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# APPENDIX E

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## BACKGROUND INFORMATION

### Introduction

Among the first steps in the planning process is to analyze existing conditions in order to identify deficiencies or surpluses, and to determine current levels of services. The background data are then used to calculate future level of service projections and identify future needs.

During the planning process and throughout the preparation of Jefferson County's Comprehensive Plan, large amounts of data were collected and analyzed. This technical appendix includes background data upon which the Comprehensive Plan is based, and which were included in the elements of previous draft versions of Jefferson County's Comprehensive Plan. In response to public comment, the information has been relocated to this appendix in order to retain the information while providing elements that are more clearly understood by the public.

## NATURAL RESOURCE CONSERVATION ELEMENT

### Interim Natural Resource Lands Ordinances

The Growth Management Act required all jurisdictions planning under its provisions to adopt designation criteria and development regulations that conserved Agricultural, Forest, and Mineral Lands of Long Term Commercial Significance. The purpose of these "interim" regulations was to conserve the resource land base of each jurisdiction until such time as this was accomplished for the 20-year planning period by the adoption of a Comprehensive Plan. Guidance on the identification and designation of these lands was provided to local governments by the "Minimum Guidelines" of the Department of Community Development.

### The Local Process

Jefferson County began the process of identifying and conserving Agricultural, Forest, and Mineral Lands of Long-Term Commercial Significance in May, 1991. County Planning staff began public discussion of alternative approaches by issuing a 'Model Forest Lands Protection Policy Statement' on May 7, followed by a public forum on forest lands one week later. After the results of this forum were publicized, citizen workgroups were formed in late September to produce specific policy recommendations. The Resource Lands Workgroup, composed of interested citizens, representatives of affected property owners, and Planning Commissioners, released a report on forest and agricultural lands in December, 1991.

In early 1992, the Planning Commission recommended revisions to the Workgroup proposal and forwarded these to the Board of County Commissioners. Planning staff then built upon these recommendations by holding a series of workshops with the County Commissioners to clarify unresolved policy issues. These Board workshops allowed staff to produce draft Forest and Mineral Land Ordinances that were released for the review of the Planning Commission in April and May. Additionally, the Board of Commissioners provisionally concluded that no Agricultural Lands of Long-Term Commercial Significance existed in Jefferson County.

The draft Mineral Land Ordinance was approved by the Planning Commission with only minor revisions. However, the draft Forest Land Ordinance was found to be inadequate by the Planning Commission. The formation of an Ad-Hoc Forest Lands Committee was approved to develop an alternative method for forest land designation.

On July 22, 1992, the Committee submitted a report on forest land designation to the Planning Commission. Although a consensus could not be obtained from all participants, the report's recommendations formed the basis of future discussions of the Forest Land issue. After several months of revision, the Planning Commission forwarded their recommendations to the Board of Commissioners in October.

Little progress was made on the designation of natural resource lands until October, 1993, when a Board of Commissioners workshop was held. The workshop resulted in the reformation of the Ad-Hoc Forest Lands Committee to evaluate the final Planning Commission recommendations. The Ad-Hoc Committee met periodically until January, 1994, when two divergent proposals for the designation of Forest Lands emerged. These alternative designation and conservation plans were reviewed by the Board of Commissioners and were taken to public hearing in March, 1994.

With two polarized proposals and no indication of movement toward compromise, planning staff issued a "middle ground" designation proposal for Forest Lands, together with a draft ordinance for the designation of Mineral Lands. The Board of Commissioners held a public hearing on both these ordinances in April and directed staff to make necessary changes to these proposed ordinances at review workshops held in June. The "middle ground" Forest Lands ordinance and the Mineral Lands ordinance were adopted in July.

Also during this time, planning staff produced a draft resolution addressing Agricultural Lands. Resolution 67-94, adopted in June, built upon the 1992 discussions of the previous County Commissioners. It concluded that no Agricultural Lands of Long-Term Commercial Significance existed in Jefferson County as a result of a combination of economic, locational and physical factors.

### **Western Washington Growth Management Hearings Board Appeals**

These interim ordinances and the Agricultural Lands resolution did not remain in effect without challenge. In September, 8 and 9, 1994, the Western Washington Growth Management Hearings Board (W.W.G.M.H.B.) received petitions for review of the interim mineral and forest land ordinances, together with Resolution 67-94 addressing agricultural lands, from the Olympic Environmental Council, the Washington Environmental Council, and the Washington State Department of Natural Resources.

In October, 1994, the County passed an emergency ordinance that committed the County to adopting new interim resource land ordinances by November 30, 1994. This reopened the public process for interim designation of resource lands and allowed the County to accept testimony and hold workshops to consider the proper criteria for designation. This deadline was later extended, first to December 14, 1994, and later to February 15, 1995.

A public hearing was held on January 11, 1995, by the W.W.G.M.H.B. on the merits of the appeals of the County's interim natural resource lands ordinances. On February 16, the Hearings Board issued its final decision and order on the appeals (Case No. 94-2-0017).

The W.W.G.M.H.B. found Resolution 67-94 out of compliance with the Growth Management Act because it did not comply with the requirements for the interim designation and protection of agricultural lands. Specifically, the Board found that there was no evidence in the record to support the County's non-designation of agricultural lands. Additionally, the language in the resolution that postponed the designation of agricultural lands was in direct conflict with the requirements of the GMA.

Jefferson County's interim mineral lands ordinance was also found to be out of compliance with the requirements of the GMA on the grounds that it did not contain regulations addressing the presence of incompatible land uses on property adjacent to designated mineral resource lands.

The "middle ground" designation scheme of the interim forest lands ordinance was found to violate the requirements of the GMA. Most significantly, the Board ruled that the designation criteria were not the result of a reasoned deliberation and decision-making process. Additionally, several of the criteria were found to be inappropriate factors for the conservation of forest lands, including exemption of forest lands based upon proximity to a road and restriction of the designation of forest lands to DNR Land Grades 1 through 3. This scheme was found to omit tens of thousands of acres that was devoted to the commercial production of timber and was not subject to development pressure.

The County was directed by the Hearings Board to adopt interim agriculture, mineral, and forest land ordinances that designated and protected natural resource lands within 60 days of the issuance of the final decision.

### **Working Toward Compliance**

In response to this decision, the County began drafting ordinances intended to designate and protect natural resource lands of long-term commercial significance. Because the majority of available staff resources were devoted to producing a new interim forest land ordinance within the mandated deadlines, the opportunity for a full public participation process to develop the interim agricultural and mineral land ordinances was limited.

In order to produce an agricultural land designation and conservation system, a thorough review of earlier public testimony, the Department of Community Development Minimum Guidelines, and U.S. Department of Commerce statistics was conducted. Through this process, a strategy was designed to retain land that is both prime agricultural soil and in agricultural use, while providing the landowner with the flexibility to supplement their agricultural income by providing appropriately scaled development and use options.

Following review of written testimony received in November 1994, the County began to write a draft ordinance intended to designate and conserve mineral resource lands of long-term commercial significance. However, review of the draft interim forest lands ordinance suggested that it provided the necessary framework for assisting in the conservation of potential mineral extraction sites. The size of the parcels required for the practice of long-term forestry and the high degree of overlap between land devoted to timber growing and land potentially containing commercial mineral deposits offered an alternative strategy for protection of mineral lands. By including mineral extraction and primary processing as permitted uses on designated forest land, Jefferson County's mineral resource land base is protected, while preserving the possibility of its future utilization.

Interim Agricultural, Mineral, and Forest Lands Ordinances that implemented these strategies were adopted on May 25, 1995.

Through reference to a previously released iteration of the forest lands ordinance and the earlier deliberations of the Planning Commission, a new draft forest lands ordinance was produced. The Planning Commission reviewed this draft ordinance and determined that it did not fully implement the forest land designation scheme they had developed at earlier workshops. The Planning Commission requested staff to produce G.I.S. maps that displayed their preferred designation options and declined to consider the issue any further until this was accomplished.

Based upon the maps of the preferred designation options, the Planning Commission held a workshop to consider forest land strategies. From this workshop, a two-tier designation and conservation approach emerged as a consensus. After further analysis and consideration, the Planning Commission completed their deliberations and produced a forest land designation system that identified two classes of forest resource land, Commercial Forest Lands of Long-Term Commercial Significance and Rural Forest Lands. The differences in the two classes were determined by the size of the parcel and the average net yield per acre of the land.

A public hearing on the sixth draft of a forest land ordinance was held by the County Commissioners on May 1, 1995. Following two workshops to review testimony received at the public hearing, an Interim Forest Lands Ordinance (Number 07-0524-95) was adopted on May 24, 1995. This ordinance became effective on June 5, 1995.

A compliance hearing on the Forest Lands Ordinance was held by the Western Washington Growth Management Hearings Board on July 18, 1995. The Agricultural Lands Ordinance and the Mineral Lands Ordinance were not challenged, so they remained in effect without modification. At the compliance hearing, the following provisions of the Forest Lands Ordinance were found to be out of compliance with the GMA:

- The ordinance contained a minimum net yield criterion that excluded lands from Commercial Forest Land designation that did not produce twenty five-thousand (25,000) board feet of timber per acre over a fifty (50) year growing cycle. The net yield chosen would exclude all Department of Revenue Private Forest Land Grade 4 and some Grade 3 land, which is commercially viable in Jefferson County. The Hearings Board found that this criterion did not adequately protect the land being commercially forested in Jefferson County.
- The ordinance contained an “opt-out provision” that would allow landowners to remove lands from Commercial Forest Land designation if the minimum net yield criterion was not met. The Hearings Board ruled that this could prove as a disincentive to good and intensive forest land management. By poorly managing the resource and reducing productivity, landowners could have the designation removed from their land and convert to non-forest use. This does not provide the long-term predictability necessary to conserve forest land and manage conversions.
- The ordinance allowed transfer of development rights, cluster development, and subdivision in the Rural Forest Land zone. The Hearings Board found these regulations would allow densities and patterns of residential development that were incompatible with commercial forest management. The ordinance also failed to implement enforcement mechanisms necessary to protect the forest lands from the allowed development.

Based upon these findings, the Hearings Board invalidated both the minimum net yield criterion and the opt-out provision of the Interim Forest Lands Ordinance on August 17, 1995.

Jefferson County declined to accept the Hearings Board finding of non-compliance and appealed the decision to the Washington State Court of Appeals. The Court of Appeals agreed to hear Jefferson County's appeal of the Hearings Board decision.

However, as the appeal proceeded, the County continued negotiations with the Olympic Environmental Council and the Washington Environmental Council to bring the Forest Lands Ordinance into compliance with the Growth Management Act. This process was being mediated by the Washington State Department of Natural Resources.

### **Achieving Compliance**

On December 2, 1996, the parties named in the initial appeal of the County's Interim Forest Lands Ordinance (Number 07-0524-95) successfully concluded the mediated settlement process. The parties involved in the settlement process reached a compromise that eliminated the need for further litigation over the designation and conservation of forest land and dismissed the appeal before the Court of Appeals.

The settlement process was concluded by agreeing to a Memorandum of Understanding, which included among its provisions a proposed ordinance for consideration by the Board of County Commissioners. The Memorandum of Understanding also stipulated that the parties involved in the settlement process would recommend a finding of compliance for Jefferson County at the compliance hearing before the Western Washington Growth Management Hearings Board.

The Board held a public hearing on the proposed ordinance on December 16, 1996, and it was adopted into law on January 21, 1997 as Ordinance Number 01-0121-97. In addition to bringing the County into compliance with the applicable regulations of the Growth Management Act, adoption of the Interim Forest Lands Ordinance will have the beneficial effect of insuring the interim designation of productive and profitable forest lands that can be successfully and sustainably managed for commercial forestry.

## **EXISTING CONDITIONS**

### **Forest Lands**

Jefferson County's forest lands provide local, regional and national benefits that are basic to our quality of life. In addition to supplying a variety of wood, fiber, and other products, forest lands produce oxygen and supply pure water, control flooding and soil erosion, enhance ground water recharge, provide habitat for innumerable plant and animal species, and offer scenic vistas and recreational opportunities. The County's forests provide employment in wood, paper, recreation, tourism, and fishing industries. Properly managed forests are fundamental to a healthy, diverse economy and environment.

Traditionally, forest land use has been seen as a lower economic value compared to agriculture, rural, suburban, urban, commercial, or industrial uses. As a result, some forest landowners have held forest land in reserve at low cost through forestry and open space tax programs while waiting for the growth of more intense land uses in proximity to their property. Many landowners in Jefferson County have taken advantage of the current use tax valuations to make forest management on their land more economical. These programs also benefit community interests by maintaining land in open space and forestry use.

The growth in human population has resulted in the loss of forest lands through conversion to non-forest uses. Premature conversion of those productive forest lands to other land uses which are incompatible with the management of forest resources is recognized as a significant threat to the forest industry. These conversions include changing the use of forest land from commercial timber production to residential,

commercial, industrial, or agricultural uses. Once forest land has been converted and roads, utilities, and other infrastructure have been constructed, the land is not as useful for long-term commercial forest production. Additionally, the encroachment of incompatible land uses into areas devoted to forest production can create conflicts.

There is a genuine need to promote conservation of productive forest land through regulatory protection as mandated by the Growth Management Act. However, this must also be balanced by providing incentives to maintain lands in long-term commercial timber production. Increasing demands are being placed upon the remaining forest land base to provide goods, recreational opportunities, and ecological functions. It is Washington State and Jefferson County policy to provide forest landowners with long-term land use predictability, for both productive forest lands and adjacent non-forestry use lands.

### **Mineral Lands**

As a result of major glacial activity in the geologic past, significant deposits of sand and gravel are located in Jefferson County. This geological heritage provides the raw material for several sand and gravel operations distributed evenly throughout eastern Jefferson County. Mining and processing these deposits is an important part of the County's economy, providing jobs and producing materials used locally and regionally. In 1994, there were seventeen (17) permitted surface mines in Jefferson County, covering approximately 150 acres.

While urbanization creates demand for sand and gravel resources, it may also encroach upon or build over those same resources, rendering them inaccessible. Community opposition to mining near residential, agricultural, or sensitive environmental areas may also limit the opportunities for mineral extraction. Potential conflicts with other land uses may include noise, dust, visual impacts, and increased traffic. Citizens may be unaware of the County zoning of surrounding property and allowed mining uses, which contributes to the conflicts between the aggregate industry and property owners.

Environmental issues associated with surface mining include groundwater impacts and disruption of fish and wildlife habitat. It is not uncommon in Jefferson County to have mineral deposits located above an aquifer recharge area. Because mineral extraction reduces the soil barrier, mining in these areas can make the area more susceptible to groundwater contamination from turbidity, industrial spills, or agricultural products. Excavation through a clay barrier or sidehill can tap the groundwater and drain an aquifer. However, as mineral deposits are depleted, reclamation to lakes or wetlands can have a positive effect on water quality and mitigate the displacement of wildlife.

Jefferson County recognizes the needs of existing residents while responding to the requirements of the Growth Management Act to protect mineral deposits of long-term commercial significance. The County's policies regarding mineral resource lands form the basis for allowing mining activities to occur and prevent residential and other incompatible uses from locating adjacent to these deposits. However, the policies also provide that mining activity should not encroach upon existing residential uses or adversely impact the environment.

### **Aquacultural Resources**

Prior to Non-Indian settlement in the Northwest, the utilization of the fisheries resource was the primary means of sustenance and maintenance of a rich cultural tradition for the Indian tribes residing in the region. The fishery resources were used for food and to trade among themselves and later with non-Indians for things that were unavailable in their particular areas. Indians had long been settled in villages along the marine waters, the lengths of the major rivers, the tributaries of the Hood Canal, and the

Washington coast in what is now Jefferson County. The Skokomish, S'Klallam, Quileute, Hoh, and Quinault Tribes all fished in marine waters and heavily relied on salmon caught in their respective rivers.

The fisheries resource remains a central part of the Jefferson County economy. A thriving commercial shellfish industry is located in Quilcene and Dabob Bays, and includes the world's largest shellfish hatchery. The presence of two large shellfish hatcheries within this area is an indication of the purity of the water, as shellfish larvae require exceptionally clean water to be reared successfully. A 1994 study estimated that the value of oyster seed, shellfish larvae, and other commercial shellfish products had an annual value of over six million dollars (\$6,000,000).

Nearly all marine shorelines in Jefferson County are productive areas for recreational shellfish harvesting, which contributes to the unique character of the area and is a popular tourist attraction. The spillover economic activity generated by the tourism industry as a result of this aquacultural resource is significant.

In addition to these marine based aquacultural operations, several land based fish hatcheries are located in Jefferson County. These operations rely on the plentiful and pure water from shallow aquifers to raise fin-fish, often pumping millions of gallons per day.

The wild and hatchery salmon harvest in rivers and marine estuaries also represents a significant economic resource to Jefferson County. A 1996 study estimated that the economic value of the tribal and commercial salmon harvest from the Queets and Hoh Rivers and Hood Canal exceeded \$3.4 million dollars. The study estimated that an additional \$1 million is generated by recreational steelhead fishing on the Hoh and Clearwater Rivers.

However, Jefferson County is experiencing significant residential growth and expansion of tourism, which in many instances have significant cumulative adverse impacts to the marine resource that is the foundation of the aquacultural resource.

Presently in Washington State, nearly 40% of productive shellfish tidelands are decertified or have restricted harvests. This downgrade is due mostly to non-point source pollution in the more densely populated areas. Efforts are being made to recover these areas, but it is very difficult and expensive to reverse these trends. Some restricted areas may never be recovered.

Salmon runs have been decreasing in Jefferson County since 1976, when accurate records began to be kept. These decreases are due to loss of fresh- and salt-water fish habitat, increased public demand for food consumption, and overfishing by recreational, commercial and tribal fisheries.

Jefferson County can maintain its relatively waters and fish and shellfish habitat areas if conservation, protection, and recovery measures are implemented before significant and potentially irreversible downgrades are experienced.

## **HOUSING ELEMENT**

### **Introduction**

The standard structure of housing planning analysis is: "needs minus resources equals gaps." This means that the first step in assessing the present and future housing requirements of Jefferson County is to analyze the characteristics of its existing and projected population, including age, household size, income, location and special needs. These characteristics of the population provide an indication of the nature of the demand for housing over the 20-year planning period.

The second step in assessing the housing requirements of County residents is to analyze the characteristics of the existing and expected housing supply, including location, size, cost, and condition. These characteristics of the housing stock provide an excellent indication of what forms the supply of housing will take over the 20-year planning period.

### Data Sources

The demographic and housing data and information contained in this element were derived from the following sources:

- 1990 U.S. Census of Population and Housing;
- 1991 Jefferson County Housing Needs Assessment Summary Report;
- 1994 Washington State Comprehensive Affordability Strategy; and,
- Population Forecast for Jefferson County and Port Townsend: Final Report (December 1994), prepared for the County and the City by the Watterson West Group.

### Demographics

#### *Population and Household Growth*

Jefferson County is one of the fastest growing counties in the State of Washington. A significant amount of this County growth is occurring in the Master Planned Resort of Port Ludlow. Once the Port Ludlow community is “built out” during the next 20-year phased development program, rate-of-growth projections will be significantly lower, and Jefferson County could become one of the slower growing counties in the State of Washington. Table E-1 provides historic information on the population of Jefferson County and Port Townsend. Over the past twenty years, most of the household growth has occurred in unincorporated areas, specifically the Master Planned Resort of Port Ludlow, the Quimper Peninsula and the Tri-Area. During the period from 1973 to 1993, the percentage of the County population living in Port Townsend decreased from 49.1% to 32.9%.

**Table E-1  
Population in Jefferson County, 1973-1993**

Jurisdiction	1973	1983	% Change 1973-1983	1993	1997	% Change 1983-1997
Total Jefferson County	10,600	16,800	58.5%	23,500	26,300	56.5%
Unincorporated	5,400	10,600	96.3	15,760	17,970	69.5%
Port Townsend	5,200	6,200	19.2	7,740	8,330	34.4%

Table E-2 provides data on the number of residential building permits issued for new residential structures during the 20-year period between 1975 to 1995. The largest number of new residences (almost 20%) was issued within the city limits of Port Townsend. Building activity within the City was closely followed by construction of new residences within the Tri-Area (17.3%) and the Quimper Peninsula community (17.0%). The Port Ludlow Master Planned Resort generated 10.5% of all new housing permits in the County within this same 20-year period.

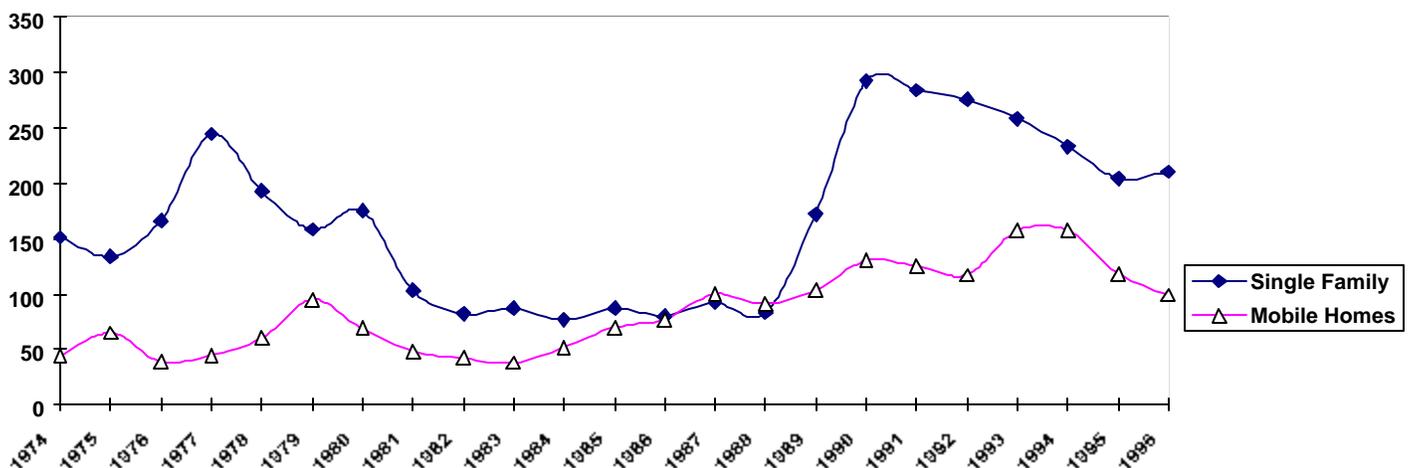
**Table E-2**  
**Single Family Residential Construction and New Mobile Homes<sup>a</sup>**  
**During the Past 20 Years, 1974-1996**

Location	Building Permit Totals 1974-1996	Percent of Building Permits
<b>Incorporated Areas:</b>		
Port Townsend	1400	19.6%
<b>Unincorporated Areas:</b>		
Quimper Peninsula (including Glen Cove)	1216	17.0%
Marrowstone Island	313	4.4%
Tri-Area (Kala Point, Irondale, Port Hadlock, and Chimacum Crossroads)	1239	17.3%
Discovery Bay (including Gardiner)	169	2.4%
S. Chimacum / Inland Valleys / Center	333	4.7%
Port Ludlow Planned Community	749	10.5%
North Port Ludlow	322	4.5%
Paradise Bay / Shine / Thorndyke	351	4.9%
Toandos Peninsula (including Coyle)	147	2.1%
Quilcene (including Lake Leland Valley)	375	5.2%
Brinnon	508	7.1%
West End	33	0.5%
<b>Jefferson County Total</b>	<b>7155</b>	<b>100.0%</b>

Note: <sup>a</sup>Data includes “stick built” construction and mobile homes, but does not include multi-family units.

Figure E-1 illustrates the annual issuance of building permits for both stick built and manufactured homes County-wide between 1975 and 1996.

**Figure E-1**  
**Annual Building Permits for Single Family Residences & Mobile Homes**  
 Source: Jefferson County Permit Center



As can be seen in Table E-3, the age distribution of Jefferson County residents shows that those over sixty years of age make up over one-quarter (27.2%) of the population.

As Jefferson County realizes an increase in senior households, demand for a variety of services and programs will also increase. For example, demand for assisted housing will increase as will the demand for subsidized home repair and weatherization services for seniors. Assisted housing provides an intermediate step between independent living and nursing home care. Many seniors benefit from this intermediate level of care which provides a “graduated” level of support through the provision of meals, nursing care and chore services. Providing some variation of these types of services helps many elderly retain a higher degree of independence and quality of life than is afforded in a traditional nursing home.

Opportunities to access subsidized home repair and weatherization programs is also important to helping seniors maintain their quality of life. Often on fixed incomes and with limited physical capacity, the elderly need assistance helping keep up their homes. The importance of this type of program to the senior population is illustrated in neighboring Clallam County where almost 80 percent of the Housing Rehabilitation Program participants are seniors.

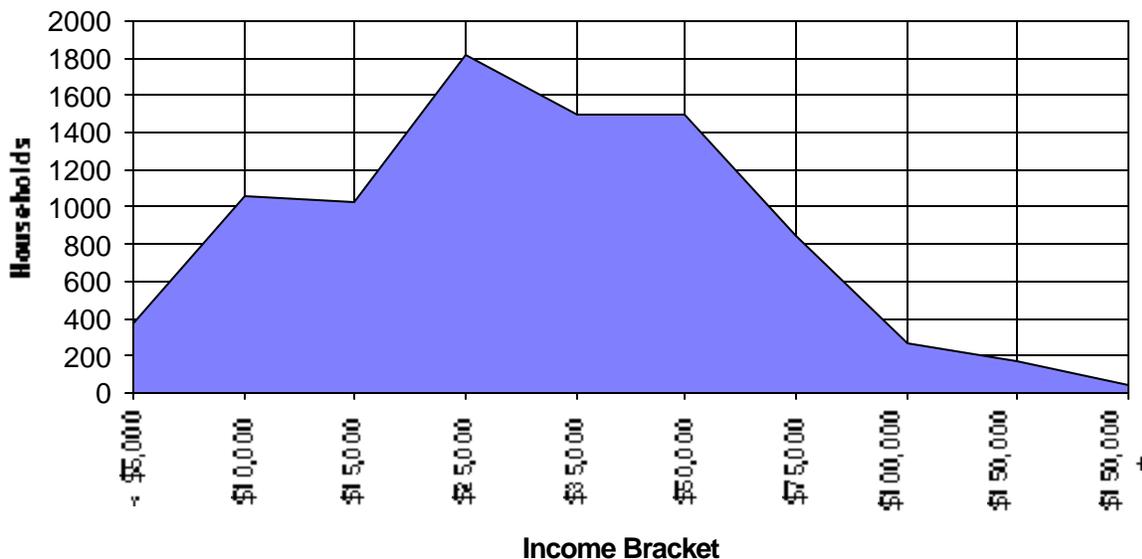
**Table E-3**  
**Age Distribution**

<b>Age Group</b>	<b>Population</b>	<b>Percent of Total</b>
0-19	4,892	24.3%
20-39	4,809	23.9
40-59	4,958	24.6
60+	5,487	27.2
Total	20,146	100.0%

### Household Income

The distribution of income among households is an essential component of housing affordability. Figure E-2 presents the income distribution for the residents of Jefferson County as compiled for the 1990 Census.

**Figure E-2  
Household Income\***



\* The household income data presented in Figure E-2 is based on the 1990 Census of Population and Housing. Therefore, incomes are in 1989 dollars.

Despite inherent shortcomings in collecting income data, this information is important because it can be used to calculate median household income. Median income is defined as the mid-point of all of the reported incomes. That is, if the reported incomes were sorted by amount, half the number of households had higher incomes and half had lower incomes than the median. Median household income is used because the median is less susceptible to being influenced by a small number of very high or very low incomes than average income.

In 1990, the median income in Jefferson County was \$25,197. In 1996, the Office of Financial Management estimated the median income to be \$31,136.

The definitions of very low, low, and moderate income households are established by the U.S. Department of Housing and Urban Development (HUD). These income levels are based on fixed percentages of the area's median income for a household of four. These categories are used to evaluate and prioritize the relative housing needs of income groups that may require housing assistance. For example, the 1994 Washington State Comprehensive Housing Affordability Strategy specifies that the State will give priority assistance to households earning fifty percent (50%) of the median income or less.

**Table E-4  
Households by Income Group**

Income Group	Definition	1996 Income Level	Number of Households	Percentage of Households
Extremely Low Income	Less than 30% of Median	\$0-9,341	898	10.4%
Very Low Income	31% to 50% of Median	\$9,342-15,568	1007	11.7%
Low Income	51% to 80% of Median	\$15,569-24,909	796	9.2%
Moderate Income	81% to 95% of Median	\$24,910-29,579	431	5.0%
Middle Income	96% to 120% of Median	\$29,560-37,363	1294	15.0%
Upper Income	Greater than 121% of Median	Greater than \$37,364	4201	48.7%

The distribution of households in these income categories is an important consideration in determining affordability targets as part of Jefferson County's housing policies. As discussed above, the County-wide Planning Policy establishes a housing cost threshold of thirty percent of household income.

### ***Housing Tenure***

E-5 shows housing units by tenure, or type of occupancy (owner occupied, renter occupied, or vacant).

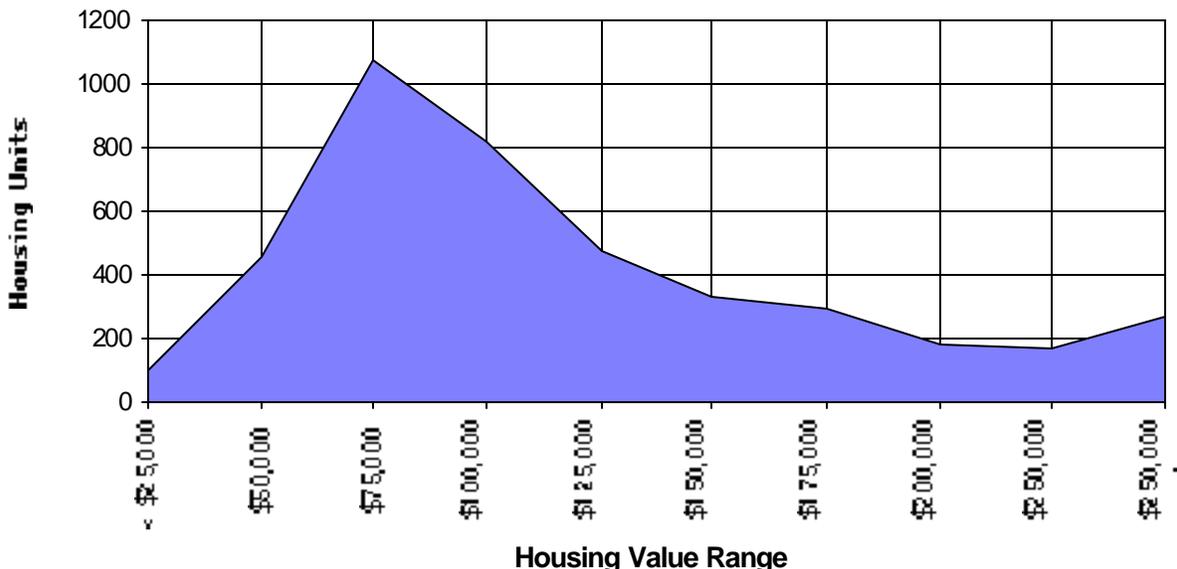
**Table E-5  
Housing Units by Tenure**

Housing Occupancy Type	Number of Units	Percent of County Total
<i>Occupied</i>		
By Owner	6,376	57.9%
By Renter	2,251	20.4
Total Occupied Units	8,627	78.3
<i>Vacant</i>		
For Rent	97	0.9
For Sale Only	120	1.2
Seasonal	1,730	15.7
Other	440	4.0
Total Vacant Units	2,387	21.7
<b>Total</b>	<b>11,014</b>	<b>100.0%</b>

### ***Housing Costs***

Figure E-3 presents the distribution of housing values as reported in the 1990 Census. The Census arrives at these figures from questionnaires that ask the respondents' opinion of what their house and/or property would sell for if it were currently for sale. Given the distribution of reported values for owner-occupied housing, the median housing value was \$88,700 in 1989.

**Figure E-3  
Housing Value Distribution\***



\* The housing value data presented in Figure E-3 is based on the 1990 Census of Population and Housing. Therefore, values are in 1989 dollars.

There has been a steady increase in the price of used single family homes and a steady series of fluctuations in the price of new single family homes. New home prices are driven by a number of factors for which used home prices are not affected. This includes, but is not limited to, labor and materials costs, permitting costs, land costs and costs of meeting regulatory requirements.

Over the five year period between 1989 and 1993, the average price for a used single family home, on five or fewer acres, rose from \$85,734 to \$135,132, or a 58 percent increase. For these homes located on more than five acres, the average sales price rose from \$72,728 to \$170,227, a 134 percent increase. This suggests that a primary component in the increasing sale prices of existing single-family residences is the land cost.

Figure E-4 presents the distribution of rents in Jefferson County as reported in the 1990 Census. Given the distribution of reported values for renter-occupied housing, the median gross rent was \$384 in 1989.

**Figure E-4  
Rent Distribution\***



\* The contract rent data presented in Figure E-4 is based on the 1990 Census of Population and Housing. Therefore, values are in 1989 dollars.

Rising housing costs are also true for the rental market. The 1991 Jefferson County Housing Needs Assessment Summary Report provides a detailed description of housing costs in sub-areas within the County. Table E-6 compares the 1991 typical monthly rents within the County based on the results of a 1994 rental-cost survey by the ERA Real Estate Company.

**Table E-6  
1991-1994 Rental Rate Comparison**

Number of Bedrooms	1991			1994
	Port Townsend/ Port Hadlock	Quilcene	Brinnon	Unincorporated Jefferson County
One	\$300	\$250	\$225	\$375 to \$450
Two	\$500	\$350	\$300	\$425 to \$600
Three	\$600	\$500	\$350	\$600 to \$700
Mobile Pad	\$100	\$75	\$75	\$135 to \$150

Although rents for all sizes of rentals increased during this period, increased demand for one bedroom rentals resulted in significant inflation in rents for this type of unit. It is instructive to observe that rents decrease as one moves away from Port Townsend. Rents in Quilcene tend to run \$50 to \$75 less than the average for unincorporated areas of the County. Similarly, rental costs in Brinnon are also \$75 to \$100 less than the average.

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### ***Housing Condition***

There is no comprehensive information available on the condition of rental housing throughout Jefferson County. The 1990 Census indicates that over four percent (4.5%) of the County's housing units lacked complete plumbing facilities. Over two percent (2.5%) of housing units lacked complete kitchen facilities. The Census does not collect data on other substandard housing characteristics or assesses housing condition.

Therefore, it is reasonable to assume that the Census information understates the number of substandard housing units and the number of households living in substandard conditions. Further evaluation of housing conditions in Jefferson County should be conducted in order to develop appropriate policies to address these issues.

### **Affordability**

A good indicator of affordability is provided by the Housing Affordability Index, which is calculated for each county in the state by the Washington State Center for Real Estate Research at Washington State University. The Housing Affordability Index (HAI) measures the ability of a median income household to carry the mortgage payments on a median price home.

The index is produced quarterly and is based upon housing market activity during the previous period. The prevailing interest rate during the quarter in that county is used to calculate housing costs. All loans are assumed to be thirty year, fully amortizing mortgages. The buyer index assumes a twenty percent (20%) down payment, with twenty five percent (25%) of income used for principal and interest payments.

A separate HAI is calculated for first time homebuyers. This index assumes the household has seventy percent (70%) of the median income. The first time buyer HAI assumes the house being purchased is eighty-five percent (85%) of the area's median price, with a ten percent (10%) down payment.

The baseline for the index is a value of 100, which indicates there is a balance between the family's ability to pay and the cost of the housing. Index values greater than 100 indicate housing is more affordable. That is, the ability to pay exceeds the cost of the housing. Index values less than 100 indicate housing is less affordable. That is, the median income household cannot afford the median priced home.

The HAIs for 1996 indicate that home ownership is becoming beyond the reach of the median income household in Jefferson County. The 1996 HAI for the County was 85.7, which indicates that the median priced home was almost fifteen percent (14.3%) more expensive than the cost that the median income household could afford.

First time homebuyers were confronted with a more difficult challenge to purchase an affordable home. The 1996 First Time Buyers HAI for Jefferson County was 51.4, meaning that the median priced starter home was nearly twice (48.6%) as expensive than could be afforded by a first time homebuyer.

## **ECONOMIC DEVELOPMENT ELEMENT**

### **The Role of Economic Development**

Economic Development has evolved from an activity which emphasized "industrial" development to one that is more akin to a planning process encompassing a larger and more diverse set of community concerns. Over the past couple of decades, economic development has refocused its efforts from one

concerned with developing real estate to one emphasizing the need to develop a community's capacity to receive economic growth. Today, economic development is seen as an integral part of community development. The economic base of Jefferson County is presently in a state of transition. Historically, Jefferson County's economic base was closely tied to resource-based "extractive" activities such as fishing and timber. For a variety of reasons, Jefferson County's economic base is facing a major restructuring, and there is a need for a strategy to provide guidance. It is the intent of the Economic Development element to provide the needed guidance and strategy.

Jefferson County has always attracted people because of its natural endowments which greatly contribute to its livability and quality of life. However, the economic opportunities historically provided by the County's natural environment are no longer as abundant and/or profitable. The County's economic development strategy should help the County move away from dependence on traditional resource-based economic activities and begin to seek alternative economic opportunities for all of Jefferson County's residents. To develop a new jobs-based economy, Jefferson County must begin to develop capacity for economic growth that is compatible with the vision of the County as a high quality of life place to live and work. To do this the County must develop a balanced approach to economic development which encompasses new business start-ups, recruitment of industry, retention and strengthening of existing businesses, and expansion of growing businesses. By developing a strategy to support and aid in the development, expansion and diversification of commerce, Jefferson County will provide incentives for businesses to create new employment opportunities, and thereby, help to create and maintain a healthy standard of living for all Jefferson County residents.

Economic development is an integral component of several elements in the Jefferson County Comprehensive Plan. For example, economic development can create opportunities for recreation, housing, and public facilities and services. Furthermore, the economic health of the County community will help foster an environment where historic preservation and environmental protection are valued. The importance of a viable economic development strategy is key to ensuring that the residents of Jefferson County are provided with a diversified job base to both maintain and improve the quality of life so valued by the residents of Jefferson County.

### **JEFFERSON COUNTY'S ECONOMY**

In Jefferson County, timber and fishing have historically dominated the regional economic base. Industries related to fishing, logging, primary manufacturing, and pulp and paper have all felt the effects of recent reductions in the available resource. A reduction of available jobs in these industries has been a direct result of these changes.

Employment in lumber and wood products, historically the mainstay of Jefferson County's economy, has declined significantly between 1983 and 1993. According to the Washington State Employment Security Department employment has declined from over 250 jobs to 60 jobs in this sector. Wages have also fallen significantly in this sector over this same time period.

While the County has lost family-wage paying jobs in the resource-based sector of the economy, new job opportunities have been created in the service, wholesale and retail industries. Unfortunately, these new jobs do not pay wages comparable with the resource industries.

During the past two decades, Jefferson County's economy has become more oriented towards the service sector. Because of the County's proximity to the Puget Sound region, the County has been able to develop a strong economy based on trade, tourism and service sector industries. Developing in concert with this new segment of the local economy is an expanding elderly or retiree population that places new demands on the local economy. Jefferson County is achieving a reputation as an ideal retirement

destination, and retirement-related industries such as health care are rapidly growing sectors of the economy. As these segments of the economy continue to develop, more businesses will “start up” to take advantage of the economic benefits accruing from those seeking recreational and leisure opportunities and the needs associated with the local population becoming characterized by an increasing proportion of seniors.

As the local economy begins to adjust to accommodate new opportunities, the County needs to develop programs to ensure the availability of adequate labor pools, infrastructure, housing, education and other factors that provide prospective firms some relative advantage in their market. According to the Washington State Department of Employment Security, labor is probably the most important factor for local efforts targeting the expansion and diversification of the local economy. Recent demographic trends in Jefferson County illustrate the shrinking of the age 24-and-under labor pool, which could very likely lead to a tightening of local labor supply. While some of this shrinkage may be offset by in-migration, the trends suggest that in-migration will continue to “age” the population.

Recently there have been signs suggesting the decline in the resource-based industries is tapering off. After several years of economic distress resulting from low market prices for paper products, some of the region’s pulp and paper employers are starting to see some relief. The Port Townsend Paper Mill, the County’s major employer, has recently made major capital investments in the Port Townsend plant to accommodate recycling operations.

Clearly the regional economy has not completed a transition to a new structure, but continued efforts to streamline operations, maximize the limited opportunities, and look for niche markets are all contributing to continued economic activities related to the region’s historical economic base.

## **ECONOMIC CHARACTERISTICS**

### **Introduction**

Jefferson County features a diverse economy, with pulp and paper, marine trades, government, tourism and wood products industries all playing important roles. Traditionally dependent on natural resources, the economic base has expanded over the past twenty years to include an internationally recognized marine trades industry, diversified manufacturing, and a multi-season tourism sector. Combined with the stability of the government sector, the local economy has not been as heavily impacted by the severe downturns that have devastated other rural resource-based communities. As with the rest of the country, small business development and the growing number of self-employed are becoming increasingly important to Jefferson County’s economy by contributing to its increasing diversity.

As illustrated in Table E-7 and Figure E-5, over the past two decades there has been a dramatic shift in the County’s employment base. In 1970, manufacturing jobs comprised 35 percent of all jobs in the County. By 1990 this sector’s share of total jobs fell to 13.9 percent. Concurrently, service and trade jobs have increased from 11.3 and 14.8 percent of the total, respectively, to 18.8 and 25.2 percent of the total.

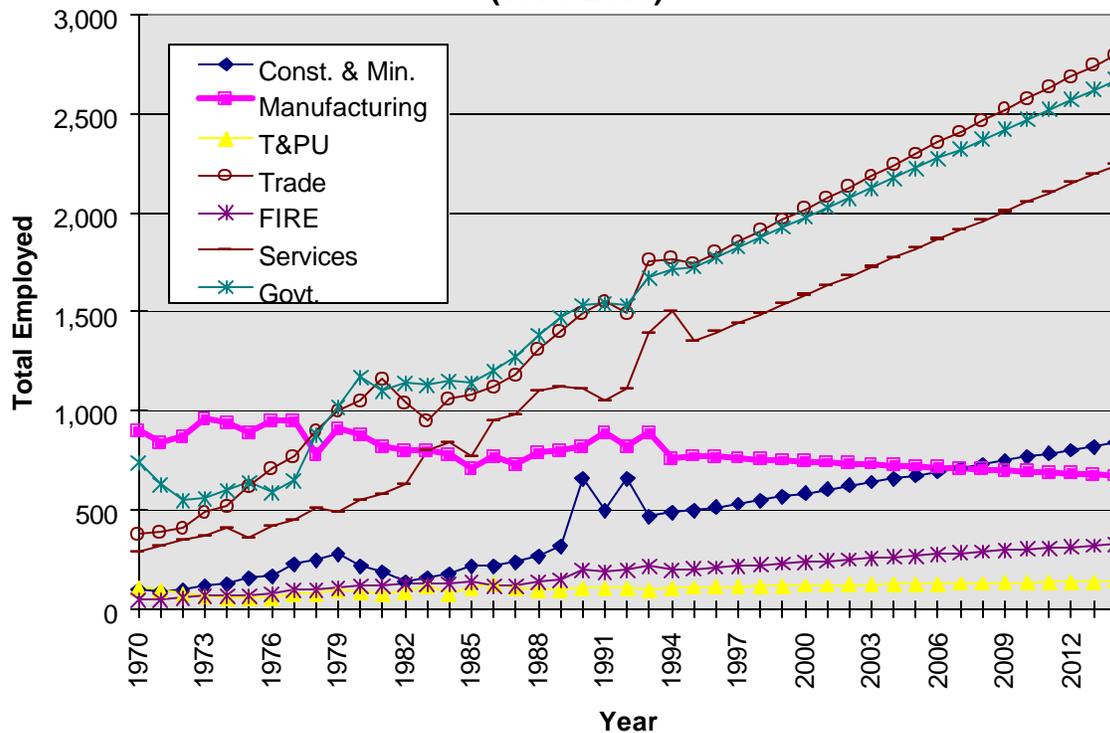
**Table E-7  
Employment Trends for Jefferson County by Industry**

Industry	Employment by Industry									
	1970		1980		1990		2005		2014	
	Total	% of Total	Total	% of Total	Total	% of Total	Total	% of Total	Total	% of Total
Const. & Mining	100	3.9%	220	5.4%	660	11.1%	678	8.3%	841	8.7%
Manufact.	900	35.0	880	21.6	820	13.9	722	8.9	675	7.0
T&PU*	110	4.3	90	2.2	110	1.9	129	1.6	143	1.5
Trade	380	14.8	1,050	25.7	1,490	25.2	2,296	28.2	2,794	28.8
FIRE**	50	1.9	120	2.9	200	3.3	272	3.3	330	3.4
Services	290	11.3	550	13.5	1,110	18.8	1,818	22.3	2,241	23.1
Govt.	740	28.8	1,170	28.7	1,530	25.8	2,222	27.3	2,669	27.5
<b>Total</b>	<b>2,570</b>	<b>100.0%</b>	<b>4,080</b>	<b>100.0</b>	<b>5,920</b>	<b>100.0%</b>	<b>8,137</b>	<b>100.0%</b>	<b>9,692</b>	<b>100.0%</b>

\* T&PU stands for transportation and public utilities.

\*\* FIRE is the acronym for finance, insurance and real estate.

**Figure 12-1  
Trends in Employment for Jefferson County by Industry  
(1970-2014)**



The changing nature of the local economy influences wage rates and household income. As the local job base changes to one dominated by service-oriented employment the County's average wage rate and household income declines. Residents have less disposable income for basic goods and services and housing costs become harder to meet. Changes in the regions average annual wage rate and household income are discussed in more detail below.

Characteristics of the County's industrial base are shown in Table E-8 below. This table reveals that at least 53% of the local industrial base is concentrated in sectors which are declining, seasonal, or highly susceptible to economic fluctuations.

**Table E-8**  
**Characteristics of Jefferson County's Industrial Base**

Characteristic	Percentage of Industrial Base	Example
Seasonal	18.3%	Food Processing
Structurally Mature	14.2%	Logging
Cyclical	20.6%	Pulp & Paper

Source: Boucher, Willis Ratcliff, Port of Port Townsend Target Industries Analysis.

### Underemployment

One of the problems associated with the local economy is "surplus labor." The impact of surplus labor can be observed in the low wage rates and underemployment in our area. In essence a two tier work force has emerged. On one tier are those who hold decent jobs. On the other tier are the underemployed, poorly paid, often part time workers.

The two tier workforce is a national trend. Recent studies have shown that male blue collar wages have continued to decline during the 1990s as have white collar male worker wages, although not as drastically. While most wages fell during the past decade, salaries of individual with college and post graduate degrees have increased. Examples of underemployment in Jefferson County can be seen in the seasonal marine trades and in retail sales dependent upon summer visitors. However, it is possible that a significant, yet undocumented portion of Jefferson County's underemployed may be due to personal choice--individuals choosing lifestyle over wage earning potential.

### Personal Income/Level of Poverty

Real wages in the Jefferson County have been falling over the past two decades. Table E-9 shows historic and projected nominal and real wages for the County.

**Table E-9**  
**Annual Wage Rate for Jefferson County**

Year	Annual Average Covered Wages			
	Nominal Wage		Real Wage (1992)	
	Wage	% Change	Wage	% Change
1969	\$ 7,175		\$24,933	
1979	13,475	88%	23,368	(6%)
1989	16,733	24%	18,036	(23%)
2005	24,915	49%	13,995	(22%)
2014	29,466	18%	11,178	(20%)

These dramatic declines in average County-wide wages may be symptomatic of the trends shown above in employment. Table E-10 provides historical evidence of the small increases in real per capita income, as well as projected income based on historical trends. The trends show a continued, yet slight, increase in real per capita income. Based on simple trend regressions, between 1990 and 2014, real per capita income is projected to increase by 31 percent or 1.14 percent annually.

**Table E-10  
Historical and Projected Per Capita Income in Jefferson County**

Year	Per Capita Income			
	Nominal		Real (1993\$)	
	Income	% Change	Income	% Change
1970	\$3,697		\$13,182	
1980	9,675	162%	17,121	30%
1990	17,372	80%	19,222	12%
2005	27,724	60%	23,011	20%
2014	34,154	23%	25,258	10%

There is another side to the income story, however. Although real per capita income is rising, this may be due to the large number of in-migrating retirement-age residents. With the in-migration of retirement aged people, the number of persons per household has declined. This decline is expected to continue. The modest increase in real per capita income and a declining number of persons per household have resulted in a declining per household income statistic. This has a negative effect on housing affordability in the County.

Figures supporting this decline are provided in Table E-11. Per household income is calculated for 1970 through 1990. For the projected years 2005 and 2014, a high, medium and low case are provided. These cases are predicated on two series of data, the per capita income in Table E-11 and a low, medium and high case for the average household size. The low household size assumes a continuation of the downward trends in household size over the past 20 years, but at half the rate of change. The high case assumes that changes occur at the same rate, but in the opposite direction of the low case. The medium case assumes no change in the average household size after 1990. Household size is multiplied by per capita income to estimate household income.

**Table E-11**  
**Per Household Income for Jefferson County**

	Household Income			
	Nominal Income		Real Income	
Year	Income	% Change*	Income	% Change*
1970	\$10,389		\$37,041	
1980	27,961	169%	49,480	34%
1990	40,129	44%	44,403	(10%)
2005				
Low Case	54,139	35%	44,935	1%
Medium Case	64,044	60%	53,155	20%
High Case	73,460	83%	60,971	37%
2014				
Low Case	60,300	50%	44,593	0%
Medium Case	78,897	97%	58,346	31%
High Case	98,260	145%	72,666	64%

\* Percent Change for 2014 based on change between 1990 and cases for 2014.

As seen in the table above, in the low case, real household incomes are projected to rise only slightly in the next 20 years. The medium and high cases show a more optimistic projection of incomes. Based on more recent trends, between 1980 and 1990, the low case may be closer to what can be expected in terms of income trends, at least for the short term.

#### *Poverty Levels*

Statistics on Jefferson County residents living below the poverty line are mixed. For *families* living within Jefferson County, the most recent data is encouraging. Between 1969 and 1979, the percentage of families living below the poverty line grew from 9.2 to 9.9 percent. A decade later the percentage dropped to 9.0 percent.<sup>1</sup> If the long-term trend holds, poverty among families living within the County will decline, albeit at a slow rate. If the short-term trends hold, poverty will continue to fall at a more rapid rate for the County's families.

The picture is slightly different for *individuals* living within the County. Between 1969 and 1979 the percentage of individuals living below the poverty line and within Jefferson County increased from 11.7 to 12.9 percent. This percentage grew to 13.5 by 1989.<sup>2</sup> Both the long and short term trends suggest increases in the number of individuals within the County living below poverty levels of income.

When comparing these County figures with the State averages, the overall magnitudes of the numbers can be put into perspective. Individuals living within the State and below the poverty line comprised 10.9 percent of the population in 1989, while 7.8 percent of the State's families were below this line.<sup>3</sup> These statistics are 2.6 and 1.2 percentage points lower than the average for Jefferson County.

<sup>1</sup> U.S. Census

<sup>2</sup> *Ibid.*

<sup>3</sup> *Ibid.*

## Education and Job Skills

As another comparison, these figures were compared with the State averages within the particular categories. In 1980, the State average for the percentage of residents attaining at least a diploma or GED was 77.6 percent, or 0.7 percent higher than the Jefferson County statistic. In 1990, the gap widened to 1.1 percent. For residents acquiring at least a bachelor's degree, the State average was 1.4 percent higher than the County average in 1980. In 1990, the gap narrowed to 1.1 percent. Therefore, this appears to suggest a divergence in the workforce between the low end of the educational spectrum and the higher end.

## Local Government Revenues

Financial resources of local governments also play an important role in local economic development efforts. Public sector investment in infrastructure and public facilities greatly affects an area's quality of life. A number of road projects have recently been initiated to improve access throughout the County for all residents. In addition to improving access, a recent major road realignment project in the County's West End is accomplishing one of the projects goals unrelated to transportation and traffic -- fish enhancement. With insight and careful planning, capital projects can be designed to provide more benefits than thought in the past.

Tax rates also affect economic development. The business community is continually comparing tax rates as a cost of doing business in one area versus another. Current taxing district levies are illustrated in the following table.

**Table E-12**  
**1992 Taxing District Levies -- Jefferson County**

<b>District</b>	<b>Assessed Value (1996)</b>	<b>Levy Rate 1996</b>	<b>Tax Amount 1996</b>
County General	1,933,132,810	1.72215	\$3,329,145
County Road	1,451,289,400	1.25364	\$1,819,394
City of Port Townsend	481,843,410	2.11189	\$1,017,600
Totals:			\$6,166,139

A temporal view of sales tax distribution are illustrated in the following Table.

**Table E-13**  
**Jefferson County Sales Tax Distributions**

<b>Jurisdiction</b>	<b>1990</b>	<b>1991</b>	<b>1992</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>
Jefferson County	\$1,023,970	\$1,332,663	\$1,105,885	\$1,187,992	\$1,254,050	\$1,300,869
City of Port Townsend	\$793,939	\$749,609	\$818,710	\$894,725	\$904,574	\$1,014,673
Combined	\$1,817,909	\$2,082,272	\$1,924,595	\$2,082,717	\$2,158,624	\$2,315,542

Jefferson County's property tax rates<sup>4</sup> have been at or below the State average for a number of years, and are comparable to rates in similar counties.

A significant portion of local government/taxing district revenue is obtained through property taxes. In 1996, the total tax collection amount of \$22,427,422 spread among a County-wide assessed value (a.v.) of 1,933,132,810 resulted in a composite average levy rate of 11.60 dollars/\$1,000 a.v. The 1985 County-wide a.v. was 900,044,601 or 47% of the 1995 a.v. The City of Port Townsend's portion of the County-wide a.v. in 1985 was 227,929,437 (47% of the City's 1995 a.v.) which shows that property values in both the City of Port Townsend and the unincorporated areas of Jefferson County have more than doubled since 1985.

## **Employment Sectors (1995)**

### ***Marine Trades***

Jefferson County's history has always been closely linked to the marine trades. In 1890, Port Townsend shipped the most tonnage of any U.S. port, outside New York City. In more recent times, the region has earned the reputation as a high quality, full-service marine trades center.

The majority of marine trades are located on property managed by the Port of Port Townsend. The Port continues to support this sector of the economy by making capital investments necessary to support this expanding industry. Recent announcements by the Port continue to be encouraging as it proceeds with a major investment to develop a heavy haulout facility.

While it is a mainstay of the local economy, the marine trades industry is subject to the boom and bust cycles of the economy. Fortunately, Jefferson County's marine trades industry is somewhat insulated from the effects of these cycles by the breadth and depth of the businesses represented. Admiral Marine Works, Inc., specializes in custom yacht construction and has launched some of the world's largest composite motor yachts. Unfortunately, Admiral Marine has relocated much of its operation to the Port Angeles Harbor and may soon leave the Port Townsend waterfront altogether, taking with it 400-plus good paying jobs. Other boat builders focus on fiberglass, wood and aluminum boat construction techniques and cater to both recreational and commercial boating markets. Port Townsend Boat Work focuses on commercial fishing vessel repair and construction; the company has recently expanded into manufacturing proprietary refrigeration systems. The Baird Boat Company and Port Townsend Shipwrights' Cooperative, both employee-owned businesses, specialize in commercial vessel repair and construction. The Northwest School of Wooden Boatbuilding is a local trade school whose graduates are often employed by the local marine trades industry. The marine trades industry also includes canvas companies, sail makers, boat and kayak kit manufacturers, machine shops, and dozens of other types of support businesses.

### ***Manufacturing***

D&A Instruments and Thermionics Northwest manufacture customized scientific instruments for worldwide markets. Thermionics relocated to the area from California. Coyote Found Candles molds custom dipped wax tapers for clients throughout the U.S. and Canada. The company has grown rapidly during the last several years and employs over 20 people during peak seasons. Another growing company, Enclume Design Products located in Hadlock, produces iron kitchen racks for a national market with 40 employees. These companies depend on small package freight services to distribute their products to distant markets.

<sup>4</sup> *Economic Development Council of Jefferson County; Jefferson County Assessors Office*

The relatively low overhead costs and access to skilled and stable labor support many small custom software and fabrication firms serving a variety of industries, from aerospace to financial services. An example is Six Sigma Case that develops CASE software tools. Seven Seas Software's products aid in mathematics visualization. J&S Fabrication serves the marine trades and aerospace industries. American Machine and Tool Company performs research and development machining, and Foresight Science and Technology focuses on research and development activities, including artificial intelligence and manufacturing networks.

### ***Forest Products***

The largest employer in Jefferson County, the Port Townsend Paper Corporation, anchors the County's forest products industry. Employing 400 people, the company operates a fully integrated mill in Port Townsend, producing Kraft pulp, paper and specialty products including paper bags. Since 1990, the company has invested over 40 million dollars in a new paper machine and advanced technology to ensure their competitive position in international pulp and paper markets. The company is planning to invest an additional \$20 million in a corrugated cardboard recycling facility, allowing for the production of a recycled pulp to meet market demands for recycled content, as well as to provide a secondary source of pulp when the wood chip market is tight.

Located in western Jefferson County, Allen Logging relies on the Olympic Peninsula's vast timber stands to produce dimensional lumber, chips and other products for a world-wide market. The County has a growing number of specialty value-added manufacturers including Maizefield Mantles, focused on architectural woodworking, and Washington Cabinet Door, supplying cabinet-makers throughout Puget Sound. These manufacturers are supported by Edensaw Woods, which continues to rapidly expand its regional and export wholesale operations. This company focuses on specialty and exotic woods. Jefferson County is also home to Timbercraft, Inc. which designs and builds custom timber frame homes and structures. Timbercraft designs and structures include the new visitors' center in the Mt. Saint Helen's National Park. Its homes have even been exported to Japan.

### ***Fisheries and Aquaculture***

The pure marine waters of Jefferson County have made the County not only a major producer of clams, oysters and other shellfish, but also a center of shellfish technology. The world's largest oyster hatchery is operated by Coast Oyster Company in Quilcene Bay. Taylor United operates a similar facility adjacent to Dabob Bay. New Day Fisheries in Port Townsend employs 20 people in fish processing and packaging. These facilities were sited because these waters are the only location in the U.S. that support natural propagation of Pacific Oysters. These companies are also supported by the Washington Department of Fish and Wildlife's Point Whitney Shellfish Lab on Quilcene Bay. This combination of clean water, technology and scientific expertise supports a part of the growing industry that has made Washington #1 in the nation in oyster production.

Shellfish species also contribute in a positive way to the economy of the County's West End. In the West End, on Kalaloch Beach, over 1 million harvestable clams were identified by the Washington State Department of Fish and Wildlife, of which 125,000 were allocated for harvest in 1995. While they are an important commercial resource, shellfish, especially clams, are an important part of the County's growing tourism industry. It has been estimated that opportunities for recreational clam harvesting on Kalaloch Beach generates over 10,000 recreational trips annually to the beach providing many economic spin-offs throughout the local economy.

Sports fishing, especially for salmon, has been a major recreational industry within Jefferson County. Salmon harvest in terminal rivers and marine estuaries represents a significant economic resource to the County. The economic impact of freshwater steelhead fishing in the West End of the County cannot be overstated. It has been estimated that steelhead fishing on the Hoh and Clearwater Rivers alone contribute about \$1 million dollars in economic benefit to the County. While recent salmon harvest restrictions have reduced the economic benefits associated with this industry, recent salmon propagation and habitat restoration programs are helping to rebuild this valuable resource.

### ***Tourism***

The natural beauty of the Olympic Peninsula and Victorian Port Townsend attract over 500,000 destination tourists each year contributing over \$18 million to the local economy. Over one million people visit Olympic National Park and Olympic National Forest, both of which offer a wide range of experiences to the visitor, from wilderness beaches to walks in the only temperate rain forest in the U.S. The Kalaloch Lodge, located in the coastal region of the National Park, is a year-round tourist destination. The lodge is managed by Aramack Corporation and, with over 80 employees, is one of the County's major employers. Twenty-seven holes of world class golf are available at the Port Ludlow Golf and Meeting Retreat that has convention and meeting facilities for groups of up to 120. Fort Worden State Park in Port Townsend is a converted military base that accommodates small retreats and major conventions in its restored military structures.

Victorian architecture hailing back to Port Townsend's maritime roots in the late 1800's is the base of the City's thriving tourism industry. Port Townsend has the largest collection of Victorian homes north of San Francisco. Visitors from all over the world support numerous hotels, motels and inns, including over 20 bed and breakfasts, while perusing the numerous stores and attractions of the restored waterfront and uptown commercial districts. The Jefferson County Museum, Fort Worden Marine Science Center and Point Hudson Marina are other popular attractions.

Tourism has become a major contributor to the Jefferson County economy. Annual hotel and motel tax receipts in Jefferson County and Port Townsend have risen from well under \$100,000 in 1986 and 1987 to over \$194,000 in 1994. The County's share of receipts has nearly doubled during that same period to \$82,000 in 1994.<sup>5</sup>

### ***Public Sector***

Public sector employment has been a relatively low growth sector of the economy, but still provides a large number and variety of employment opportunities. In Jefferson County over 28 percent of employment and 33 percent of wages is derived from this sector, and government employees are among the better-paid workers in the area.

### ***Military***

The military presence in the area has influenced the local economy over the years. The earliest military presence in the County was in 1856 when Fort Townsend was established in response to Indian uprisings around Puget Sound. In 1896, the U.S. Congress appropriated funds for two Jefferson County forts -- Fort Worden at Point Wilson and Fort Flagler at Point Marrowstone. The military presence is not as noticeable as it once was, but the U.S. Navy base on Indian Island currently has 65 personnel.

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<sup>5</sup> *Local Tax Distributions, Washington State Department of Revenue, November-December 1994.*

## Services

Nationally, service industries are the fastest growing sector of the U.S. economy. Between 1970 and 1980, employment increased by more than 65 percent and is currently expanding at a rate above 6 percent.

Wholesale and retail trade accounts for approximately 26 percent of Jefferson County's employment. Area wholesalers deal primarily with the County's natural resource-based products. Major retail businesses include building and garden supply stores, automotive supply stores, furniture stores, general merchandise and department stores, grocery stores, restaurants and taverns, and transient accommodations. (Source: Jefferson County Economic Development Council).

The County's only hospital, Jefferson General, is located in Port Townsend and employs 240 people. The facility was enlarged in 1996 to accommodate more patients. Jefferson General provides a full range of health care and medical services including emergency services, surgery, physical therapy, health promotion, cardiac rehabilitation, home health care, and hospice.

**Table E-14**  
**Driving Distance from County Rural Residential Areas to "Regional" Economic Centers**

FROM	DESTINATION	
	TO PORT TOWNSEND	TO KITSAP MALL (adjacent Kitsap County in Silverdale)
Port Hadlock	10 min. (8 miles)	42 min. (312 miles)
Nordland	20 min. (15 miles)	52 min. (372 miles)
Discovery Bay	20 min. (122 miles)	20 min. (172 miles) <i>to Sequim</i>
Port Ludlow	22 min. (17 miles)	28 min. (22 miles)
Paradise Bay	27 min. (20 miles)	23 min. (182 miles)
Shine	32 min. (21 miles)	20 min. (17 miles)
Quilcene	28 min. (23 miles)	38 min. (33 miles)
Brinnon	43 min. (342 miles)	53 min. (442 miles)

The above table illustrates that most rural County residents are within convenient commuting distance of the "regional" economic centers for Jefferson County. Sustainable economic development will only occur in Jefferson County through the purposeful undertaking of public and private actions that create family-wage jobs, supporting a healthy and diverse economy and enhancing the quality of life.

## ENVIRONMENT ELEMENT

### Critical Areas Ordinance - The Local Process

In October of 1991, the Jefferson County Board of Commissioners organized a citizen work group for the purpose of generating policy recommendations to guide the preparation of interim critical areas regulations. Policy recommendations of the critical areas work group were forwarded to the Board in December of 1991, and the Jefferson County Planning Commission submitted recommended revisions to the work group policy recommendations in January, 1992.

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Following review and revision of the critical areas work group policy recommendations, the Board directed Planning Department staff to begin drafting ordinance language for incremental review by the Planning Commission. The Planning Commission began incremental review of draft critical areas ordinance sections in March. The draft sections were designed to be incorporated outside of, and in addition to, the County's existing regulatory framework and procedures.

In June, the Board directed Planning Department staff to follow an alternative approach that would incorporate interim critical areas protection measures into the County's existing regulatory framework and procedures.

In September, Planning Department staff completed a draft amendment to the County's State Environmental Policy Act Implementing Ordinance that addressed GMA requirements for critical areas. Pursuant to Chapter 36.70.640 RCW, this "SEPA Draft" was forwarded to the Planning Commission for review and report in October. In turn, the Planning Commission forwarded its report to the Board later that month.

In November, two new County Commissioners were elected. The Board continued to hold workshops with Planning Department staff for the purpose of reviewing both the "SEPA Draft" and modifications recommended by the Planning Commission and staff. At this time, final revisions were directed prior to public hearing.

On December 7, 1992, the Board conducted a public hearing on the "SEPA Draft" in order to receive public testimony on the proposal, and to meet the procedural requirements of Chapter 36.70 RCW.

Approximately four hundred (400) members of the public were present for this public hearing. The hearing concentrated on the complexity and substance of the "SEPA Draft". However, a significant amount of public testimony also voiced opposition to the Board taking action on the "SEPA Draft" prior to the newly elected Board members assuming office. On December 31, 1992, Commissioners Dennison and Brown left office without the Board having taken further action on the "SEPA Draft".

In January, 1993, the Board, comprised of Chairman Richard Wojt and newly elected Commissioners Robert Hinton and Glen Huntingford, held workshops with Planning Department staff in order to review options and determine an appropriate course of action regarding development of interim critical areas protection measures.

On February 4, the Board adopted a motion to set aside the "SEPA Draft" and to produce a "Stand Alone" ordinance. On February 8, the Board clarified and expanded its original motion and directed that... "to the maximum feasible extent the new draft ordinance should be limited in coverage to those minimum designations and minimum protection standards permissible under the GMA."

On March 19, Planning Department staff forwarded a "Stand Alone" draft interim critical areas ordinance to the Board for review and revision. On April 5, the Board held a workshop with Planning Department staff for the purpose of reviewing the "Stand Alone" draft and identifying further revisions necessary prior to public workshops. Final revisions to the "Stand Alone" ordinance draft were directed by Commissioners Hinton and Huntingford, individually, during informal meetings with staff on April 8 and April 9, 1993.

During the period of April 28 through May 4, the Board and Planning Department staff held public workshops on the "Stand Alone" ordinance draft in Clearwater, Chimacum and Quilcene for the purpose of explaining the operation and effect of the ordinance, and to receive informal public comment on the proposal.

On May 28, 1993, the Board forwarded the “Stand Alone” ordinance draft to the Planning Commission for review and report pursuant to Chapter 36.70.640 RCW. The Planning Commission submitted its report to the Board on July 1. On July 12, the Board held a workshop with Planning Department staff for the purpose of reviewing both the “Stand Alone” ordinance draft and the modifications recommended by the Planning Commission and staff. At this time, the Board directed final revisions prior to public hearing.

On November 21 and 22, the Board conducted a public hearing on the “Stand Alone” ordinance Draft #6 to receive public testimony on the proposal, and to meet the procedural requirements of Chapter 36.70 RCW.

On December 22, 1993, and January 4, 14, and 20, 1994, the Board held public workshops with Planning Department staff for the purpose of reviewing testimony received from the November, 1993 public hearing. Based upon this testimony and separately provided legal review, the Board directed revisions to the draft ordinance.

On March 29, 1994, the Board conducted a public hearing on the “Stand Alone” Draft #7 to receive public testimony on the proposal, and to meet the procedural requirements of Chapter 36.70 RCW.

The draft ordinance determined that critical areas which require regulation by Jefferson County are: wetlands; areas with a critical recharging effect on aquifers used for potable water; fish and wildlife habitat conservation areas; frequently flooded areas; and geologically hazardous areas. The draft ordinance was adopted on May 9, 1994.

#### ***Ordinance No. 05-0509-94 Jefferson County Interim Critical Areas Ordinance***

The purpose of the Jefferson County Interim Critical Areas Ordinance is to protect regulated critical areas against development proposals that pose adverse environmental impacts which threaten public health, safety and welfare. “Protect” or “protection” is defined by the Ordinance as: “...*Conserv(ation) (of) a particular area and the naturally occurring processes directly associated with it.*”

The following ecological features are designated and regulated as critical areas by the Ordinance:

- Wetlands;
- Critical Aquifer Recharge Areas;
- Frequently Flooded Areas;
- Geologically Hazardous Areas; and,
- Fish and Wildlife Habitat Areas.

The first step in the regulatory framework established by the Ordinance is to determine if critical areas are present on a property that is proposed for development. If regulated critical areas are present, the approach to development is always based on determining the least invasive intervention. Levels of intervention can be characterized as a range beginning with Avoidance (the least invasive) and ending with Replacement or Compensation (the most invasive):

- Avoidance: Avoid development in the identified critical area and its associated buffer. While this is the simplest approach to site planning, it is not always feasible to avoid critical areas if the site is constrained by other physical limitations, such as topography or poor soils for development.

- Minimization: Minimize the amount of development that must occur in the critical area or its associated buffer. This can be achieved through revising the site plan to consider the location and extent of critical area. Techniques such as buffer averaging may aid in the minimization of impacts to critical areas.
- Replacement or Compensation: If no other options exist for development of the subject parcel than to place development in an identified critical area, on or off-site replacement of the critical area to an amount specified by percentage or rate is assigned.

### ***Regulatory Program Overview***

The table on the following pages provides information regarding some of the primary agencies involved in regulation of the environment. While there are other agencies and permits that may apply to a project, the ones listed are those that most commonly apply to projects.







## ENVIRONMENTAL CONDITIONS

### Water Resources

#### *Surface and Ground Water*

Much of the East County lies in the rain shadow of the Olympic Mountains, which is responsible for chronic low summer flows in many streams. Because of low summer flows resulting in high water temperatures and depleted oxygen levels, salmon habitat in these streams is highly susceptible to degradation resulting from poor land use practices. Low flows also affect ground water recharge areas and water supply for residents. In the Quilcene River area, and other parts of both the East and West County, flooding causes many problems such as erosion, loss of habitat, and possible ground water contamination.

The County's largest single surface water diversion is the City of Port Townsend's supply from the Big Quilcene River, which is transported to Port Townsend by way of the Olympic Gravity Water System. The capacity of the Olympic Gravity Water System is 19.4 Million Gallons per Day (MGD), about 14 MGD of which is supplied to the Port Townsend Paper Mill. The City also has a surface water right to the Little Quilcene River for about 6 MGD. Surface water is also used for agriculture and for fish hatchery supplies.

The quality and quantity of surface waters of Jefferson County have been affected by development, agriculture, industry, and timber harvesting. In Eastern Jefferson County the Big Quilcene River is listed by the Department of Ecology as water quality impaired for instream flows and fish habitat under Section 303(d) of the Clean Water Act. Additional water quality listings include Chimacum Creek for fecal coliform and temperature, Tarboo Creek for temperature, Jackson Creek for fish habitat, and the marine waters of Dabob and Quilcene Bays for fecal coliform. Port Townsend Bay is listed based on elevated PCB levels in fish tissue samples. In Western Jefferson County, a number of tributaries of the Bogachiel, Hoh, and Quinault Rivers as well as several independent drainages are listed as water quality impaired for temperature and dissolved oxygen. Joe Creek, an independent drainage, is listed for fecal coliform elevations. By developing watershed management plans that address the sources of pollution, the County will work with Ecology to remove these streams from the 303(d) list.

Approximately 65 percent of the population in Eastern Jefferson County are served by the City of Port Townsend water system. The remainder relies primarily on ground water for their water supply. Over the years, population growth has increased the demand for small community systems. Of the more than 160 public water systems currently in the County, almost all rely on ground water as their source. Recent analysis indicates that up to 30% of the County residents rely on ground water for their water supply.

Ground water quality concerns in Eastern Jefferson County include seawater intrusion on Marrowstone Island and in other shoreline areas, elevated levels of iron and manganese in some areas, and vulnerability to hazardous materials. There is concern that nitrate contamination may occur in areas subject to septic system, fertilizer, and feedlot inputs, although no public systems have reported significant levels of nitrate to date. Because of the scarcity of data, there is no opportunity to determine any geographical pattern to water quality parameters.

Recent concerns in Eastern Jefferson County have focused on the ability of surface and ground water sources to meet demand. The demands today include not only public supply, but also include those for habitat, recreation, and aesthetics. For the Big Quilcene River, the effects of withdrawals on these other demands was the subject of a two year public planning effort resulting in 1994 in the Dungeness - Quilcene (DQ) Water Resources Management Plan. In addition, the public supply has been a source of

discussion over the last four years as the Coordinated Water System Plan (CWSP) has been updated. Through both of these processes, it has been clear that more data and understanding of Jefferson County's hydrogeologic conditions and water resources is needed.

It has also been clear that, given current public policy (city, county and state), ground water will continue to be the major new supply for the future. The magnitude of the effects of these increased withdrawals will be a primary public policy issue and, as such, will require additional analysis and data to ensure that public policy is established in the context of good technical information.

### ***Watershed Planning***

Watershed planning, or the development of Watershed Action Plans, is the method of non-point source pollution control recommended by the Puget Sound Water Quality Authority (PSWQA). Under the PSWQA rules, counties rank watersheds for development of "action plans." Characterization reports are sometimes done in preparation of actual planning.

Development of the plans generally involve local committees and considerable local, state, and federal agency involvement. In Jefferson County, the Quilcene/Dabob Bay Watershed Action Plan (June 1991), the Ludlow Watershed Action Plan (November 1993), and the Discovery Bay Watershed Management Plan (March 1995) have been developed.

The most comprehensive watershed planning effort to date is the Dungeness-Quilcene Planning Process, funded in 1990 by the State as a pilot planning effort under the Chelan Agreement. Representatives of state, local and tribal governments, and agricultural, business, environmental, fisheries, and recreational interests participated through caucuses to gather and evaluate information which led to the final DQ Plan, dated June 30, 1994.

The DQ Plan provided regional strategies and recommendations to address water use, management, conservation, and related habitat issues for both the Dungeness and the Quilcene watersheds. A special recommendation for the region was to conduct a comprehensive hydrogeologic investigation of the quantity and quality of surface and ground water. A work plan for a five-year study was developed by the United States Geological Survey for the DQ project. An accompanying recommendation included continuing water quality and quantity data monitoring and management which is recognized as essential for ongoing water resource and land use planning efforts.

Recommendations of the DQ Plan specific to Eastern Jefferson County included limiting new surface water rights or permits until such time as instream flows for each stream are adopted by rule by the Department of Ecology. Ground water, habitat, fish management, education, and conservation strategies were also developed. It was recommended that a Watershed Council representative of all interests be formed to focus and coordinate habitat restoration effort, to investigate the resources, to design and implement projects, and to work with Ecology on instream flow and water rights issues.

The Jefferson County Water Resources Council was formed in January, 1995 in order to implement the DQ and other watershed plans. The County did not sign the charter, but did send representatives to Council meetings and participated in projects. Because of a decrease in the budget of the Department of Ecology on the state level, there was a lack of implementation funding for the plan. The Water Resources Council has been funded through an MOU between the Jefferson County P.U.D. and the City of Port Townsend.

In October 1997, the County signed the Water Resources Council charter, which is being revised to address County concerns regarding decision-making and representation. The Council has been designated as the watershed planning and management unit for the Quilcene-Snow Water Resource Inventory Area (WRIA 17) under state funding for watershed planning. The DQ Plan will serve as the basis for the next level of watershed planning, technical studies, and policy development.

Other watersheds in Jefferson County have not had the benefit of pilot planning efforts, and will require coordination with other counties. Jefferson County watersheds in WRIA 16 along Hood Canal, including the Dosewallips and Duckabush Rivers, will be planned under a cooperative process with Mason County serving as lead agency. Jefferson County will participate in this process as an initiating government. The County will work cooperatively with Clallam and Grays Harbor Counties to develop watershed planning units for the western portion of the County, where WRIA 20 (Soleduck-Hoh) and WRIA 21 (Queets-Quinault) will be addressed. The watershed planning process will require new coordination and organizational efforts across both watershed and jurisdictional boundaries. Jefferson County is in the process of laying the foundation for these efforts as this Comprehensive Plan is being completed.

### **Endangered Species Act Issues**

In February, 1998 the National Marine Fisheries Service proposed the Puget Sound Chinook and the Hood Canal/Straits of Juan de Fuca Summer Chum for listing as “threatened” under the Endangered Species Act. In June, 1998, the U.S. Fish and Wildlife Service proposed as “threatened” the bull trout, also a fish species native to Jefferson County. Within the next several years the federal government will review local, state, and tribal actions to protect habitat and address other factors such as hydropower facilities, harvest, and hatcheries for their impacts on the decline of fish species. Other species are in depressed or critical condition.

The proposed listing of fish species native to Jefferson County streams highlights the need to integrate watershed and fish habitat recovery plans. The County expects to work with local, state and federal agencies to develop land use regulations based on these plans that protect the water resources of the County for use by future residents and for the salmon species that are threatened with extinction. Habitat recovery planning will be coordinated for Eastern Jefferson County through the Hood Canal Coordinating Council (HCCC), an organization that includes Mason, Jefferson, and Kitsap Counties, the Skokomish Indian Tribe, and the Port Gamble S’Klallam Tribe. The HCCC will coordinate the development of recovery plans, land use regulation recommendations, restoration projects, public education, and other recovery tools. The Council will also coordinate with watershed planning units to ensure consistency and communication on these integrated issues.

### **Critical Areas**

The identification and characterization of Jefferson County critical areas is an ongoing process. The data available on the various critical areas is not comprehensive, and in all areas there is a need for additional information based on the best available science. Critical areas maps will be updated with new information as funding of inventory studies allows. The goals, policies, and strategies for critical areas include both protection of the environment and protection of development from environmental hazards.

### ***Geologic Hazard Areas***

In Jefferson County natural conditions that favor landslides, erosion, and mudslides include unconsolidated glacial sediments that overlie bedrock geologic materials, steep topography, and high amounts of winter rainfall. Slope failures can damage public and private property and pose a risk to public safety. Approximately half of the land profile in East Jefferson County contains slopes of 15 percent or greater.

Growth pressures have resulted in development in areas where views and water access are maximized, and these are often areas where risk from geologic hazard is also maximized. New development on slopes and shoreline bluffs has in many areas exacerbated the natural processes, with adverse impacts on existing development and on fish and wildlife habitat. Critical areas review standards and regulations should protect new development, existing development, and the environment. Avoidance of high-risk areas, use of setbacks and engineering techniques, and storm water management are measures that are applied on a site-specific basis. Public education and outreach can be effective in informing residents of activities that may decrease risk.

The Puget Sound region is also a seismically active area. Seismic risk is higher where the soils are unconsolidated, such as along some shorelines, the deltas and flood plains of rivers, areas of fine-grained bay and tide flat sediments, and poorly compacted artificial fill. Ground shaking, landslides, liquefaction of soils, and subsidence are higher risks in these areas. Low lying shoreline areas may be at risk from tsunami effects. Sudden downslope movement on unstable slopes and bluffs is more likely to occur during an earthquake. Soil liquefaction occurs when noncohesive silts with high moisture content lose strength and bearing capacity during an earthquake. Standards for design and decisions for siting of essential public facilities can address these concerns. Development that occurs in seismic risk areas can minimize damage by using special engineering and construction methods.

### ***Flood Hazard Areas***

Jefferson County is subject to flood events that cause damage and threaten public safety. Frequently flooded areas along streams, in estuaries, and along low-lying shorelines are flood hazard areas. The most probable areas of flood hazards occur in the flood plains of Snow Creek, Leland Creek, the Dosewallips, the Duckabush, Chimacum Creek and the Big Quilcene Rivers. Portions of the Hoh, Queets, Quinault, and Clearwater Rivers in the Western County are also subject to seasonal flooding.

The Federal Emergency Management Agency's (FEMA) National Flood Insurance Program provides the most complete information available about frequently flooded areas of Jefferson County. FEMA requires that development in the flood plain include "floodproofing" measures to reduce risk. Goals and policies also promote the protection of natural flood plain, channel and habitat functions.

### ***Fish and Wildlife Habitat***

The diverse ecosystems of the Olympic Peninsula provide habitats for approximately 60 different species of mammals, 82 species of resident birds, and 220 migratory birds. Wildlife habitats include marine shorelines, rivers, streams, wetlands, lake riparian vegetation zones, forest land, and known nesting sites.

Wildlife species, which once thrived in many areas of the lowland of the Peninsula, are diminishing in numbers, especially in the areas where growth has occurred. Most native wildlife species cannot exist in urban areas. Rural land uses result in a mix of field and pasture habitat that can support a wide variety of native wildlife. However, the presence of humans, even in low densities, may drive off many native forest species such as black bear and cougar. Deer, coyote, and many other native northwest animals have adapted to exist in rural areas despite the presence of humans and fragmented habitat. Others, such as the Blue Heron, are very sensitive to human activity and can abandon nest sites if disturbed. Land use and regulatory standards that maintain interconnected wildlife corridors are addressed in Comprehensive Plan goals and policies, not only under critical areas, but also under the Open Space, Parks and Recreation Element. Goals and policies for critical areas review, such as protection of adequate buffers and riparian habitat, will be addressed in the adoption and implementation of a permanent critical areas ordinance.

Shellfish habitat is important as a local source of employment and food. Commercial growing areas are concentrated in Discovery Bay, along the southwest shoreline of Marrowstone Island, and in Dabob and Quilcene Bays. North Quilcene Bay, Brinnon, Port Ludlow Bay, and portions of the Tri-Area shoreline are classified as restricted from commercial growing due to various environmental hazards. Other areas of County shorelines are utilized for recreational harvesting. A 1995 report by the Hood Canal Coordinating Council<sup>6</sup> identified several environmental factors contributing to these problems, including failing septic tank systems, untreated storm water runoff, inappropriate handling of solid and hazardous household wastes, and poor farm and forestry practices.

The anticipated federal listings of salmon species as endangered or threatened is expected to raise protection of habitat critical areas to a high priority in land use decisions. Protection and restoration of wild runs of the Hood Canal summer chum, the Puget Sound chinook, and the Dolly Varden/Bull trout on the Pacific Coast, all of which are proposed for listing, will become important criteria for all land use decisions. Many other species are depressed or critical, and may be proposed for listing in the future if measures are not taken to promote their recovery. Salmon recovery plans based on comprehensive watershed planning will be required for species proposed for listing; the plans will help to protect and restore other species of fish and wildlife, as well. The effort to save the salmon will require cooperation of multiple agencies, governments, organizations, jurisdictions, and elements of the community.

### ***Aquifer Recharge Areas***

Recharge is the process by which groundwater is replenished. An aquifer recharge area identifies where water from precipitation is transmitted downward to an aquifer. Areas that transmit the most precipitation as a result of relatively permeable soil and geologic conditions are referred to as “high” or “critical” recharge areas. Based on existing information, hydrogeologically susceptible areas include much of the Quimper Peninsula, Tri-Area, Snow Creek, Quilcene River Basin, North Dabob Bay, Toandos Peninsula, and the Chimacum Valley. All of Marrowstone Island and the majority of shoreline in the East County areas are susceptible to seawater intrusion.

Jefferson County aquifer recharge susceptible areas have been mapped based on the permeability of soils. Vulnerability of ground water aquifers to contamination from land uses is a critical public health issue, and regulation of these areas occurs through wellhead protection overlay zones, and on-site sewage system and storm water best management practices. As funding becomes available, geohydrologic studies will identify additional areas which are important for the seasonal recharge of aquifer volumes. Removal of vegetation, compaction of soils, creation of impervious surfaces, filling of wetlands, and alteration of surface water drainage to inhibit infiltration can accompany development and impair aquifer recharge. Measures to protect, enhance or replace the functional infiltration of precipitation to aquifers will be incorporated into storm water management requirements. Protection of these critical areas is crucial to the health and welfare of residents, due to the reliance of a large number of residents on ground water supplies and the need to protect ground water supplies needed for future growth.

### ***Wetlands***

Wetlands protected under critical areas perform a variety of important ecological functions, including fish and wildlife habitat, water quality improvement, excess storage of flood waters, floodwater conveyance, sediment control, storm water attenuation, low-flow contribution, plant diversity, recreation, and cultural values. Major wetlands have been identified in the Snow Creek area of Discovery Bay, the Quimper Peninsula, Chimacum Valley and Chimacum Creek, north end of Dabob Bay, the Quilcene River basin,

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<sup>6</sup> *Shellfish and Finfish Resources at Risk in the Hood Canal Watershed*, Hood Canal Technical Work Group, Hood Canal Coordinating Council, June, 1995, 149 pages plus maps.

and the Dosewallips River basin. Approximately 116 square miles, or about 6.4 percent, of Jefferson County have been designated as wetlands.

Because of funding limitations, wetlands critical areas maps for the County are not comprehensive, particularly in forested areas where vegetative cover may obscure wetland identification in air photos. Long-term studies for comprehensive watershed management will contribute to the inventory and understanding of wetland hydrologic functions. Buffers for protection of hydrologic and wildlife functions will be evaluated, with increasing emphasis on consistency with salmon recovery and watershed management plans.