10P-16: Work with the County Shellfish Advisory Committees, Marine Resources Committee, ~~Salmon Recovery Fund Board~~, WRIA 1 Watershed Management Board, and other local, state, federal, and tribal agencies to address issues associated with shellfish, shellfish area closures, and shellfish habitat.

~~Policy 10P-17: Consider establishing the Drayton Harbor Watershed as a sending area when considering a transfer of development rights (TDR) program in.~~

Policy 10P-1~~7~~8 Support the Department of Health's Large On-Site Sewage System (LOSS) Program, and WCHCS On-site Sewage System program (OSS) as a means to lower degradation of our waterways.

~~Other Marine and Marine Dependent Organisms and Systems~~

~~Our Marine system supports not only local, critical, and global fisheries resources, but also a myriad of interdependent organisms, the importance of which we lack the capacity to fully grasp. The Marine ecosystem is a complex web of life that is increasingly affected by anthropogenic impacts. Toxics, hormones, heavy metals, and other harmful substances flushed into nearshore and marine environments with stormwater have been shown to have deleterious cumulative impacts on a range of aquatic and marine dependent organisms. Whatcom County will take steps to halt the practice of treating its streams and rivers as a storm sewer and the marine system as a water treatment facility.~~

Policy 10P-1~~8~~9: Promote Best Management Practices, land use, and stormwater policies that result in a minimal release of harmful chemicals, bacteria, ~~and~~ metallic, and other substances into surface water and the marine environment.

Other Marine and Marine Dependent Organisms and Systems

Our Marine system supports not only local, critical, and global fisheries resources, but also a myriad of important interdependent organisms. The Marine ecosystem is a complex web of life that is increasingly affected by anthropogenic impacts. Toxics, hormones, heavy metals, and other harmful substances flushed into nearshore and marine environments with stormwater have been shown to have deleterious cumulative impacts on a range of aquatic and marine dependent organisms. Whatcom County will not treat its streams and rivers as a storm sewer and the marine system as a water treatment facility. (#73)

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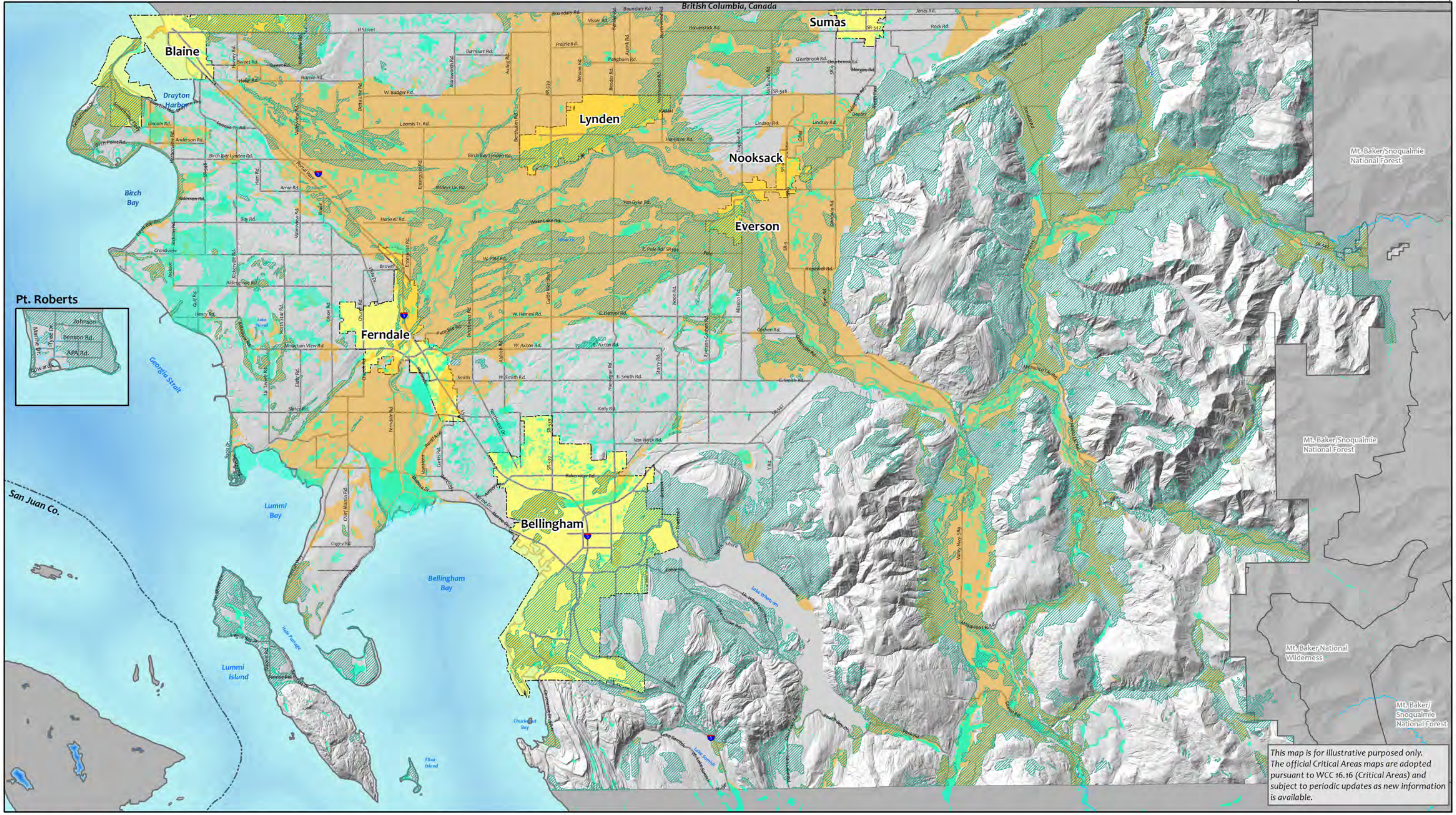
Map 10-1
Water Resources (CAO Articles V & VI)



Geographic Information System WHATCOM COUNTY WASHINGTON 2025

Hydrologic Soils Groups A & B (NRCS)

Wetlands (PHS, NWI, Project)

Surficial Aquifers (USGS, WA Dept. of Ecology)

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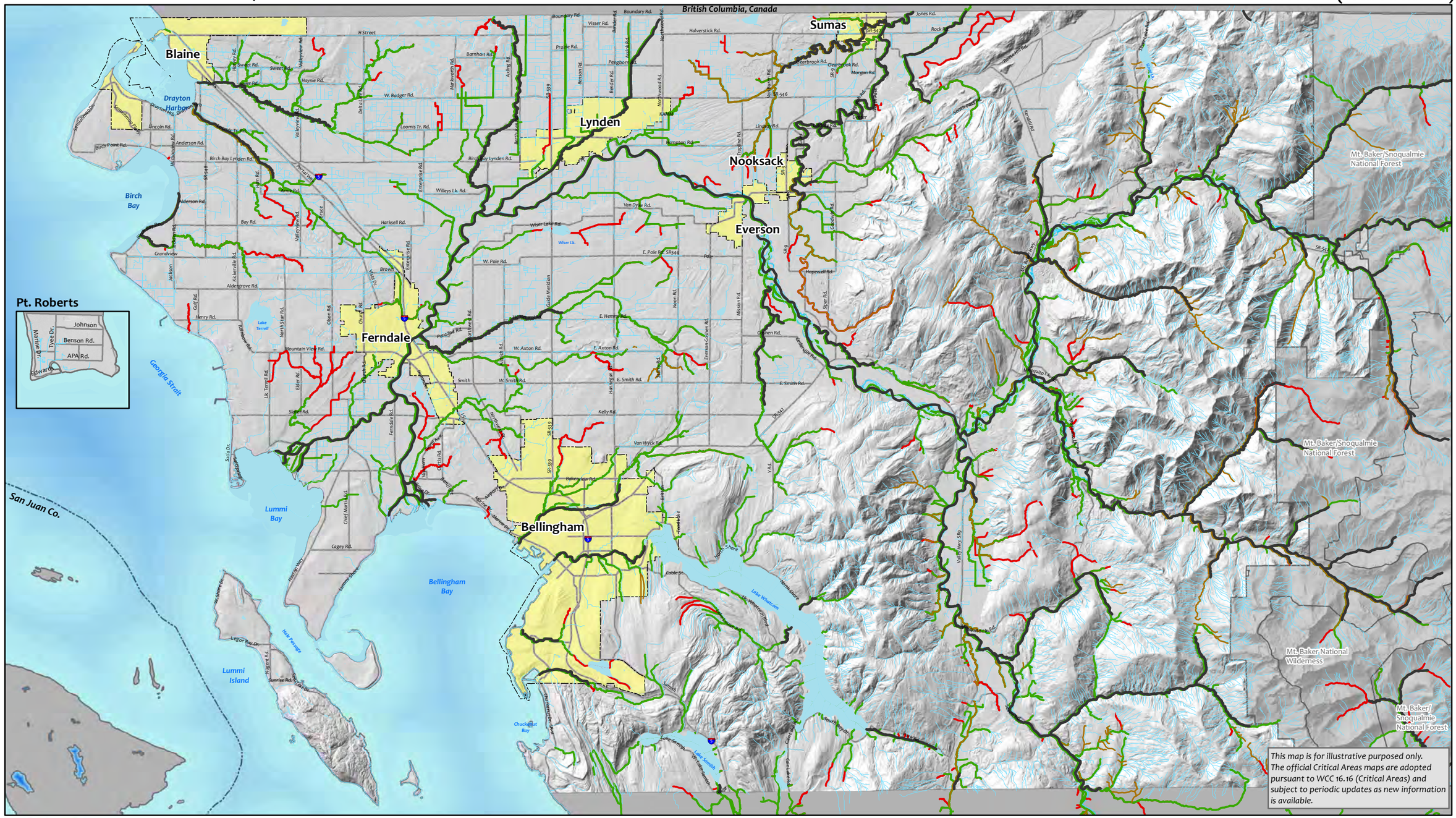
Map 10-2
Fish Habitat Conservation Areas (CAO Articl VII)



This map is for illustrative purposed only. The official Critical Areas maps are adopted pursuant to WCC 16.16 (Critical Areas) and subject to periodic updates as new information is available.

Shoreline Master Program Streams
- HCA 1a - Shoreline Streams

Streams (NHD 2024)
- HCA 1c - No Salmonid Fish Presence

Fish Distribution (WDFW 2024)
- HCA 1b - Fish Bearing Streams - Current known distribution
- HCA 1b - Fish Bearing Streams - Current presumed distribution
- HCA 1b - Fish Bearing Streams - Presumed/Potential/Historic distribution

0 0.75 1.5 3 4.5 6 Miles

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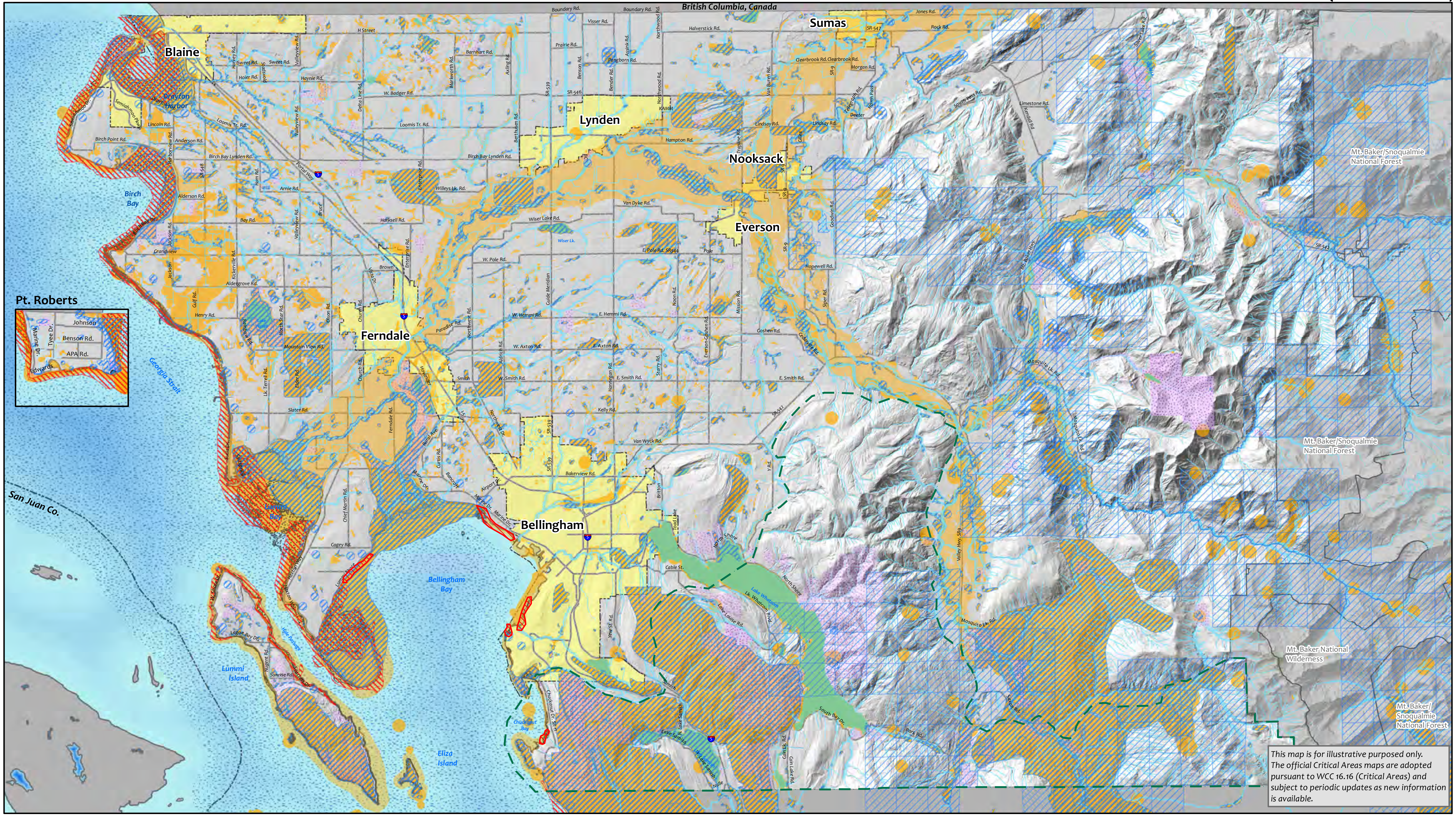
Map 10-3
Wildlife Habitat (CAO Article VII)



- HCA 1b - Streams
- HCA 2 - State & Federal Listed Species
- HCA 3 - State Priority Habitats & Species
- HCA 4 - Commercial & Recreational Shellfish Areas
- HCA 5 - Kelp & Eelgrass Beds
- HCA 6 - Pacific Sand Lance & Herring Spawning Areas
- HCA 7, 8 - Lakes & Ponds
- HCA 9 - Natural Area Preserves
- Habitats/Species of Local Importance

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0 0.75 1.5 3 4.5 6 Miles

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Map 10-4
Natural Hazards (CAO Articles III & IV)

Landslide Hazards

- 15-35% Slope
- >35% Slope
- Upland Landslide Hazards
- Marine Landslide Hazards

- Alluvial Fan Hazard Area
- Seismic Hazard Areas (Geologic Units)
- Mine Hazards
- Volcanic Hazards

Tsunami Hazards - Inundation

- 0 ft.
- 1-4 ft.
- 4-8 ft.
- 8-12 ft.
- 12-16 ft.

- FEMA 100 yr. Floodplain

0 0.75 1.5 3 4.5 6 Miles