

4 Environmental Element

Introduction

Clark County contains a diverse mixture of natural resources, parklands, and open spaces. Of the county's 656 square miles, almost half is in forest and agricultural lands. Air, water and land resources are essential to the very existence of human development. They influence every aspect of quality of life, from the local climate to the availability of safe drinking water to flood control and drainage patterns to recreational opportunities and to the habitat that we share with plants and animals.

The Environmental Element provides specific environmental goals and requirements as the basis for development regulations and general goals for land use planning and parks acquisition. The Environmental Element addresses land development throughout the entire unincorporated area of the county, and includes various environmental policies that apply to the entire county.

Relationship of the Environmental Element to other Elements and Plans

The Growth Management Act (GMA) recognizes that environmental protection is important to the citizens of the State of Washington. The GMA contains three goals that relate to the natural environment:

- **Environment.** This goal requires protection of the environment and enhancement of the state's high quality of life, including air and water quality.
- **Open Space and Recreation.** This goal encourages the retention of open space, the development of recreational opportunities, the conservation of fish and wildlife habitat, increasing access to natural resource lands and water and the development of parks. (See Chapter 7 for a more complete discussion of county parks, recreation and open space.
- **Natural Resource Industries.** This goal requires the maintenance and encourages enhancement of natural resource-based industries, including productive timber, agricultural, and fisheries industries. The conservation of productive forest lands and productive agricultural lands is encouraged, while incompatible uses are discouraged. (See Chapter 3 for a more complete discussion of the county's natural resource industries).

All development activities create some level of impact on the air, water and land resources of the county. The benefits of development activities are easily measured in terms of economic benefits to the county or its cities. However, there are often unintended consequences of development that are not included in the environmental balance sheet. It is these consequences that are addressed through the programs and policies in the Environmental Element.

The ultimate goal is to recognize the functions and values of the natural environment around us and to maintain or improve those functions and values, independent of the type of development that is proposed. The Environmental Element of the 20-Year Plan is important because protection and enhancement of our environment has the potential to conflict with other 20-Year Plan elements.

Environmental Conditions and Conservation Programs

Critical Areas

The GMA specifically lists five “critical areas” for which local governments must designate and develop protection and enhancement programs. These five are fish and wildlife habitat, wetlands, aquifer recharge areas, flood hazard areas, and geological hazard areas. Protection of critical areas and resource lands is a key goal and purpose of the GMA, and is a longstanding goal of the Clark County community. The county contains a variety of critical areas, ranging in size and scope from smaller, discrete areas which provide habitat for threatened, sensitive or endangered wildlife species, to broadly based aquifer recharge areas, which encompass most of the lowland area within the county. The soils and terrain in the rural and resource areas create significant environmentally sensitive areas, such as steep, erodable slopes, wetlands and ground water recharge areas (Figure 1). Many types of critical areas geographically overlap.

The benefits that these critical areas yield range from providing wildlife or vegetative ecosystem habitat, to limiting or mitigating human concerns over water pollution and flood hazards. Vegetation retention is critical to protecting streams and riparian habitat necessary for sustaining healthy fish and wildlife populations. Critical areas also provide the benefits of recreation, aesthetic enjoyment and water supplies. Maintenance of tree cover, natural vegetation and wetlands are critical to prevention of erosion, flooding, property and habitat damage, the continued functioning of the ecosystem and preservation of rural character.

Unlike residential, commercial, industrial, or other uses, critical areas do not constitute a separate 20-Year Plan or zoning designation, unless they are under public ownership. Policies and programs used to protect and conserve these areas involve a range of federal, state, and local programs and standards. Most policies used to address critical areas are therefore regulatory or incentive-based and are applied to privately held lands.

One effective way of protecting critical lands is through public ownership. Publicly owned lands within the urban area are largely confined to parks which emphasize recreational opportunities. Outside urban areas, most publicly owned lands emphasize wildlife and other critical land values, although access and passive recreation may be allowed. Protecting sensitive lands through public ownership requires that substantial funds be raised for acquisition and maintenance of the land.

Prohibitions or limitations on structural development also provide critical lands protection. Such programs currently in place in Clark County include the Shoreline Master Program; flood hazard, wetlands protection and habitat conservation ordinances; and prohibitions against placement of structures within designated unstable slope areas. As part of the development review process, the State Environmental Policy Act (SEPA) authorizes the imposition of a wide range of conditions which can prohibit or limit construction within certain areas or enact other mitigation measures to protect environmentally sensitive areas.

1) Fish and Wildlife Habitat

Most of the land and water area of Clark County provides some form of fish or wildlife habitat. Much of this area is in park land, resource production, or open space. Clark County has several hundred miles of streams and rivers. Under state and federal law, these streams are designated to support a wide range of “beneficial uses” that include water supplies, fish and wildlife habitat, and recreation. The ability of these streams to meet these beneficial uses is more generally considered stream health. Stream health has not been comprehensively measured for all streams in the county, and

much of this work is underway but not yet complete. Available data on stream health shows that streams range from near pristine conditions in remote areas of the Cascade Foothills to fair to poor health in urban areas. Most rural streams could be categorized as being in fair to good health.

There are few lakes in Clark County. Aside from small manmade ponds and seasonal wetland ponds, the only significant lakes within or bordering the county are Vancouver Lake, Battle Ground Lake, Lacamas Lake, Shillapoo Lake, Mud Lake, Lake Merwin and Yale Lake. These areas provide essential habitat for a variety of fish, wildlife and plant species.

Fish of the lower Columbia River are either resident or migratory species. Most migratory species, such as salmon, shad, smelt, and steelhead, are anadromous, meaning that they hatch in freshwater, migrate to the ocean as fry, mature in the ocean and then return to freshwater streams to spawn. In addition to critical areas, the GMA requires that local jurisdictions address the requirements of anadromous fish species. There are some resident species, such as sturgeon, whitefish, and resident trout, that migrate long distances within freshwater streams to feed or spawn.

Certain areas of critical habitat are readily identifiable because of their protected status under public ownership. The Ridgefield National Wildlife Refuge contains over 5,000 acres of Columbia River floodplain consisting of marshes, lakes, woodlands, grasslands, and croplands, which provide migration and wintering habitat for Pacific Flyway waterfowl, as well as many species of water birds, raptors, shore and songbirds. The concentration and diversity of native and migratory bird species in the Refuge are the largest in the county; and includes sandhill cranes, a state endangered species. Several species of mammals, reptiles and amphibians can also be found in the Refuge.

Steigerwald Lake National Wildlife Refuge, located in the southeast corner of the county, includes 627 acres of Columbia River bottomland, consisting of reed canary grass marshes, riparian woodlands and improved pastures. Among the species inhabiting the Refuge are raptors, geese, and marsh, water, and riparian woodland songbirds. The Vancouver Lake lowlands area provides over 1,000 acres of wildlife habitat within close proximity to Vancouver. Much of this land is owned by the Washington State Department of Fish and Wildlife, which has prepared a management plan to determine how the land will be used.

Wildlife habitat is not restricted to those areas already under public ownership. Riparian corridors and other areas adjacent to or including surface water bodies clearly provide the most wide ranging and significant wildlife habitat. The Washington Department of Fish and Wildlife has identified 36 sites within the county providing game, non-game or fish habitat, of which, 33 are along riparian corridors or other water bodies. Their program provides management recommendations for both priority species and habitat (Figure 2).

Fish and Wildlife Habitat Conservation Programs

The county's habitat conservation ordinance (HCO; CCC Chapter 40.440) was adopted in 1997 and significantly updated in 2006. The stated purpose of the ordinance is to: further the goal of no net loss of habitat functions and values within designated habitat areas by protecting environmentally distinct, fragile and valuable fish and wildlife habitat areas for present and future generations, while also allowing for reasonable use of private property. This ordinance intends to conserve the functional integrity of the habitats needed to perpetually support fish and wildlife populations.

The county updated the HCO in 2006 to reflect the best available information as required by the GMA, and has continued to update the ordinance as needed to remain consistent with the new

guidance from the Washington Department of Fish & Wildlife (WDFW). Development proposals involving impacts to priority habitats and species often require consultation with WDFW.

Endangered Species Act

Congress passed the Endangered Species Act (ESA) in 1973. It requires the recovery of species that are listed as threatened or endangered. Clark County currently has populations of salmonids that are listed as threatened with extinction under the ESA. Steelhead were listed in March 1998; Chinook and chum in March 1999. Coho were listed as threatened in 2005, and Pacific eulachon were listed in 2010.

Clark County also has populations of, or the potential for, other important fish and wildlife species threatened with extinction under the ESA. These species include gray wolf (listed in 1974), Columbian white-tail deer (listed in 1968), northern spotted owl (listed in 1990), streaked horned lark (listed in 2013), yellow-billed cuckoo (listed in 1997), Oregon spotted frog (listed in 2014), bull trout (listed in 1999), golden paintbrush (listed in 1997), water howelia (listed in 1994) and Bradshaw's lomatium (listed in 1998). Protecting, conserving and enhancing critical stream and riparian habitat and other priority habitats are essential to supporting and recovering threatened and endangered fish and wildlife populations throughout the county.

States, counties, and other jurisdictions must comply with the federal Endangered Species Act when species are listed by avoiding harm to any member of the species or the habitat upon which they depend. County policies and regulations must support recovery of those species. The goal is to make Clark County a county where sustainable populations of salmon and other native species are a testimony to a healthy ecosystem; where our well-being is supported by the integrity of the ecosystem we share with other living species; and where, by ensuring healthy habitat for all inhabitants of Clark County, we ensure the quality of life we value.

In 1998, the state adopted the Salmon Recovery Strategy (RCW 77.85) as a guide to statewide salmon recovery efforts. Regionally, the Lower Columbia Fish Recovery Board developed and the National Marine Fisheries Service (NMFS) adopted a salmon and steelhead recovery plan for the lower Columbia River and its tributaries in Washington in 2010. This plan is called the "Washington Lower Columbia Salmon Recovery and Fish & Wildlife Sub-basin Plan". The two overarching goals for this plan are to: 1) restore the region's fish species listed as threatened under the federal Endangered Species Act (ESA) to healthy, harvestable levels, and 2) protect and enhance other fish and wildlife species that have been adversely affected by human actions, including the development and operation of the Federal Columbia River Power System. The Lower Columbia Fish Recovery Board and its partners have been actively implementing recovery efforts for the past 18 years. Clark County has implemented or partnered on implementation of many projects targeting recovery efforts during this time.

Clark County complies with all local state, and federal regulations pertaining to the protection of ESA listed fish and wildlife populations during the delivery of capital construction projects. Clark County also participates in the Regional Road Maintenance ESA Program (Regional Program). The Regional Program guidelines describe physical, structural, and managerial best management practices designed so that when they are used, singularly or in combination, they reduce road maintenance activities' impacts on water and habitat. Participation in the program has resulted in a biological opinion from NMFS and approval under Limit 10 of the ESA section 4(d) rule.

In addition, land use planning will also accommodate state and federally listed wildlife species through implementation of the county's Habitat Conservation Ordinance, Wetland Protection Ordinance, and State Environmental Policy Act land use regulations. Protecting and enhancing critical upland habitat is essential to supporting and recovering terrestrial wildlife populations throughout the county.

Water Quality

Clark County has an abundance of streams and groundwater supplies. Groundwater aquifers are capable of providing huge amounts of water to industry, business, residences and agriculture. The federal Clean Water Act lists the "beneficial uses" of the United States' rivers, streams and lakes. Many beneficial uses are features valued in Clark County and are required to be protected and restored under the National Pollutant Discharge Elimination System (NPDES) municipal stormwater permit. These are:

- Surface water supply for industrial water supply, agricultural water supply, domestic water supply, and stock watering;
- fish and wildlife production and habitat, including spawning, rearing, migration, and harvesting;
- recreation and enjoyment, including contact recreation (swimming, wading, etc.), non-contact recreation (boating and sport fishing), and aesthetic enjoyment; and
- commerce and navigation.

Urbanization influences stream biological health. The Washington Department of Ecology Stormwater Management Manual for Western Washington (2012, revised 2014) describes the effects urbanization has on water bodies. It states that before forests were cleared for farms and towns, rainfall was largely absorbed into the ground where it replenished streams as springs and seeps. As settlement occurs, trees are removed and replaced by fields, buildings and roads. Instead of soaking into the ground and returning to streams as springs, rainwater runs off rapidly and greatly increases stream channel erosion and degrades stream habitat. During the summer, stream flow may be reduced to low levels because less water is available to springs and seeps that feed the stream. The manual also states that along with changing stream flows, urbanization adds various pollutants to surface water and groundwater.

The combination of increased runoff and pollutants in stormwater runoff drastically alters stream habitats. Pesticides washed off landscaped areas can do great harm to aquatic insects that feed fish. Stormwater runoff from roads, business, industrial facilities, and residences degrades streams by flushing pollutants that harm fish and other aquatic life. The volumes of water running off paved areas also wash away streambed sediments and the creatures that live there. If sediment is allowed to wash off construction projects and agricultural land it can smother aquatic creatures in the streambed. In order to begin to address this problem, a set of regulations was added to the Clean Water Act in 1987 to decrease problems caused by stormwater runoff. The Clark County Stormwater Management Program is a direct response to that mandate.

Clark County performs many activities to meet requirements of a Washington Department of Ecology permit to discharge stormwater to county water bodies and groundwater. The program contains the following main program elements:

- regulatory program for development and pollution control;
- operation and maintenance of storm sewers and roads to reduce polluted runoff;

- inspection of business sites and stormwater facilities for compliance with pollution control standards;
- watershed planning;
- monitoring, data management and evaluation to provide information to manage stormwater;
- public involvement and education about untreated stormwater runoff and pollutant reduction; and
- stormwater capital improvements to reduce the potential harm caused to streams by stormwater runoff.

The regulatory program largely consists of implementing development regulations (CCC Chapter 40.386) requiring stormwater control facilities such as ponds and low impact development practices for development projects. Chapter 40.386 also requires construction projects to minimize erosion and sediment washed into streams from land development and land-disturbing activities. The water quality ordinance (CCC Chapter 13.26A) addresses pollutants associated with everyday activities such as disposal of used motor oil and vehicle wash water. In 2012 (and amended in 2014), the Department of Ecology published the Stormwater Management Manual for Western Washington, which provides best available science for stormwater requirements relating to development and re-development, stormwater maintenance standards, and pollution control standards for existing businesses. The county's 2013 NPDES municipal stormwater permit required the county to update its stormwater and erosion control ordinance (CCC Chapter 40.386) and stormwater manual to be equivalent with the state stormwater manual. The 2015 county stormwater manual also implements the state mandate for development projects to use low impact stormwater facilities where feasible.

The operation and maintenance program involves maintenance and repair of county stormwater controls such as ponds and grassy swales, cleaning of catch basins, and sweeping of roads. The purpose is to reduce the amount of pollutants discharged from the system and make sure it operates as designed. The program also includes a program to inspect and ensure that privately operated stormwater facilities are properly cleaned and maintained. The NPDES stormwater program also performs stormwater monitoring and watershed-scale stormwater planning.

Reducing stormwater pollution requires that individuals prevent their homes and businesses from becoming pollution sources. For that reason, information and education is a major part of the stormwater program.

Large areas of the county were developed without the stormwater control facilities that prevent pollution and excessive amounts of runoff from harming streams. The stormwater program includes a program to plan and build stormwater control facilities and stream restoration projects to address stormwater problems created before the program began in 1999. The stormwater capital plan was last adopted in 2013 and will be updated every six years. The program is mapping all existing storm sewer systems and beginning to plan and build projects using stormwater fees from each home, business and government property in unincorporated Clark County.

2) Wetlands

Wetlands provide valuable wildlife habitat and include marshes, swamps, fens and bogs that perform several other functions. Wetlands can aid hydraulics by moderating water overflow, advancing groundwater recharge, and enhancing water quality. Water quality is enhanced by preventing erosion, removing sediments and filtering nutrients and other pollutants from runoff, and slowing down the flow of water which allows time for pesticides and other chemicals to break down. Wetlands also provide vegetative habitat and human recreational and open space amenities.

Some mapping of the highest quality wetlands in Clark County has been completed. Countywide mapping covering the full range of wetland classes is available in a generalized form through National Wetland Inventory and hydric soil mapping; these inventories are inaccurate on a site-specific basis. More precise wetland boundaries are not usually known until site specific analyses are conducted, normally during the review of individual development proposals. Most wetland areas are in low elevations areas within relatively close proximity of rivers and streams, or associated floodplains (Figure 3 and Figure 4).

Wetlands Conservation Program

The county's wetland protection ordinance (WPO; CCC Chapter 40.450) was adopted in 1992, significantly updated in 2006, and then again in 2014. The stated purpose of the ordinance is to:

- further the goal of no net loss of wetland acreage and functions;
- encourage restoration and enhancement of degraded and low quality wetlands;
- provide a greater level of protection for higher-quality wetlands;
- maintain consistency with federal wetland protective measures;
- avoid over-regulation by limiting regulatory applicability to those development proposals which significantly impact important wetlands; and,
- minimize impacts of wetland regulation on private property rights.

The county recently updated the WPO in 2014 to reflect the best available information as required by the GMA, more specifically to reflect changes made to the Washington State Wetland Rating System for Western Washington. This classification system rates wetlands from Category 1 to Category 4 based on their characteristics, and the county regulates based on a combination of the type of wetland and the intensity of the use around it. Development proposals involving wetlands often need review by the Army Corps of Engineers (under Section 404 of the Clean Water Act) and the State Department of Ecology.

Wetlands Mitigation Banking

Wetlands mitigation banking is a method of mitigating a decrease in or loss of wetland function by providing wetland functions and values (e.g. creating, restoring, enhancing and/or protecting wetlands) away from the site of a proposed development project. A wetland mitigation bank generates credits that can be used for wetland mitigation for individual projects with wetland impacts. Mitigation banking has a number of benefits over other mitigation strategies including:

- consolidation of small isolated mitigation projects into larger, more ecologically significant sites;
- higher likelihood of long-term mitigation success; and,
- efficiency in permit review for projects using bank credits.

Wetland mitigation banking is not a means of reducing the protection and conservation of wetlands in the urban area. It is only a method to improve mitigation success at a regional scale and streamline permit review for projects that have wetland impacts. The criteria used to evaluate and permit wetland impacts are independent of the type of mitigation proposed and, instead, focus on the benefits and design of the project. A key element to developing an effective wetland mitigation banking program is to maintain a good inventory of existing and historic wetlands in order to allow mitigation bank developers to locate sites that are well suited to bank development. Another key element is to ensure that the wetland permitting process gives due consideration to the use of mitigation bank credits when they are available. Clark County has an application for mitigation banks.

State regulations have been proposed for the program, and the county will pursue a program when the regulations are finalized.

3) Aquifer Recharge Areas

An aquifer is a body of rock (generally sand, gravel, or fractured basalt in Clark County) that transmits groundwater in useable quantities to wells. Almost all of the county's industrial water needs and about 47 percent of public water needs are met by wells located near the Columbia River, where the overlying deposits consist mostly of coarse sand and gravel. Water infiltrates the soil and percolates through surface rocks into the water table, and then travels deeper downward into aquifers, which are water sources in most parts of the county. Recharge of aquifers is often greatly reduced in urban areas because most surfaces are impervious, preventing rainfall from entering the soil. Some aquifer recharge occurs in urban areas through dry wells and septic system drain fields, but these methods may decrease groundwater quality by allowing contaminants to enter the soil.

Since most of the lowland area of the county is covered with permeable alluvial, or sand, gravel, and silt deposits, there is no one identifiable point of recharge. Virtually the entire county pervious area functions as an aquifer recharge area to some extent. The most critical aquifer recharge areas are those located near production wells (Figure 6).

Aquifer Protection Programs

Clark County residents and commerce are almost totally dependent on water pumped from relatively shallow aquifers. Both the quantity and quality of this water is critical. The county has several programs to protect aquifer recharge amounts and water quality. The stormwater and erosion control ordinance (CCC Chapter 40.386) for development projects require stormwater infiltration wherever soil conditions make it feasible. This preserves recharge when sites are covered with buildings and pavement. Stormwater regulations also require that this infiltrated stormwater be treated to remove pollutants.

The water quality ordinance (CCC Chapter 13.26A) prohibits discharging pollutants to surface water and groundwater. The county implements the ordinance by actively educating businesses and the public on acceptable ways to manage everyday pollutants such used oil, paint and dirty wash water.

The critical aquifer recharge area (CARA) ordinance (CCC Chapter 40.410) identifies critical areas and places special requirements on higher risk development projects in those areas. The CARA ordinance was updated in 2005 to reflect best available information as required by the GMA.

Source-based policies are typically used to provide protection to larger and less clearly defined critical areas, such as aquifer recharge areas, or to address other concerns related to ground or surface water quality. Sewage regulations, particularly those regarding septic system uses, are administered by Clark County Public Health, and are directed toward the protection of critical areas which are not necessarily at the site of the potential pollutant source. Stormwater management policies and programs administered by Clark County are similarly intended to address potential adverse water quality impacts beyond the source site.

4) Flood Hazard Areas

Flood hazardous areas are another category of critical area, and are often associated with riparian corridors. Flood hazard areas are defined and delineated by the Federal Emergency Management Agency (FEMA) to include all areas subject to flooding during 100-year flood events. This definition encompasses areas along most rivers in the county. These areas provide wildlife habitat and

hydraulic functions. Building limitations in these areas limit damage to persons and property from the periodic floods (Figure 5).

Flood Protection Programs

It is recognized that approximately 90% of all disasters in the US are flood-related. The avoidance of damage from flooding is accomplished by the application of zoning regulations and building ordinances. The National Flood Insurance Program (NFIP) was created by Congress in 1968, and significantly amended in 1973 to:

- reduce loss of life and property caused by flooding;
- reduce rising disaster relief costs caused by flooding; and
- make federally-backed flood insurance coverage available to property owners.

The program was designed to achieve these goals by:

- requiring that new and substantially improved buildings be constructed to resist flood damages;
- guiding future development away from flood hazard areas;
- transferring the costs of flood losses from the American taxpayers to floodplain property owners through flood insurance premiums; and
- prohibiting new development in designated floodways that would aggravate flooding.

The National Flood Insurance Program is a voluntary program based on mutual agreement between the federal government and the local community. In exchange for adopting and enforcing a flood plain management ordinance, federally-backed flood insurance is made available to property owners throughout the community.

The National Flood Insurance Act of 1968 created the Federal Insurance Administration and directed it to conduct Flood Insurance Studies (FIS) that identify flood-prone areas within the US, and establish and map flood risk zones within those areas. The studies provide technical data for the adoption of floodplain management measures required for NFIP participation by a community and for development of flood-risk information needed to establish flood insurance premiums.

In March of 1977, the county adopted a flood hazard ordinance (CCC Chapter 40.420). Of the county's 86 Flood Rate Insurance Maps (FIRM), more than half were prepared in 1982 and almost 90% of the maps dated prior to 1986. Clark County, in partnership with FEMA, completed updates to the FIRMS and to Chapter 40.420 in 2012. Changes were made to the flood hazard ordinance to bring the ordinance into compliance with federal requirements, and to comply with the best available information requirement of the GMA.

5) Geologically Hazardous Areas

Geologically hazardous areas are not environmentally-valued critical areas such as wetlands or wildlife habitat, even though many contain critical fish and wildlife habitat protected by other ordinances. The primary function of development limitations within geologically hazardous areas is to limit potential adverse impacts to persons and property. The primary geologically hazardous areas are those of steep and or unstable slopes, which are often, but not exclusively, found along the stream corridors.

Geohazard Protection Programs

The county's geologic hazard areas (geohazards) ordinance (CCC Chapter 40.430) was enacted in 1997. Maps have been produced showing earthquake potential and steep slopes with the susceptibility to landslides and erosion (Figures 7, 8, and 9). The geohazards ordinance was updated in 2005 to reflect better seismic hazard vulnerability information throughout the county and to meet the best available information of the GMA. The county adopted the International Residential Code in 2005. New, more stringent and relevant seismic codes will be incorporated into the permitting and building ordinances as necessary.

Other Hazard Mitigation Programs

Natural hazards (such as floods and landslides, earthquakes, volcano, severe weather, drought, winter storms and wildfires) to Clark County's natural resources, parklands and other environmentally critical areas cause millions of dollars of damage every year. Clark County Emergency Services Agency (CRESA) is currently leading a multi-agency collaborative effort, including the county and its jurisdictions and partners, to update the Multi-Hazard Mitigation Plan. The Multi-Hazard Mitigation Plan is designed to be the foundation of a long-term strategy to reduce disaster losses and break the cycle of damage, reconstruction, and repeat damage.

As established by the planning partnership, the purpose of the Multi-Hazard Mitigation Plan is to define natural hazard risk and, through collaboration and partnerships, establish strategies and actions for reducing the impacts of disasters in Clark County.

Goals of the plan include:

- Reduce and prevent the loss of life and property.
- Protect public services and critical facilities from the impacts of natural disasters.
- Increase public awareness of vulnerability to natural hazards and educate on risk reduction strategies.
- Promote community resilience.
- Protect environmental resources and utilize natural systems to reduce natural hazard impacts.
- Develop and implement cost-effective mitigation strategies.

The Multi-Hazard Mitigation Plan strategies and actions are of such value they are to be incorporated into the ordinances and codes of the county wherever possible in order to make natural hazard mitigation a sustainable part of everyday life.

The inclusion of identified Hazard Mitigation strategies and action in order to safeguard the county's natural resources are an important part of the 20-Year Plan. Upon final approval, the county and its Multi-Hazard Mitigation Plan partners will include proven mitigation strategies and actions as one of the primary methods of alleviating damages from future natural disaster hazards. The strategies and actions for hazard mitigation are to be enforceable, sustainable and maintainable for the protection of the land and its residents.

The update to the Multi-Hazard Mitigation Plan is currently scheduled to be completed in July 2016. Once the update is complete and upon approval by the participating jurisdictions, the plan will be forwarded to the Federal Emergency Management Agency (FEMA) for review and final approval. Once approved, participating jurisdictions are eligible for Federal Mitigation Grant monies. The

county will look to include applicable strategies and action in regularly scheduled updates to the 20-year Plan. Other Designated Areas

Shorelines

The shorelines of rivers, streams, and lakes of Clark County are important and sensitive natural resources, and encompass other critical areas such as wildlife areas, wetlands and flood areas. They provide habitat, drainage, recreational opportunities, transportation and economic opportunities, some of which may conflict with each other. The State Shoreline Management Act of 1971 (SMA) defines shorelines as being within 200 feet of the ordinary high water mark or associated wetlands of all rivers with mean annual flow of 20 cubic feet per second (cfs) or more, and lakes greater than 20 acres in size. This definition encompasses the majority of shorelines for most of the rivers and lakes within Clark County, although shorelines of smaller water bodies also provide many of the same functions.

Clark County's Shoreline Master Program (SMP) was originally adopted in 1974. The Department of Ecology has issued new shoreline rules in 2003. The county and its cities formed a Shoreline Coalition in 2008 and applied for an Ecology grant to update SMPs across the county. The county met the deadline of December 1, 2011 to have an SMP submitted to Ecology. The program was approved and took effect in September 2012. Chapter 13 of the Comprehensive Plan contains the county's shoreline policies; CCC Section 40.460 contains shoreline development regulations.

Columbia River Gorge National Scenic Area

Clark County contains a variety of scenic areas, typically located near major river systems. The most prominent is in southeast corner of the county, where approximately 6,000 acres east of the City of Washougal was designated by Congress as part of the Columbia River Gorge National Scenic Area (NSA) in 1986. From 1988 to 1996 specific land use regulations intended to foster the scenic, natural, cultural and recreational functions of these and other similarly designated areas within the Gorge were administered by the US Forest Service and an appointed Columbia River Gorge Commission and staff. In 1996, Clark County adopted an implementing ordinance, which was deemed consistent with the management plan for the NSA by the Gorge Commission and the Secretary of Agriculture. This approval allows for county administration and jurisdiction over these lands.

The gorge management plan was updated in 2004 and an implementing ordinance adopted by the Gorge Commission in 2005. As a result, the county updated its scenic area ordinance (CCC Chapter 40.240) in 2006. One of the ongoing efforts in the NSA is a program to improve air quality in the gorge. There has also been a program underway to evaluate whether or not the management plan and its regulations are meeting the intent of the scenic area act.

Regional Conservation and Greenway Systems

Regional Conservation and Greenway Systems are the "resource-based" open space land types identified in the Clark County Open Space Commission Final Report (August 1992). The Open Space Commission identified 17 functions for open space that were divided into economic, resource, urban-based and other categories, and subsequently identified a number of "open space categories" as being of greater importance including the following:

- river systems and associated flood plains, which provide low-intensity recreation, natural vegetation, shore-lines, fisheries, and wildlife habitat (for example, the North and East Forks of the Lewis River, Lacamas Lake and Creek, Washougal River, Burnt Bridge Creek, and Salmon Creek);

- Columbia River lowlands, providing benefits similar to river systems and flood plains, but of a much larger scale than other county river systems;
- Cascade foothills, providing significant wildlife habitat and vegetation, sensitive water features, remote/low intensity recreation; and,
- dispersed open space areas which are site specific and combine resource, economic and urban based areas.

Conservation and greenway systems may be managed for a variety of uses, depending on the attributes of the site. Potential uses include wildlife habitat, low impact access for wildlife viewing and environmental education, regional trails, and where appropriate, picnic areas, boat ramps, fishing areas and regional parks. The Greater Clark Parks District coordinates development of management scenarios with the state and federal wildlife agencies. Planning for and developing a park and recreation system which serves the diverse recreational interests of the residents of Clark County and fosters an environmentally sensitive approach toward preservation and enhancement of the county's valuable natural resources such as fish and wildlife habitat, wetlands and water quality. (See Chapter 7 for more details.)

Air Resources

Clark County is located in an air shed that is bounded on the south by West Linn, Oregon, on the north by Woodland, Washington, on the west first by the west Portland hills and then further west by the Coast Range, and on the east by the Cascade Mountains. The area experiences mild-wet winters and warm-dry summers. This region is susceptible to concentrations of air pollution near human activity centers. The Vancouver/Portland metropolitan area is considered to be a single interstate air shed by the U.S. Environmental Protection Agency. In topographic terms, the area is located within a bowl fully surrounded by mountains. The region also experiences strong atmospheric summertime inversions that can result in stagnant air conditions and the risk of incurring high air pollution levels. Air pollutants come from a wide variety of sources. Pollutants are often placed into specific source categories:

- Point sources, which are traditionally stationary facilities like power plants, lumber mills, rock quarries, and other manufacturing plants and processes. These facilities can generate relatively large volumes of air pollutants from a single location, but their emissions are generally well controlled by air permitting programs which often require pollution control equipment. Clark County's industrial facilities (major sources) contribute less than 5 percent of the county's total ozone precursor air pollutants (e.g., volatile organic compounds (VOCs) and nitrogen oxides (NOx)), and about 7 percent of the total fine particle pollution (PM_{2.5}).
- Area source emissions (such as from wood stoves/fireplaces, outdoor burning, commercial or industrial solvents, dry cleaning chemicals, gas stations, auto body shops, gasoline-powered lawnmowers/blowers/trimmers, household paints, etc.), come from relatively small, individual sources of pollution, which are usually spread over a broad geographic area. Area sources collectively contribute significant levels of emissions, about 18 percent of the county's total VOCs and NOx, and about 73 percent of the total fine particle pollution (PM_{2.5}).

Mobile sources include cars, trucks, planes, trains, ships, boats and mobile off-road equipment. In Clark County, pollutants generated by mobile sources in 2001 accounted for 57 percent of the ground level VOCs and NOx, and were also responsible for 85 percent of the total carbon monoxide pollution. In addition, mobile sources emit 19 percent of the county's total PM_{2.5} pollution and significant quantities of numerous other (gaseous) toxic air pollutants. Mobile sources are one of Clark County's largest producers of air pollution Air Quality Conservation Programs

Clark County in the past has exceeded federally defined threshold pollution levels for ozone and carbon monoxide more frequently than allowed by the National Ambient Air Quality Standards (NAAQS) established by the Environmental Protection Agency (EPA). On March 15, 1991, the Governor of Washington designated the urban area of the Vancouver portion of the Portland-Vancouver Interstate Air Quality Maintenance Area as a non-attainment area for ozone (O₃) and carbon monoxide (CO).

The Southwest Clean Air Agency (SWCAA) developed air quality maintenance plans to address CO and ozone problems and submitted them to the state in 1995. The maintenance plans, with the identification and implementation of transportation control measures based on the land use assumptions of the 20-Year Plans, had to demonstrate that there would be no violations of NAAQS. Within the non-attainment area, state and federal regulations require additional limitations on outdoor burning and on the sale and use of wood stoves and fireplaces for heating. As a result, outdoor burning was prohibited in non-attainment areas and all new woodstoves purchased in Clark County are required to be certified as meeting stringent statewide emission standards. In addition, most vehicles are subject to regular emission inspection and maintenance tests. However, these testing requirements are being gradually phased out under state law. Testing and other mitigation measures have helped to keep air pollution levels within the NAAQS since 1995. Both the ozone and CO maintenance plans were updated in 2006 and these plans remain in effect today with controls and contingencies in place to maintain compliance with the NAAQS.

Summertime ozone air quality has been good in recent years due in part to relatively moderate summertime temperatures. But even through the hottest periods of last summer there were no exceedances of either the current ozone standard or the newly proposed stricter standard. Looking forward, growth in vehicle miles traveled (VMT), a continuing warming trend and a stricter standard will keep pressure on the county's air resources with respect to summertime ozone and smog pollution. CO levels have not been a problem in Clark County since the original maintenance plan was implemented in the mid-to-late nineties. The decreasing trend in monitored CO levels led to the removal of Clark County's CO monitor in 2006. The 2006 CO maintenance plan update stipulates that as long as the inventory of CO emissions from on-road mobile sources remains below 2002 levels, CO monitoring will not be required.

Clark County has historically been in attainment with the NAAQS for fine particulate matter (PM_{2.5}) since it was established in 1997. The county had a reasonably adequate buffer for maintaining compliance with the standard until it was tightened significantly (i.e., lowered 46%) in 2006. Since that time, 40 exceedance days have been documented at the Vancouver compliance monitor. These high levels of particulate pollution in recent years have put the area at risk of being in non-attainment with the standard. All 40 of the exceedance days have occurred during the winter months on cold days with stagnant air conditions. Chemical analyses of the air samples on these high PM_{2.5} days have indicated that about half of the PM_{2.5} pollution is from wood smoke. Recognizing the potential impact of wood smoke on air quality statewide, the legislature has provided funding to help homeowners replace old wood stoves with new cleaner heat sources and permanently prohibited outdoor burning within all urban growth areas effective in 2007.

Mobile sources continue to be the major source of Clark County's air pollution, contributing 76 percent to the total of NO_x, VOC, CO, and PM_{2.5}. Mobile sources are also major contributors to greenhouse gas emissions. The next largest contributing category is area sources, contributing 15 percent to the total. This category includes largely the activities of individual citizens carrying out their daily activities. This category includes largely the activities of individual citizens carrying out their daily activities. These activities are called "area sources" because they are individually small

sources of air pollution. However, because there are so many citizens the emissions are collectively significant. The most significant component of this category is residential wood burning for home heating (wood stoves, inserts, and fireplaces), contributing 10 percent of the total air pollutants and 47 percent to the total PM_{2.5} pollution. Industry's air pollution emissions follow behind the transportation and area source categories. Under existing air quality regulations, new industry locating in the county is required to use the best available control technology to reduce its own emissions.

Land use planning decisions need to incorporate air quality impacts as one of the decision making tools when making land use designations. In particular, emissions of odor causing pollutants which can create a public nuisance must be considered during this process. Computer software exists to perform this activity (e.g., quantify and incorporate air quality impacts into land use planning decisions). Ensuring clean, healthy air year round for Clark County and preserving our scenic panoramas on hot summer days means there needs to be viable alternatives for citizens to perform their daily activities without relying on gasoline powered motor vehicles. Once the citizen has made the decision to turn on their motor vehicle, a high percentage of the vehicle's air pollution emissions are emitted in those first few minutes of vehicle usage. Designing land use so that it is possible for residents to not have to turn on their motor vehicle needs to be a goal. A combination of walking, using a bicycle or riding a bus needs to be a convenient possibility for performing short shopping trips and getting from home to work. Similarly, integrating bus stops and schedules with the needs of major employers in the Downtown, east Clark County and eventually north Clark County areas is a key to minimizing air pollution emissions from the transportation sector. Ultimately, planning for a transportation system where bus stops also connect to light rail for transportation throughout the region is the single most important means to improve air quality in the county.

Goals and Policies

A variety of programs and policies exist for the protection and conservation of environmentally critical areas. Due to the geographical overlap of many of the types of critical areas, there is a functional overlap of many of the policies. A program to address one type of critical area, such as a building limitation within a floodplain, may often offer some additional protection for other critical areas, such as wildlife habitat or wetland functions.

Washington State Goals and Mandates

As noted earlier, the GMA requires the identification and protection of critical areas (RCW 36.70A.170 and 172). Critical areas can be found within the urban areas and within the rural and resource areas of the county. These critical areas include: flood hazard areas, geologic hazard areas, wetlands, shoreline and surface waters, habitat conservation areas, aquifer recharge areas and scenic areas. Mapped critical areas can be found in Figures 1-11. In addition, the GMA requires that jurisdictions give special attention to the preservation and enhancement of anadromous fisheries. Policies outlined below are designed to meet the requirements of the GMA.

4.1 Countywide Planning Policies

- 4.1.1 Urban growth areas shall be established consistent with the protection of the environment and the enhancement of the county's high quality of life, including air and water quality, and the availability of water. The establishment of urban growth areas shall also be done in a manner consistent with the preservation of land, sites and structures that have historical or archeological significance.

- 4.1.2 The county and each municipality shall cooperate to ensure the preservation and protection of natural resources, critical areas, open space, and recreational lands within and near the urban area through adequate and compatible policies and regulations. These policies and regulations shall provide for the long-term viability of terrestrial habitat functions and natural watershed processes identified by scientifically-based assessment.

County 20-year Planning Policies

Goal: Protect and conserve environmentally critical areas.

4.2 Policies

- 4.2.1 Identify the variety and diversity of natural environments and incorporate conservation of such areas into all land use decisions.
- 4.2.2 Encourage habitat protection that will provide a diverse and sustainable population of fish and wildlife.
- 4.2.3 Protect groundwater and surface water as a resource for drinking water, commerce, recreation and for wildlife by:
- minimizing the amount of impervious area created by developments;
 - promoting the use of non-toxic pesticides and fertilizers;
 - minimizing potential application of sludge or animal waste material in or near sensitive areas such as aquifer recharge areas or surface water bodies as required by state law;
 - providing stormwater management service as specified in the Capital Facilities and Utilities Element (Chapter 6) of the 20-Year Plan; and
 - using biological engineering methods to control stream bank erosion.
- 4.2.4 Reduce risk to life and property from hazards associated with development in geologically hazardous and floodplain areas by:
- prohibiting or discouraging development in areas of steep slopes or other areas with high potential for geological hazards;
 - limiting the removal of vegetation during development in order to reduce storm runoff and erosion;
 - requiring geotechnical studies to determine construction methods and technologies necessary to further public safety in geologically hazardous areas including landslide areas and steep slopes. Development design and construction technology used shall be appropriate to the soil limitations of the particular site; and,
 - prohibiting development in the floodway. In the flood fringe, development impacts shall be mitigated through the use of appropriate construction designs, methods and timing. Floodplain functions will be protected to the extent possible.
- 4.2.5 Limit clearing of vegetation from stream banks, and restore the integrity of stream banks where degraded by development.
- 4.2.6 Encourage the use of northwest native plants in landscaping, particularly adjacent to critical areas, and discourage the use of invasive non-natives (e.g., English ivy).

4.2.7 Coordinate with other jurisdictions and agencies to protect environmentally critical lands, particularly ecosystems and watershed processes that span jurisdictional boundaries. Encourage consistency regarding methods of critical area definition, mapping, mitigation strategies, and policy treatment.

4.2.8 Facilitate public education and outreach programs explaining the variety of critical area and habitat resources that exist in Clark County and the benefits and opportunities for conservation, protection, and hazard mitigation.

Goal: Protect and recover endangered species within Clark County.

4.3 Policies

4.3.1 In cooperation with the Washington Department of Fish and Wildlife (WDFW), establish appropriate avoidance, minimization, and mitigation measures that functionally replace or improve affected species habitat.

4.3.2 Solicit review assistance from the (WDFW) for development proposals directly affecting state or federal sensitive, threatened, or endangered species.

4.3.3 County operations shall be conducted to meet the requirements outlined in any species recovery program.

Goal: Protect, conserve, and recover salmonids within Clark County.

4.4 Policies

4.4.1 Restore and maintain properly functioning ecosystem conditions for salmonids in all county waters. Implement recovery plans adopted by the National Marine Fisheries Service (NMFS) and the Lower Columbia Fish Recovery Board.

4.4.2 Salmon protections in both urban and rural areas shall be applied using recovery strategies based on best available science and adaptive management principles.

4.4.3 Use incentives and public/private partnerships in land use activities to encourage salmon-friendly development and habitat restoration efforts.

4.4.4 Restore streams and fish passageways in urban sub-basins and other appropriate watershed basins.

Goal: Require sewer service within urban growth areas and discourage septic use.

4.5 Policies

4.5.1 All new development in the urban area should be served by a connection to a public sewer system.

4.5.2 Septic systems in urban areas are to be phased out.

4.5.3 In rural areas, wastewater treatment shall be provided by individual on-site treatment systems or approved alternative sewage treatment technologies.

4.5.4 Existing sewer systems in rural centers shall not be expanded beyond rural center boundaries.

- 4.5.5 Sewer lines shall not be extended except to correct existing health hazards and provided that other means for treatment, such as state approved alternative technologies, have been assessed and determined not to be feasible due to environmental constraints.

GOAL: Protect the waters of the county through a stormwater management program that minimizes impacts from stormwater run-off.

4.6 Policies

- 4.6.1 Minimize impacts to waters of the county through an effective stormwater management program that includes stormwater basin planning and promotion of on-site infiltration to effectively address stormwater in developed and urbanizing areas.
- 4.6.2 Maintain stormwater standards substantially equivalent to those in the Washington DOE Stormwater Management Manual, and continue to monitor and update the stormwater control ordinance and related policies and standards to reduce on-site run-off that implement and enhance stormwater management.
- 4.6.3 Continue to monitor and update the stormwater control ordinance and related policies and standards to reduce on-site run-off that implement and enhance stormwater management.
- 4.6.4 Limit the clearing of vegetation in order to reduce storm water runoff and erosion.
- 4.6.5 Establish a coordinated approach with local jurisdictions to solve both surface water and groundwater issues including the development of regional storm water facilities.
- 4.6.6 County operations shall be conducted to meet the requirements outlined in the National Pollutant Discharge Elimination System permit.

Goal: Protect and enhance the shorelines of Clark County.

4.7 Policies

- 4.7.1 Clark County's Shoreline Master Program as included in Chapter 13 of this comprehensive plan and as codified in CCC Chapter 40.460 shall be implemented to protect and enhance the shorelines of Clark County.
- 4.7.2 The county and its cities shall implement the mutually-adopted shoreline goals, policies, and shoreline designations through development regulations contained in their respective shoreline master programs. Such programs are designed to foster appropriate uses of and access to shorelines of the state while protecting natural resources and shoreline ecological functions. (CWPP)

Goal: Manage the parks and open space of Clark County consistent with protecting water quality and critical areas, and with enhancing the recovery of listed species.

4.8 Policies

- 4.8.1 County Parks will be managed to meet the compliance and recovery objectives as identified through the ESA process and the regional recovery plan.

Goal: Maintain and enhance the region's air quality.

4.9 Policies

4.9.1 Clark County's air resource is to be managed to preserve and enhance air quality.

4.9.2 Land use planning needs to incorporate air quality impacts as an additional land use planning decision criteria.

Goal: Minimize property damage from geological hazards and flooding.

4.10 Policies

4.10.1 Apply reasonable land use and building restrictions in flood hazard areas to minimize the loss of life and property damage.

4.10.2 Work with the cities to coordinate a sustainable approach to natural hazard mitigation on identified critical areas, open space and recreational lands to lessen or eliminate hazards before an emergency happens.

Goal: Clark County shall carry out its activities in a manner that can serve as an example of environmentally sustainable practices.

4.12 Policies

4.12.1 County resources and purchasing power will be used to the extent practicable to support environmentally sustainable business practices.

4.12.2 County activities shall be periodically reviewed and updated to reflect best management practices.

Strategies

The following strategies are proposed as a means to achieve the goals and policies of the Environmental Element. These are a range of strategies that the county is considering and some of these should be implemented over time.

- Develop incentives that encourage open space, recreation, and protection of the natural environment.
- Evaluate a variety of funding sources and their feasibility for acquisition of land and other programs to implement the policies within the Environmental, Rural and Natural Resource Elements.
- Develop and implement comprehensive stormwater management plans, including ongoing monitoring and funding for all watersheds in the county that comply with recovery objectives.
- Develop and implement a watershed protection implementation program that is salmon-friendly with the goals of resolving and preventing deterioration of all local water resources within identified watersheds. Develop and implement watershed plans that recognize watershed processes and that address impacts to wildlife habitat. The program shall:
 - protect groundwater;
 - safeguard drinking water quality;
 - protect surface water quality;

- insure groundwater recharge;
- control urban flooding;
- enhance wetland habitat; and
- establish local funding mechanisms for water quality and water resource protection.
- Develop and implement a protocol to identify natural watershed-wide processes, their inter-relationships reach by reach, and how they might be degraded by human activities. The protocol will be designed to associate the watershed processes with the various environmental mandates imposed by the state and federal governments on Clark County and the jurisdictions within it. The use of a standardized assessment protocol should streamline permitting, promote efficient monitoring and focus restoration and mitigation projects.
- Update ordinances and other regulations to meet salmon recovery goals.
- Investigate the use of a Public Benefit Rating System of property taxation to encourage development, recording and implementation of Stewardship Plans on parcels essential to salmon recovery or other watershed processes.
- Develop measures countywide to ensure erosion and sediment control for new development, re-development, and excavation projects.
- Develop regional detention and on-site disposal system.
- Adopt the use of land use planning software that analyzes air quality impacts of proposed land use actions.