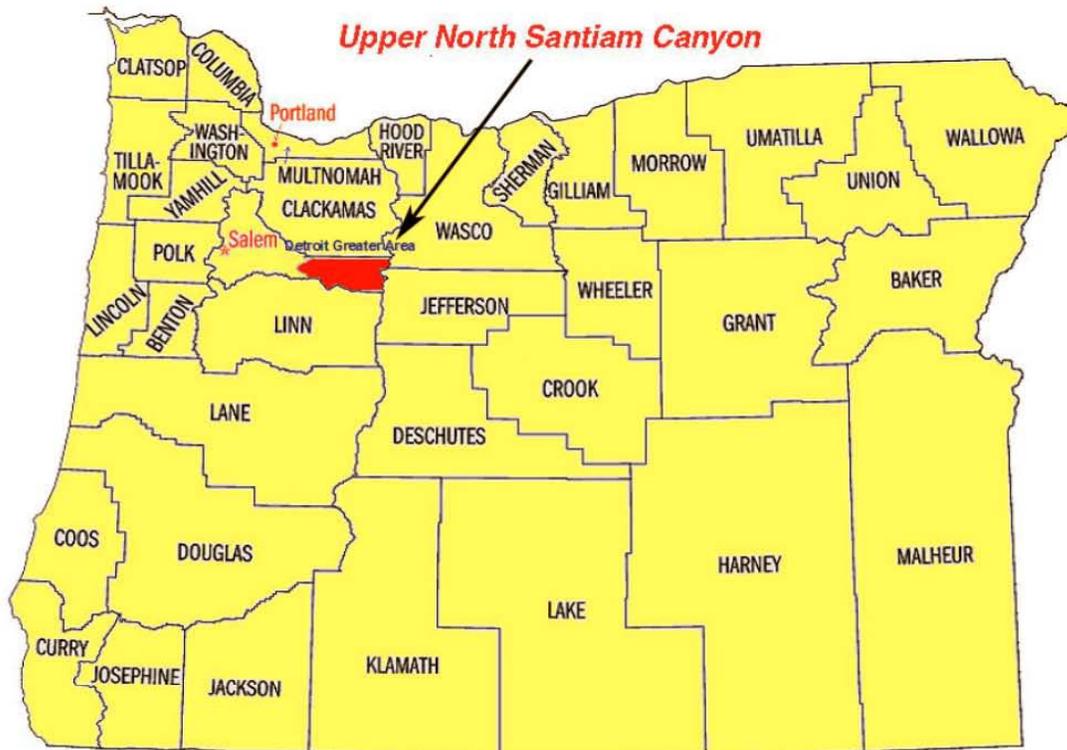


Special Report 1071 May 2006

Economic Impact Study for Detroit Lake and the Upper North Santiam Canyon



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Acknowledgments

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Economic Impact Study for Detroit Lake and the UNSC Canyon

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“Located in the Cascade Mountains, Detroit Lake State Park is the gateway to beautiful Detroit Lake. The 400-foot-deep lake was created in 1953 when the U.S. Army Corp of Engineers completed the Detroit Dam project. The lake is over nine miles long with more than 32 miles of shore line. This is the spot for all types of water sports: fishing, boating, swimming, water skiing, and personal watercraft.”

—Oregon Parks and Recreation Department, 2005

Introduction and Summary of Conclusions

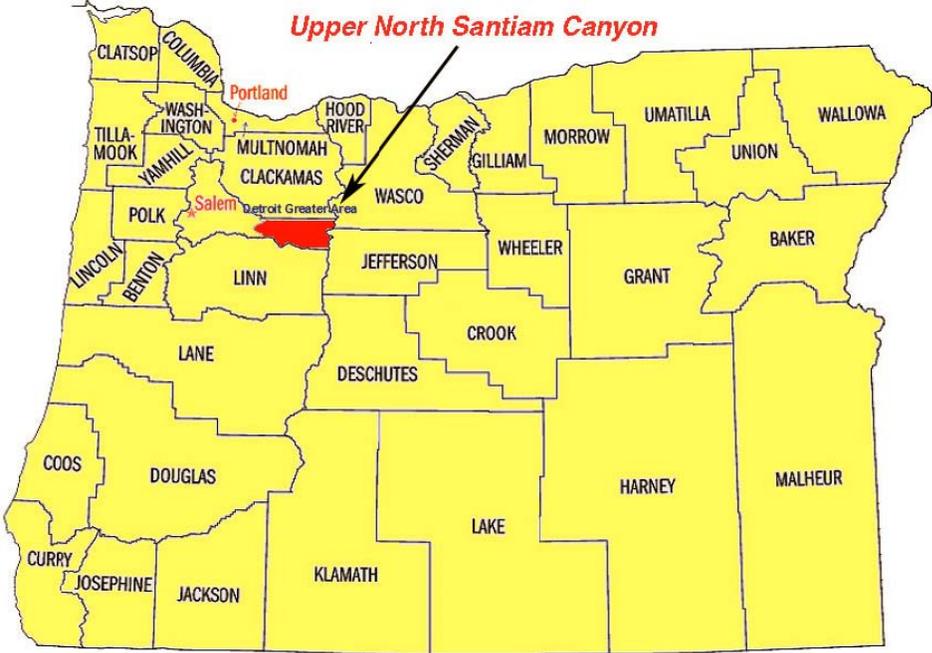
This report profiles the demographic and economic trends within the Upper North Santiam Canyon (UNSC). We describe the economic structure and determine the export base of the UNSC. We estimate the economic impacts of a water level in the Detroit Lake that is too low for the moorages to operate and suggest ways those impacts could be addressed. Finally, we suggest some additional options for increasing the resilience of the local economy.

Our conclusion is that development in the UNSC is less than would be expected, given its proximity to the Portland-Salem metro corridor and its numerous natural and human-made amenities. The uncertainty of water levels in Detroit Lake and the constrained sewer and water infrastructure in the community of Detroit have limited seasonal tourism and recruitment of second-home owners and retirees.

While providing more certainty as to water levels in Detroit Lake may help attract more visitors and residents to the UNSC, those adjustments must be made carefully to avoid jeopardizing downstream irrigation or seriously affecting downstream recreation. The UNSC study area is shown in Figures 1 and 2.

The study area for this project, which we refer to as UNSC, includes the economic area most affected by the Detroit Lake amenities.

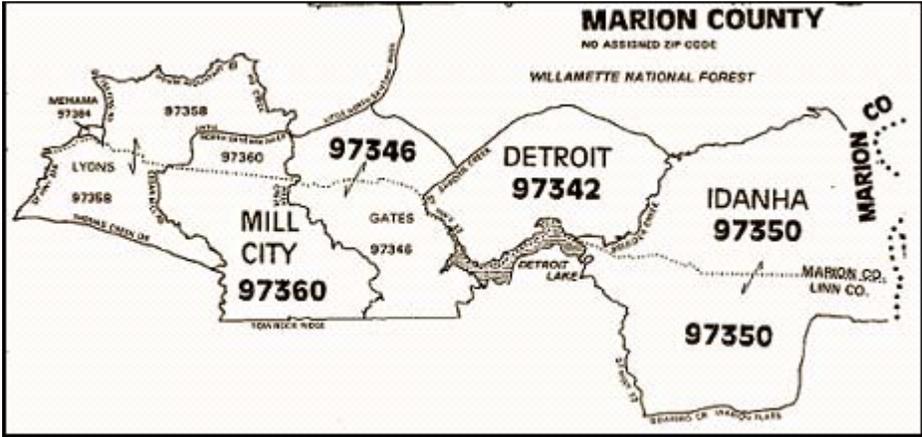
Figure 1. UNSC, Oregon (highlighted in red).



Source: Census Finder, <http://www.censusfinder.com/mapor.htm>.

The UNSC was delineated by zip codes. It included the incorporated cities of Detroit, Gates, Idanha, Lyons, Mehama, and Mill City and their surrounding areas as determined by the U.S. Postal Service. Data trends were determined using U.S. census tract 106, which roughly matched the study UNSC. Census tract 106 includes all or part of every city in the study, and it avoids incorporating any of the other nearby cities.

Figure 2. Zip Code Detail of the UNSC.



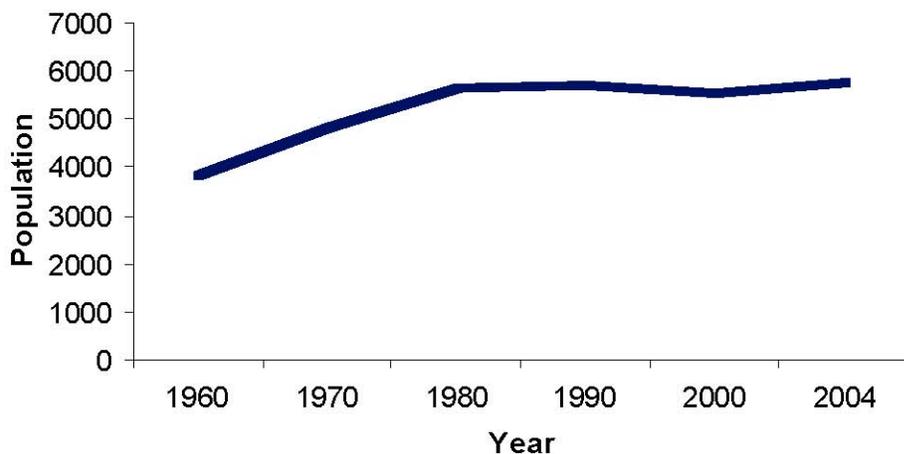
Population

In the 2000 U.S. Census, 3,510 people lived in the cities incorporated within the study area, and the total UNSC population was approximately 5,577 people. The UNSC’s population has declined by 114 people (2 percent) from the estimated 1980 population of 5,691. Meanwhile, during the same 20-year period, the State of Oregon had a nearly 30 percent population growth (U.S. Census Bureau, 2005).

The UNSC, following regional trends, experienced significant economic distress during the 1980s and 1990s, as timber harvests from public lands declined and, consequently, manufacturing and natural resource-based jobs declined in the UNSC and throughout Oregon. Although its location between the Portland-Salem corridor on the west and the resort towns of Bend, Sisters, and other areas in central Oregon in the east provided high exposure for the UNSC as people traveled through the area on Highway 22, one of the better-maintained routes to central Oregon in all seasons, its communities struggled to retain population and maintain economic viability.

While Deschutes County had the highest population growth rate in Oregon over the past 10 years, the UNSC’s growth rate was minimal. People passing through the UNSC might have preferred to recreate for a day, build a second home, or retire closer to the Willamette Valley to avoid crossing mountain passes to reach their destinations, yet the UNSC was not able to capitalize on its geographic proximity or relatively high amenities close to the Willamette Valley to maintain even modest population growth, as can be seen in Figure 3.

Figure 3. UNSC Population, 1970–2003.

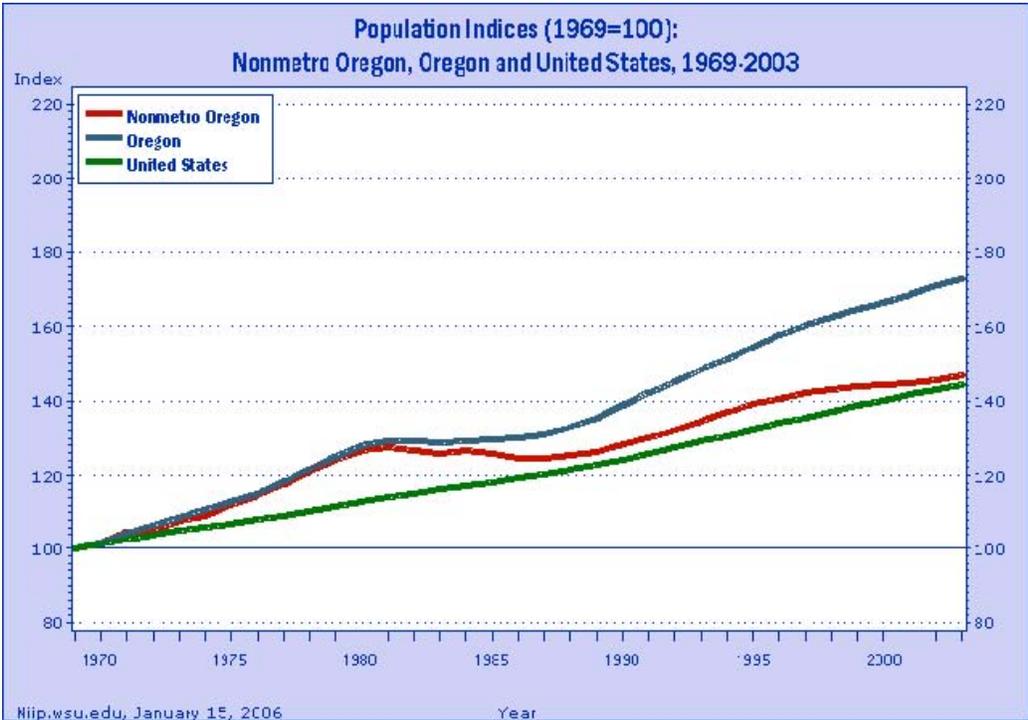


Source: U.S. Census Bureau (2005) (www.census.gov), adjusted to incorporate surrounding UNSCs.

As Gary Smith, Washington State University Extension economist, notes, economic growth causes and is a consequence of population growth. The ability of regions to recruit and retain people in communities is determined by those communities' availability of jobs and quality of life, including opportunities to purchase goods and services.

The UNSC's lack of growth was particularly unusual considering Oregon's nonmetro growth rate, which, though lower than Oregon's overall growth rate, was still considerably greater than the UNSC's growth rate (Figure 4).

Figure 4. Nonmetro Oregon Population 1969–2003.



Source: Smith, Gary W. 2006. Oregon Regional Economic Analysis Project. Web page (<http://www.pnreap.org/Oregon>).

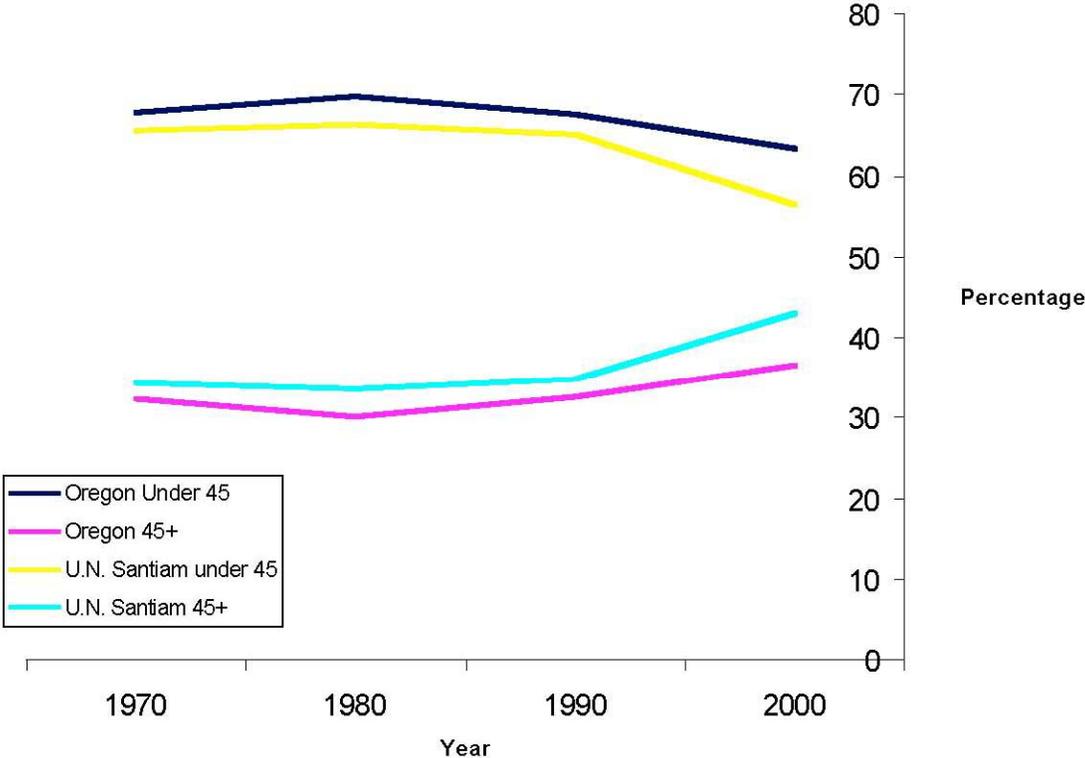
When the UNSC's population growth between 1990 and 2003 is considered with a selected group of other amenity-rich communities and/or communities in similar proximity to metro areas, including Ashland, Gold Beach, Hood River city and county, Sisters, and Tillamook city and county, the UNSC's communities have a low median growth rate of 0.58 percent, compared to the selected communities' median growth rate of 23.87 percent.

The UNSC's population aged more quickly than Oregon's (Figure 5); however the UNSC's shift to an older population is consistent with the rest of nonmetro Oregon (Figure 6). So, while the UNSC does seem to be losing young people, it is not doing so any faster than other rural communities. A more diverse and stable economy would be helpful in retaining young people or

maybe encouraging them to return.

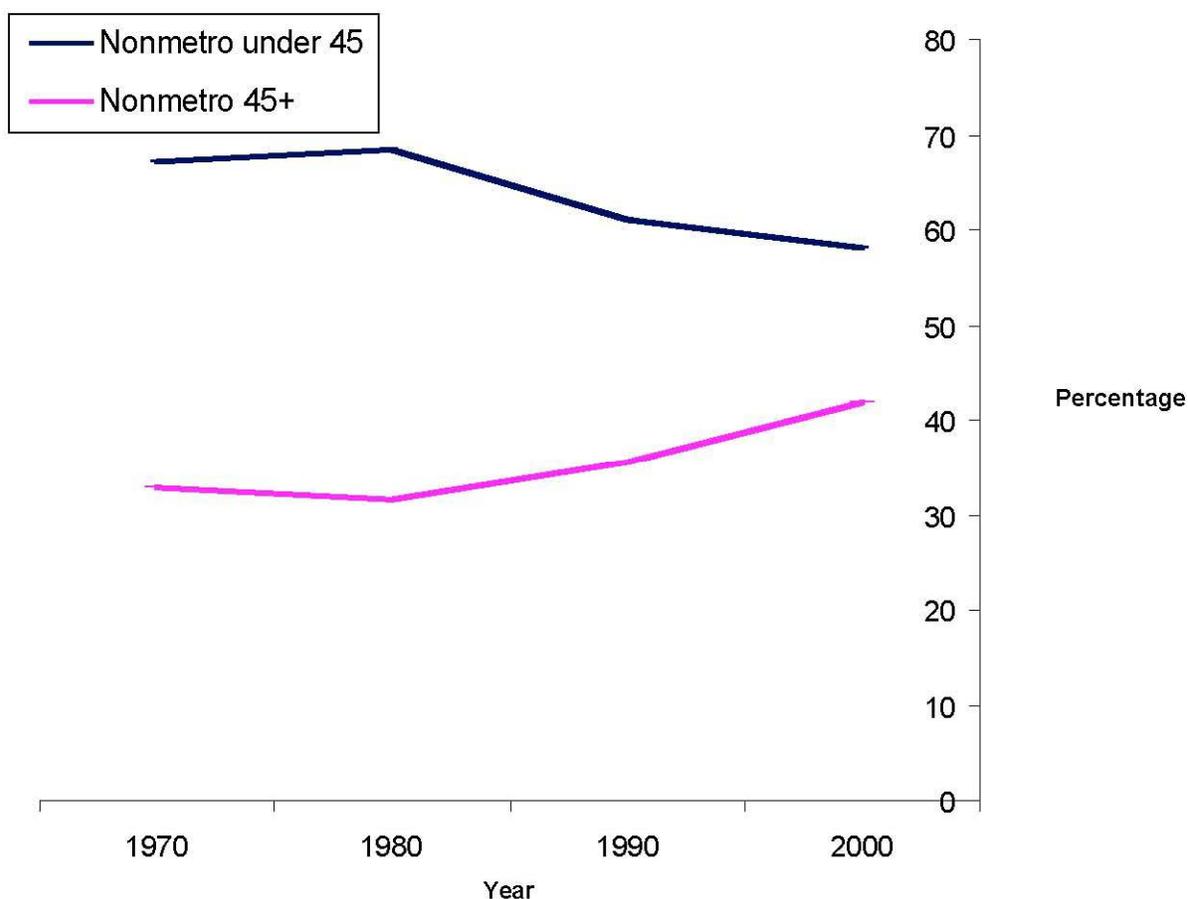
Many of the options to diversify and stabilize the UNSC economy include recruiting new people on a short-and long-term basis. As the UNSC evaluates economic development options that may retain young people and recruit newcomers, it needs to carefully anticipate and consider the social changes that may accompany the more diverse economy before implementing related policies.

Figure 5. Aging Populations, UNSC and the State of Oregon 1970–2003.



Source: Population Finder, U.S. Census Bureau (2005) (www.census.gov).

Figure 6. Aging Populations, Nonmetro Oregon (Outside SMSA).



Source: Population Finder, U.S. Census Bureau (2005) (www.census.gov).

Employment

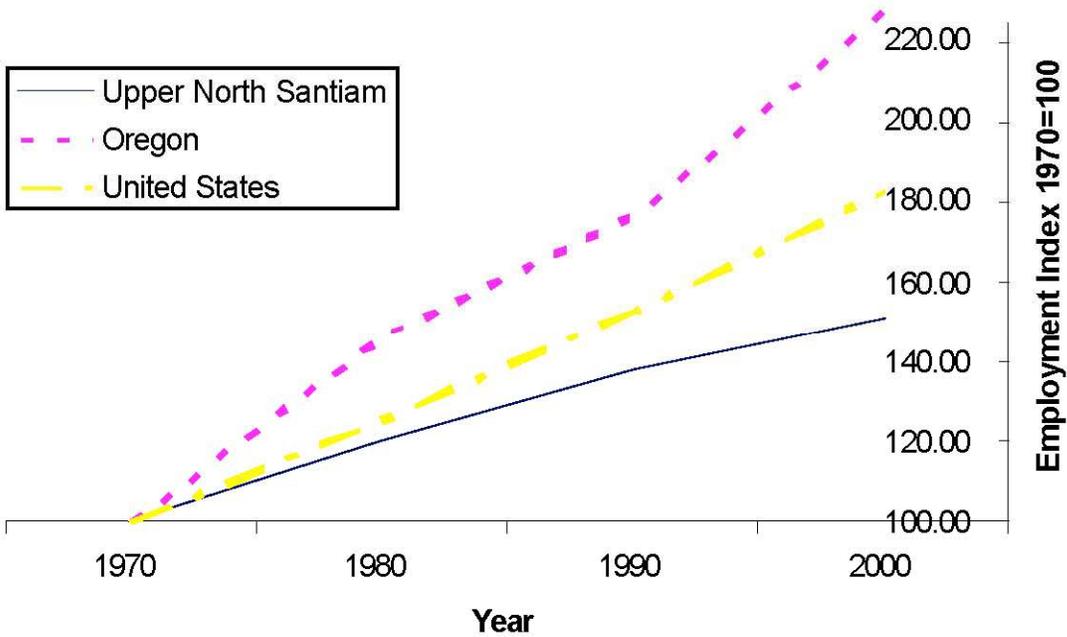
One goal of economic development often is to create the ability for a community to weather economic fluctuations or become more economically resilient. *An economically resilient community is one that can be economically shocked (e.g., reduced harvest on public lands), quickly begin a rebound, and reach an equilibrium that may be very different from the pre-shock equilibrium, yet provides a similar number of jobs and preserves the community's population.* “Quickly” is measured in months rather than years. *An economic shock or event is a market change that is a surprise and affects the employment growth rates and may permanently affect the employment level* (Bartik 1991, 11). A new equilibrium is reached when the local UNSC’s attractiveness to households and firms is at least attractive enough to prevent population and employment decline (ibid. 72).

Probably the most important variable, for many people concerned with economic resilience, is employment. Employment both in terms of full-and part-time jobs is frequently used as a criteria in determining the economic health and trends in communities.

In the UNSC, employment grew by 446 jobs, or 50.6 percent, from 1970 to 2000 (Figure 9). Please note that the estimates in the Employment and Sectoral Employment and Location Quotients sections are derived from U.S. Census data using the 106 census tract, which does not perfectly correspond to the UNSC. However, we needed to use the 106 census tract as our best source to obtain longitudinal data. The estimates in the Input/Output Modeling and Ground-Truthing sections came from the zip code level *IMPact PLANning* (IMPLAN) model, which was purchased from the Minnesota Implan Group, Inc. We adjusted the purchased model to include the information we gained in discussions with local business people and officials.

The term “Jobs” throughout this report includes full-and part-time jobs and does not necessarily represent individual people. A person may hold more than one of the jobs and, as in the Agricultural Sector, the jobs may be seasonal and last a few days or weeks. Also, employment estimates in the following graphs are based on place-of-work and do not include place-of-residence considerations. A number of people commute into the UNSC to work, and a number of UNSC residents commute to work outside the UNSC.

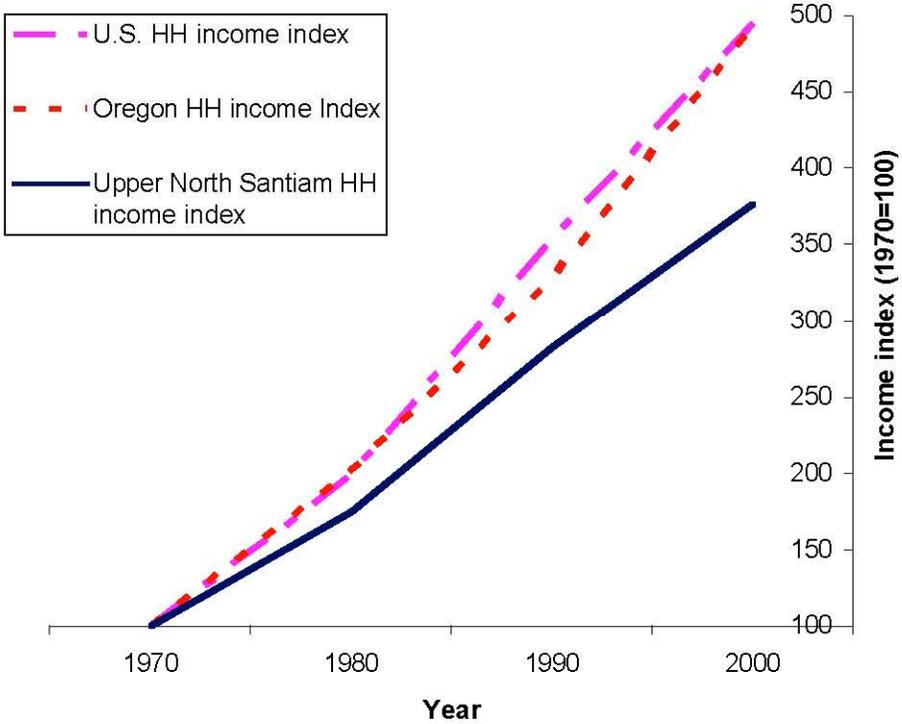
Figure 7. Employment Indices (1970 = 100), UNSC, Oregon, and United States, 1970–2000.



Source: 2000/1990 U.S. Census Summary File 3 “Detailed Tables,” United States, Oregon, Census Tract 106. 1970 Census of Population and Housing pt. 182. 1980 Census of Population and Housing pt. 314.

Between 1970 and 2000, the UNSC’s employment grew by 50.6 percent; this was lower than the U.S. at 82.8 percent employment growth, and Oregon at 127.9 percent (Figure 7). The employment growth that the UNSC did experience was based on increased employment in the service sectors. There was also growth of household income in the UNSC, though it lagged the national and state income growth during the same period (Figure 8).

Figure 8. Household Income Indices (1970 = 100), UNSC, Oregon, and United States, 1970–2000.



Source: 2000/1990 U.S. Census Summary File 3 “Detailed Tables,” United States, Oregon, Census Tract 106.
 1970 Census of Population and Housing pt. 182, Tract 106.
 1980 Census of Population and Housing pt. 314, Tract 106.

The UNSC’s household income has continued to grow between 1970 and 2000; however, as Figure 8 shows, the UNSC grew at 80 percent of the Oregon and U.S. growth rates. Note that Oregon far outpaced the national rate in total employment, but stayed just about even in terms of income. Oregon’s workforce has shifted toward more service occupations, which can have a higher percentage of part-time and relatively lower paying jobs. That shift also has taken place in the UNSC, to an even greater degree than the statewide changes (Table 1).

Table 1. UNSC and Oregon Employment Changes for Selected Sectors, 1970–2000.

Sector	Upper North Santiam Canyon				Oregon			
	1970		2000		1970		2000	
	Jobs	%	Jobs	%	Jobs	%	Jobs	%
Total full-time and part-time employment	790	100.0	1,236	100.0	925,914	100.0	2,118,403	100.0
Wage and salary employment	547	69.2	853	69.0	767,676	82.9	1,699,647	80.2
Proprietors employment	106	13.4	159	12.9	158,238	17.1	418,756	19.8
Ag. Services, forestry, fishing, and others	34	4.3	73	5.9	8,606	0.9	44,524	2.1
Construction	58	7.3	144	11.7	41,190	4.4	123,253	5.8
Manufacturing	340	43.0	186	15.0	179,059	19.3	258,694	12.2
Transportation and public utilities	45	5.7	72	5.8	53,441	5.8	93,432	4.4
Wholesale trade	23	2.9	77	6.2	46,089	5.0	101,506	4.8
Retail trade	91	11.5	131	10.6	146,314	15.8	361,367	17.1
Finance, insurance, and real estate	5	0.6	27	2.2	69,173	7.5	165,766	7.8
Services	129	16.3	418	33.8	169,173	18.3	632,614	29.9
Government and government enterprises	137	17.3	257	20.8	159,657	17.2	269,212	12.7
Federal government	70	8.9	27	2.2	40,771	4.4	43,989	2.1
Local government	67	8.5	230	18.6	118,886	12.8	225,223	10.6

Source: U.S. Bureau of Economic Analysis and U.S. Census Bureau.

2000/1990 U.S. Census Summary File 3 “Detailed Tables,” United States, Oregon, Census Tract 106.

1970 Census of Population and Housing p. 182, Tract 106.

1980 Census of Population and Housing p. 314, Tract 106.

Comparing employment changes on a sectoral basis between the UNSC and Oregon can indicate how the county has adjusted to the different economic shocks it has experienced since 1970 and where it might be heading in relation to statewide trends. As a percentage of total employment, the general Services sector in Oregon has grown from 18.3 percent to 29.9 percent of the jobs. In the UNSC, the Services sector also grew, from 16.3 percent to 33.8 percent of the jobs (Table 1). Examples of the types of services that are included in the Services sector include accommodations, food, professional (e.g., architectural, legal), health care, education, business, and repair. The Manufacturing sector in the UNSC experienced a significant drop, even in comparison to the overall decline in the State of Oregon. Manufacturing jobs decreased from 19.3 percent of the jobs to 12.2 percent in Oregon and from 43.0 percent to 15.0 percent in the UNSC.

Total population, employment growth, and, to a lesser degree, the rate of growth for household income in the UNSC have all lagged the U.S. and Oregon, as have many rural areas. Many rural areas are actively seeking opportunities to increase their tourism/recreation industries and pursuing increases in their construction sectors for second and retirement homes. The UNSC may have additional opportunities to develop those types of initiatives. There may be a window of opportunity to strengthen the UNSC’s recreation and construction sectors, as baby boomers over the next 20 years make decisions about how and where they will spend their leisure time and where they

will live, at least a portion of the year, during retirement.

Sectoral Employment and Location Quotients

This section provides a more detailed examination of the UNSC’s comparative advantages by analyzing the current proportions of employment in each sector in the UNSC, as they compare to those proportions in Oregon and the U.S. It also considers areas of opportunity for future development.

Location quotients (LQs) can be used to make these comparisons. LQs are calculated by taking the percentage of employment that a sector represents in the UNSC and dividing it by the percentage of employment that sector represents in Oregon or the U.S. – $LQ_{UNSC} = (UNSC_{Industry\ Employment} / UNSC_{Total\ Employment}) / (Oregon_{Industry\ Employment} / Oregon_{Total\ Employment})$. LQs can indicate where the UNSC is relatively more specialized and where the UNSC may be presumed to have a comparative advantage, or at least did at some time in the past, in relation to Oregon or the U.S.

If the percentages of employment for a sector are the same for the UNSC and Oregon or the U.S., the location quotient will be 1.0. If the UNSC is less specialized in a sector, the LQ will be less than 1.0; if it is more specialized, the LQ will be greater than 1.0.

“LQs can be used as an indicator of economic diversity; having several sectors with LQs greater than 1.0 indicates multiple specializations that are the key to economic diversity” (Weber, Sorte, and Holland 2002, 9). When a sector has an LQ greater than 1.0, it may also indicate that the sector is a basic industry or an industry that exports or has forward linkages beyond the UNSC and has backward linkages to suppliers in the UNSC. Basic industries bring new money into the region, and they respnd at least a portion of that money with other businesses in the region, thereby leading to economic growth.

Table 2. UNSC Location Quotients for Selected Industries.

Sector	1970			2000		
	Jobs	OR LQ	US LQ	Jobs	OR LQ	US LQ
Total full-time and part-time employment	790	1.00	1.00	1,236	1.00	1.00
Wage and salary employment	547	0.84	0.81	853	0.86	0.83
Proprietors employment	106	0.79	0.98	159	0.65	0.77
Ag. Services, forestry, fishing, and others	34	4.63	7.47	73	2.81	4.55
Construction	58	1.65	1.53	144	2.00	2.05
Manufacturing	340	2.23	2.01	186	1.23	1.32
Transportation and public utilities	45	0.99	1.08	72	1.32	1.18
Wholesale trade	23	0.58	0.64	77	1.30	1.38
Retail trade	91	0.73	0.77	131	0.62	0.65

Finance, insurance, and real estate	5	0.08	0.10	27	0.28	0.27
Services	129	0.89	0.83	418	1.13	1.06
Government and government enterprises	137	1.01	0.91	257	1.64	1.53
Federal government	70	2.01	1.33	27	1.05	0.74
Local government	67	0.66	0.78	230	1.75	1.75

Source: U.S. Bureau of Economic Analysis.

2000/1990 U.S. Census Summary File 3 “Detailed Tables,” United States, Oregon, Census Tract 106.

1970 Census of Population and Housing pt. 182, Tract 106.

1980 Census of Population and Housing pt. 314, Tract 106.

Table 2 indicates that while the comparative advantages the UNSC had in natural resource-based industries 35 years ago have declined, they continue to provide a comparative advantage for the UNSC. Since a number of mills are still operating and the nursery industry is developing in the area, high-value horticulture and niche-marketed wood products may provide indirect routes for the UNSC to enjoy some of the benefits of Oregon’s, and particularly the Portland Metro area’s, strong market demand. While there was some growth in the service sectors, it has not been sufficient to compensate for the loss of manufacturing jobs and it has not been as great as in many other rural communities that have focused on developing a recreation or lifestyle basis for their economies.

The recreation-based service sectors have not achieved the rates of pay that were lost from the Manufacturing Sector. However, amenity-rich areas that wish to compensate for some of the losses to their Manufacturing Sector and work to develop their service sectors have higher incomes and educational attainment than rural areas in general. There also can be negative effects from developing the service sectors, including higher housing prices and crime rates (Reeder and Brown 2005). The increase in housing costs can be more than offset by the higher income and new retirees, and second-home owners can be useful allies in developing anti-crime programs.

The LQs we have been discussing provide a good initial understanding of the UNSC economic base. To get a more precise understanding, we used an input-output (I-O) model, which we constructed to more accurately reflect the UNSC economy. It is described in the next section.

Input/Output Modeling and Ground-Truthing

Each business or policy decision that is made within the UNSC affects its economy. The effects of those decisions, as they spread throughout the economy, can be estimated using an I-O model. Input-output analysis provides an effective way of organizing and using detailed economic information. After the tables and matrices of an I-O model are constructed, an economic event like low water in Detroit Lake can be introduced into the model/economy and a set of impacts projected.

When considering the estimates of impacts provided in this report, the reader needs to remember that an I-O model has limitations. It is dependent on its assumptions of how things are produced or their production functions, the price of inputs, and the percentage of purchases made within the UNSC. An I-O model is static and linear. It does not account for major changes in markets and technological conditions. It assumes that industries can and do continue to produce goods and services in the same manner without regard to how much they produce. Even with these limitations, I-O models can be very useful for estimating economic impacts and understanding how the impacts ripple throughout an economy from the backward (supplier) and forward (customer) linkages among industries.

To develop a more detailed profile of the UNSC economy and conduct the economic impact analysis necessary to study the institutional and organizational structures, an I-O model of the UNSC was constructed. First, the IMPLAN software I-O model and database was used to construct a basic I-O model for the UNSC.

IMPLAN is an effective tool being used across the U.S. and is regularly tested and improved. The IMPLAN system can be used to construct an I-O model at the national, state, county, or zip code levels, as in this UNSC. The data for the IMPLAN system is updated on a regular basis, although the process to do so is time consuming and data sets are released with a multi-year lag. This report used the 2002 IMPLAN database for the I-O model, which was modified by the authors based on data from 2003 and as discussed below.

Once the IMPLAN out-of-the-box model was built, it was customized or “groundtruthed” to provide a more accurate representation of the UNSC area’s economy. When the I-O model was finished, it was used to produce a detailed economic profile of the UNSC. The UNSC is about a \$266-million economy (Table 3) in terms of output; \$122 million of that output comes from value that is added within the UNSC’s economy (employee compensation, proprietor income, other property income, and indirect business taxes). The difference between output and value-added measures—\$144 million—is from goods and services that are purchased from outside the local economy and used as inputs by each sector to produce the output it sells.

Table 3. Industry Output, Employment, and Value Added.

SECTOR	Total Industry Output	Employment	Value Added
Agriculture	37.751	652	18.816
Forestry & Logging	6.000	75	2.950
Utilities	2.363	3	1.769
Construction	13.530	131	5.257
Manufacturing - Food and Beverages	41.005	172	11.557
Manufacturing - Wood Products	87.753	489	33.239
Manufacturing - Other	16.886	62	5.460
Wholesale Trade	3.474	32	2.515
Transportation & Warehousing	4.108	42	2.069
Retail Trade	4.879	103	3.665
Information	0.773	3	0.382
Finance & Insurance	1.370	10	0.925
Real Estate & Rental & Leasing	1.554	17	1.040
Professional and Technical Services	0.821	13	0.624
Administrative and Support Service	2.519	35	1.082
Private Educational Services	0.193	6	0.095
Health Care and Social Assistance	1.455	25	1.044
Arts, Entertainment & Recreation	2.250	40	1.412
Accommodation & Food Services	8.277	205	4.761
Other Services	3.622	78	1.824
Public Administration	25.314	495	21.345
TOTAL	265.897	2,688	121.831

Source/Note: IMPLAN Model 2002 edited to 2003 data with Total Industry Output and Value Added in Millions of Dollars and Employment, including full-and part-time jobs.

When the percentage of the total value added is calculated from Table 3, four natural resource-based or related sectors produce 60 percent of the county’s output (Agriculture – 15.4 percent, Forestry & Logging – 2.4 percent, Manufacturing including Food and Wood Products – 36.8 percent, and an estimated one-third of Public Administration that is directly related to natural resources – 5.8 percent).

The UNSC has been able to maintain a significant level of natural resource-based production, despite the serious declines experienced in those sectors over the past 25 years. This may be one reason the UNSC has not pursued development of the recreation-or lifestyle-based sectors to the same extent as rural communities that have been unable to maintain significant agricultural and wood products industries.

UNSC Export Base

Important elements of the UNSC’s economic base are the goods and services that are

exported outside the area. The term “exports” is used here to include any activities that bring dollars into the UNSC economy. This means that items such as tourism and federal transfer payments, dividends, interest, and rent are considered part of the export base.

The UNSC I-O model can directly estimate exports from each industry and, using the multipliers for each sector, generate estimates of the dependence of the economy on the exports from each sector. A sector’s contribution to the UNSC’s economy is determined by the demand from outside the UNSC for the goods and services produced within the sector and the subsequent respending associated with meeting that demand. The contribution of that industry to the region’s employment is the number of employees in all industries whose jobs are dependent—directly, indirectly (through interindustry linkages), and through household spending (induced effects)—on the exports of that industry.

Specifically, the procedure followed to calculate the UNSC’s export base was to individually remove each sector’s exports to determine an economic “dependency index.” We also removed the payments from outside the UNSC to households, which include transfer payments, dividends, and interest. In the UNSC, those payments totaled \$48.4 million. They were 45 percent federal (e.g., Social Security), 18 percent state (e.g., low-income health care support), and 37 percent private (e.g., stock dividends).

Table 4 shows the export dependency by sector and compares the sectoral employment with the export-base-dependent employment for each sector. As noted above, the export-dependent jobs for each sector include all the jobs across all sectors that are dependent on the particular sector’s exported products.

Table 4. UNSC Sectoral and Export-Base-Dependent Employment.

SECTOR	Sectoral Employment		Export Dependency	
	Jobs	%	Jobs	%
Agriculture	652	24.3	538	20.0
Forestry & Logging	75	2.8	74	2.8
Utilities	3	0.1	3	0.1
Construction	131	4.9	130	4.8
Manufacturing - Food and Beverages	172	6.4	22	0.8
Manufacturing - Wood Products	489	18.2	477	17.7
Manufacturing - Other	62	2.3	54	2.0
Wholesale Trade	32	1.2	26	1.0
Transportation & Warehousing	42	1.6	34	1.3
Retail Trade	103	3.8	88	3.3
Information	3	0.1	3	0.1
Finance & Insurance	10	0.4	8	0.3
Real Estate & Rental & Leasing	17	0.6	16	0.6
Professional and Technical Services	13	0.5	12	0.4
Administrative and Support Service	35	1.3	27	1.0
Private Educational Services	6	0.2	8	0.3
Health Care and Social Assistance	25	0.9	24	0.9
Arts, Entertainment & Recreation	40	1.5	34	1.3
Accommodation & Food Services	205	7.6	173	6.4
Other Services	78	2.9	64	2.4
Public Administration	495	18.4	475	17.7
Households			398	14.8
TOTAL	2,688	100.0	2,688	100.0

Source: IMPLAN Model 2002 edited to 2003 data.

Reviewing this export-dependency information, one can distinguish the significant basic or exporting industries, particularly those with higher positive percentages in the last column, such as Manufacturing—Wood Products, etc. The non-basic or service industries also can be determined as those with no or lower positive percentages in the last column, such as Finance & Insurance or Utilities. They primarily provide services to the export industries, and their jobs are predominantly included as indirect effects in the exporting sectors. Comparing the UNSC's export-dependency percentages to the export-dependency percentages for rural Oregon generally indicates some differences, which are discussed in the next section.

Analysis

Introduction

Most of rural Oregon has shifted over the past 30 years from an economy that was heavily dependent on natural resources and a few large manufacturers to rely more and more on tourism and retirees. Their economies, though not as robust, are more diverse and maybe more resilient. The UNSC generally is moving in the same direction. What differentiates the UNSC from other rural places in Oregon is that it has many of rural Oregon's amenities relatively close to metro areas, and yet it has not made the transition to more lifestyle businesses and land use as quickly as many rural communities. We could not find evidence that policies had been adopted or action explicitly guided by communities within the UNSC wanting to avoid the transition to a greater role for recreation-and lifestyle-based businesses, although individuals expressed some of that feeling.

One amenity that sets the UNSC apart is Detroit Lake, with its excellent public access and fishing, sailing, and water sports opportunities. This might explain partially why the uncertainty of water levels in Detroit Lake both within and between years and the constrained development options available at Detroit Lake could have a significant impact on the UNSC's economic vitality. Remember, the UNSC's population, job, and income growth all lagged Oregon growth and increases in comparable nonmetro counties and communities across Oregon. If boaters could reliably expect to purchase a moorage or visit Detroit Lake on day trips throughout the season and that season extended to September 30, economic growth in the UNSC might be more similar to that of other amenity-rich rural areas.

Impact Scenario: Water Levels Below 1,546 Feet During the Summer Season

The UNSC I-O model can be used to estimate the single-season impact of dropping the water level in Detroit Lake so low, below 1,546 feet, that moorages cannot operate during the summer season. To make this estimate, we asked business owners and other community leaders about the impacts of prior low-water seasons to determine a percentage reduction in each impacted sector. We then shocked the UNSC I-O model with those changes.

There are three types of effects to the economy of reduced water levels: 1) direct effects, which are the economic impacts on the exporting industries that will lose money right away from reduced demand for their goods and services; 2) indirect effects, which are the reduced sales by suppliers to the exporting industries; and 3) induced effects, which include the reduced spending by all affected industries and employees (households) in the local economy at the bank, grocery store,

dentist, etc.

The direct effects of a low water level as they were estimated by local marinas, food services, accommodations, retail shops, government agencies, and other tourism-related sectors are noted in Table 5.

Table 5. Direct Effects of a Summer Season Water Level < 1,546 Feet Elevation, in 2006 Dollars.

<i>Sector</i>	<i>Amount</i>
Recreation - Moorages, etc.	\$1,495,972
Accommodations & Food Services	\$1,112,984
Retail	\$800,969
Construction	\$551,264
Public Administration	\$1,133,598
Total	\$5,094,787

The total economic impact of the low-water shock to the economy is the sum of the direct, indirect, and induced effects. Table 6 shows the impact expressed in output, value-added, and employment of the lower summer lake level.

Table 6. Output, Value-Added, and Employment Impacts of a Summer-season Water Level < 1,546 feet Elevation, in 2006 Dollars.

	<i>Direct</i>	<i>Indirect</i>	<i>Induced</i>	<i>Total</i>	<i>Upper North Santiam Area Multiplier</i>	<i>Oregon Weighted Average Multiplier</i>
Output	\$5,094,787	\$626,560	\$777,884	\$6,499,231	1.28	1.60
Value-Added	\$3,278,209	\$320,939	\$478,514	\$4,077,662	1.24	1.71
Employment	90	17	20	127	1.41	1.76

Table 7 breaks the employment impact down by sector and types of effect.

Table 7. Employment Impact of a Summer-season Water Level < 1,546 Feet Elevation by Sector.

SECTOR	Direct Effects	Indirect Effects	Induced Effects	Total
Agriculture	0.0	-1.0	-1.0	-2.0
Forestry & Logging	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	-5.0	-1.0	0.0	-6.0
Manufacturing - Food and Beverages	0.0	-1.0	-1.0	-2.0
Manufacturing - Wood Products	0.0	-1.0	-1.0	-2.0
Manufacturing - Other	0.0	-1.0	-1.0	-2.0
Wholesale Trade	0.0	-1.0	-1.0	-2.0
Transportation & Warehousing	0.0	-1.0	-1.0	-2.0
Retail Trade	-15.0	-1.0	-2.0	-18.0
Information	0.0	0.0	0.0	0.0
Finance & Insurance	0.0	-1.0	-1.0	-2.0
Real Estate & Rental & Leasing	0.0	-1.0	-1.0	-2.0
Professional and Technical Services	0.0	-1.0	-1.0	-2.0
Administrative and Support Service	0.0	-1.0	-1.0	-2.0
Private Educational Services	0.0	0.0	-1.0	-1.0
Health Care and Social Assistance	0.0	0.0	-1.0	-1.0
Arts, Entertainment & Recreation	-25.0	-2.0	-1.0	-28.0
Accommodation & Food Services	-25.0	-1.0	-3.0	-29.0
Other Services	0.0	-1.0	-1.0	-2.0
Public Administration	-20.0	-1.0	-1.0	-22.0
Total	-90.0	-17.0	-20.0	-127.0

In a low water year, the UNSC would lose 2.4 percent of its total output, 3.3 percent of its value-added output, and 4.7 percent of its employment. Those impacts seem modest; however, if that same proportionate impact was experienced by the Salem Metropolitan Statistical Area it would represent 8,861 jobs. In addition, the impacts of low water in Detroit Lake are not evenly distributed, and average impact estimates mask some of the more serious effects. Based on discussions with local business owners and the rate of turnover in terms of ownership for some businesses that are highly dependent on Detroit Lake, the economic impacts to the community of Detroit and individual businesses along Highway 22 could range from double-digit percentages to 100 percent.

Along with the estimates of how very low water would affect the UNSC's current economy, the potential benefits that could be gained by reliable water levels and easier development adjacent to Detroit Lake also warrant attention. As an area's economy ceases to grow and even decline, the demand for goods and services declines as well. The threshold for retaining businesses that have

sufficient economies of scale to compete with the prices of larger market areas such as Stayton or Salem, even when transportation costs are included in the calculations, is different for each business. However, that threshold appears to have been reached for a number of retail and construction trade-related businesses in the UNSC. This causes a breakdown in the backward-or supplier-related economic linkages and is reflected in the significant difference between the UNSC's and Oregon's multipliers (Table 6). While larger economic areas have larger multipliers because they can develop a broader range of suppliers, the difference between the UNSC's multipliers and Oregon's multipliers are greater than many other rural areas that we have studied.

While there is only one example of a drought-induced low water year in 2001, increased needs for spring and early-summer flows to support fish migration may cause or at least threaten low water every 3–5 years. That level of uncertainty may be sufficient to discourage a significant number of moorage customers and daily visitors. Many people are not willing to accept that level of uncertainty, so they seek other areas where they can develop multi-year business and social relationships that can be assured. Examples of those alternatives include the Columbia River, the Oregon Coast, Hood Canal, and Puget Sound. The potential economic impacts that cannot currently be achieved because of uncertainties associated with the water levels and the construction options adjacent to Detroit Lake are significant. These uncertainties may be seriously constraining the economic benefits that Detroit Lake could bring to the UNSC.

Limitations

The limitations of these types of hypothetical simulations and suggestions must be recognized. They rely to a large degree on conjecture about general trends. Specifically in this study, some businesses expressed a high degree of optimism and adaptability in terms of the direct impacts they would face during a very low water season. This optimism, while possibly well founded in the short run or for an infrequent very low water year, probably does not fully recognize the impacts of repeated very low water years or the potential economic benefits that currently are being constrained by the uncertainty surrounding annual decisions that can be changed midseason. Many of the UNSC's competitors (e.g., coastal or Columbia River communities) can provide potential users a much higher level of certainty as to water levels.

While this I-O method of analysis is able to show the linkages within the UNSC's economy and the strength and direction of economic impacts, its results should not be considered precise. The model relies on many assumptions and is a snapshot in time. Thus it cannot project all the ways people will react to an economic shock like very low water levels in Detroit Lake. These static and

linear limitations of the model can be strengths, as well. The reader can assess whether the projected impacts are too high or too low. The reader can make a proportionate adjustment in the findings, and the relationships among the findings in terms of output, value-added, and employment will remain intact.

Summary

The UNSC's economy is still driven 60 percent by manufacturing and natural resource-based industries, specifically wood products. Another 20 percent of the economy is provided by jobs or transfer payments received away from the UNSC. Recreation-and tourism-linked businesses provide the other 20 percent of the economy activity. While tourism and recreation-related businesses and agencies are forming approximately 20 percent of the economic base of the UNSC, the potential to expand that component of the economy seems to be significant.

As discussed previously, the UNSC has not kept pace in terms of population growth (UNSC 0.58 percent compared to 23.87 percent in comparable communities and 14.60 percent in nonmetro Oregon), in terms of employment growth (UNSC 50.6 percent compared to 76.87 percent in nonmetro Oregon and 82.80 percent in Oregon), and in terms of household income, which has grown in the UNSC at 80 percent of the rate that household income has grown in Oregon and the U.S. We cannot be certain exactly how much the economy would benefit by more predictable water levels in Detroit Lake that extend to September 30. We also cannot be certain as to how infrastructure development in communities adjacent to Detroit Lake may attract weekend residents and retirees, thereby bolstering construction and other industries. Yet, we cannot identify other obvious reasons that the UNSC has lagged comparable areas in economic indicators. We believe a combination of policy decisions, including some greater risk-taking and collaboration by water-related interest groups and a good deal of community and state and federal agencies' resolve, has the potential to diversify, stabilize, and maybe reverse a declining trend in the UNSC economy.

The opportunity to make these changes will not last indefinitely. Over the next 15–20 years, baby boomers will make their decisions as to how and where they will retire or at least recreate as they age. The following generation may not have the same resources or the same opportunities for recreation and retirement. Communities that act now may be able to take advantage of the economic activity that the baby boomers will bring. There is also some evidence that as those baby boomers' children, other relatives, and friends visit them in their new rural homes, some of the visitors may decide to relocate to the rural communities. The retirees and the people that they familiarize with the

community also may bring their businesses, creativity, and energy. The next step for the UNSC would be a market study to more precisely assess the level and sources of demand for additional UNSC recreational, residential, and business development.

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