

Curry County Telecommunications Strategic Plan

Assessment



Prepared for:
Curry County

Prepared by:
John Irwin

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Curry County Telecommunications Strategic Plan

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Curry County Telecommunications Strategic Plan

Preface and Authorization

We present this Assessment phase of Telecommunications Strategic Plan to Curry County. The planning work is well underway and will build on the data gathered in this assessment phase. Phase Two addresses the Goals and Strategies necessary to move us forward. Successful implementation of the strategic plan recommendations depends on continuing community participation, cooperation and collaboration.

Authorization for this planning work was completed under the auspices of Curry County and under the direction of Susan Brown, Economic Development Director. Here we need to give special thanks to Marlyn Schafer, County Commissioner, Chair, for her vision and leadership in setting this planning effort in motion.

It probably goes without saying that these are very complex and extremely time-consuming activities. The planning process that got us to this point here is rooted in and modeled after best practices collected from successful ventures throughout the United States.

Fostering development of a 21st century knowledge-based economy means building on our existing strengths while adding additional diversification to the economy.

INTRODUCTION

Telecommunications is the central nervous system of the American economy. It has revolutionized virtually every aspect of our lives and every industry, from education and health care to banking and finance. Between 1995 and 2004, advances in telecommunications and information technology were responsible for as much as 75% of U.S. labor productivity gains.

To remain competitive in the world Curry County businesses, institutions and residents must have available to them the most advanced telecommunications technologies and services AND the knowledge of how to use them. The Curry County Telecommunications Strategic Plan, will emphasize coordination with telecommunications efforts of Del Norte county towards an integrated and regionally based cooperative strategy; including private sector interaction and legislative remedies where deemed necessary. This Assessment phase provides basic information on which to build our planning recommendations.

In Curry County this will have a positive impact on the entire community by expanding opportunities for business development, jobs, access to quality healthcare, and educational opportunities. Likewise, it will serve to leverage the reliance on traditional forms of transportation and commerce, and lessen any negative impacts the county may have due to its physical isolation.

Today we find ourselves confronting rapidly changing economic realities as well as the many existing challenges that present themselves to areas such as Curry County. Discussion of ways to move the region forward frequently turns to the impediments of not having widely available and affordable advanced telecommunications infrastructure (i.e., broadband). A recent announcement of advanced telecommunications services from Charter in the region is a good first step forward to removing this barrier to economic and quality of life improvements.

To ensure a continuing expansion of the supply of telecommunications services we need the additional participation of current and emerging telecommunications services providers. It is also in their best interests in serving the public needs (i.e., customers) to be engaged in these planning processes. By no means are we finished with our infrastructure growth. New applications are coming on line everyday and these applications require more and more bandwidth.

Of critical importance is to recognize that having the tools to enable our future as a 21st century knowledge-based economy at our disposal is only one part of the equation. A parallel effort needs to occur on the demand side of the equation. Here we must assist our residents, businesses, educators and others in understanding how to integrate these technologies into their lives, whether for profit, for service, or for entertainment purposes. Lifelong education and workforce development absolutely must be addressed for us to succeed with these tools.

Economic diversification is the cornerstone of a healthy, growing 21st century information age county. By taking full advantage of our telecommunications infrastructure, Curry County is poised with the opportunity to become a world-class destination for a wide variety of businesses, healthcare, retirees and tourism. A 21st century county benefits from leveraging the communication technologies available to it, improving the quality of life and standards of living for all residents. Listed here are just a few of the ways in which we will all benefit:

- Access to world-class telecommunications services that will enable community leaders to actively recruit companies to the county.
- Family wage jobs will become the rule and not the exception due to expanded employment opportunities.
- New options will become available for businesses to establish operations in rural areas as well as providing employees with the choice of working from their homes.
- Educators and students alike will have the opportunities to develop skills and knowledge by employing telecommunication services to work with and learn from people around the world.
- Healthcare options will grow dramatically for communities and their residents in the area. Online consultations, diagnostics, and patient monitoring will be available to those requiring special assistance. Medical staff will have access to state-of-the-art training.
- Public safety, of greater concern than ever before, will operate with improved efficiency and responsiveness.
- Housing will become more affordable due to rising incomes of prospective homebuyers.

ASSESSMENTS

We do not exist in a vacuum. What happens at the global, national and state levels have an impact on our county's telecommunications environment. In the Assessment we looked at the global, national and state telecommunications landscape as well as Curry County's. Our focus is substantially on broadband but we do touch on other telecommunication related topics.

Let's be clear. Telecommunications is no longer just about making a phone call. In the following portion of the narrative we report on a relatively small subset of the massive amount of information available re telecommunications.

Curry County Profile

Location

Curry County is a county located in the U.S. state of Oregon. The county was named for George Law Curry, territorial governor of Oregon Territory for much of the time between 1853 and 1859. As of 2000, the population was 21,137. The county seat of Curry County is Gold Beach.



Geography

The county originally contained about 1,500 square miles. However, boundary adjustments with Coos County in 1872 and 1951 and Josephine County in 1880 and 1927 increased the area to 5,150 km² (1,989 mi²). 4,215 km² (1,627 mi²) of it is land and 935 km² (361 mi²) of it (18.16%) is water.

Located in Curry County is Cape Blanco, the westernmost point in Oregon, with a longitude of 124 degrees, 33 minutes and 46 seconds.

Adjacent Counties:

- Coos County, Oregon - (north)
- Douglas County, Oregon - (northeast)
- Josephine County, Oregon - (east)
- Del Norte County, California - (south)

Incorporated cities:

- Brookings
- Gold Beach
- Port Orford

Unincorporated communities and Census Designated Palces:

- Agness
- Carpenterville
- Harbor
- Langlois
- Ophir
- Pistol River
- Sixes
- Wedderburn

Population and Demographic Characteristics¹

The Oregon south coast's population grew faster than the statewide average between July 1, 2003, and July 1, 2004.² Oregon added 30,256 residents during that 12-month period, growing at 0.8 percent. Curry County's population increased even faster, adding 403 people, a 1.9 percent gain. Curry County was one of Oregon's fastest growing counties, ranking fourth among Oregon's 36 counties. Deschutes County grew the fastest, up by 3.8 percent over the 12-month period and also had the distinction of being the fastest-growing county from July 1, 2000, to July 1, 2004, up by 16.6 percent.

During the past four years ending July 1, 2004, Curry County ranked 12th-fastest growing in Oregon over that time, gaining 963 residents. Curry County's percentage increase, 4.6, also trailed the statewide percentage increase of 5.1.

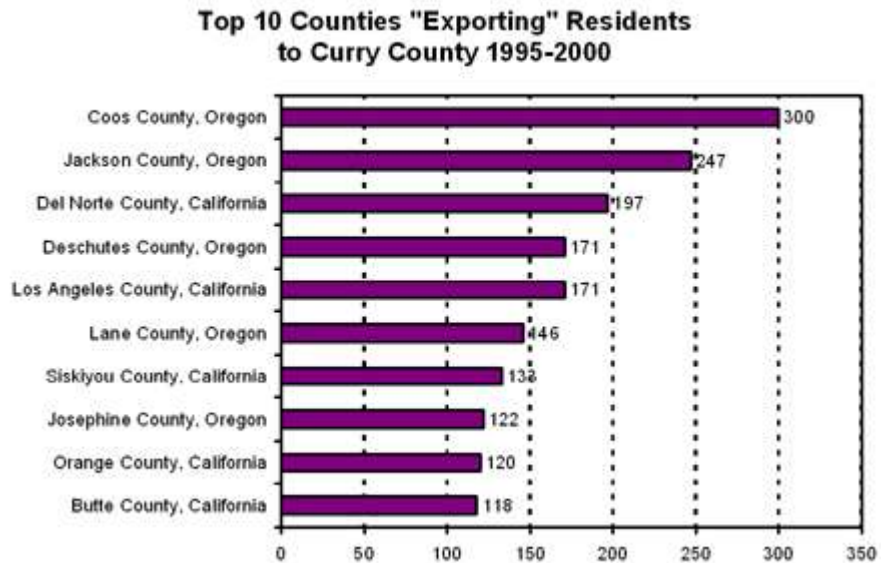
Components of population change show that deaths exceeded births in both South Coast counties, meaning that all of the region's population increase occurred due to in-migration. Of the South Coast's 1,458 people who migrated from other areas between July 1, 2003, and July 1, 2004, 67 came from other countries. The census bureau does not produce annual estimates of where new residents migrate from by state or county. But during the decennial Census, it asks residents what county and state they resided in five years before. This gives us the best snapshot, even if it is only available every 10 years, of where new residents are coming from. Data are also available on where a county or state's residents have moved to.

Census data show 300 people who lived in Coos County in 1995 had migrated to Curry County by 2000. Coos County was the largest "exporter" of people to Curry County. Of the 740 or so people who moved between the two counties between 1995 and 2000.

People QuickFacts	Curry County	Oregon
Population, 2005 estimate	22,427	3,641,056
Population, percent change, April 1, 2000 to July 1, 2005	6.10%	6.40%
Population, 2000	21,137	3,421,399
Persons under 5 years old, percent, 2005	3.70%	6.20%
Persons under 18 years old, percent, 2005	17.30%	23.30%
Persons 65 years old and over, percent, 2005	26.20%	12.90%
Female persons, percent, 2005	51.20%	50.30%
White persons, percent, 2005 (a)	95.00%	90.80%
Black persons, percent, 2005 (a)	0.20%	1.80%
American Indian and Alaska Native persons, percent, 2005 (a)	2.00%	1.40%
Asian persons, percent, 2005 (a)	1.00%	3.40%
Native Hawaiian and Other Pacific Islander, percent, 2005 (a)	0.10%	0.30%
Persons reporting two or more races, percent, 2005	1.80%	2.30%
Persons of Hispanic or Latino origin, percent, 2005 (b)	4.30%	9.90%
White persons not Hispanic, percent, 2005	91.10%	81.60%
Living in same house in 1995 and 2000, pct 5 yrs old & over	52.30%	46.80%

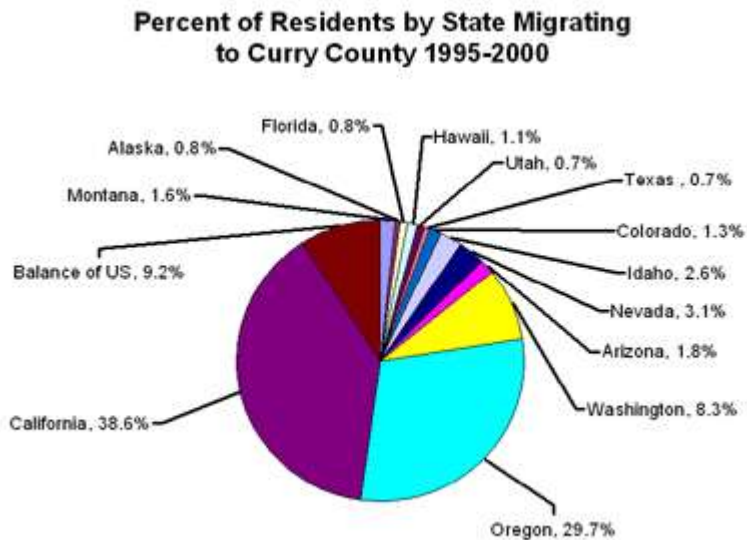
Foreign born persons, percent, 2000	3.70%	8.50%
Language other than English spoken at home, pct age 5+, 2000	5.40%	12.10%
High school graduates, percent of persons age 25+, 2000	81.70%	85.10%
Bachelor's degree or higher, pct of persons age 25+, 2000	16.40%	25.10%
Persons with a disability, age 5+, 2000	5,617	593,301
Mean travel time to work (minutes), workers age 16+, 2000	14.4	22.2
Housing units, 2005	11,968	1,558,421
Homeownership rate, 2000	73.00%	64.30%
Housing units in multi-unit structures, percent, 2000	11.30%	23.10%
Median value of owner-occupied housing units, 2000	\$148,000	\$152,100
Households, 2000	9,543	1,333,723
Persons per household, 2000	2.19	2.51
Median household income, 2003	\$31,333	\$42,593
Per capita money income, 1999	\$18,138	\$20,940
Persons below poverty, percent, 2003	12.40%	12.00%
Business QuickFacts		
Private nonfarm establishments, 2004	785	1,054,491
Private nonfarm employment, 2004	5,685	13,555,421
Private nonfarm employment, percent change 2000-2004	16.30%	0.0% ¹
Nonemployer establishments, 2004	1,969	236,812
Total number of firms, 2002	2,478	299,505
Black-owned firms, percent, 2002	NA	0.70%
American Indian and Alaska Native owned firms, percent, 2002	NA	1.00%
Asian-owned firms, percent, 2002	NA	3.00%
Native Hawaiian and Other Pacific Islander owned firms, percent, 2002	NA	0.10%
Hispanic-owned firms, percent, 2002	NA	2.10%
Women-owned firms, percent, 2002	23.40%	29.50%
Manufacturers shipments, 2002 (\$1000)	132,182	45,864,552
Wholesale trade sales, 2002 (\$1000)	D	56,855,958
Retail sales, 2002 (\$1000)	194,960	37,896,022
Retail sales per capita, 2002	\$9,081	\$10,756
Accommodation and foodservices sales, 2002 (\$1000)	37,062	5,527,223
Building permits, 2005	185	310,241
Federal spending, 2004 (\$1000)	170,556	218,708,961
Geography QuickFacts		
Land area, 2000 (square miles)	1,627	95,996
Persons per square mile, 2000	13	35.6
FIPS Code	15	41

The following figure demonstrates the strong migration link between California and Curry County. In fact, five of the top 10 counties people moved from between 1995 and 2000 were in California. There is also a notable absence of in-migration from the Portland area to Curry County, much less so than in Coos County.



Top 10 Counties "Exporting" residents to Curry County 1995 – 2000

State-level analysis displayed in the next figure shows other counties in Oregon and the Golden State contributing to the majority of new Curry County residents between 1995 and 2000.



Percent of Residents by State Migrating to Curry County 1995 - 2000

The following charts illustrate estimated population growth through the year 2035.³

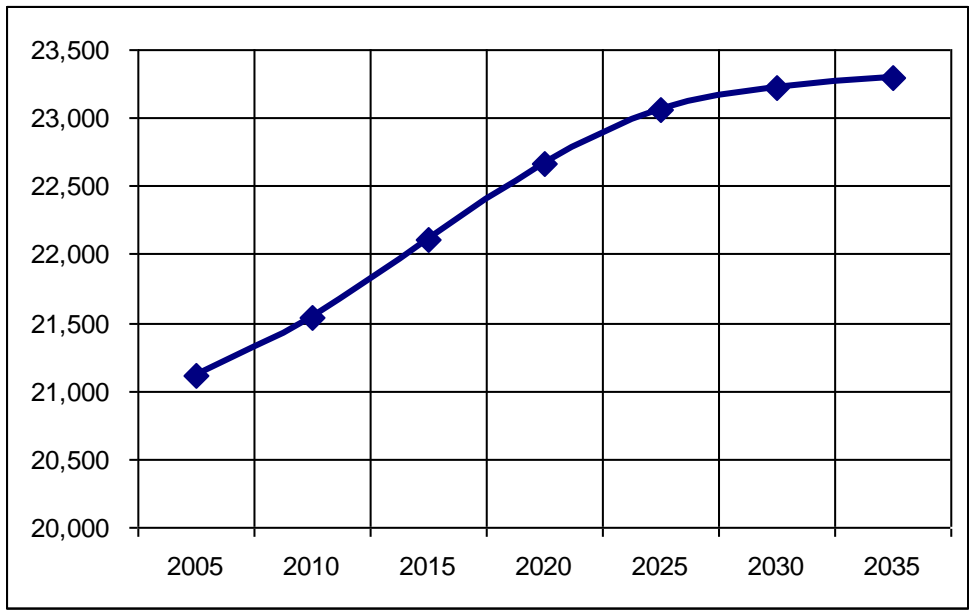


Figure 1 - Total Estimated Curry Population Growth

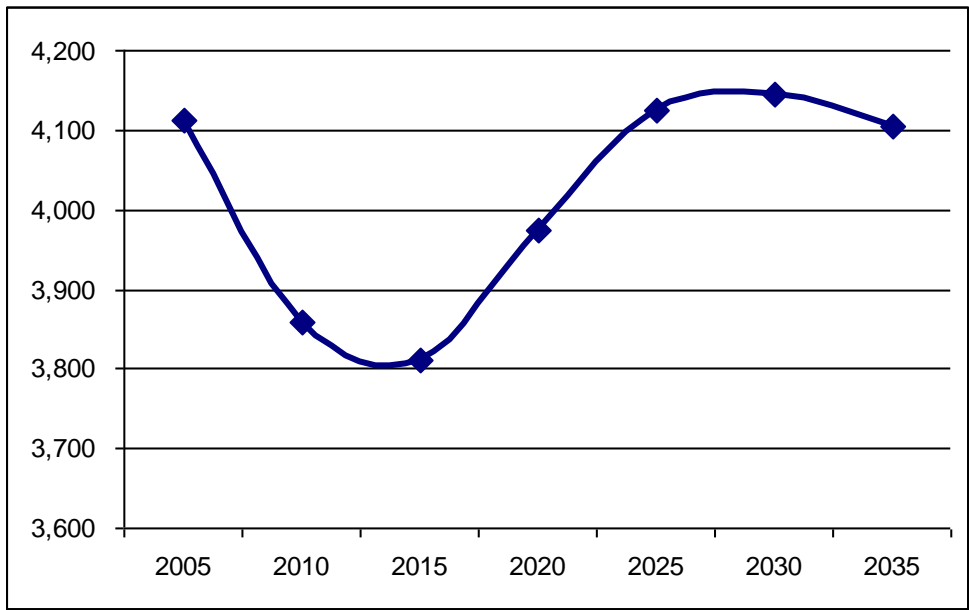


Figure 2 – Estimates for Ages 0-19

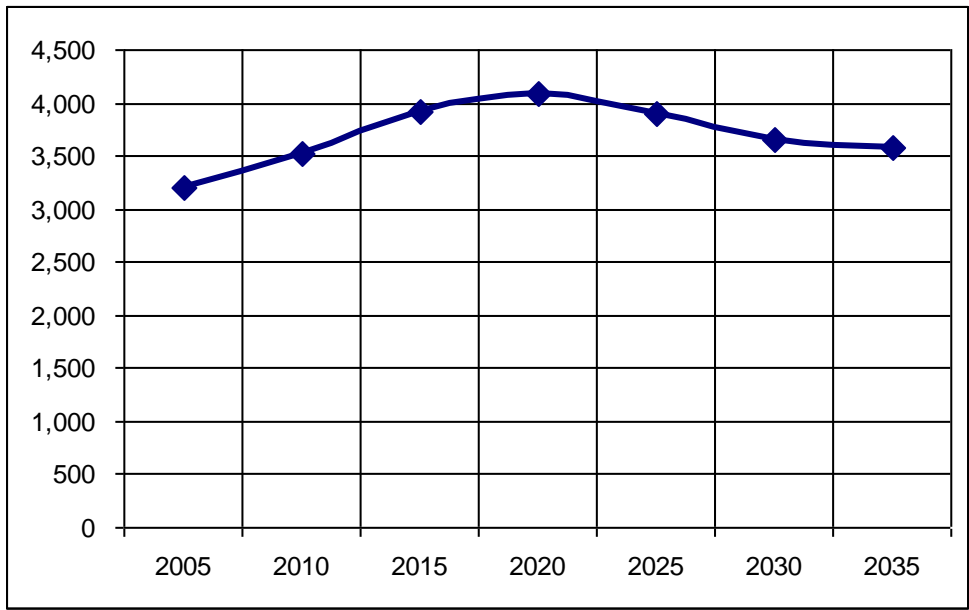


Figure 3 - Estimates for Ages 20-39

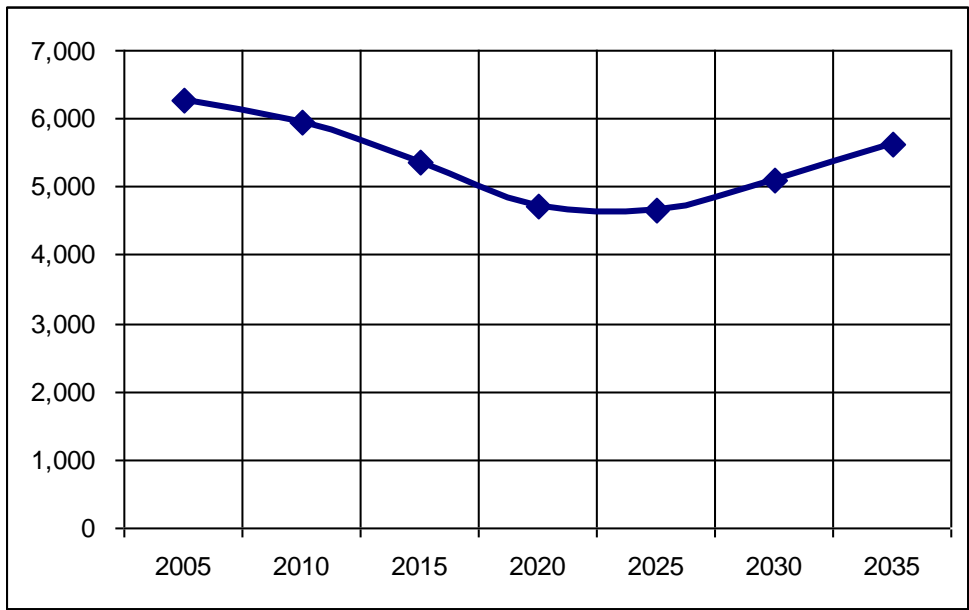


Figure 4 - Estimates for Ages 40 - 69

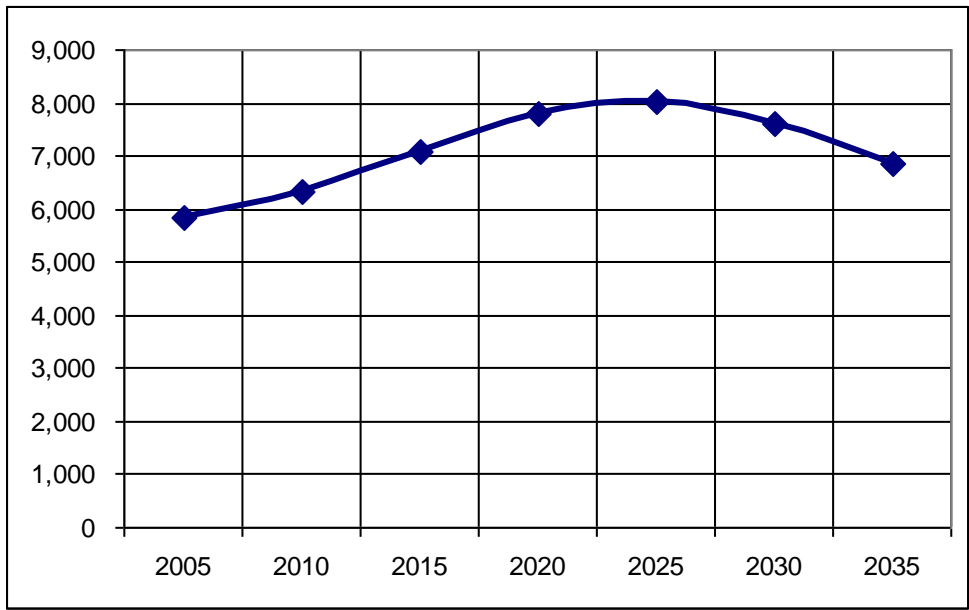


Figure 5 - Estimates for Ages 60 - 79

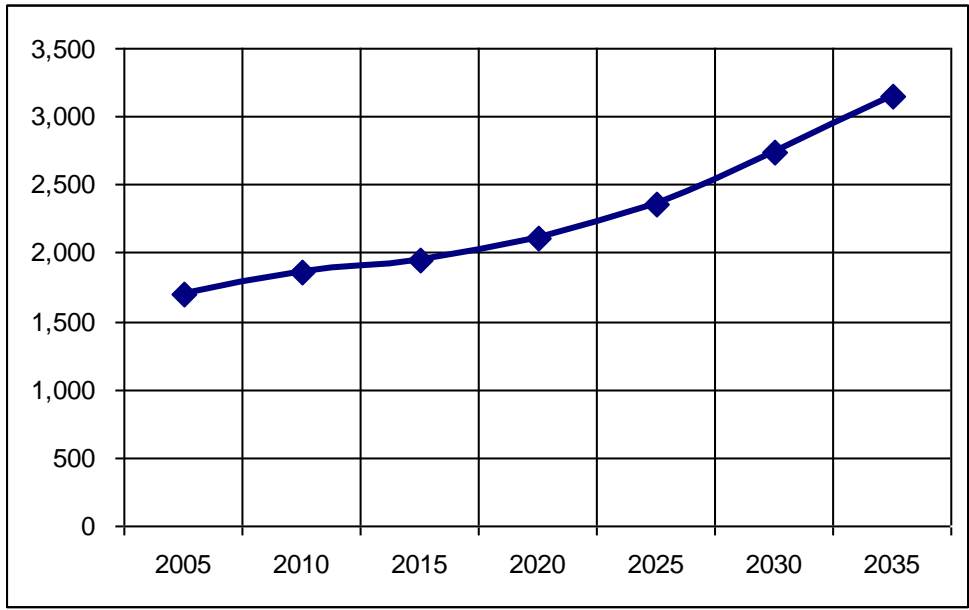


Figure 6 - Estimates for Ages 80-85+

Here's that same information presented on a single chart. It's cluttered but can help put all the trends into a single picture.

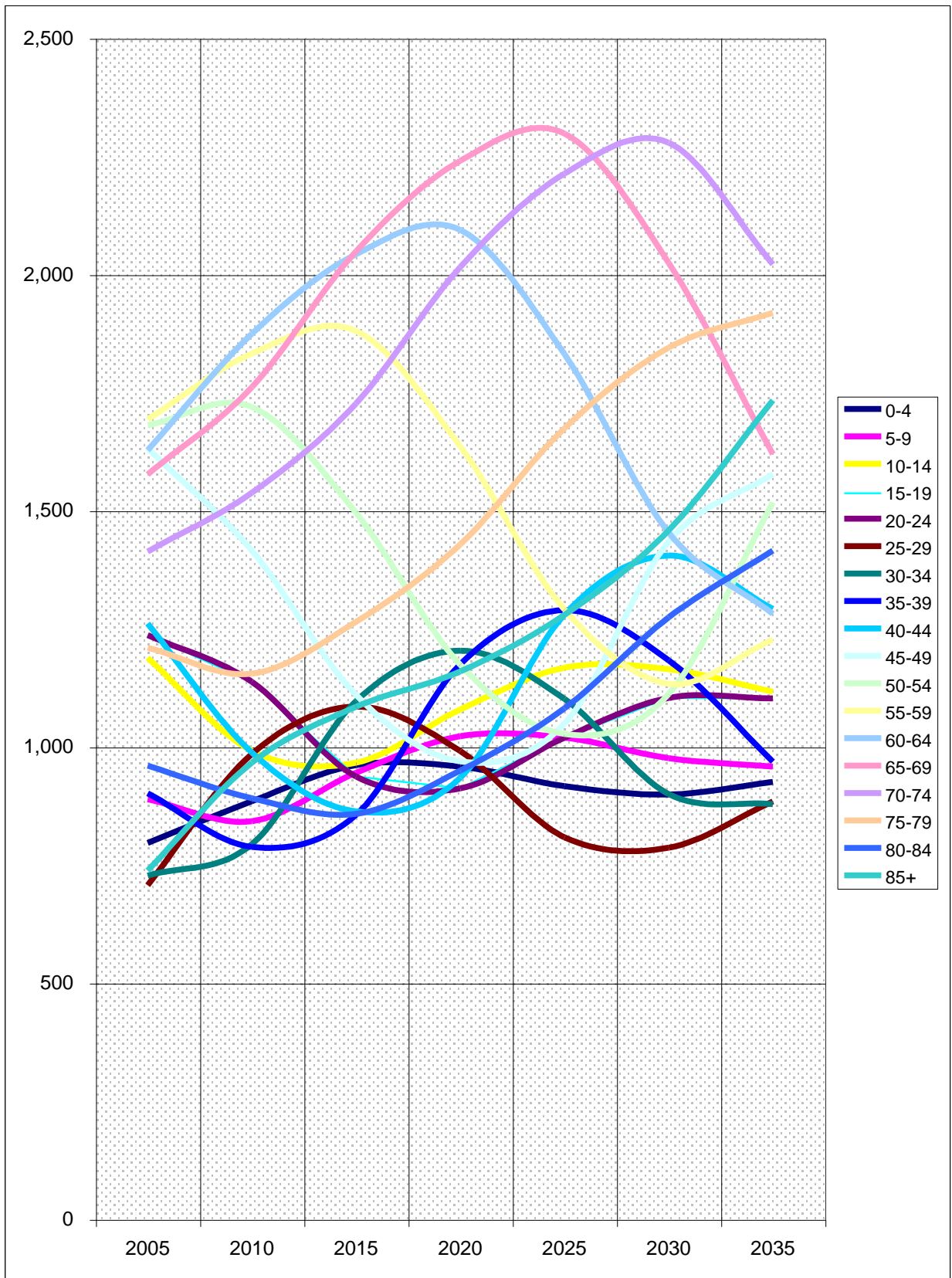


Figure 7 - Estimated Population changes – All Ages

*Economic Profile*⁴⁵

Curry is one of 36 counties in Oregon. It is part of the Brookings, OR Micropolitan SA. Its 2004 population of 22,147 ranked 24th in the state.

In 1852 explorers discovered gold and other precious metals in the rivers and along the beaches of this area. As a result, settlement in the county was concentrated along the coast, depending primarily on water transportation. The slow development of inland transportation routes kept the county relatively isolated well into the twentieth century. While there is still some mining of cobalt, nickel, and chromium in the Gasaquet Mountain area, the economy has reoriented to agriculture and timber. Port Orford cedar (also known as Lawson's Cypress) and myrtlewood are important export products.

The county has excellent grazing areas for raising cattle and sheep. The county also produces blueberries, horticultural nursery stock, and 90% of all Easter lilies raised in the United States. In 2001, the native tanoak in the county were afflicted by Sudden Oak Death, caused by infection of *Phytophthora ramorum*, which has threatened the success of the local nurseries; however, the infection has been successfully contained to an area 12 miles in size. Tourism is also important to Curry County.

The Forest Service owns 59% of the land within the county boundaries. The Port of Brookings is considered one of the safest harbors on the coast.

PER CAPITA PERSONAL INCOME

In 2004 Curry had a per capita personal income (PCPI) of \$25,084. This PCPI ranked 24th in the state and was 82 percent of the state average, \$30,561, and 76 percent of the national average, \$33,050. The 2004 PCPI reflected an increase of 3.9 percent from 2003. The 2003-2004 state change was 4.8 percent and the national change was 5.0 percent. In 1994 the PCPI of Curry was \$18,282 and ranked 14th in the state. The 1994-2004 average annual growth rate of PCPI was 3.2 percent. The average annual growth rate for the state was 3.8 percent and for the nation was 4.1 percent.

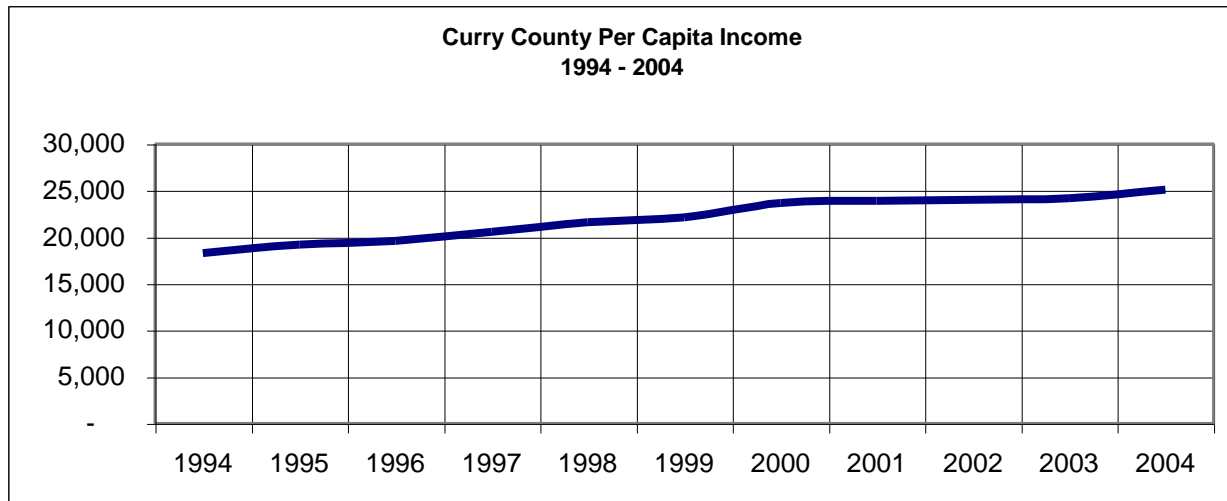


Figure 8 - Per Capita Income⁶

TOTAL PERSONAL INCOME

In 2004 Curry had a total personal income (TPI) of \$555,529*. This TPI ranked 24th in the state and accounted for 0.5 percent of the state total. In 1994 the TPI of Curry was \$378,757* and ranked 24th in the state. The 2004 TPI reflected an increase of 6.1 percent from 2003. The 2003-2004 state change was 5.6 percent and the national change was 6.0 percent. The 1994-2004 average annual growth rate of TPI was 3.9 percent. The average annual growth rate for the state was 5.3 percent and for the nation was 5.2 percent.

COMPONENTS OF TOTAL PERSONAL INCOME

Total personal income includes net earnings by place of residence; dividends, interest, and rent; and personal current transfer receipts received by the residents of Curry. In 2004 net earnings accounted for 43.0 percent of TPI (compared with 41.4 in 1994); dividends, interest, and rent were 28.0 percent (compared with 33.4 in 1994); and personal current transfer receipts were 29.0 percent (compared with 25.2 in 1994). From 2003 to 2004 net earnings increased 8.8 percent; dividends, interest, and rent increased 2.6 percent; and personal current transfer receipts increased 5.6 percent. From 1994 to 2004 net earnings increased on average 4.3 percent each year; dividends, interest, and rent increased on average 2.1 percent; and personal current transfer receipts increased on average 5.4 percent.

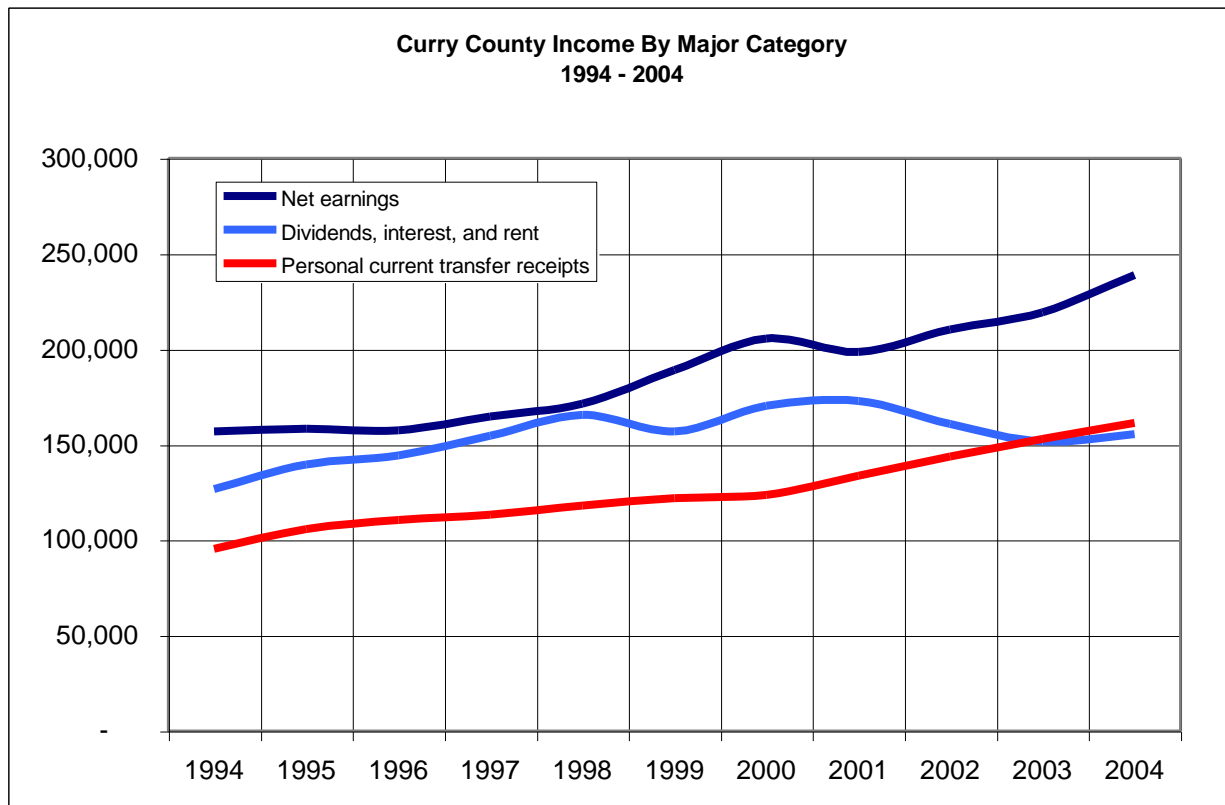


Figure 9 - Income By Major Category⁷

EARNINGS BY PLACE OF WORK

Earnings of persons employed in Curry increased from \$252,427* in 2003 to \$275,434* in 2004, an increase of 9.1 percent. The 2003-2004 state change was 6.8 percent and the national change

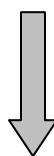
was 6.3 percent. The average annual growth rate from the 1994 estimate of \$173,559* to the 2004 estimate was 4.7 percent. The average annual growth rate for the state was 5.7 percent and for the nation was 5.5 percent.

**Note:* All income estimates with the exception of PCPI are in thousands of dollars, not adjusted for inflation. See Appendices for the 1994 BEARFACTS.

Telecommunication Readiness

Curry County in many ways mirrors the emerging provisioning and utilization of advanced telecommunications capabilities (i.e., broadband) found elsewhere in rural areas. Yet, just as in many other areas of our nation, we are by no means at the end of the journey to providing access neither to broadband nor to benefiting from the myriad opportunities afforded by broadband. The more densely populated areas of the county have these resources. Yet many parts of the more rural areas of Curry County still have neither “reasonable access” nor “reasonably priced” broadband available to them. Perhaps of comparable concern is the challenge residents face of how to best use these powerful technologies and how to prepare our workforce for the inevitable rise of the knowledge-based economy.

On a generally used “connectedness and readiness” scale, Curry County ranks a solid number two and with distinct movement toward the third level of readiness:

- 
1. Services are hard to get or expensive; few use the Internet regularly.
 2. High-speed services are more widely available; local web sites are limited.
 3. General access to high-speed services; web sites support transactions.
 4. Universal access to high-speed services; the Internet has changed the way all organizations operate and is fully integrated into everyday life.

In a connected 21st century county:

- High-speed services are reliable, affordable and everywhere.
- Parents participate more easily in their children’s education.
- Public services are on-line 24x7.
- Businesses are dynamic and able to serve the needs of narrower and global markets.
- Work moves to where people want to live.
- Education is more personal and convenient.
- People coordinate with their doctors to practice preventive healthcare.

Survey Results

Telecommunications planners strengthen their policy determination and strategic planning efforts by continually identifying and understanding trends for their region. Decision makers often rely on long-term demographic and economic projections, based on current trends and foreseeable influences, in their strategic planning. Surveys complement information gathered from a variety of sources, for example, demographic analysis or economic projections. These tools are essential for planning and policy determination. However, they alone are not sufficient. Many contributing factors can compound one another in ways difficult to predict.

While the survey (see Appendices) was not “random”, and as such not mathematically extensible across all of the population of the region, it did see a sufficiently high enough return rate to help us guide policy-making for the county.

Over the month of January – March, 2007 the Curry County Port Orford, Gold Beach and Brookings Chamber of Commerce memberships and others responded to a survey on various factors related to telecommunications and new economy skills. The results are best used to understand how small to mid-sized entities of the area think about these factors. When reviewing the responses keep in mind that this population was predominantly composed of businesses and government.

The response rate of 31% exceeded expectations and demonstrates the growing interest in telecommunications issues; reflecting growth in Internet access, importance of advanced services, ownership of personal computers and a number of other factors useful for planning purposes.

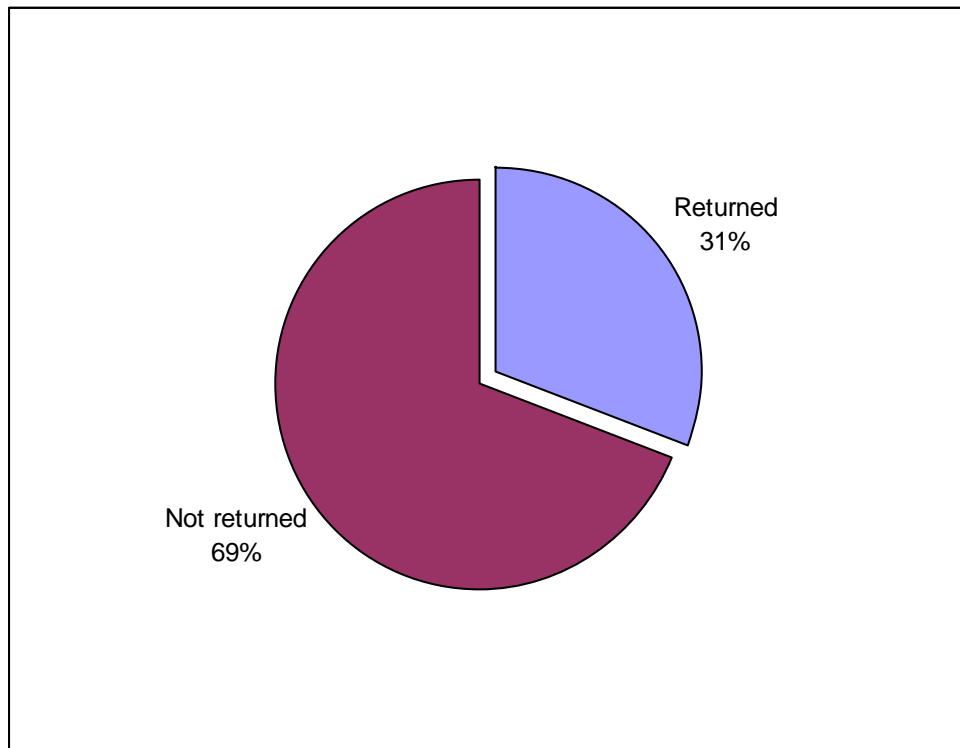


Figure 10 - Survey Responses

Responses were received from throughout the county with 32% from unincorporated areas and 65% from the incorporated areas of the county.

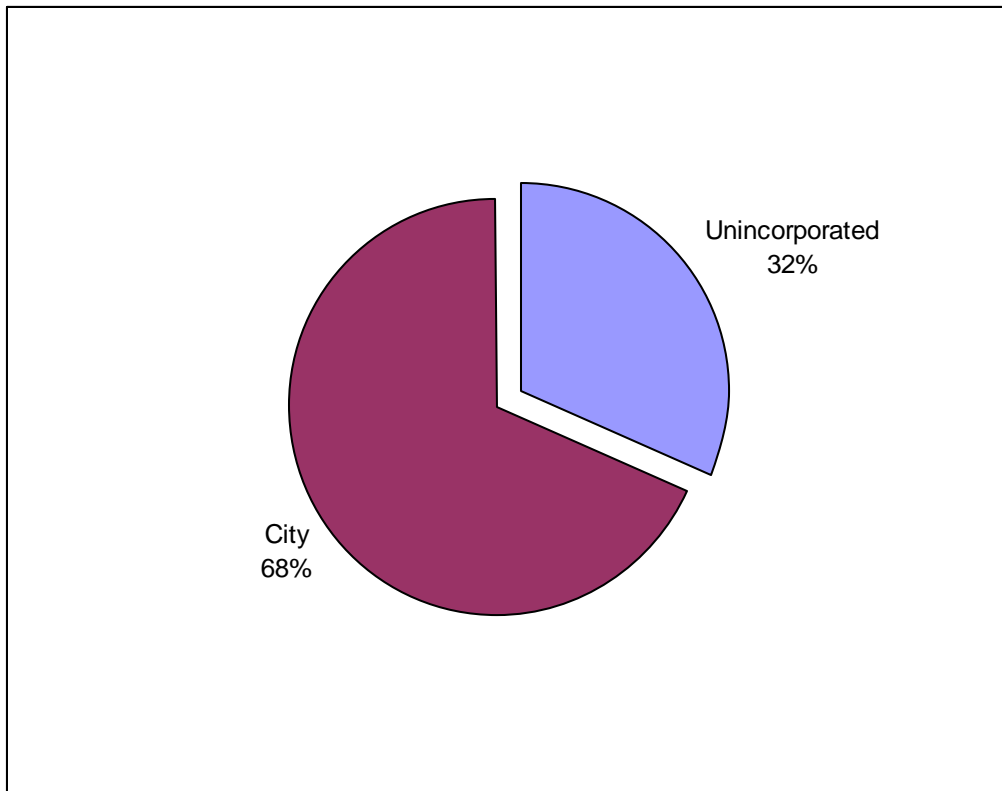


Figure 11 - Areas Responding to the Survey

Sectors represented by the survey population are indicative of the chamber memberships and presents a picture of a service-oriented economy. Retail (17%) and services (11%) constitute 34% of the responses. Construction (10%) and real estate (11%) likely are linked and likely correlates to the housing construction “boomlet” occurring in response to inward migration of retirees. Hospitality/lodging (7%) is a component of tourism related economic activity. Healthcare (8%) responses seemed to be largely driven by small direct service delivery organizations, a number of which indicated they were a home business. Manufacturing (3%) responses was surprisingly low. However, this is not too surprising, as they often tend to belong to other sector-oriented organizations.

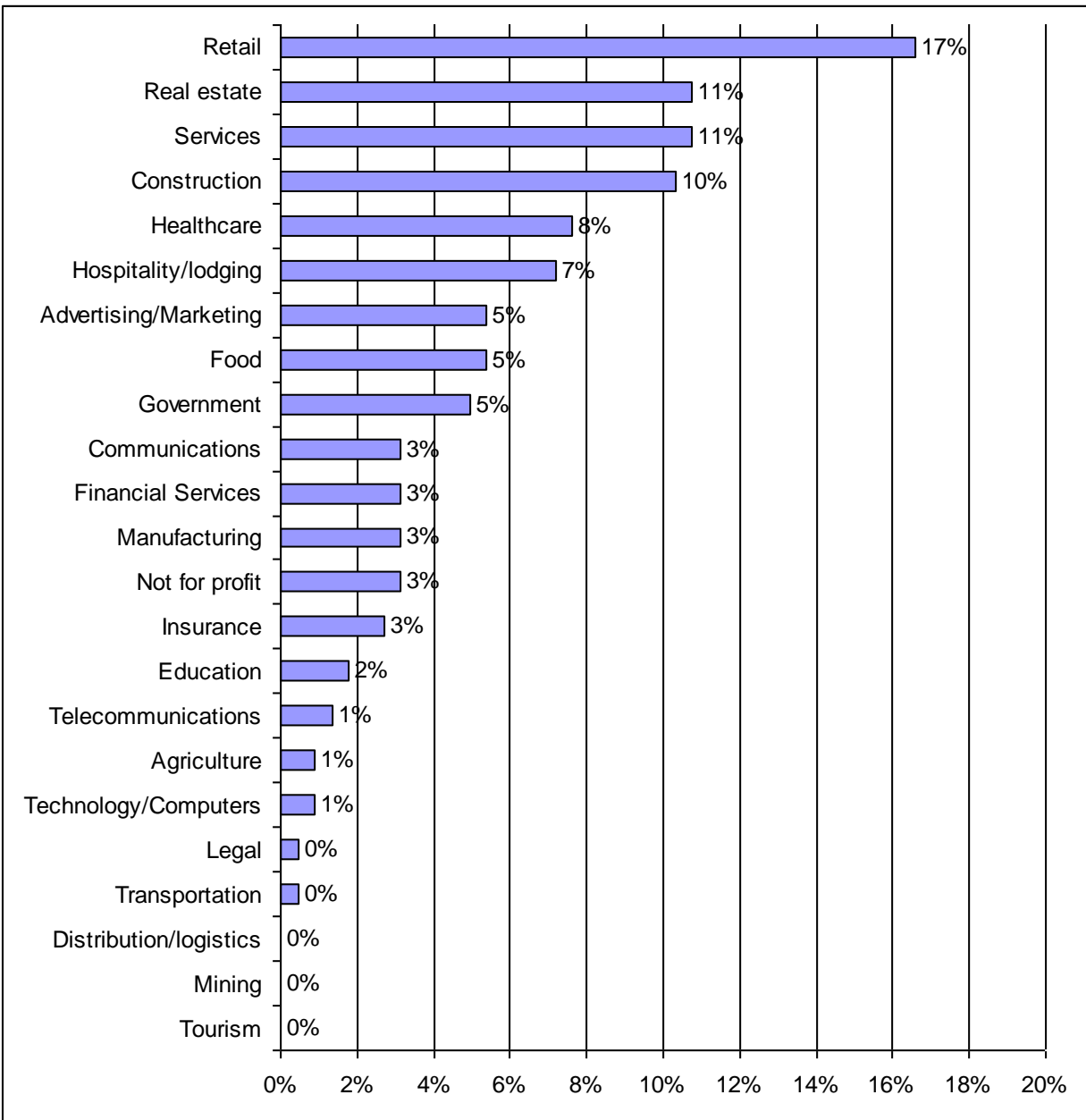


Figure 12 - Sectors

Nearly a third of respondents indicated they were a home-based business.

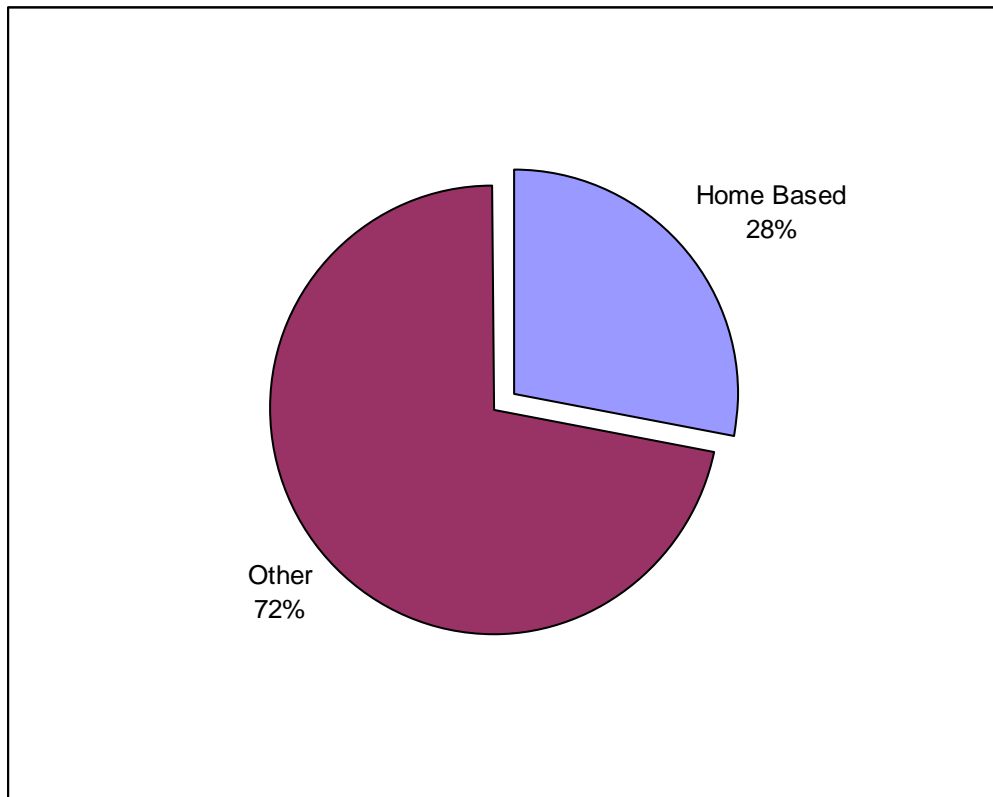


Figure 13 - Home Based Businesses

Telecommunications Connections indicate the expected high level of landline connections (95%) and a high level of cellular phone connections (69%). Everyone had at least one form of telephony connection.

TV connections for cable (36%) and satellite (15%) is on par with expectations, keeping in mind that these were predominantly businesses and government responses. TV reception with an antenna was reported at 4%. It was no surprise to find use of Satellite Wireless Internet (7%) given the rurality of the county, although there were a couple of instances where the respondent's business was apparently located in the Charter cable footprint (not every survey was returned with the business name and/or specific location).

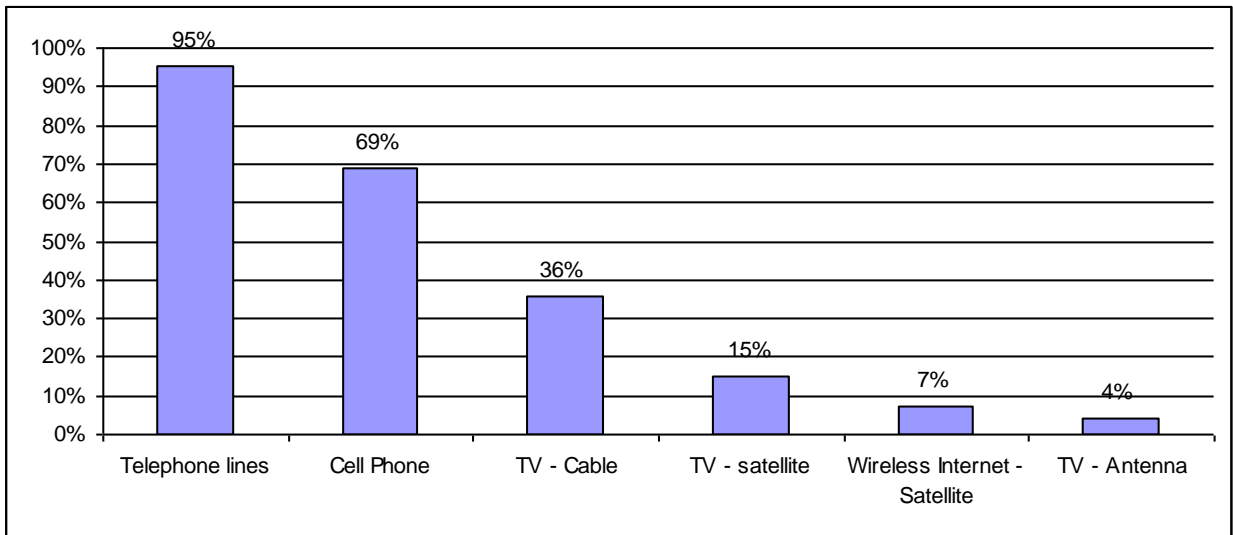


Figure 14 - Telecommunications Connections

Curry County businesses and government Plain Old Telephone (POT) usage revealed that telephony use is predominantly dedicated for Business (92%). A substantial number of lines are dedicated for FAX usage (53%). Lines dedicated to Internet dial-up were at 31%! Personal / Family Use (47%) was not surprising given the number of home-based businesses, and honest.

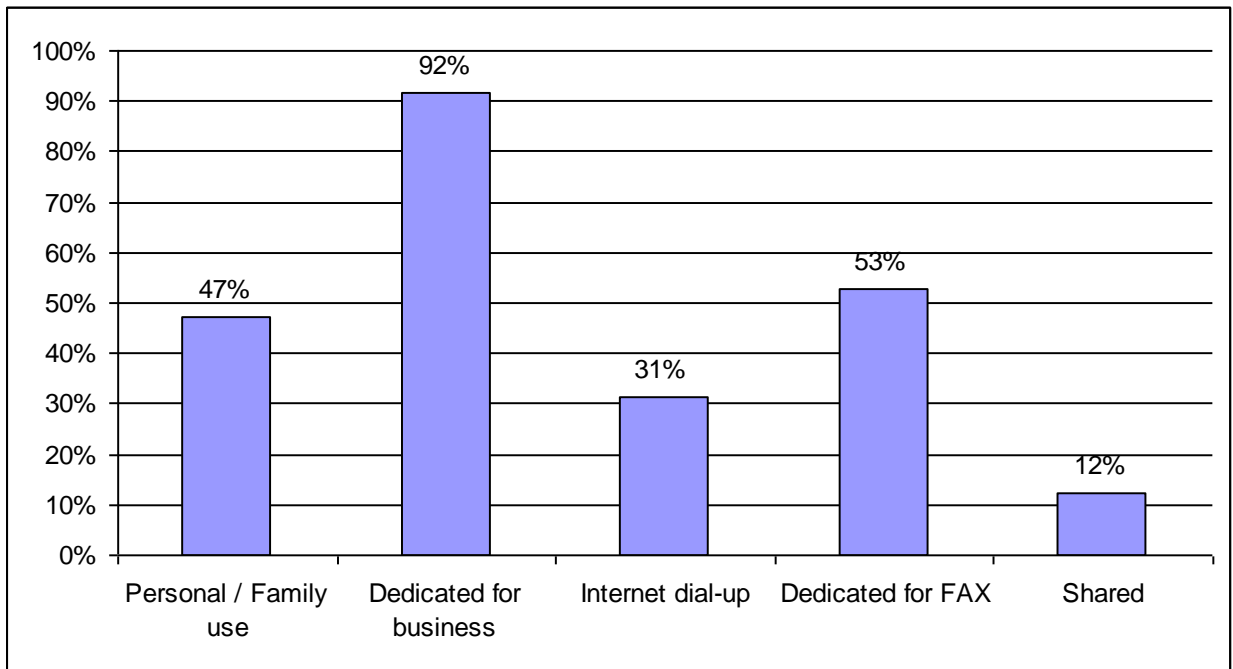


Figure 15 - Plain Old Telephone (POT) Usage

Service provider ratings indicated 70% of respondents (Excellent – 14% and Good – 56%) were largely satisfied with their telephony service. This flies somewhat in the face of anecdotal reporting derived from interviews. There the complaints generally were linked to failures due to service interruptions of from fiber cuts (i.e., this cuts to the route redundancy issues).

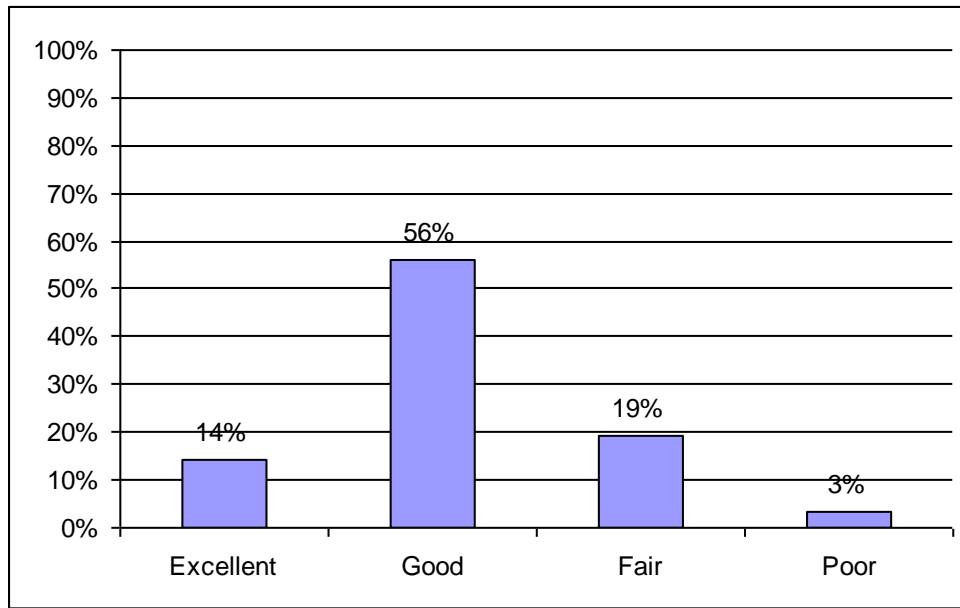


Figure 16 - Service Provider Ratings

PC Ownership and Usage indicated a very high level of PC ownership (95%). Word Processing (88%) was the highest indicated PC application. Spreadsheet usage at 68% was a near second. Database (64%), Digital Photography (57%) and Presentations (35%) followed

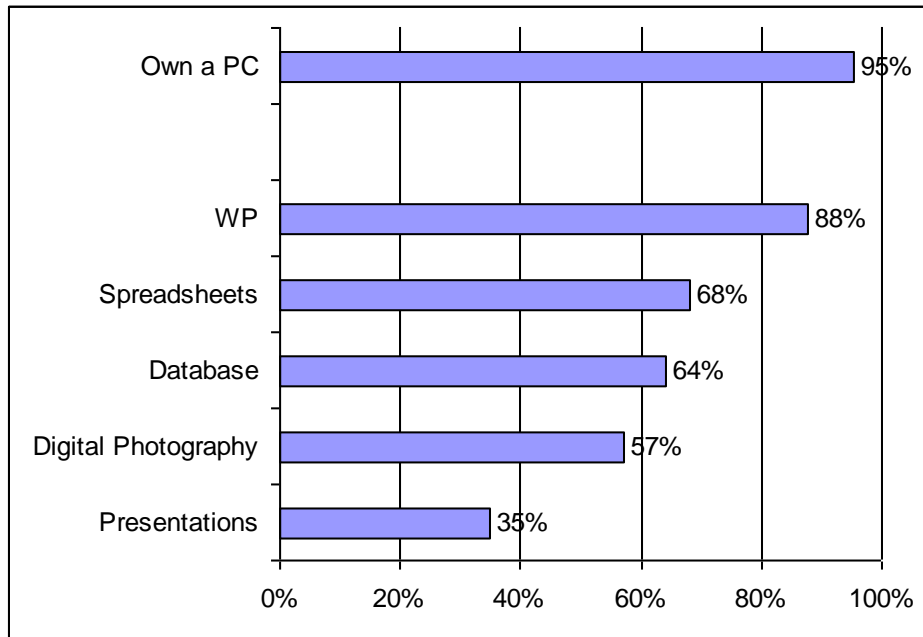


Figure 17 - PC Ownership and Usage

Other uses of PCs included:

HIS/PACS	Bookkeeping
VoIP, publishing, project management	Design & running outdoor printers
Programing	Invoicing
Music	POS & windows merchant services
CAD	Internet

Web design and maintenance	Website management
email stock information	Utility billing
Accounting	GIS mapping
Other	Accounting
Websites	Online Publishing
CAD	Accounting
Internet & iChat w/video	Web site building software
Cataloging & circulation	Billing
Webmaster	QuickBooks
PTP, programming, more	QuickBooks
Financial programs	Business checkbooks
Income tax accounting	Web page/business
Payroll	Accounting software
Web page design & maint.	Websites, accounting
Mainframe connection at HQ	CAD
Audio processing	QuickBooks
Banking	Advertising
Bookkeeping	Shopping
Family history software	Billing/scheduling software
Web Development	Banking
Print Work	Purchasing
Command batch	Internet research
eBay	POS
Mapping	Marketing-signs
Programming systems	Patient management software
Point of sale	Bookkeeping, estimates
Order taking, order placing	Inventory/sales/tracking program

Local Area Networks (LAN) were reported (49%) in nearly half of locations.

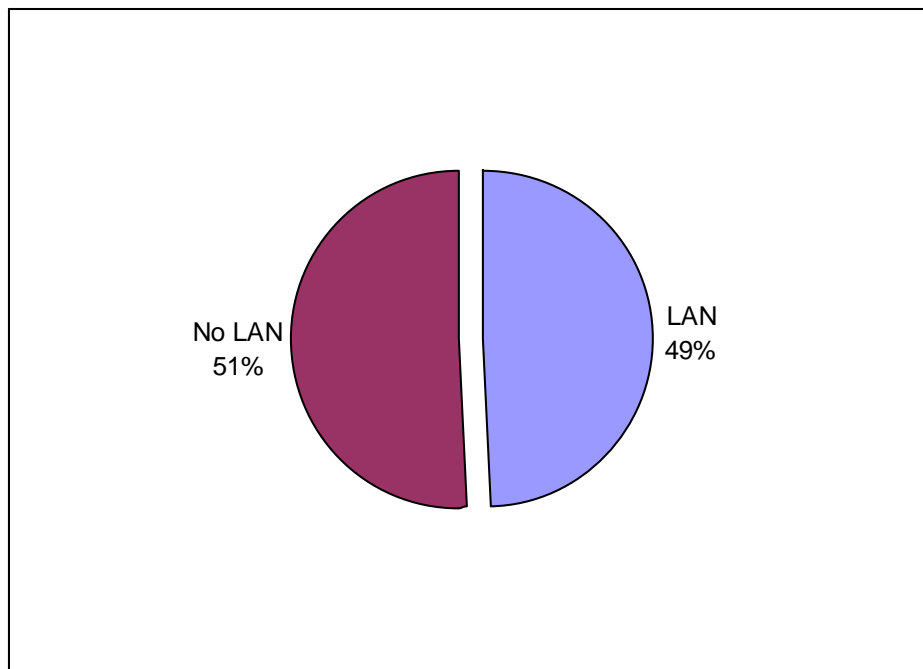


Figure 18 - LAN Ownership

A solid 91% reported use of the Internet/Web in their business. The predominant usage was that of Sending and Receiving Email (87%). Folks are using the Internet/Web to look up information (85%). Online purchases are at 62%. 33% report selling goods or services online. 29% of respondents indicated taking education courses online.

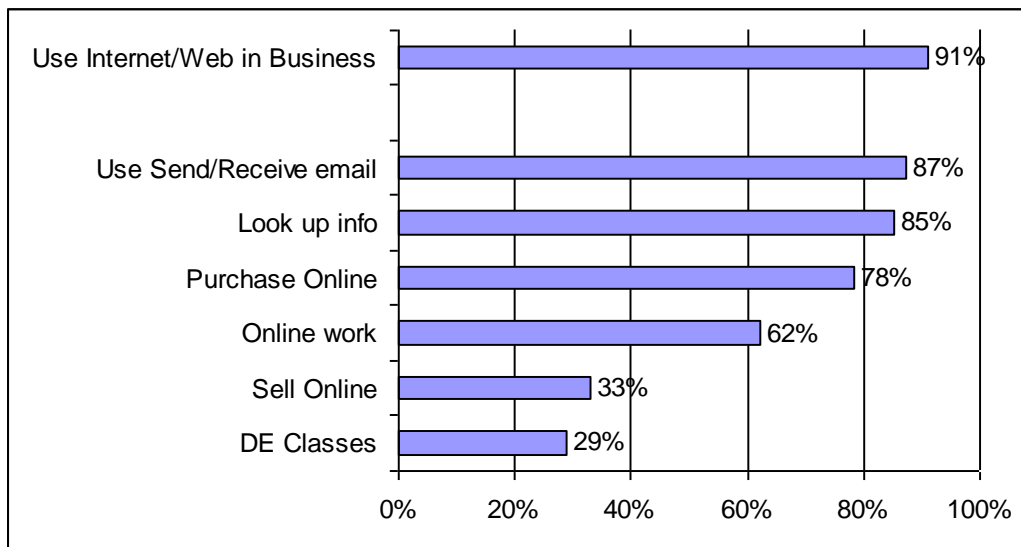


Figure 19 - Business Internet/Web Usage

There is strong interest in Business Management Training (16%).

Respondents indicated Marketing Strategy (26%) was the leading category of interest. Web site design and Maintenance (22%) is a close second.

Running as a pack are e-Commerce (18%), Management (17%), Improve Your Home and Small Business (17%), Finance and Accounting (17%), Sales (17%), Law (16%), Business

Communications (16%), Interviewing and Hiring the Right People (15%), and Achieving Balance at Home and at Work (15%).

Credit Sales (7%) and, surprisingly, Building and Operating a Small Business (7%) brought up the rear of the pack.

This would seem to indicate a strong interest in growing the existing businesses of chamber members and others. Interestingly, was the strong showing of Marketing Strategy, Web Site Design and Maintenance, and e-Commerce. These areas have strong dependencies on a robust telecommunications infrastructure.



Figure 20 - Business Management Training

Access and Speed are related. In the Access category 71% rated this as Critical to Very Important. Only 7% rated Access as Not Important, although that seems high.

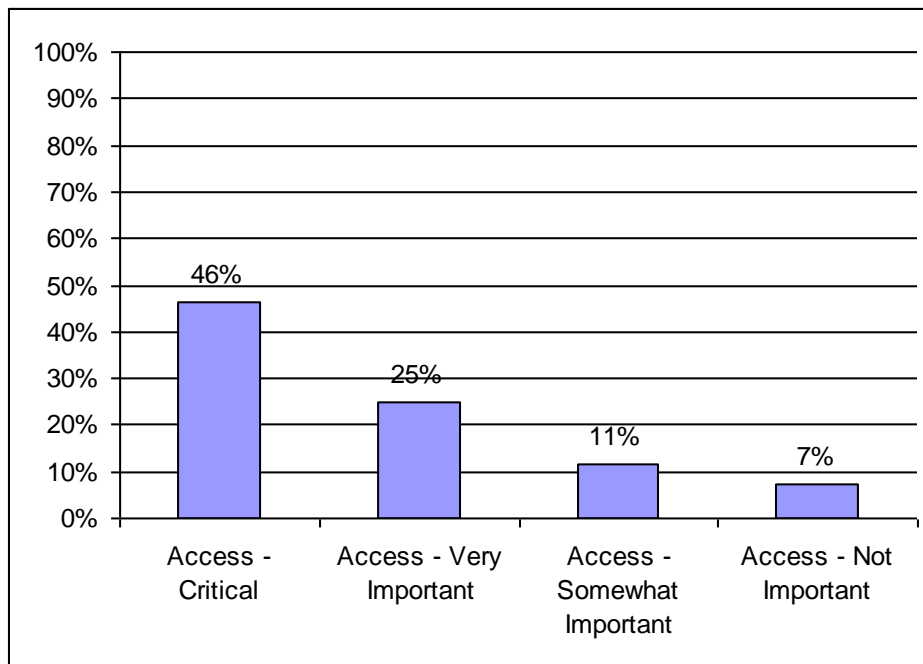


Figure 21 - Access

In the Speed category 69% rated this as Critical to Very Important, whereas 7% rated Speed as Not Important, this again seems high in this day.

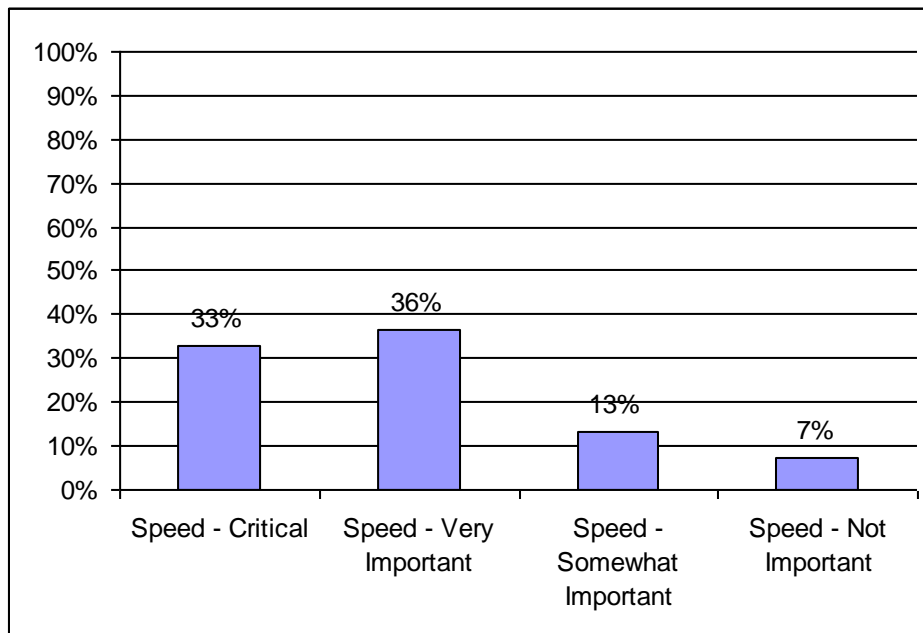


Figure 22 - Speed

Paying for more Speed (37%) was not supported fully by the amounts people are willing to pay. Indeed, many reported a willingness to pay for more speed and then indicated a lesser amount than they currently pay. This is consistent with the general lack of understanding of the cost of providing services as well as the value derived from those services. It may very well be that those wishing a lower price point have not as yet realized the full value that can be derived from

the broadband service. Yet 12% indicated a willingness to pay over \$60. This is likely to be the price point for Charter's 10 mbps service when it is made available.

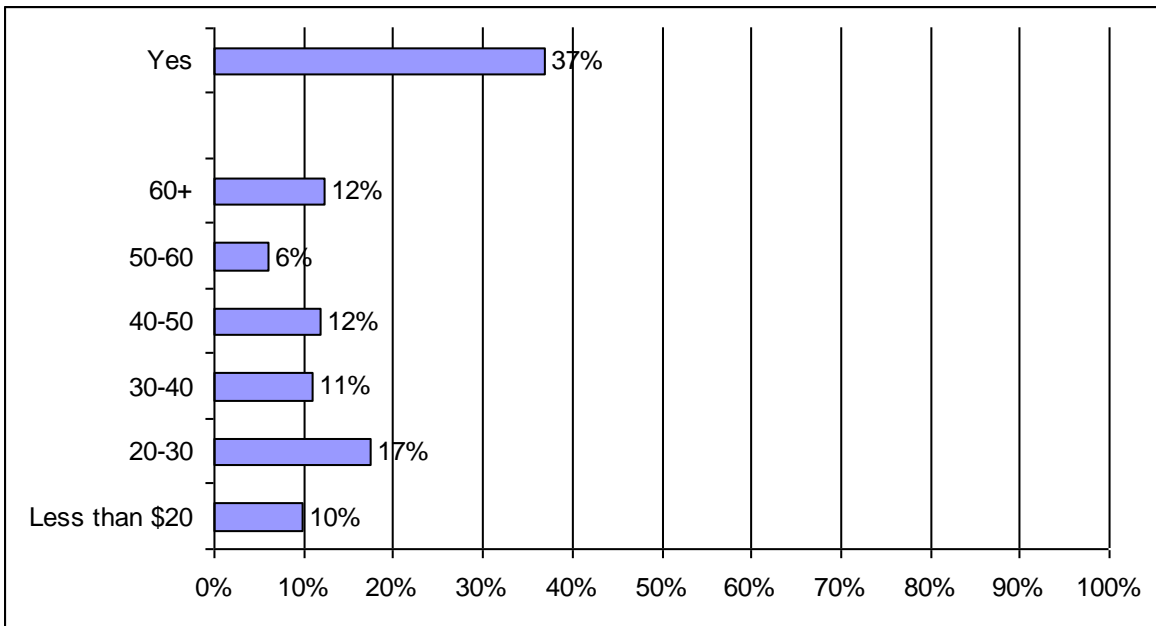


Figure 23 - Pay for Speed

When asked about their view of telecommunications technologies that would be important to the future, many respondents indicated little or no knowledge of Virtual Private Networks, DS/3, Fast Ethernet, Gigabit Ethernet. Again this is not a surprising finding in that the vast majority of those responding were relatively small entities.

Wireless (land-based) (32%) dominated the future view. T-1 (24%), Cable (24%) and Wireless Satellite (24%) were neck and neck. It's not too surprising to see ISDN (1%) at the bottom of the heap. This is an aging technology that is being replaced.

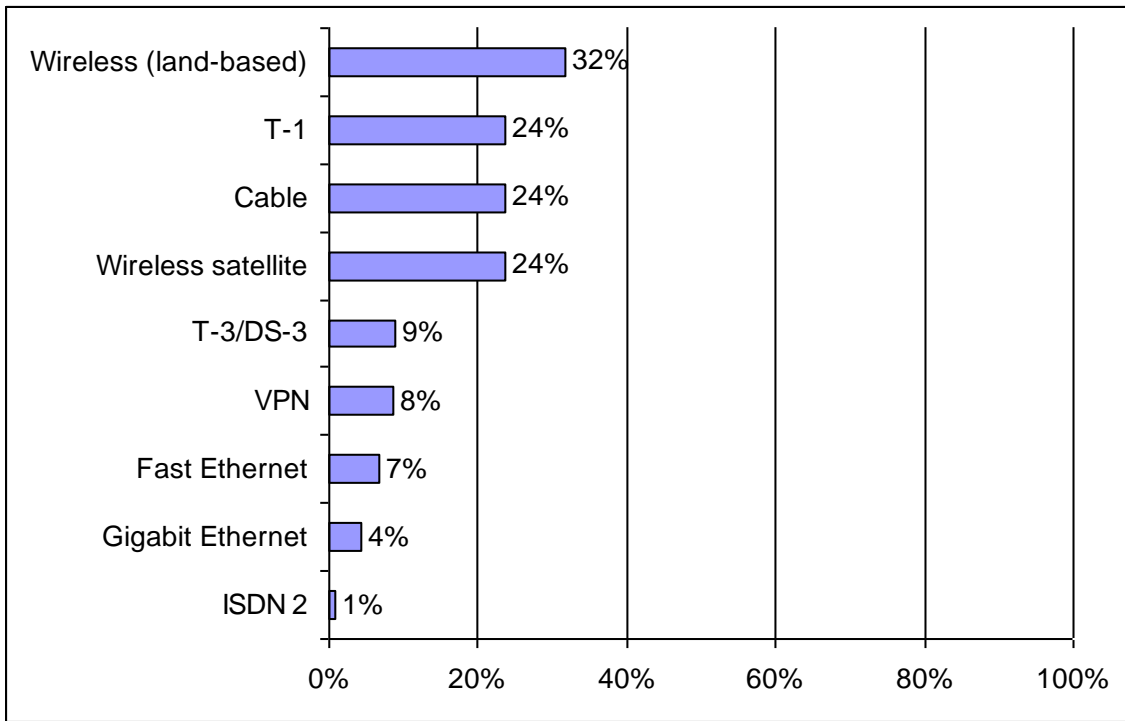


Figure 24 - The Future

13% of respondents indicated videoconferencing would be of value, either it's already on site (4%) or there is a perceived need for videoconferencing (9%). This reflects the view of the importance of face-to-face encounters. Videoconferencing availability would pay for itself in short order in saving of dollars for travel expenses and time to travel.

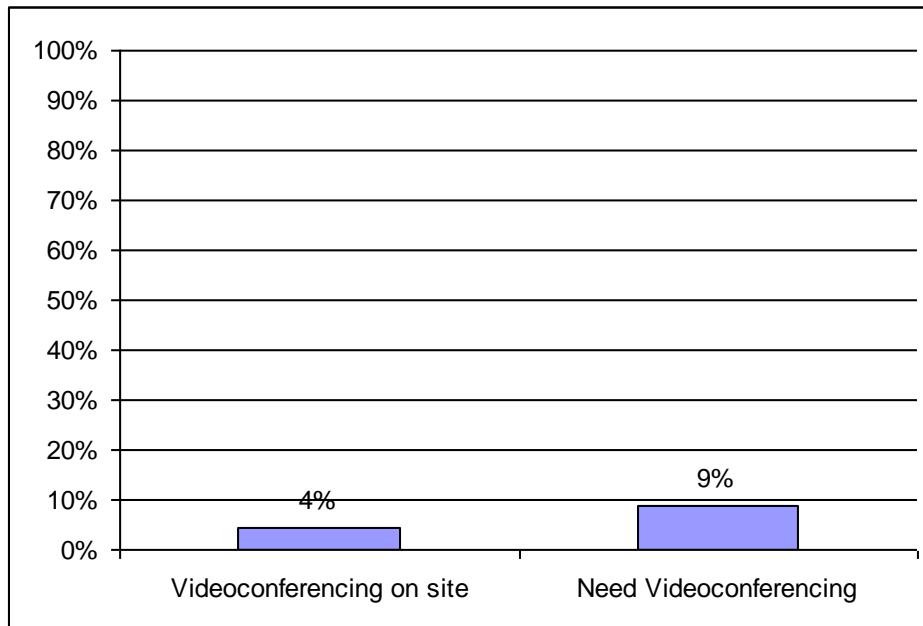


Figure 25 - Videoconferencing

Comments – Voice:

Cellular phones dominated these comments...

- Cell provides some "spotty" redundant coverage
- Better cell coverage
- Poor cellular coverage in our area
- Cell -- coverage outside of communities
- Cellular service is abysmal at best. No competition.
- Continuity of connection.
- Cellular service on the rural OR coast is extremely poor and is only going to get worse with the new GSM technology.
- Spotty cell service throughout the county.
- Cellular service is spotty and has lots of room for improvement.
- Need more towers.
- Better cell phone service.
- Verizon is poor customer service.
- Cell service does not provide full area coverage.
- Cellular does not work in many places.
- Need more comprehensive cell coverage. Too many "dead zones" along coast and up Chetco River.
- Cellular rates are too high compared to large cities. There are more options and more providers in large cities --> lower prices.
- No cell service between Gold Beach & Brookings
- Service is intermittent for cell phones
- Call service between towns needs to increase
- Cellular reception very poor in town and outlying areas. Very expensive.
- Spotty cellular service in county
- Cellular coverage area, cost of landline service
- Need more cell towers between Brookings & GB
- Edge Wireless-sucks, poor service
- Need better Verizon cellular reception
- Cellular service provided by Edge is very poor. No other GSM provider in area.
- Cell phone needs to be better! Can't use it at the business. Have to go outside.
- More cellular choices
- Cellular tower coverage
- Cell phones are terrible around here!
- Cellular service in this area is too hit or miss-way too many "dead spots"!
- Cell coverage & service needs improvement.
- Too many non-service areas
- US Cellular is great!

Other comments ranged in their scope...

- This is OK as is.
- No loop - only one wire out of area.
- Increasing phones in office. What is least expensive and best phone system?
- Long distance costs too much.
- % of calls that are blank or telemarketer.
- Single source for landline is outrageous! Verizon is NOT customer oriented. No services such as v-mail in GB.
- Poor service.
- Verizon charges are out of line and they have a predatory attitude.

- Dial-up service for credit cards fails consistently
- Landlines are expensive for service provided.
- Verizon is horrible. Unicom is all bad. Verizon is a monopoly. Unicom is a bad second.
- Too many vendors & confusion for decisions on whose service to use.
- Emergency back-up systems (redundancy)
- Why isn't Verizon providing all services to all areas?
- Too expensive
- Payphone arrangement -too expensive
- Verizon rips people off. They have charged me for cable Internet more than once and I can't even get cable Internet at my house.
- Unicom is outstanding!!
- Verizon sucks!
- Consistent service year-round
- Telephone company very difficult to deal w/ lack customer service surveys
- Old outdated telephone lines
- 1 phone for Festival & 1 personal

Comments – Internet/World Wide Web

Route redundancy is mentioned often, as is reliability of services. These are often interrelated issues. Cost and lack of competition are addressed.

- EMR/PACS/ebilling regulatory requirement, diagnosis & treatment
- We are improving our website and need active in/out access w/ field auditors and clients.
- Lack of fast Internet on the south coast. Takes 5-10 times longer to do what needs to be done which increases the cost of doing business here.
- Higher speed (landline only possible now)
- Cable Internet costs too much
- No back up for T-1 if cut, need to finish loop to CA.
- Cable or DSL Internet service without it we live in the communication dark age. It's embarrassing.
- Too slow
- Need fast reliable connection. Satellite is awful.
- Prefer satellite but cost prohibitive. Cable adequate but not reliable. No competition!
- Need more speed.
- No loop. No high-speed service.
- We are changing from dial-up to satellite service.
- Need better than dial-up. Currently our only option.
- Faster more dependable service.
- Faster Internet and up to date county procedures for public records and property transactions.
- Fiber connections to Bandon/PO, Brookings, etc.
- Need high speed to come to PO.
- Would like to get DSL here -- downloading is tedious.
- Speed on online.
- Poor service from cable and DSL providers.
- It is too easy for the whole county to be down at once, creating huge loses in productivity. We need more options & high speed lines into the county.

- Verizon service is NON-EXISTENT. Price too high.
- Speed
- We need a high speed Internet connection in PO.
- Slow speed
- No high speed!
- I would like to see some form of high speed Internet put in place in Port Orford.
- Redundancy & competition for pricing
- Limited in this rural area (PO). No service if problem occurs.
- Takes too long.
- Better, faster, less expensive. Available elsewhere.
- It would be nice to have a faster Internet. Our phone lines are too old and they won't bring cable where we live.
- Lack of redundancy
- Need better speed-dial up is not adequate
- Slow connection
- Just cancelled service because can't afford anymore
- Member maintains website
- Connection-response speed
- At the port of Brookings Verizon often says no DSL circuits are available leaving only one option, wireless via Northwest Tech.
- OK
- Carter.net not always reliable. We were out 5 days, which messed up our POS info.
- We need additional services in our area for videoconferencing.
- Cost & access to affordable high speed. The region is antiquated in services and price.
- Port Orford needs high speed!
- Verizon connection is sometimes sketchy-cable is wonderful but not easily available.
- Slow dial-up service. Our area phone lines cause very slow Internet speed- there is no alternative.
- Less the better for high-speed internet

Comments – Video/Television

Quality of cable reception as well as price is mentioned. Quality will improve once Charter has completed the infrastructure improvements on the Oregon coast. Rates are equivalent to other areas in Charter territory.

- Healthcare/diagnosis, training, medical consults, staff training
- We want to have videoconference calls. Currently our conference calls are \$800/mo. W/ Verizon.
- TV costs too much. It would be excellent to be able to pick up the channels I want w/o having to receive channels I have zero interest in.
- Cost!
- Need fast reliable connection. Satellite is awful.
- Satellite preferred to cable. Service is a monopoly. Need more competition.
- Lousy and expensive choices
- Satellite/cable is too expensive.
- We could use video conferencing if we had the bandwidth.
- Cable company is a joke.
- Lack of truthful information broadcast by media.
- HDTV from local affiliates

- Limited use
- Nothing worth watching
- Why isn't Charter Cable providing high speed to all areas?
- Too expensive
- Cable only choice
- Only one cable company. No competition. Prices go up continually. No choice in channels.
- Poor signal strength (KDR-TV, Medford)
- Video conferencing would be helpful
- No local repeaters-No off the air highdef.-When will the coast go digital?
- Need NY & SF or LA feeds. Local stations are hokey
- We have cable & satellite. When one goes we have the other.
- Charter does not seem especially service oriented and is getting too expensive
- College needs video conferencing-may be coming.
- No HD TV in area
- No cable TV available

Comments - Other (for example, training)

Comments in this category ranged and indicated a wide range of opinions from the region.

- Moving clinical to technology
- Northwest Technical ISP good
- I am not computer skilled [sic].
- Small business funding sources, grants, loans or investors.
- Most local training is designed for smaller business, start-ups, turnaround, etc. F/M needs are different. It's counter productive for our people to attend training that doesn't help as much as it could.
- SWOCC provides little besides thumb twiddling courses in PO.
- Private computers are presently used due to limited use of computers at site of non profit organization.
- Shipping options.
- Low cost shipping, better public infrastructure, low taxes
- PC- overall costs are mounting regularly
- There are ample training sources available now for those willing to seek them out.
- Please share your results w/ SOCC, especially those re-training.
- Business skill need-how to run a B & B without technology.

Telecommunications Infrastructure

Global Telecommunications Landscape

Telecom revenue worldwide amounted to \$3 trillion in 2006, up more than 11% from the previous year.

The growth of the Internet has delivered a parallel and more flexible network that promises ultimately to overtake and to make obsolete the traditional Public Switched Telephone Network (PSTN). At its current growth rate of over 90% per year, China will pass the US in total broadband subscribers by late 2006 to become the largest broadband country in the world.

The international long-distance market also has undergone dramatic changes over the past 20 years. By 2004, 92 percent of the world's long distance traffic came from markets with competition.

The status of mobile telephones has changed from an expensive executive toy to a basic necessity for 1.7 billion subscribers worldwide.

Global Communications is an extremely complex mix of land, aerial, satellite and submarine cables (Figure 33). Figure 33 is included to give some sense of this complexity. Note that the majority of transpacific cable landings in on the Oregon Coast (11 and 2 in development). This is due to favorably negotiated agreements with fishermen and the Oregon Division of State Lands. It's been stated that the costs of doing a California landing are excessive and constitute a barrier to such landings. This has not stopped these efforts but has certainly slowed the pace.

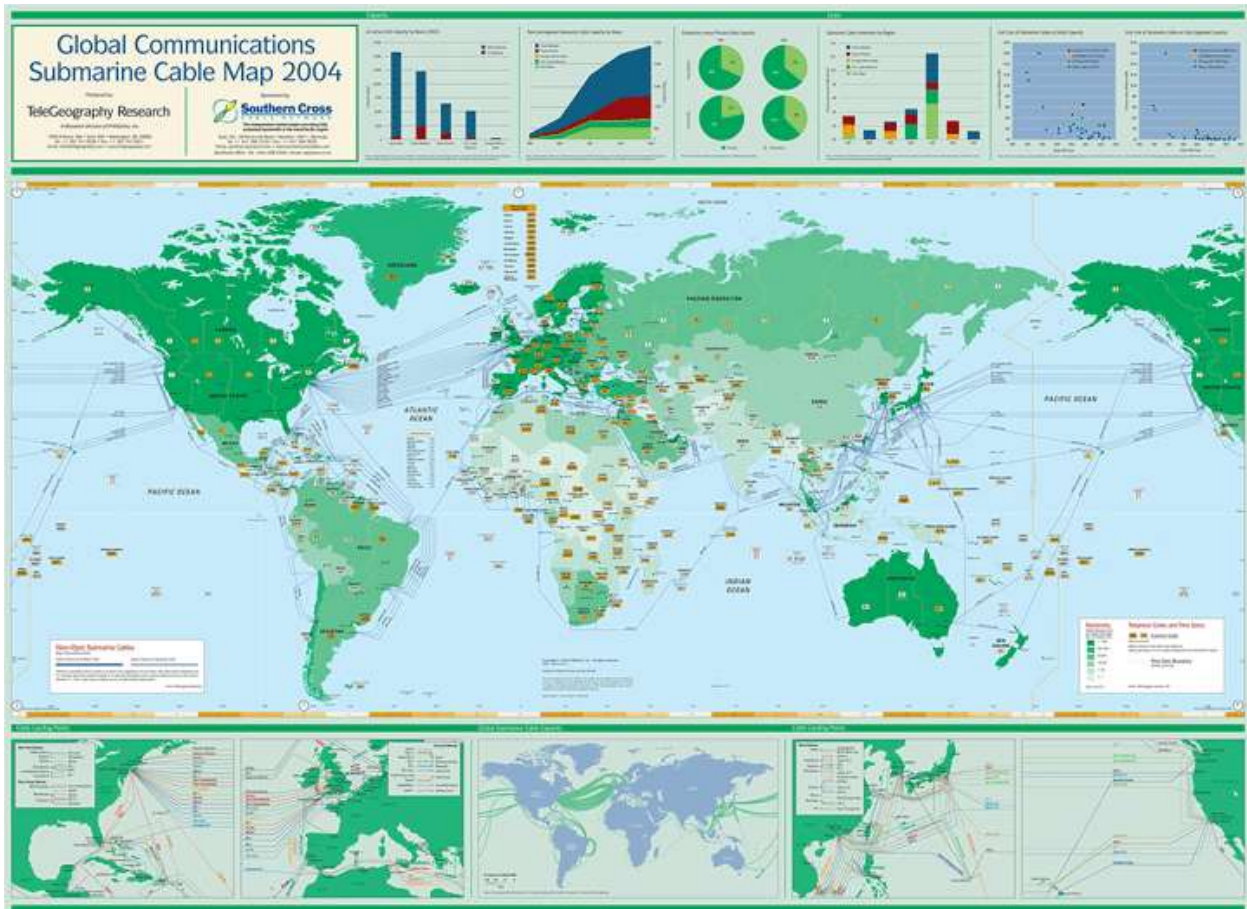


Figure 26 - Global Communications Submarine Cable Map

The following figure provides some perspective of global broadband traffic. Simply put, it's huge and growing at an exponential rate.

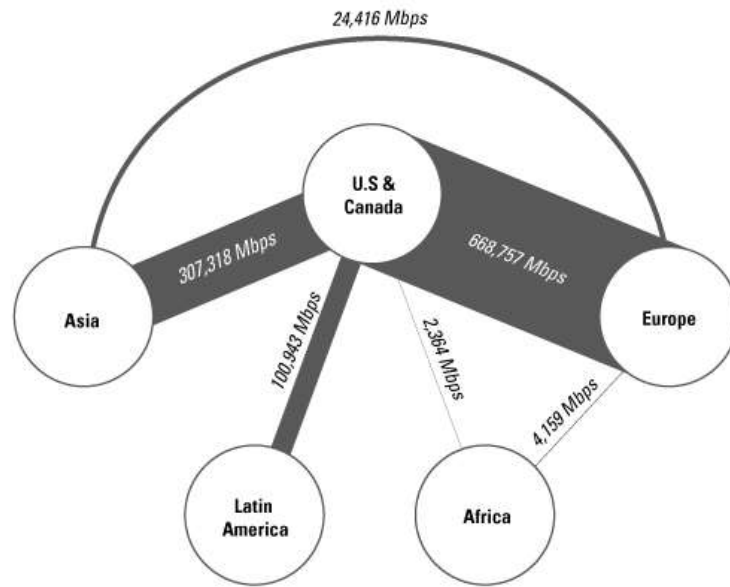


Figure 27 - "US-Centric" Broadband Traffic Rates

Among the challenges we face is our distance to Tier 1 Internet Access Points. A quick look at Figure 35 shows that the nearest Tier 1 points are San Francisco, followed by Seattle. Here's the implication. Local Internet service providers buy their access from secondary and tertiary or deeper levels of access points. That is there are many node hops transited to get to a destination. Every node hop adds a millisecond of delay. Every node hop adds an incremental transit cost. This adds up to poor video quality and costly transit rates. The further one is from the Tier 1 access point, the slower the reception, the poorer the quality of IP-based video and the more costly the connection. Del Norte end users are about as far removed as one can get in the US.

National Telecommunications Landscape

The US has fallen to 19th overall in household broadband penetration, and is in danger of being passed by Slovenia in early 2007. Even so, over the past ten years, advances in telecommunications and information technology were responsible for as much as 75% of U.S. labor productivity gains.

Another indicator, online sales, has soared. Last Christmas season online spending reached \$667 million on December 13, the highest-earning day of the 2006 holiday season. The first 48 days of the holiday season amounted to \$21 billion spent online. That's a 25 percent increase over the same period in 2005.

The FCC recently announced high-speed lines in the US increased by 52% last year. Of the total high-speed lines reported as of June 30, 2006, 78% served primarily residential end users. Cable modem service represented 55% of these lines while 40% were DSL connections. The Federal Telecommunications Commission readily concedes that our work is not done.

U.S. cable stocks were a sure bet in 2006 as they posted strong growth in phone and Internet subscribers, but the 2007 outlook is a little murkier as telephone companies step up their

counterattack. Cable won the 2006 battle; stealing customers from telecom rivals by offering competitively priced "triple play" packages of TV, phone and Internet access.

Still, share performances for phone companies could be muted this year since concerns remain about the costly investment they are making building fiber optic networks for video offerings. Phone companies have to spend several thousand dollars per user to connect their new networks and offer bundled services, while cable operators spend just a hundred dollars, since they do not need new networks.

The Federal Communications Commission (FCC) fourteenth semi-annual data collection⁸, presents a snapshot of subscribership as of June 30, 2006. High-speed lines connecting homes and businesses to the Internet increased by 26% during the first half of 2006, from 51.2 million to 64.6 million lines in service, compared to a 21% increase, from 42.4 million to 51.2 million lines, during the second half of 2005. For the full twelve month period ending June 30, 2006, high-speed lines increased by 52% (or 22.2 million lines). The presence of high-speed service subscribers was reported in all 50 states, the District of Columbia, American Samoa, Guam, Northern Mariana Islands, Puerto Rico, and the Virgin Islands, and in 99% of the Zip Codes in the United States.

Twice a year, all facilities-based providers of high-speed connections to end users are required to report to the Commission basic information about their service offerings and types of customers. Prior to June 2005, providers with fewer than 250 high-speed lines (or wireless channels) in service in a particular state were not required to report data for that state. Small providers of high-speed connections, many of whom serve rural areas with relatively small populations, were therefore underrepresented in the earlier data. Including these providers resulted in a substantial one-time increase in the number of holding companies and unaffiliated entities reporting information about high-speed connections from December 31, 2004 to June 30, 2005.

The data reported for June 30, 2006 include detail about the information transfer rates ("speeds") of the reported connections and a breakdown of high-speed connections by type of technology. The reported data also enable us to estimate, for individual states, the extent to which Digital Subscriber Line (DSL) high-speed connections provided by incumbent local exchange carriers (incumbent LECs), and cable modem high-speed service provided by cable system operators, are available to households residing in the areas these companies serve. Readers can draw the following broad conclusions from the data summarized in this report:

- High-speed lines (or wireless channels) connecting homes and businesses to the Internet at speeds that exceed 200 kbps in *at least one* direction increased from 51.2 million lines to 64.6 million lines during the first half of 2006. For the full twelve month period ending June 30, 2006, high-speed lines increased by 22.1 million, from 42.4 million lines to 64.6 million lines.

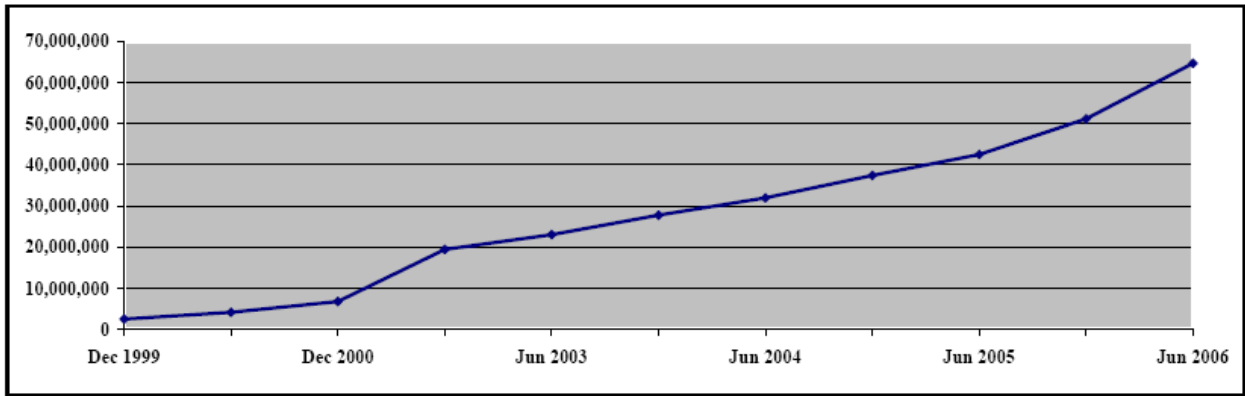


Figure 28 - Total High-speed Lines

- ADSL lines increased by 3.1 million lines during the first half of 2006 compared to an increase of 2.0 million lines for cable modem service. For the full year, ADSL increased by 6.3 million lines compared to an increase of 4.6 million lines for cable modem service.
- Of the 64.6 million total high-speed lines, 44.1% were cable modem, 34.9% were ADSL, 1.5% were symmetric DSL (SDSL) or traditional wireline, 1.1% were fiber to the end user premises, and 18.4% used other technologies.

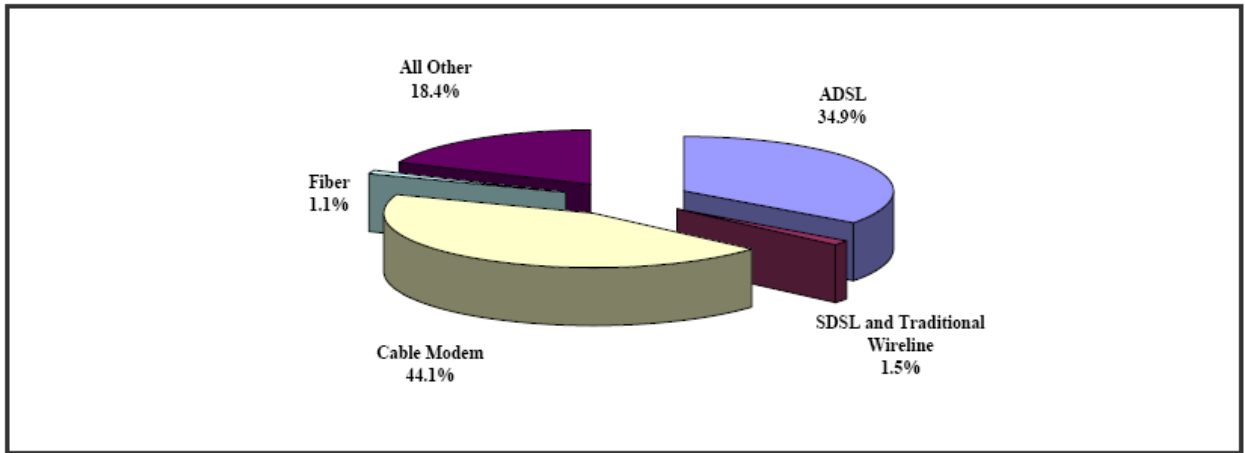


Figure 29 - High-speed Lines By Technology

- Lines connecting homes and businesses to the Internet at transmission speeds that exceed 200 kbps in *both* directions increased from 43.8 million lines to 50.4 million lines during the first half of 2006. For the full twelve month period ending June 30, 2006, they increased by 13.2 million, from 37.3 million lines to 50.4 million lines.

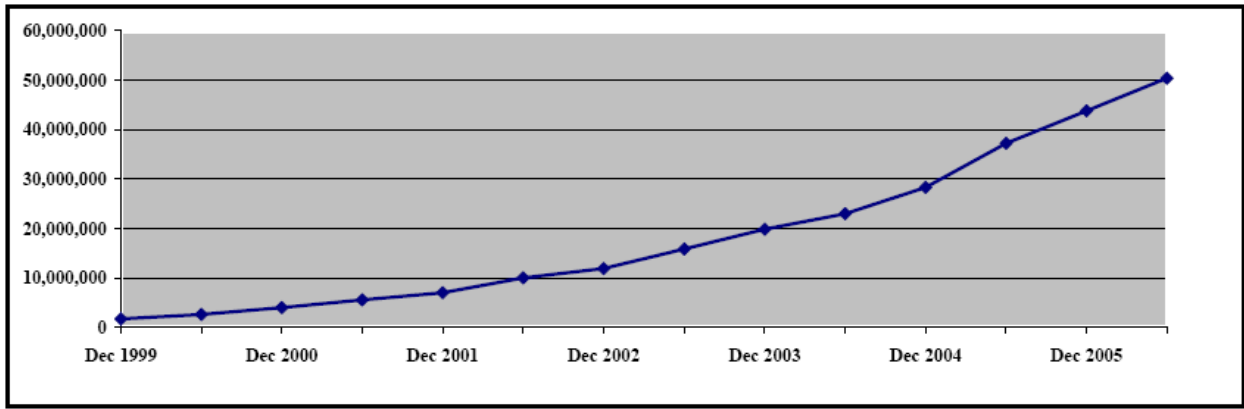


Figure 30 - Advanced Services Lines

- Of the 50.4 million lines which were faster than 200 kbps in *both* directions, 55.9% were cable modem, 36.3% were ADSL, 1.9% were SDSL or traditional wireline, 1.4% were fiber to the end user premises, and 4.5% used other technologies. See Chart 4.

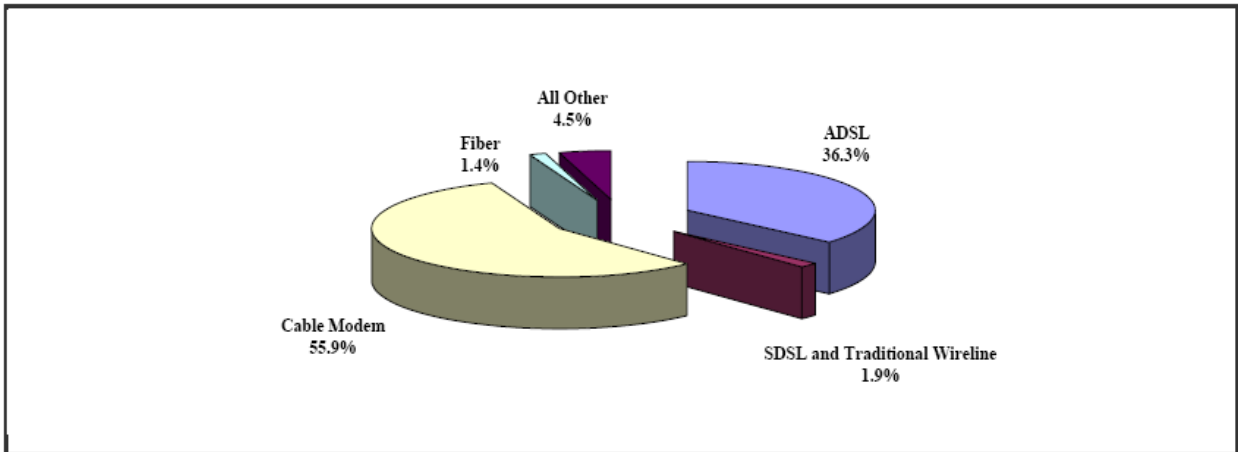


Figure 31 - Advanced Services Lines By Technology

- Of the 64.6 million total high-speed lines, 50.3 million were designed to serve primarily residential end users. Cable modem represented 55.2% of these lines while 40.1% were ADSL, 0.2% were SDSL or traditional wireline connections, 0.9% were fiber to the end user premises, and 3.7% used other technologies.

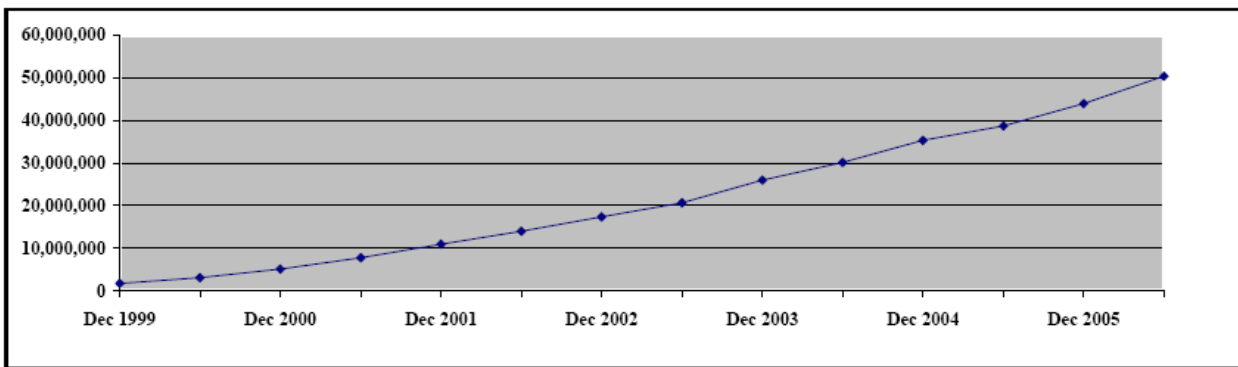


Figure 32 - Residential High-speed Lines

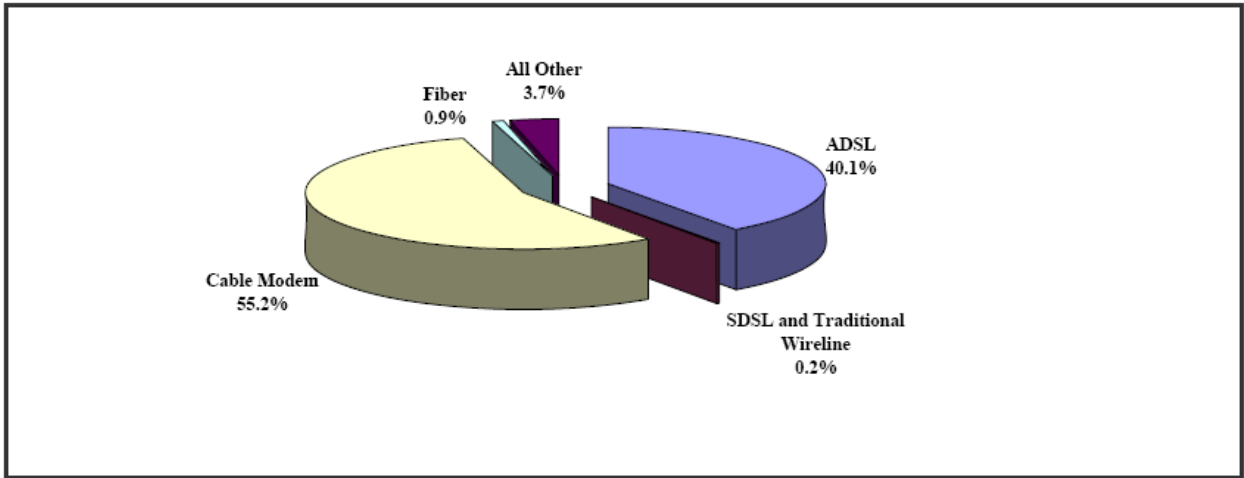


Figure 33 - Residential High-speed Lines By Technology

- Of the 50.4 million lines that were faster than 200 kbps in *both* directions, 45.9 million lines were designed to serve primarily residential end users. Of these, cable modem represented 59.9% while 35.8% were ADSL, 0.2% were SDSL or traditional wireline, 1.0% were fiber to the end user premises, and 3.2% used other technologies.

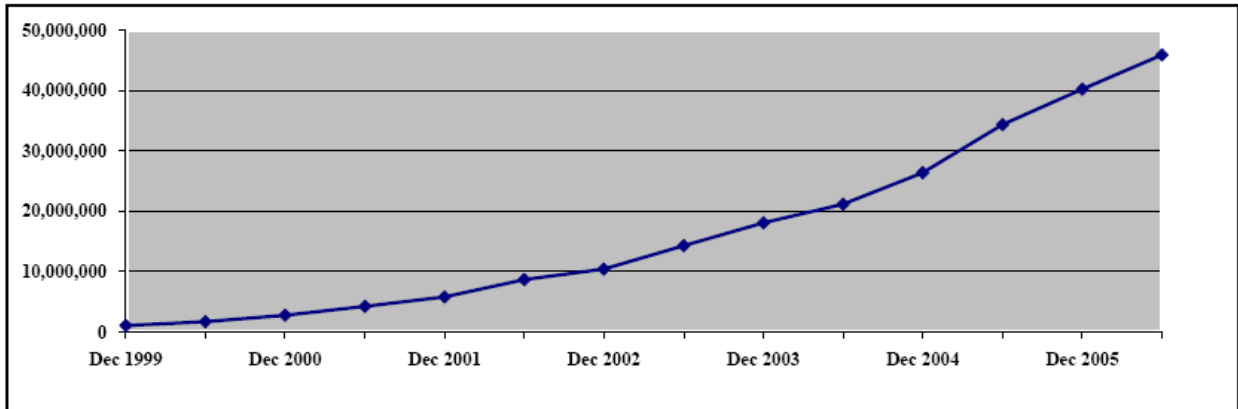


Figure 34 - Residential Advanced Services Lines

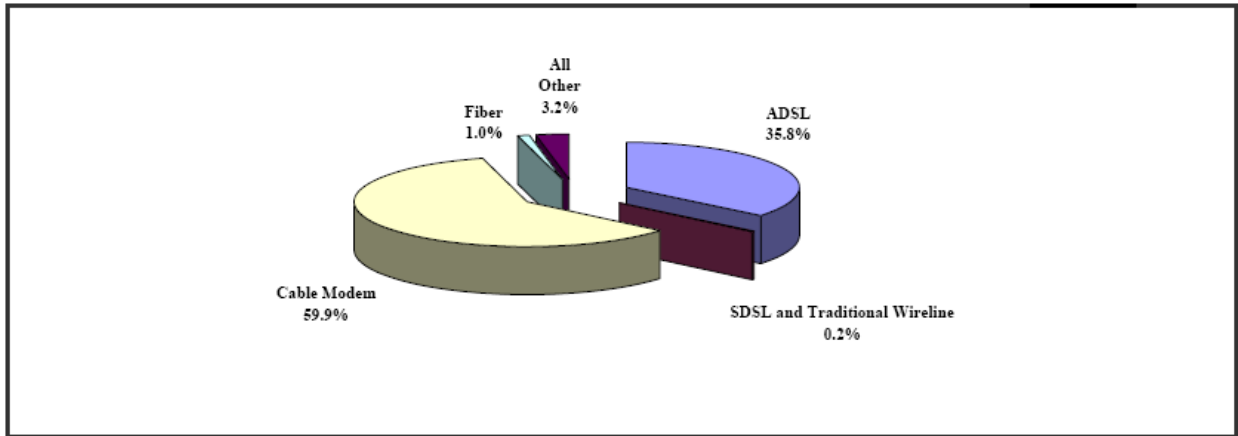


Figure 35 - Residential Advanced Services Lines By Technology

- Of the 50.4 million reported high-speed lines that were faster than 200 kbps in *both* directions as of June 30, 2006, 63.1% were at least 2.5 mbps in the faster direction and 36.9% were slower than 2.5 mbps in the faster direction.
- Incumbent LECs or their affiliates reported 96.7% of ADSL connections and 52.8% of traditional wireline connections. When all technologies are considered, incumbent LECs reported 49.5% of total high-speed connections.
- High-speed lines were reported in all 50 states, the District of Columbia, American Samoa, Guam, Northern Mariana Islands, Puerto Rico, and the Virgin Islands.
- As a nationwide average, we estimate that high-speed DSL connections were available to 79% of the households to whom incumbent LECs could provide local telephone service, and that high-speed cable modem service was available to 93% of the households to whom cable system operators could provide cable TV service.

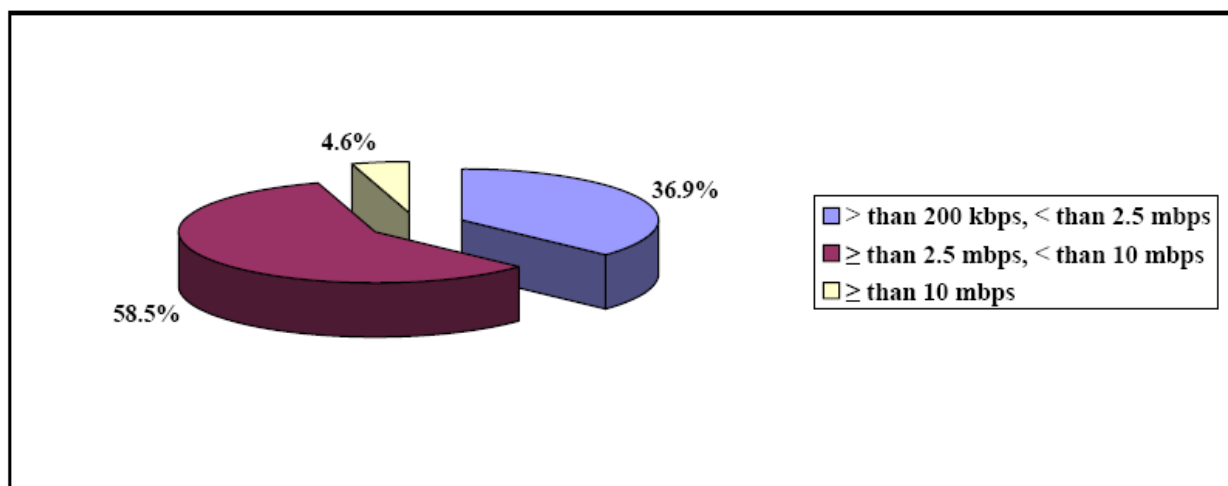


Figure 36 - High-speed lines By Information Transfer Rates in the Faster Direction

- The Commission’s data collection program requires providers to list the Zip Codes in which the provider has at least one high-speed connection in service to an end user, and 99% of Zip Codes were listed by at least one provider. The most widely reported technologies by this measure were satellite (with at least some presence reported in 90% of Zip Codes), ADSL (in 82% of Zip Codes), and cable modem (in 64% of Zip Codes). ADSL and/or cable modem connections were reported to be present in 88% of Zip Codes.
- Our analysis indicates that more than 99% of the country’s population lives in the 99% of Zip Codes where a provider reports having at least one high-speed service subscriber. Moreover, numerous competing providers report serving high-speed subscribers in the major population centers of the country.

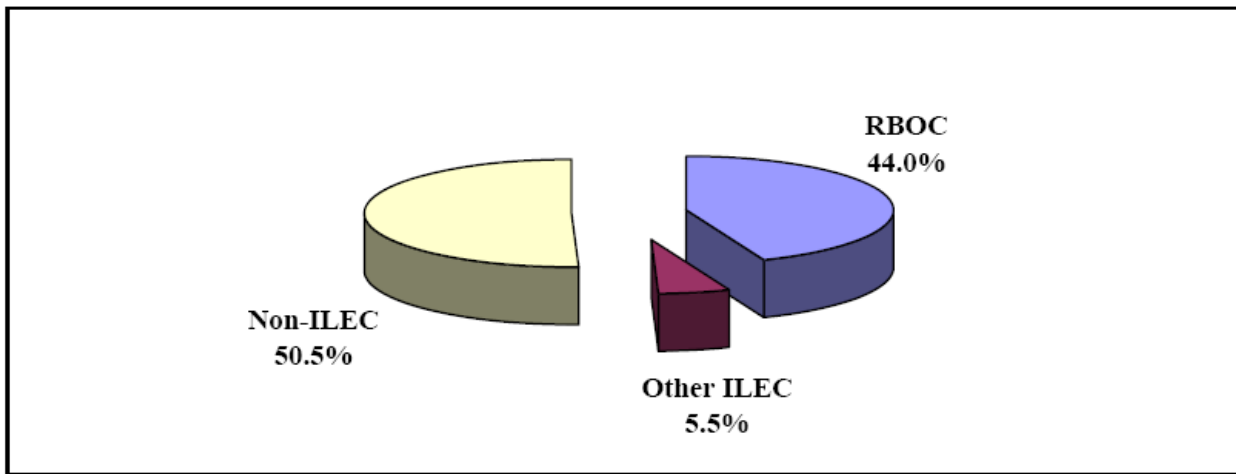


Figure 37 - Share of High-speed lines By Provider

- High population density has a positive association with reports that high-speed subscribers are present, and low population density has an inverse association. For example, high-speed subscribers were reported to be present in 99% of the most densely populated Zip Codes and in 89% of Zip Codes with the lowest population densities. The comparable figure for the lowest-density Zip Codes was 84% a year earlier.
- High median household income also has a positive association with reports that high-speed subscribers are present. In the top one-tenth of Zip Codes ranked by median household income, high-speed subscribers are reported in 99% of Zip Codes. By contrast, high-speed subscribers are reported in 91% of Zip Codes with the lowest median household income, compared to 88% a year earlier.

The following map is provided to give a “big picture” of where the major Internet “highways” run. The take-away here is that for the south coast of Oregon it’s like living under the overpass.

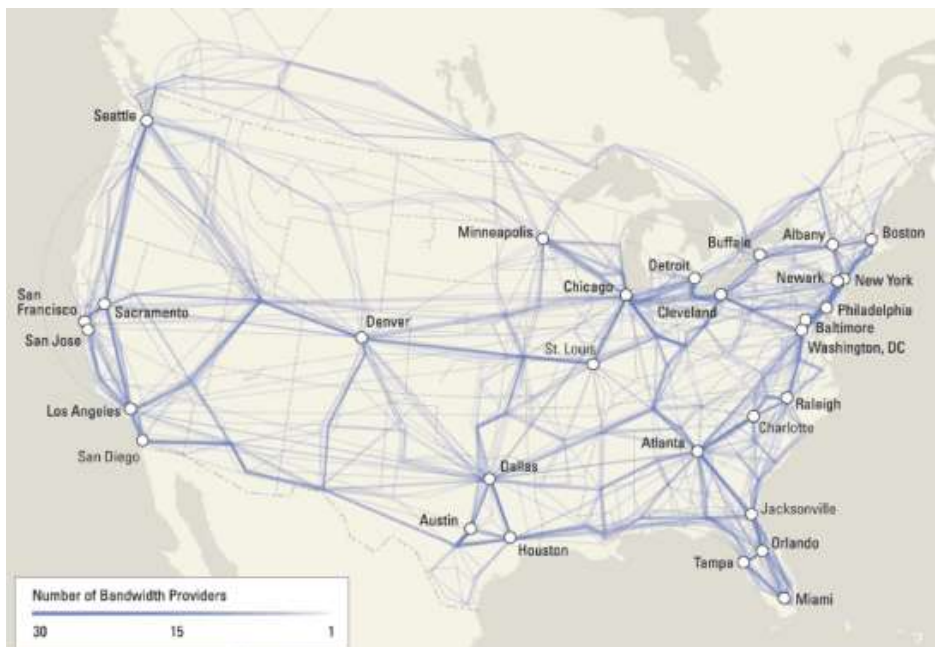


Figure 38 - Map of U.S. City Internet Connectivity

Oregon Telecommunications Landscape

The Oregon legislature recognizes the importance of broadband⁹

Over the past few legislative sessions Oregon has been moving forward and positioning the state for a future with broadband by placing key concepts into Oregon statute.

Oregon has a broadband goal

“...it is the goal of this state to promote access to broadband services for all Oregonians in order to improve the economy in Oregon, improve the quality of life in Oregon communities and reduce the economic gap between Oregon communities that have access to broadband digital applications and services and those that do not, for both present and future generations...”¹⁰

Guidelines for broadband goal implementation for Oregon are established

“That the goal set forth in subsection (1) of this section may be achieved by:

- (a) Expanding broadband and other telecommunications services;
- (b) Creating incentives to establish and expand broadband and other telecommunications services;
- (c) Undertaking telecommunications planning at the local, regional and state levels that includes participants from both the public and the private sectors;
- (d) Removing barriers to the full deployment of broadband digital applications and services and providing incentives for the removal of those barriers; and
- (e) Removing barriers to public-private partnerships in areas where the private sector cannot justify investments.”¹¹

Telecommunications is public works infrastructure

“The improvement, expansion and new construction of the state's sewage treatment works, water supply works, telecommunications infrastructure, roads and public transportation provide the basic framework for continuing and expanding economic activity in this state, thereby providing jobs and economic opportunity for the people of Oregon”¹²

Telecommunications has a key role to play in the state's economy

“Focus on strategies and investments that maximize the economic benefit to the state of the global shift to an information, science and technology driven economy and on industries and companies that make significant use of the high-capacity telecommunications, science and technology-related manufacturing processes or knowledge transfer typical of these emerging economic sectors”¹³

Telecommunications has a role in public safety

“It is the policy of the State of Oregon to encourage and support the rapid deployment of broadband telecommunications services in areas of the state where

such services do not exist, to support redundancy of critical telecommunications assets in order to ensure homeland security protections in the state and to ensure that a secure conduit is available for emergency communications and public safety networks in all Oregon communities.”¹⁴

Oregon broadband today -- progress continues

Overall we can report continued progress in the roll out and usage of broadband in Oregon (see following charts based on the April, 2006 report from the FCC).¹⁵ One source shows by June of 2002 Oregon ranked 24th in the U.S. in broadband subscribers.¹⁶ Yet another report shows Oregon ranked as 11th using a broadband index approach that is based on the extent to which policies spur or impede broadband deployment or demand.¹⁷ As of October in 2003 in the US as a whole, 2.8% of households added high-speed Internet service in the second half of 2002 -- with Connecticut, Oregon and New Jersey leading the nation in incremental broadband growth.¹⁸ The available data does not present a clear picture of Oregon’s current status beyond indicating that encouraging progress continues.

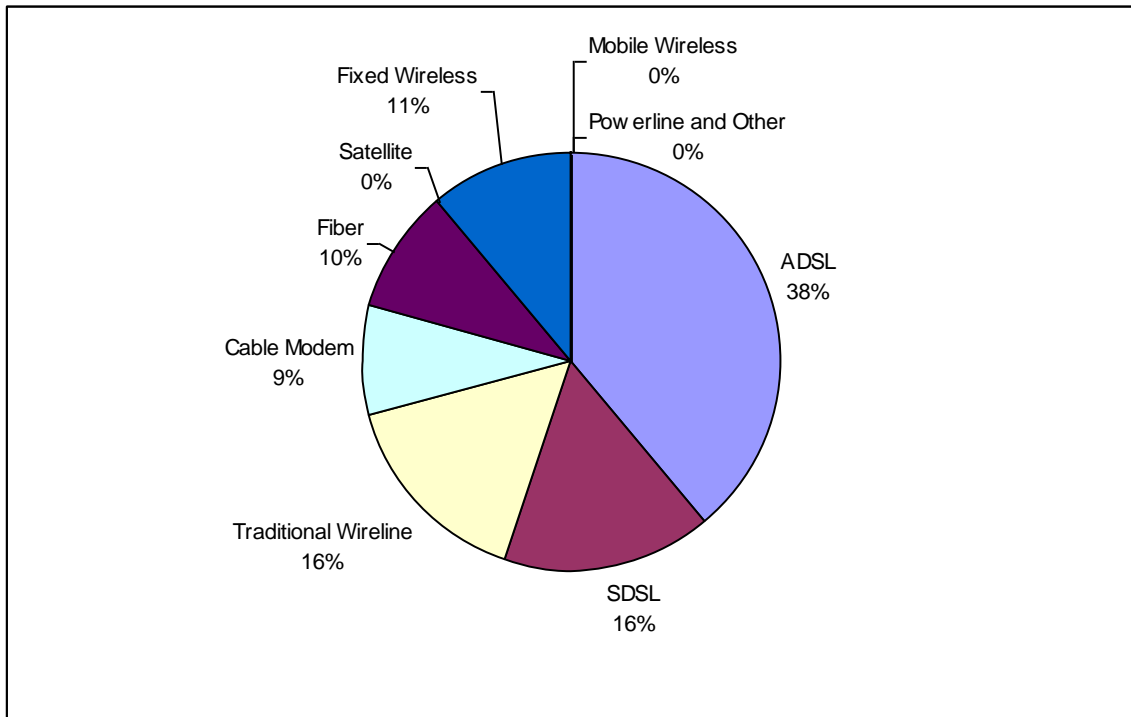


Figure 39 - Providers of High-Speed Lines by Technology (over 200 kbps in at least one direction)

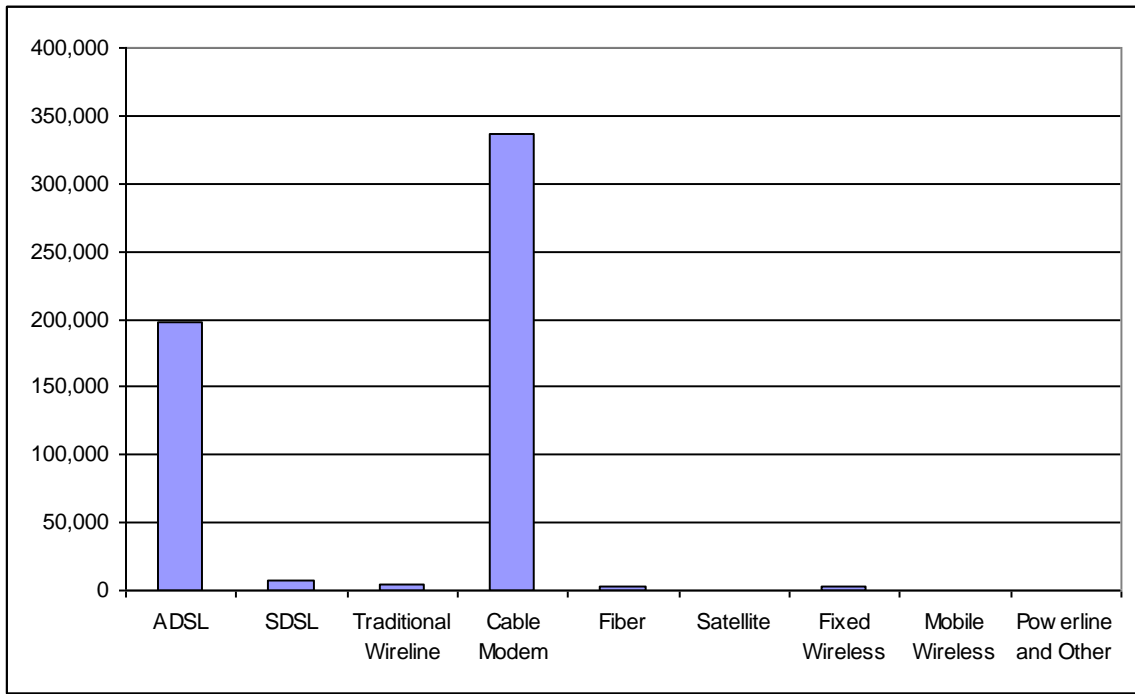


Figure 40 - High-Speed Lines by Technology as of June 30, 2005
(over 200 kbps in at least one direction)

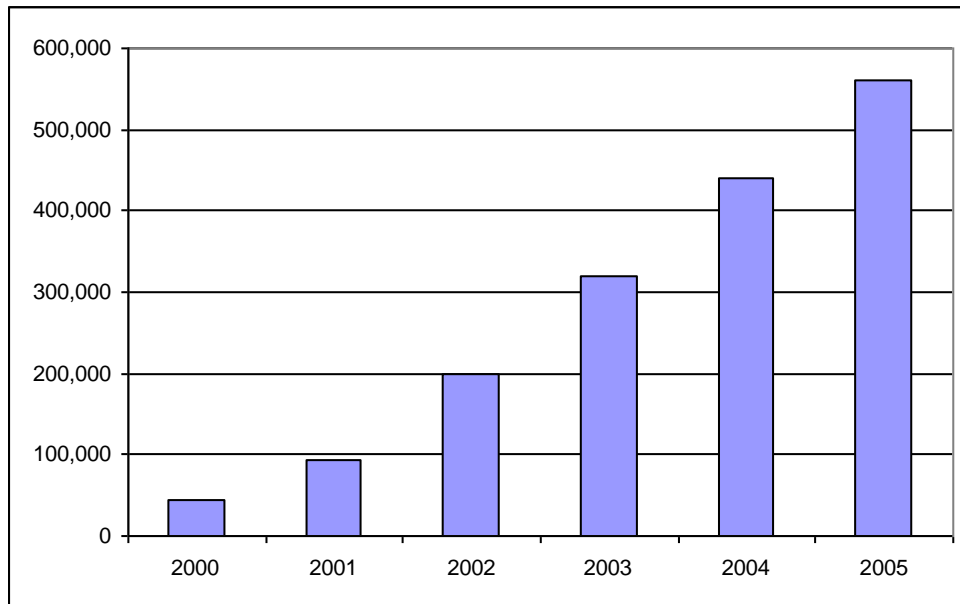


Figure 41 - High-Speed Lines by State
(over 200 kbps in at least one direction)

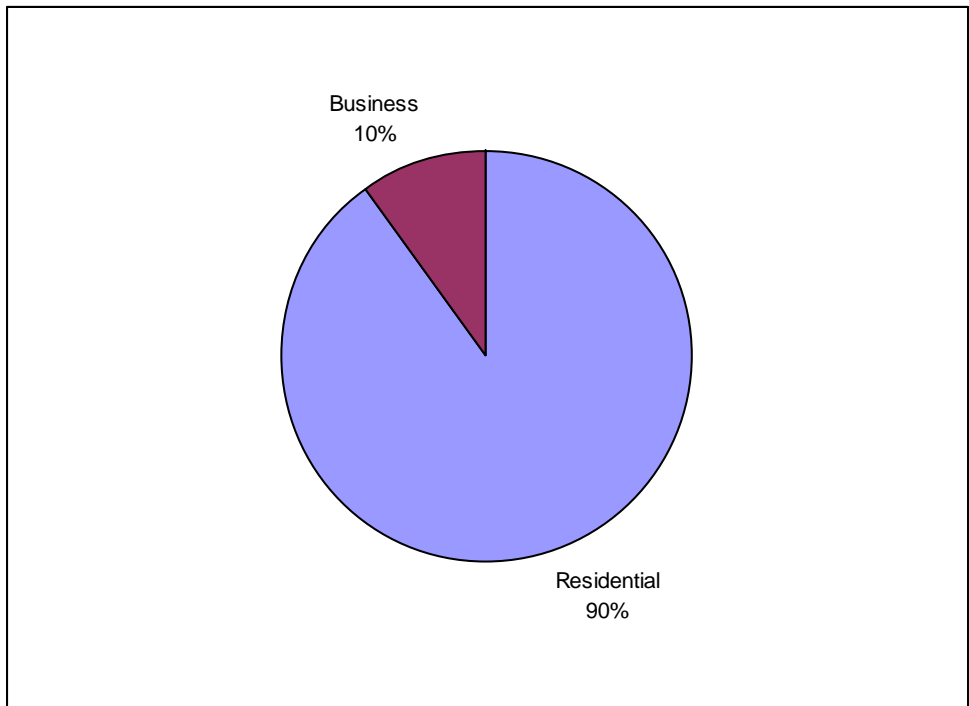


Figure 42 - High-Speed Lines by Type of User as of June, 2005
(over 200 kbps in at least one direction)

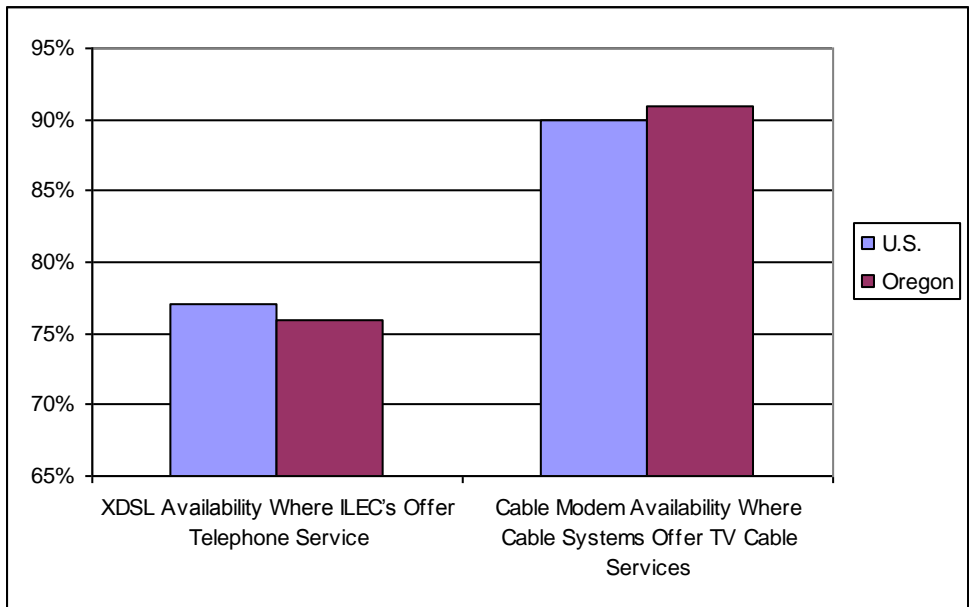


Figure 43 - % Residential End-User Premises with Access to High-Speed Services
(over 200 kbps in at least one direction)

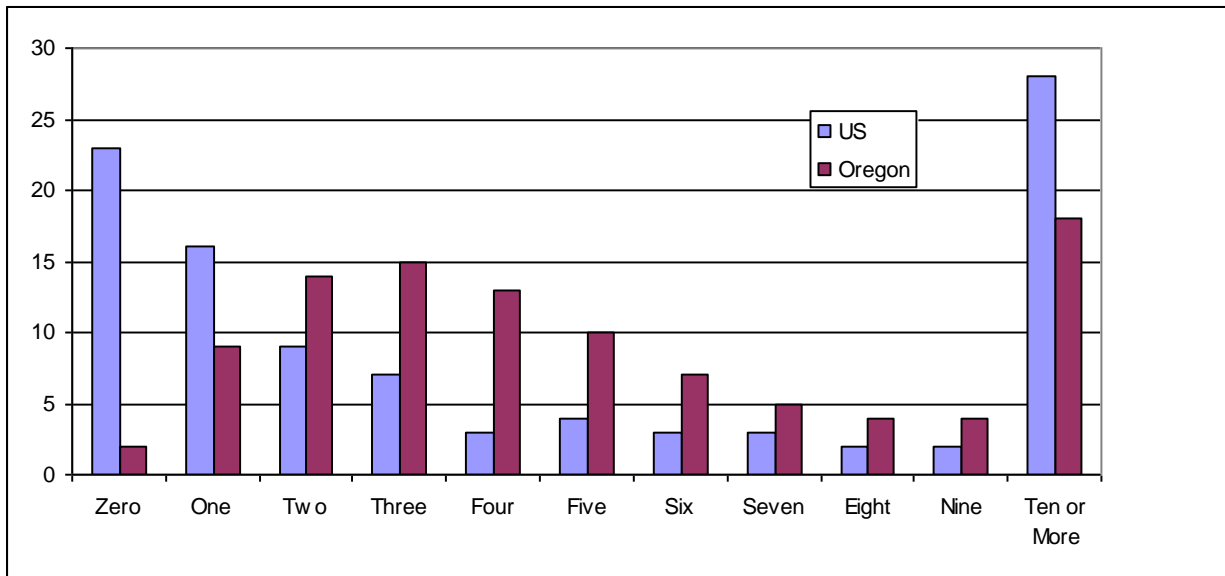


Figure 44 - % Zip Codes with High-Speed Lines in Service as of June 30, 2005 (over 200 kbps in at least one direction)

Most rural Oregon cities now have better telecommunications infrastructure, thanks in large part to the infrastructure investment Qwest made as a result of Senate Bill 622 in the 1999 legislative session.

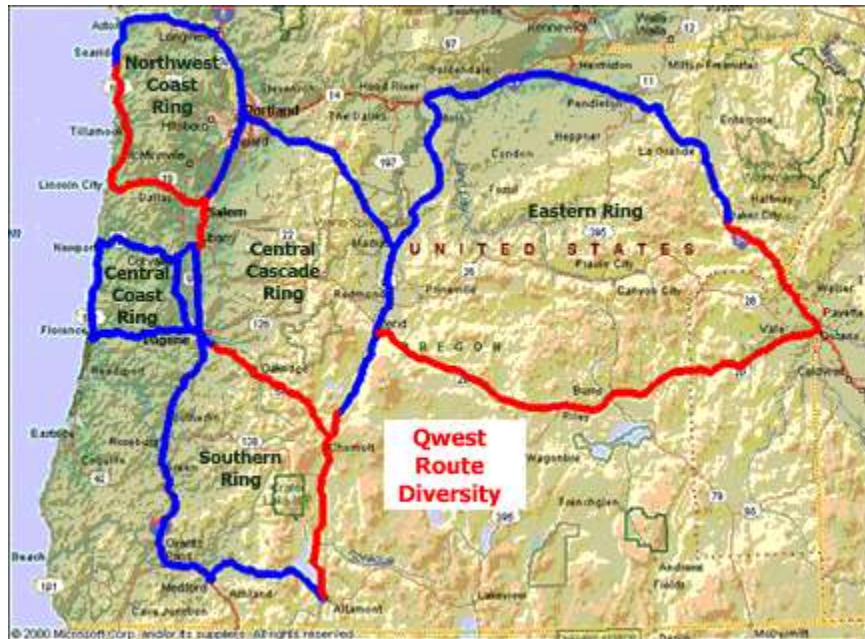


Figure 45 - Oregon Qwest Rings /Route Diversity

There is more broadband service availability and more reliable network capacity as a result of the five self-healing fiber optic rings serving different parts of Oregon. For these areas of the state, the current focus should be on how best to use that economic competitive advantage to recruit new businesses, to grow existing businesses and develop the applications that will utilize the technology to improve quality of life. In particular we need to work on public sector applications in health care, education, public safety, and government as well as electronic commerce and other business applications.

Oregon has seen significant fiber network infrastructure deployment in addition to the SB622 SONET Rings. The LS Networks, formerly Northwest Open Access Network of Oregon (NoaNet Oregon) is a nonprofit cooperative corporation that has licensed fiber optic facilities from the Bonneville Power Administration and other sources. LS Networks is unique in the nation for creating a cooperative to provide a competitive, open access fiber optic backbone in the state with local members to build out the middle and last mile. LS Networks has also been turning up its backbone network over the past several years along with the fiber distribution networks of its members, providing communities with additional capacity and route diversity in a fiber network completely separate from the incumbent Telco's. Several municipalities and organizations have built out fiber and deployed wireless to push broadband into rural areas. Primarily these are electric co-operatives along with some municipalities and an Indian Tribe are building the local fiber distribution networks. LS Networks has announced an extension of its network backbone to Southern Oregon and California with plans to connect with its eastside network completing yet another major backbone serving the state.

Additionally, other businesses and consortiums have built or created competitive fiber networks in a number of areas of the state.

Eleven undersea cables currently come ashore in Oregon (see Transpacific Cable Landings on the Oregon Coast). Oregon has a competitive advantage over Washington and California in attracting future west coast cable landings due to established "fast track" permitting policies and a mature cooperative relationship between the undersea cable industry, the fishing industry and the state. Currently, most of those undersea cables pass through Oregon on their way to major out-of-state connection points. Oregon has the choice of being passive and becoming a poor neighborhood living "under the freeway" without an on-ramp to this economic opportunity as these highways of the future pass through without leaving much local benefit. Oregon also has the choice of being proactive and arranging its Internet connections so that Oregon becomes a preferred geographic location for organizations doing business in the Pacific Rim.¹⁹

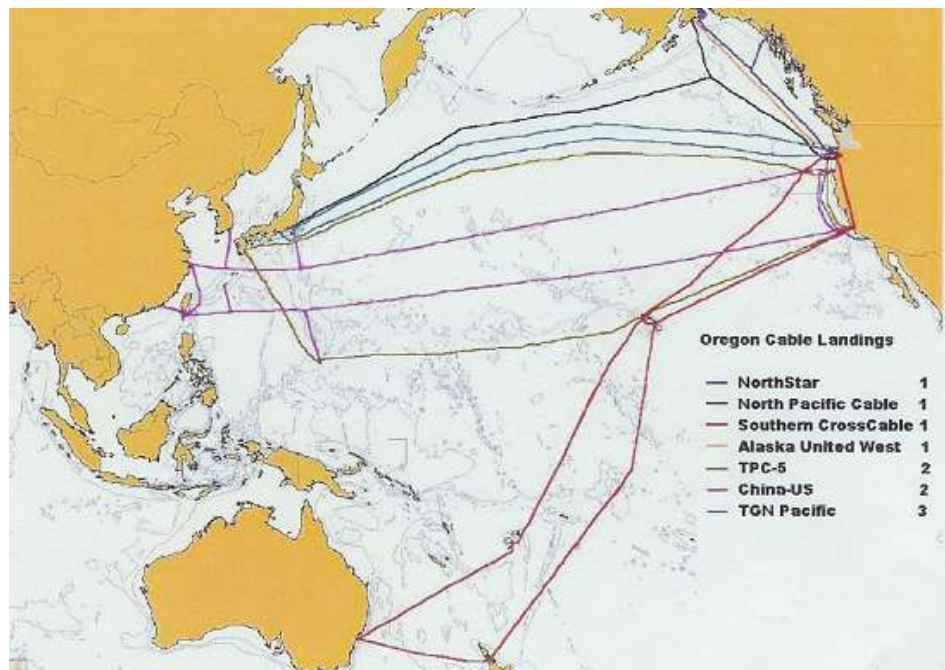


Figure 46 - Transpacific Cable Landings on the Oregon Coast

Cellular Towers in Oregon

Cellular phone service is available in most of the more densely populated areas and along many of the major highway corridors according to this map from the cellular phone association a little over a year ago (see Cell Tower Location Map for Oregon).

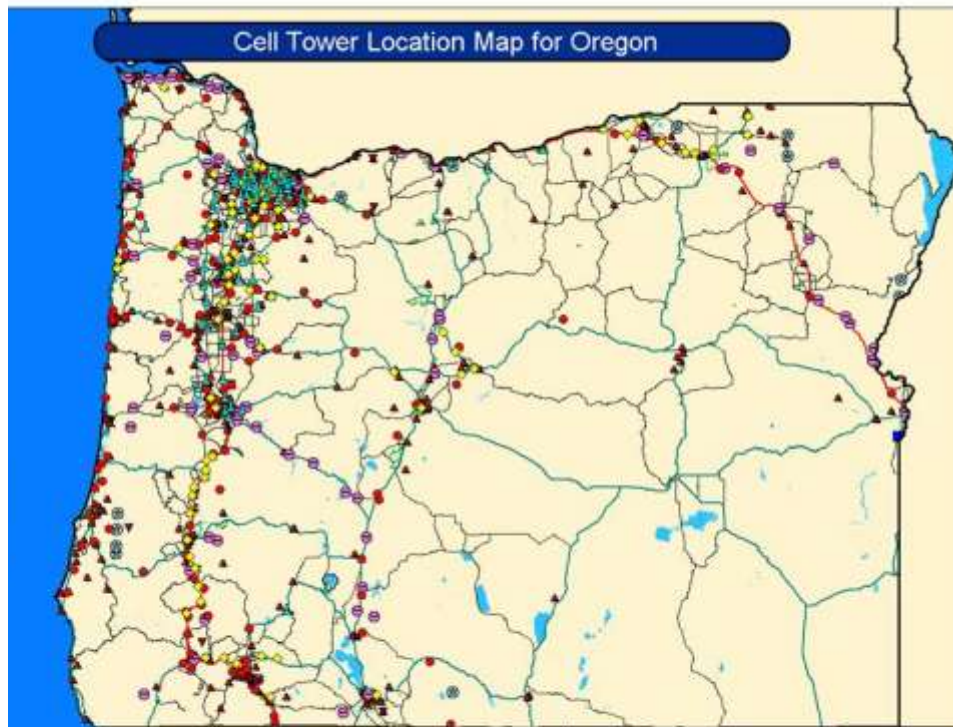


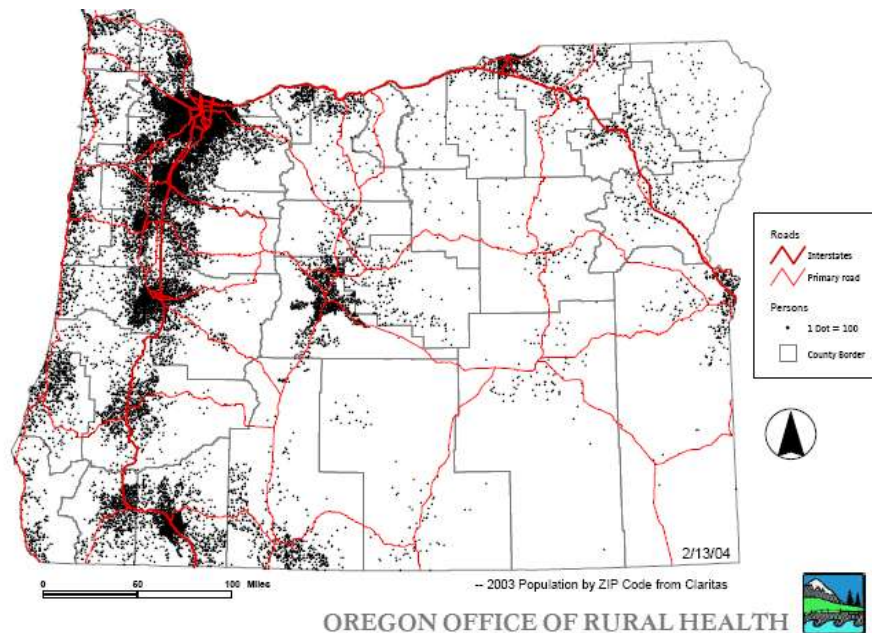
Figure 47 - Cell Tower Location Map for Oregon²⁰

Many areas of rural Oregon remain “broadband-challenged”

Oregon has a telecommunications infrastructure extending throughout the state that is world class. Fiber optic backbone networks with diverse routing together with extensive broadband access provide excellent network reliability and connectivity throughout the state for both voice and data traffic. Oregon should continue to build on these strengths and work to improve the Internet infrastructure that will be the key to the state’s future economic development.

Yet we honestly must report, based on the preponderance of anecdotal evidence that not all areas of the state are served with the benefits of broadband. Just as it’s been conceded at the national level that the work is not done, so too is the case in Oregon. Cities remain without access to broadband services and there continue to be areas without the benefit of route diversity. Even in those places in Oregon with the best current infrastructure and services the current advantage will be short-lived as other states catch up and as the rapid changes in information technology continue. We will need to run fast to avoid falling behind other states and regions and to maintain our economic competitive advantage.

As illustrated by the following map, Oregon’s population density accrues to a few modest sized cities. Most of the state remains sparsely populated.²¹



OREGON OFFICE OF RURAL HEALTH
 Figure 48 - Population Density in Oregon

The growth in availability of broadband is primarily seen in cities or areas demonstrating significant demographic clustering (see following map).

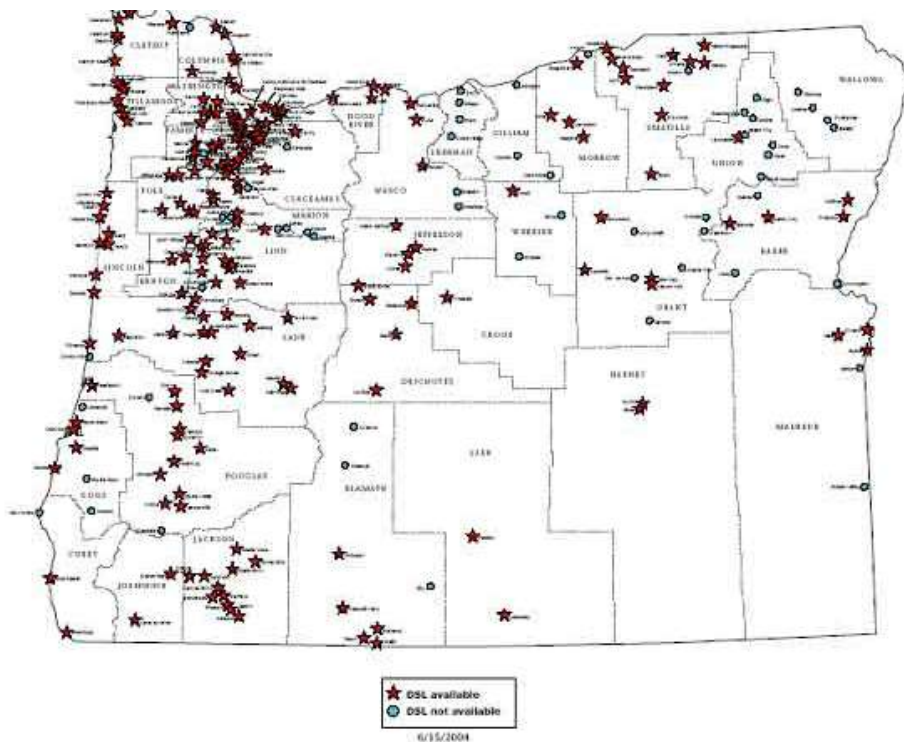


Figure 49 - DSL Access in Oregon²²

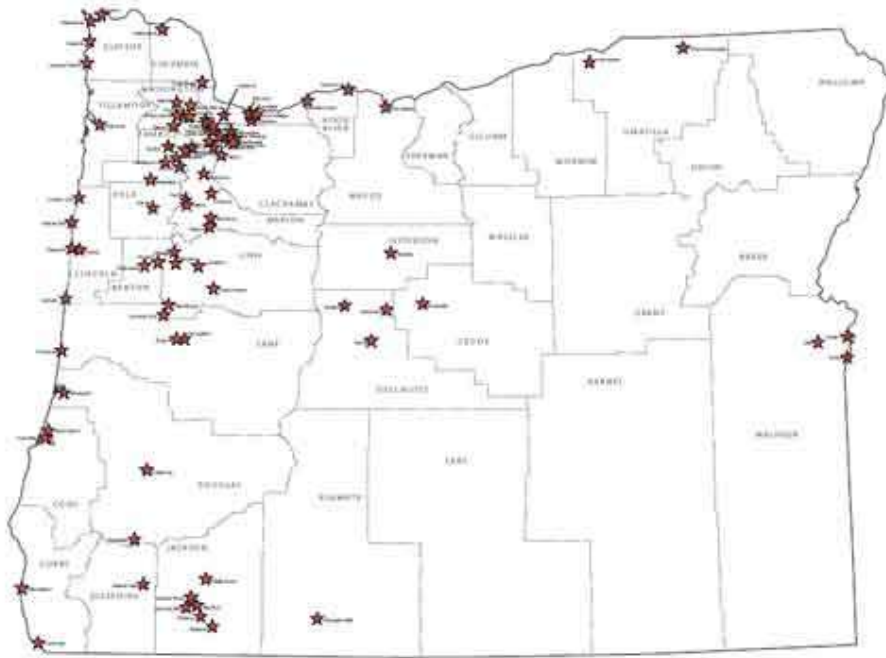


Figure 50 - Cable Modem Access²³

One only need cross just outside the city centers or be slightly off the path of a cable run to discover this fact. Solutions to provide broadband to these residents of these areas, who indicate they want it and are willing to pay cable or DSL-like rates for it, need to be pursued in the interest of leaving no community behind. Just because you don't live in a city doesn't mean you're not a part of a community.

Oregon is now a set of regional economies, not a single statewide economy. Oregon can now be seen as nine distinct regions, each with its own values, economic approach and political outlook.²⁴

It's the OBP view that four factors characterize a regional view of Oregon²⁵:

- Different parts of Oregon have distinctive economies reflecting the locational preferences of various industry clusters.
- Declining pay is the chief economic problem of rural regions. All of the regions outside the Willamette Valley have lower average wage levels today, adjusted for inflation, than in 1976. Northwest Oregon wages are up 20 percent.
- Regional pay differentials closely correlate with variations in educational attainment -- rural areas have far fewer highly educated workers as a fraction of their population than does the Portland metropolitan area.
- No region has failed to create jobs. Every region has more jobs than in 1976; growth rates in lagging regions (Eastern Oregon, Coos-Curry-Douglas) have been a third to 40 percent of the state average. Southern and Central Oregon are growing faster than the rest of the state.

Across the state we are seeing evidence of these dramatic changes occurring in Oregon. In every sector there are substantial and continuing changes in technology, markets, and competition. Firms that have been most successful in Oregon, indeed across America, have been those that

have developed new and more efficient production techniques and better products. Telecommunications plays a significant and growing role in these successes.

Regional

Getting a grip on just what fiber is where is a very difficult proposition. The bulk of our knowledge comes from anecdotal information, as telecommunications providers do not provide maps to policy-makers to aid them in their decisions. Up to 9/11 competitive reasons were cited. Post 9/11 security reasons have been cited.

So we rely on bits and pieces of information. This is often presented in maps that “represent” the locations of fiber but are never all that accurate. The following map is an example of what we often find. This is a particularly rich representation as things go, albeit very difficult to read.



Courtesy: Victor Braud, of Fiber Channels, Inc.

Figure C-1. Optical Fiber Routes, Existing and Under Construction
Figure 51 - One view of fiber in the region

We can use Federal Communications Commission data to develop detailed maps of antennas; microwave locations, radio frequencies, paths and other data; and other databases (FCC – see Appendices for more information on antenna registration and the FCC data bases) to identify telephony switch locations as well as other related information, such as tandem routing, which is how a long distance call is routed. For Curry County all calls leaving the region are routed through Coos Bay. This means that, for example, when someone in Brookings calls Smith River, the call goes up the coast, over to the I-5 corridor, down the I-5 corridor to Redding over to the coast at Eureka, and up the coast to Smith River.

Note: The last sentence in the previous paragraph needs additional verification.

The reason cited to now for the long transit has been the LATA boundary on the Oregon-California border. However, these boundaries are now readily waived through an FCC application process. It's up to Verizon to take that initiative.

Curry County

Few competitive telecommunications providers serve the county with Verizon and Charter being the dominant players. Unicom is among the alternatives but they too depend on Verizon for backhaul.

Cellular providers include Verizon, Edge Wireless, Sprint, and Ramcell.

Broadband offerings are limited to Charter (Gold Beach to Crescent City) and Verizon DSL in Brookings and Gold Beach. Charter is underway with a major plant expansion that will bridge the area from Port Orford to Ophir, and they will no longer be dependent on Verizon. This capacity expansion will result in availability of up to Gigabit Ethernet transit for the south coast. Residential and business cable modem offerings will be available with up to 10 mbps x 512 kbps rates.

Wireless broadband is reported in some areas: Carroll's Web in Port Orford and Brookings and NW Technical Internet Services in Gold Beach and Brookings.

T-1 rates in some areas are reported at levels up to \$1,600 per month.

Refer to "Curry County Telecommunications Data", parts 1 and 2 for extensive details on the county's telecommunication assets.

IT Department information²⁶

The links shown for remote sites on County Intranet (Roads, Home Health, Brookings, Harbor and Port Orford) don't indicate they run on Verizon frame circuits. Likewise for the frame circuits for the LAW Intranet. This map doesn't show the upcoming wireless/microwave backbone.

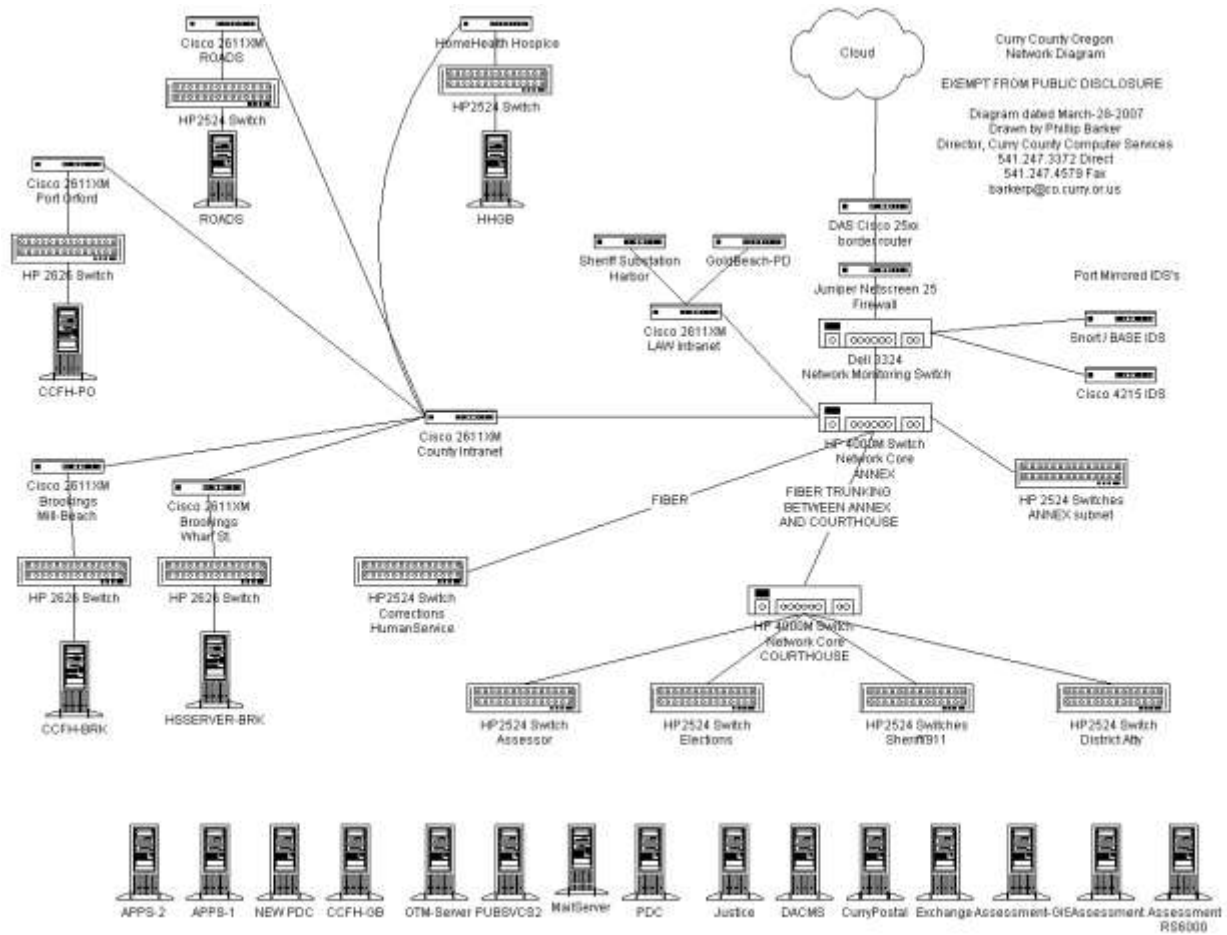


Figure 52 - Curry County IT Network diagram
 NOTE: This diagram NOT to be published to the public.

Fiber between Courthouse and Annex is trunked fiber pairs for redundancy and better throughput. The servers along the bottom are housed in the IT department; the others are at remote sites. This also doesn't yet show the LEDS/NCIC gateway housed with the 911 gear in the Jail basement. None of this shows the completely separate multi-point frame circuits that support VOIP trunking between remote site BCM's and the Nortel Option11-c in the Jail basement.

All servers are RAID-5 with at least 4 in the array and at least 1 or more hot spares. Although current network switches are 10/100, all servers are GIG capable. Most servers are running MS-Server 2000, MS-Server 2003. Active Directory migration is almost completed. Still have a few remaining NT4 boxes so can't go to "native" mode in AD as yet.

Name: SOSERVER_BRK
 Purpose: Sheriff Harbor Substation File and print server.
 Mfg: Dell PowerEdge 1600SC
 CPU: 2.4 Ghz XEON, 266 Mhz bus-clock.
 RAM: 1 GB
 Disk: RAID-5, SCSI-Ultra160 4 drive array, 1 hot spare.
 Disk-Capacity: 89 GB total, 67 GB available.

Name: DACMS

Purpose: District Atty Case Management Server

Mfg: Dell PowerEdge 4300/500

CPU: PIII/350 Mhz, 100 Mhz bus-clock.

RAM: 1 GB

Disk: RAID-5, Megaraid SCSI-UW 6-drive array includes 1 hot spare.

Disk-Capacity:90.5 GB, 27.5 GB available.

OS: Windows-2000 Server Standard, SQL Server 2000 Standard.

Backup-Media: HP DDS-4

Synopsis: Retired Public Health server. Rebuilt with largest drives available to use for DACMS.

DA received grant funds applied to building server from old chassis.

Name: JUSTICE

Purpose: Sheriff Case Management, Jail Management, Dispatch CAD.

Mfg: Dell 1600SC

CPU: Quad-XEON, each 2.4 Ghz, 533 Mhz bus-clock.

RAM: 2 GB

Disk: RAID-5, 6 drive array includes 2 hot spares. SCSI Ultra-320.

Disk-Capacity:96.1 GB, 58.7 GB available.

OS: Windows-2003 Server Standard, SQL Server 2000 Standard.

Backup-Media: DLT-1 400 GB native

Name: PUBSVCS

Purpose: Public Services Department Server. All construction permits. Primary Symantec centralized Anti-Virus server.

Mfg: Dell PowerEdge 1800

CPU: XEON, 2.8 Ghz, 800 Mhz bus-clock.

RAM: 2 GB

Disk: RAID-5, 5 drive array includes 1 hot spare. SCSI Ultra-320.

Disk-Capacity:386 GB, 378 GB available.

OS: Windows-2003 Server Standard, ACELLA Permits Plus package.

Backup-Media: DLT/VS-160

Name: CURRYPOSTAL

Purpose: Replacement for ancient exchange server.

Mfg: Dell PowerEdge 1600SC

CPU: XEON, 2.0 Ghz, 533 Mhz bus-clock.

RAM: 2 GB

Disk: RAID-5, SATA 4 drive array includes 1 hot spare. 3 GB/s transfer rate.

Disk-Capacity: 296 GB, 174 GB available.

OS: Windows-2003 Server Standard, Exchange Server 2003

Backup-Media: Quantum Ultrium-2

Synopsis:Built on remains of retired Elections server. Upgraded to Raid-5 on SATA.

Name: APPS2

Purpose: Public Health Ahlers server

Mfg: Dell PowerEdge 600SC

CPU: Pentium-4, 2.4 Ghz, 400 Mhz bus-clock.

RAM: 1 GB

Disk: RAID-5, Ultra-160 4-drive array, hard drive carriage capacity:4

drives. No hot spare.
Disk-Capacity: 101 GB, 57 GB available.
OS: Windows-2000 Server Standard, Ahlers Pulic Health software packages.
Backup-Media: DLT/VS-80

Name: APPS1
Purpose: Serves County Fiscal Department
Mfg: Dell PowerEdge 600SC
CPU: Pentium-4, 2.4 Ghz, 400 Mhz bus-clock.
RAM: 1 GB
Disk: RAID-5, Ultra-160 4-drive array, hard drive carriage capacity:4
drives. No hot spare.
Disk-Capacity: 101 GB, 85 GB available.
OS: Windows-2000 Server Standard, Caselle Financial Management packages.
Backup-Media: DLT/VS-80

Name: CURRYMAIL (Ancient exchange server)
Purpose: Serving minimal email needs while waiting to die.
Mfg: Hewlett Packard NetServer E60
CPU: PIII/550, 100 Mhz bus-clock.
RAM: 320 MB
Disk: RAID-5 3-drive array, no hot spare.
Disk-Capacity: 36 GB, 10 GB available.
OS: NT-4 Server, SP6. Exchange-5.5 server.
Backup-Media: HP DDS-4.

Name: OTM-SERVER
Purpose: Filters HTTP traffic, blocks banned websites, logs all HTTP traffic.
Mfg: Dell PowerEdge 750
CPU: Pentium-4, 2.80 Ghz, 800 Mhz bus-clock.
RAM: 1 GB
Disk: 1 SATA 80 GB drive.
Disk-Capacity: 79 GB, 60 Gb available.
OS: Windows-2000 Professional
Backup-Media: None, periodic drive snapshots for recovery.

Name: CCFH-GB
Purpose: Public Health Office Gold Beach file server.
Mfg: Dell PowerEdge 4300/550
CPU: PIII/550, 100 Mhz bus-clock.
RAM: 512 MB
Disk: RAID-5, Megaraid SCSI-UW, 3x8.37 GB RAID-5, no hot spare.
Disk-Capacity: 17.9 GB, 11 GB available.
OS: NT-4 Server, SP6.
Backup-Media: DLT-40

Name: NEWPDC
Purpose: Backup Active Domain Controller, File and Print.
Mfg: Dell PowerEdge 1800
CPU: XEON, 2.80 Ghz, 800 Mhz bus-clock.

RAM: 2 GB
Disk: RAID-5, SATA, 6-drive array, 1 hot spare.
Disk-Capacity: 399 GB, 348 GB available.
OS: Windows-2003 Server Standard.
Backup-Media: DLT/VS-160
Synopsis: File and Print for: Sheriff, District Atty, Elections, Veteran Services, Fiscal Department.

Name: Assessment-GIS
Purpose: GIS mapping server for Assessor's Office.
Mfg: Dell PowerEdge 2600
CPU: Quad-XEON, 2.80 Ghz each, 533 Mhz bus-clock.
RAM: 4 GB
Disk: RAID-5 dual Ultra 320 arrays.
Disk-Capacity: Array-1:355 GB, 27 GB available Ultra-160. Array-2: 819 GB, 642 GB available Ultra-160.
OS: Windows-2003 Server Standard, SQL Server-2000 Standard, Apache 2.0.55
Backup-Media: Dell/Ultrium PowerVault 124t (jukebox).
Synopsis: Go to <http://gis.co.curry.or.us> and have a look.

Name: Assessment
Purpose: File and Print for Assessor, Recorder, Clerk, Commissioners, Emergency Services, Juvenile, Public Services, RSVP, Tax, Treasurer.
Mfg: Dell PowerEdge 1800
CPU: Dual XEON, 2.8 Ghz, 800 Mhz bus-clock.
RAM: 2 GB
Disk: SATA RAID-5,
Disk-Capacity: 732 GB, 527 Gb available.
OS: Windows-2003 Server Standard
Backup-Media: Ultrium2

Name: PDC
Purpose: Primary Active Director domain controller.
Mfg: Dell PowerEdge 750
CPU: XEON, 2.40 Ghz, 533 Mhz bus-clock.
RAM: 512 MB
Disk: 70 GB SATA.
Disk-Capacity: 68 GB, 63 GB available.
OS: Windows-2003 Server Standard
Backup-Media, over the wire to Assessment weekly.

Name: mailserver.co.curry.or.us
Mfg: Dell PowerEdge 2650
CPU: XEON 2.4 Ghz, 533 Mhz bus-clock.
RAM: 1 GB
Disk: RAID-5 Ultra 320, 4 drive array, 1 hot spare.
Disk-Capacity: 140 GB, 115 Gb available.
OS: Slackware Linux, base-version 10.1; heavily customized.
Backup-Media: DDS-4

Name: Assessment/IBM-RS6000

Purpose: Assessment and Taxation server for Assessor and Treasurer

Mfg: IBM, RS6000

CPU: RISC

RAM: 4 GB

Disk: unknown file-system, unknown controller(s)

Disk-Capacity 3 GB (?)

OS: AIX 4.3

Backup-Media: DDS-4

CCFH-Brookings

Purpose: Print and File server, Brookings Public Health/Human Services/Juvenile

Mfg: Dell PowerEdge 1800

CPU: XEON 2.8 Ghz, 400 Mhz bus-clock.

RAM: 1 GB

Disk: SATA RAID-5 5 drive array, 1 hot spare. Ultra-320 Tape Controller

Disk-Capacity: 174 GB, 168 GB available

OS:

Backup-Media: DLT VS/160

CCFH-PO

Purpose: Print and File server, Port Orford County Offices Public Health/Human Services/Juvenile/Probation/SWOCC campus extension

Mfg: Dell PowerEdge 1800

CPU: XEON 2.8 Ghz, 400 Mhz bus-clock

RAM: 1 GB

Disk: SATA RAID-5 5 drive array, 1 hot spare.

Disk-Capacity: 174 GB, 172 GB available.

OS: Server 2003

Backup-Media DLT VS/160

ROADS-GIS

Purpose GIS database and Print and File server

Mfg: Dell PowerEdge 2600 (Twin of Assessor-GIS)

CPU: Quad-XEON, 2.80 Ghz each, 533 Mhz bus-clock.

RAM: 4 GB

Disk: RAID-5 Ultra-160

Disk-Capacity: 355 GB, 180 GB available

OS:

Backup-Media: Ultrium-2

HHGB

Purpose: Home Health/Hospice file, database and print server.

Mfg: Dell PowerEdge 2600

CPU: XEON 2 Ghz

RAM: 3 GB

Disk: RAID-5, Ultra-160. Single array, 6 drives 1 hot spare.

Disk-Capacity: 115 GB, 102 GB available.

OS: Server 2000 SBE.
Backup-Media DDS-4

As we now stand we're good for several years at least. Regular consumables such as replacement data backup tapes, laser toner, equipment maintenance supplies will be all we would need to order.

- Every critical server is new with full and multi-year extended warranties in place to cover parts failures.
- We now use Microsoft's new logical domain structure 'active directory' which has a very strong security model within it.
- All services now operated in-house so we have direct control over security and content.
- We have critical spares such as extra hard drives for the different servers on-hand to react immediately to a failure.
- Each server is configured to use predictive failure analysis to calculate odds for failures so we can replace parts before they fail, when possible.
- All new servers purposely oversized on storage capacity and memory to maximize useful lifespan.
- The fiber network in use between the courthouse and annex has been physically rebuilt to modern standards and is now fault-tolerant and 400% faster.
- The entire network is monitored 24/7 with email notification of outages.
- Network monitoring also involves collecting performance statistics to pinpoint and eliminate weak spots.
- All inbound email is received by a server dedicated to filtering, inspection and threat assessment. Any hostile content is either stripped off leaving the remainder of the message intact or is quarantined for manual handling.
- We now practice what Cisco refers to as 'defense in depth' with a layered approach to security. It's not perfect implementation but it's a major improvement over what was lacking in the county's past.
- We now actively filter web-based Internet access to prevent most forms of abuse.

Future plans

Currently the county is dependent on Verizon for all its voice and data transport needs. Verizon is really the only game in town; even their competitors such as Unicom are at their mercy. With an eye towards the future the IT Director began building a countywide fault-tolerant network.

The Sheriff is nearly ready to begin using his new Public Safety radio system. Each mountaintop is linked to the others using point-to-point microwave radio equipment. The excess capacity of that microwave network will be used with equipment already paid for to build a countywide data network that is completely independent of Verizon. The first phase of that network will directly support the Assessor's GIS partnership. The GIS partnership includes the Assessor's Office, City of Brookings, City of Gold Beach and City of Port Orford.

With future funding available and looking at future cost reduction opportunities, if the second phase of the wireless network supporting all the outlying county sites were operational the County could then exercise the option as they came up for renewal to not renew the Verizon data

contracts for any location connected wirelessly and save between 300-600 per month depending on mileage and speed charges. Estimated savings of between 30k and 50k annually would occur with elimination of most of the Verizon data circuits over time.

With tools and materials already on hand further improvements to the existing fiber optic cabling to provide further fault-tolerance and even greater speeds for the DA, Sheriff, Juvenile and GIS programs which all use large amounts of bandwidth within the county network while doing their jobs.

Here is a list of the monthly / bi-monthly charges:

- Verizon Data Services for countywide voice and data circuits:.\$5350.00[monthly]
- Verizon Special Services hardware support for Option-11 phone system in Jail basement:\$5406.00[quarterly]
- Verizon Special Services software support for Option-11 phone system in Jail basement:\$4065.66[monthly]
- State of Oregon DAS [data services, connection to internet]:\$700.00[monthly]

Here's a list of the annual charges:

- Symantec Anti-virus system for all county computers and servers \$6,648.60 [licenses for 210 computers]
- Comstor Microfilm of Assessor's Records from RS6000 server:\$678.33
- Verizon BCM 29821 Colvin St, GB:\$654.84[annual:3/7/06-3/6/07]
- Verizon BCM 425 Mill Beach, Brookings:\$856.20[annual:3/27/06-3/26/07]
- Verizon BCM 306 Wharf, Brookings:\$697.50[annual:3/27/06-3/26/07]
- Verizon BCM 93976 Ellensburg, GB Home Health:\$865.56[annual:UNKNOWN TERM,UNKNOWN AMOUNT]
- Verizon BCM 1403 Oregon St, Port Orford:[annual:UNKNOWN TERM,UNKNOWN AMOUNT]
- Verizon Select Services, phone system networking hardware support contract:\$1575.00[annual3/11/02-3/10/07]

Here's a list of the multi-year charges:

- IBM & Tyler Works (TSG) RS6000 hardware/software support of Assessor's/Treasurer's server [6/23/05-6/22/08]\$4832.21

Here's a summary highlighting most of the one-time acquisition costs for the last 2+ years and where it went.

Assessor's Office:

- New Server for GIS project of Assessor's Office: \$11,290.72[Comp Svcs funds, July 2004]
- New GIS server for ROAD Dept.:\$11,290.72[Comp Svcs funds, July 2004]
- Additional data storage for GIS server:\$4756.20 [Assessor funds]
- External tape drive to back up GIS data:\$4359.96 [Assessor funds]
- GIS large-format plotter:\$8759.25 [Assessor funds]

- SQL database software for GIS server:\$5305.00 [Assessor funds]
- Thousands of man-hours from Bill O'Connor in custom programming working closely with Toni Fisher on the web front-end to the county GIS website
<http://gis.co.curry.or.us>

Public Health, HAN grant network security upgrade:

- Replacement routers, Cisco intrusion detection, HP data switches:\$11,842.25
- Replacement servers, Port Orford, Brookings:\$8707.00
- 96 Nursing PDA's, public health grant:\$31,488.00

Computer Services-borne expenses:

- Dell Warranty extensions for servers:\$1805.41
- Dell spare hard drives for servers:\$849.98
- Dell New Assessment server;\$5117.60 (CompSvcs funds) [serves: DA, Commissioners, Sheriff, Assessor, Clerk, Juvenile, Public Health, Public Services, Computer Services].
- Dell Warranty extension Justice server:\$372.00
- Centralized Security-patch management system from GFI: \$1180.00 [allows us to patch all systems countywide at a moment's notice en-masse].
- Cisco network routers for upcoming countywide data network over public safety radio system: \$7796.14
- Rebuild of Exchange Server [internal email server] software costs: \$9515.96 [parts, software licenses]. (Server rebuild used retired server from Elections Division plus parts and software to build new system).
- Networking hardware to rebuild fiber optic data network, phase-1:\$7602 [switches, fiber parts]
- Networking hardware to rebuild fiber optic data network, phase-2:\$5,372.46 [switches, fiber parts, stacking kits]
- Networking hardware to rebuild fiber optic data network, phase-3:\$2881.99 [fiber interfaces]
- Stand-by power [APC smartups 2200's]:\$2,400.00
- Stand-by power, Sheriff Servers:[APC 2200-XL's]:\$2870.00
- Network security monitoring/blocking server:\$2262.28
- Replacement servers: PUBSVCS,NEWPDC:\$8,117.22

NOTE: One of Curry County's really great assets is the IT Director, Phillip Barker. Under his direction the IT department is performing at a level of effectiveness and efficiency that rises above most of the IT departments in Oregon counties.

Route Redundancy

Several alternatives are possibilities for route redundancy for the region. First, let's start with what is or soon will be in place. Here I refer to the Charter build on Oregon's south coast that will feed the north the south coast. Charter does not disclose investment amounts but we have come to understand they are investing on the order of \$4 to 7 MM in this expansion. On completion (Fall 2007) and finalization of all connections this expansion will bring Gigabit Ethernet connectivity to the area. This is HUGE!

Charter made this investment to make money. For them to make the investment they needed to have assurances outside of their internal marketing and engineering staff. In June Of 2006 I was asked to sell them on this investment. We brought them demographics, growth rates, income data and so on. All of which presented a very compelling investment opportunity. By their own understanding of take rates, Charter rates the area as the highest in the Pacific Northwest.

There's a lesson in this that the consultant has seen repeatedly: we need to bring the market realities of rural properties to the attention of telecommunication company senior management. We can no longer sit back and wait for something to happen.

Four potential routes to route diversity are worth further exploration. The estimates for the first three are very rough. It will take a more detailed engineering study to explore them further. The fourth option, 299, has already been subjected to a significantly more detailed level of analysis.



Figure 53 - Route Redundancy Possibilities in the Region

Route 199

It's also worth noting that Charter has 32-count fiber that runs from 101 up 199 to Gasquet. The remaining route is about 75 miles. Using estimates from the Route 299 study (see below -- these would be very rough estimates, indeed) we get a \$5,000,000 build cost and \$240,000 ongoing maintenance and operations cost. There is an existing right of way (ROW) in place using PacifiCorp's ROW that roughly parallels 199.

Crescent City to Trinidad

This approximate 60-mile route running along or near 101 between Crescent City and Trinidad would connect to the SBC/ATT fiber at Trinidad. Using the FirstMile costs as a very rough guide this would yield a cost of installation of \$3.3 MM and \$191,040 ongoing maintenance and operations cost. The ROW has yet to be established, adding to the installation cost, and this is very rugged terrain.

Soames Bar to Klamath

This potential route to the I-5 corridor has many unknowns and dependencies. This approximate 60-mile route roughly follows the Klamath River. The costs would be roughly similar to the Crescent City to Trinidad route. The ROW would need to be established, adding to the costs. This also is extremely rugged terrain. This leg depends on having the Crescent City to Trinidad legs in place. This route could be of particular interest to the Yurok Tribe.

Route 299

Route 299 estimates are available through the "An Alternate Middle Mile Fiber Feasibility Study" produced FirstMile.US in June of 2006. The total estimated cost of installation for this aerial fiber plant is \$8.8 MM (\$59, 864 per mile). The ongoing maintenance and operations cost for this option is \$468K annually (\$3,184 K per mile). Efforts are underway currently to establish a business case for this route.

APPENDICES

Appendix 1 -- A Primer on Bits²⁷

Measuring Bytes Bit by Bit

Below are the standard metric prefixes used in the SI (Système International) conventions for scientific measurement. With units of time (e.g., gigabits per second) or things that come in powers of 10, they retain their usual meanings of multiplication by powers of 1,000 = 10³. When used with bytes (e.g., gigabytes of data storage) or other things that naturally come in powers of 2, they usually denote multiplication by powers of 1,024 = 2¹⁰.

Base 10			
1 Kilobit/s	=	1,000 ¹ = 10 ³ =	1,000
1 Megabit/s	=	1,000 ² = 10 ⁶ =	1,000,000
1 Gigabit/s	=	1,000 ³ = 10 ⁹ =	1,000,000,000
1 Terabit/s	=	1,000 ⁴ = 10 ¹² =	1,000,000,000,000
1 Petabit/s	=	1,000 ⁵ = 10 ¹⁵ =	1,000,000,000,000,000
1 Exabit/s	=	1,000 ⁶ = 10 ¹⁸ =	1,000,000,000,000,000,000
1 Zettabit/s	=	1,000 ⁷ = 10 ²¹ =	1,000,000,000,000,000,000,000
1 Yottabit/s	=	1,000 ⁸ = 10 ²⁴ =	1,000,000,000,000,000,000,000,000
Base 2			
1 Kilobyte	=	1,024 ¹ = 2 ¹⁰ =	1,024
1 Megabyte	=	1,024 ² = 2 ²⁰ =	1,048,576
1 Gigabyte	=	1,024 ³ = 2 ³⁰ =	1,073,741,824
1 Terabyte	=	1,024 ⁴ = 2 ⁴⁰ =	1,099,511,627,776
1 Petabyte	=	1,024 ⁵ = 2 ⁵⁰ =	1,125,899,906,842,624
1 Exabyte	=	1,024 ⁶ = 2 ⁶⁰ =	1,152,921,504,606,846,976
1 Zettabyte	=	1,024 ⁷ = 2 ⁷⁰ =	1,180,591,620,717,411,303,424
1 Yottabyte	=	1,024 ⁸ = 2 ⁸⁰ =	1,208,925,819,614,629,174,706,176

Table 1 Bytes Bit by Bit

Carrier Technology	Data Rate (Mbps)	Description	64 Kbps Circuits*
DS-0	0.064	Base rate in the Digital Signal (DS) level hierarchy	1
T-1 (DS-1)	1.544	Primary level of the American T-carrier multiplexing system; capacity is the same as a DS-1 carrier	24
T-2 (DS-2)	6.312	Four times the capacity of T-1	96
T-3 (DS-3)	44.736	28 times the capacity of T-1	672
T-4 (DS-4)	274.176	168 times the capacity of T-1	4,032
E-1	2.048	Primary level of the European E-carrier multiplexing system	30
E-2	8.448	Carries four multiplexed E-1 signals	120
E-3	34.368	Carries four E-2 signals	480
E-4	139.264	Carries four E-3 signals	1,920
E-5	565.148	Carries four E-4 signals	7,680
OC-1/STS-1	51.840	Basic signaling rate of SONET hierarchy	672
OC-3/STM-1	155.520	Exactly three times the capacity of OC-1**	2,016
OC-12/STM-4	622.080	12 times the capacity of OC-1	8,064
OC-24	1,244.160	24 times the capacity of OC-1	16,128
OC-48/STM-16	2,488.320	48 times the capacity of OC-1	32,256
OC-192/STM-64	9,953.280	192 times the capacity of OC-1	129,024

Table 2 Measuring Telecommunications Bandwidth—DS-0 to OC-192

“T” T-carrier system in U.S., Canada, and Japan with 1.544 Mbps as the primary level (24 voice channels x 64 Kbps per channel).

“DS” Digital Signal that travels on the T-carrier or E-carrier.

“E” Used in countries other than U.S., Canada, and Japan. The hierarchy was established by the CEPT (Conférence Européenne des Postes et Télécommunications) with 2.048 Mbps as the primary level ([30 voice channels + 2 channels for overhead] x 64 Kbps per channel).

“OC” Optical Carrier interface designed to work with STS-n (Synchronous Transport Signal) signaling rate in a SONET (Synchronous Optical Network).

“STM” Synchronous Transport Module refers to a large carrier (base signal 155.52 Mbps) in a SONET.

“STS” Synchronous Transport Signal is the electrical counterpart to the Optical Carrier (OC).

Notes:

* The number of 64 Kbps is presented for comparative purposes only. The actual number of simultaneous conversations possible over a given carrier may vary depending on the encoding scheme used.

** In the "E" and "T" hierarchies, each higher level is set to be "almost but not exactly" a multiple of the bit rate for the previous order (plesiochronous).

To eliminate problems associated with plesiochronous multiplexing, SONET, a synchronous hierarchy, was defined in the United States in 1986. As a result, the "OC" and "STM" carriers are exact bit-rate multiples of their primary levels, OC-1 and STM-1, respectively.

Appendix 2 -- Electromagnetic Spectrum

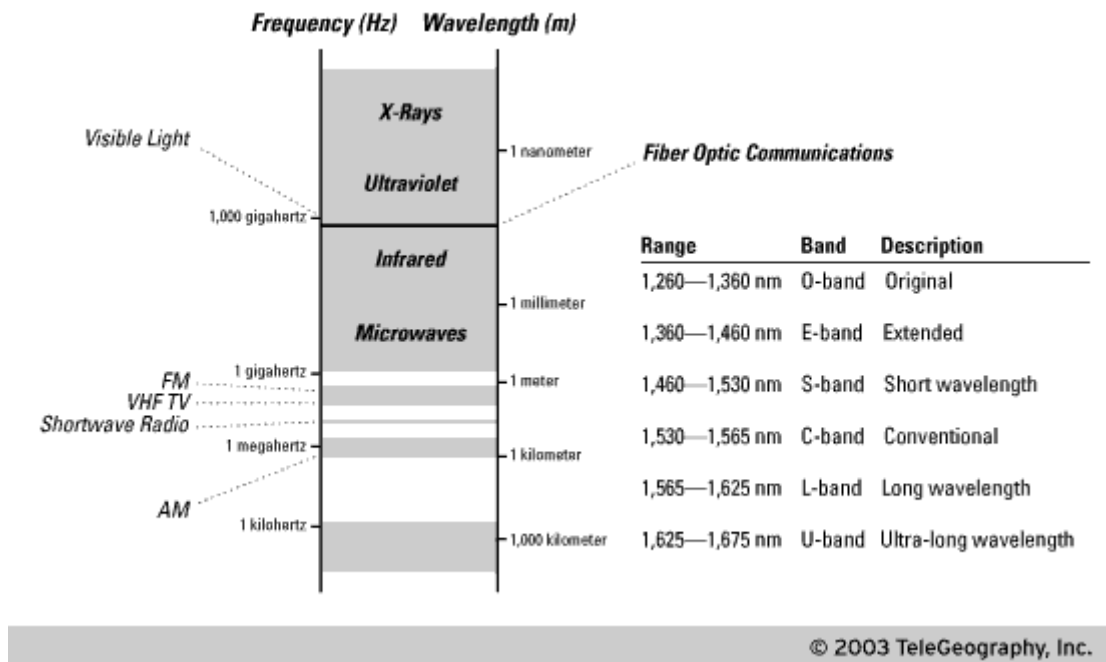


Figure 54 - Electromagnetic Spectrum

The laser light used in fiber-optic communications operates within a narrow band on the electromagnetic spectrum. Radiation (such as TV signals and light) on the electromagnetic spectrum can be measured by both frequency (the number of wave cycles per second, or Hertz) and wavelength (in meters). Frequency and wavelength are inversely proportional (that is, the higher the frequency, the shorter the wavelength), and either can be used to describe communications signals. For example, radio broadcasts are denoted in frequency—a 100 megahertz (MHz) frequency on the FM dial corresponds to approximately a three meter wavelength. In contrast, signals on fiber-optic cables operate at much higher frequencies, and have tiny wavelengths—only 850 to 1,625 nanometers (billionths of a meter).

In scientific literature, a wavelength often is denoted as lambda (λ). Individual wavelengths also are referred to as colors—an analogy to frequencies within the visible light spectrum.

One of the more important objectives of fiber designers has been to design fiber that has a wider "window" or range of usable frequencies for light signals. The wider the usable band, the more distinct signals can be transmitted. This is determined in part by the composition of the fiber itself. Hence, some recent designs have extended the low attenuation window at 1550 nm (now called the C-band) to 1600 nm (called the L-band), allowing more signals to be transmitted. At the other end, scientists have eliminated water molecules that greatly increase attenuation at 1400 nm, releasing this band (the S-band) for possible future use.

Appendix 3 -- "BEARFACTS" 1994²⁸

PER CAPITA PERSONAL INCOME

In 1994 Curry had a per capita personal income (PCPI) of \$18,282. This PCPI ranked 14th in the state and was 87 percent of the state average, \$21,060, and 82 percent of the national average, \$22,172. The 1994 PCPI reflected an increase of 5.5 percent from 1993. The 1993-1994 state change was 5.1 percent and the national change was 3.9 percent. In 1984 the PCPI of Curry was \$11,658 and ranked 19th in the state. The 1984-1994 average annual growth rate of PCPI was 4.6 percent. The average annual growth rate for the state was 5.0 percent and for the nation was 4.8 percent.

TOTAL PERSONAL INCOME

In 1994 Curry had a total personal income (TPI) of \$378,757*. This TPI ranked 24th in the state and accounted for 0.6 percent of the state total. In 1984 the TPI of Curry was \$195,927* and ranked 24th in the state. The 1994 TPI reflected an increase of 7.3 percent from 1993. The 1993-1994 state change was 7.1 percent and the national change was 5.2 percent. The 1984-1994 average annual growth rate of TPI was 6.8 percent. The average annual growth rate for the state was 6.7 percent and for the nation was 5.9 percent.

COMPONENTS OF TOTAL PERSONAL INCOME

Total personal income includes net earnings by place of residence; dividends, interest, and rent; and personal current transfer receipts received by the residents of Curry. In 1994 net earnings accounted for 41.4 percent of TPI (compared with 45.7 in 1984); dividends, interest, and rent were 33.4 percent (compared with 34.0 in 1984); and personal current transfer receipts were 25.2 percent (compared with 20.3 in 1984). From 1993 to 1994 net earnings increased 3.7 percent; dividends, interest, and rent increased 8.5 percent; and personal current transfer receipts increased 11.9 percent. From 1984 to 1994 net earnings increased on average 5.8 percent each year; dividends, interest, and rent increased on average 6.6 percent; and personal current transfer receipts increased on average 9.1 percent.

EARNINGS BY PLACE OF WORK

Earnings of persons employed in Curry increased from \$165,267* in 1993 to \$173,559* in 1994, an increase of 5.0 percent. The 1993-1994 state change was 6.8 percent and the national change was 4.9 percent. The average annual growth rate from the 1984 estimate of \$99,457* to the 1994 estimate was 5.7 percent. The average annual growth rate for the state was 7.1 percent and for the nation was 6.0 percent.

**Note:* All income estimates with the exception of PCPI are in thousands of dollars, not adjusted for inflation.

Appendix 4 -- Curry County Technology Survey

Note: The survey listed on the following pages was provided in a 12-point format for ease in reading. Each survey also was accompanied by a self-addressed, stamped return envelope. Each survey was on two pages with the survey contents on the front and back pages (i.e., 2 pages, duplexed).

Curry County Technology Survey

PLEASE PROVIDE REQUESTED INFORMATION AND CHECK BOXES FOR ALL THAT APPLY

Your location: Unincorporated Area or City Area/City Name: _____

YOUR NAME (OPTIONAL): _____

Your Business Name (optional): _____

Your business eMail address (optional): _____

Number of Employees (included yourself): _____ **Home Based Business:** Yes No

Your business sector:

- | | | |
|---|--|---|
| <input type="checkbox"/> Advertising/Marketing | <input type="checkbox"/> Government | <input type="checkbox"/> Retail |
| <input type="checkbox"/> Agriculture | <input type="checkbox"/> Healthcare | <input type="checkbox"/> Real Estate |
| <input type="checkbox"/> Communications | <input type="checkbox"/> Hospitality/Lodging | <input type="checkbox"/> Services |
| <input type="checkbox"/> Construction | <input type="checkbox"/> Insurance | <input type="checkbox"/> Technology/Computers |
| <input type="checkbox"/> Distribution/logistics | <input type="checkbox"/> Legal | <input type="checkbox"/> Telecommunications |
| <input type="checkbox"/> Education | <input type="checkbox"/> Manufacturing | <input type="checkbox"/> Transportation |
| <input type="checkbox"/> Financial Services | <input type="checkbox"/> Mining | |
| <input type="checkbox"/> Food | <input type="checkbox"/> Not for profit | <input type="checkbox"/> Other Specify: _____ |

Telecommunication connections in your business *(Check all that apply)*

- | | |
|--|---|
| <input type="checkbox"/> Telephone lines | <input type="checkbox"/> Wireless Internet |
| <input type="checkbox"/> Cell phone | <input type="checkbox"/> Wireless Internet- Satellite |
| <input type="checkbox"/> TV- Cable | <input type="checkbox"/> TV- antenna <input type="checkbox"/> TV- Satellite |

How many telephone numbers do you have? _____

[Note: Not telephone handsets, but different telephone numbers to your business)

How are they used? *(Check all that apply)*

- | | |
|--|---|
| <input type="checkbox"/> Personal/family use | <input type="checkbox"/> FAX machine |
| <input type="checkbox"/> Business use | <input type="checkbox"/> Shared- FAX/Internet/conversations |
| <input type="checkbox"/> Internet dal-up | <input type="checkbox"/> Other: _____ |

Rate your business telephone service *(Check only one)*

- | | |
|------------------------------------|--|
| <input type="checkbox"/> Excellent | <input type="checkbox"/> Good <u>List your telephone</u> _____ |
| <input type="checkbox"/> Fair | <input type="checkbox"/> Poor <u>company:</u> _____ |

Does your business have video conferencing on site? Yes No

If you answered "No," do you have a need for video conferencing? Yes No

Computer ownership in your business

Do you have a computer(s) (includes personal computers (PCs)) in your business? Yes No

If you checked "Yes," please answer these questions:

How many PC's do you have in your business? _____

How many people in your business use your PC's? _____

Do you have a local area network (LAN - two or more computers connected together)? Yes No

If you checked "No," check all that apply:

- | | |
|--|---|
| <input type="checkbox"/> PC's are too expensive | <input type="checkbox"/> I need training before I'll get a PC |
| <input type="checkbox"/> PC's are unimportant | <input type="checkbox"/> I don't like technology |
| <input type="checkbox"/> I have access to a PC elsewhere | <input type="checkbox"/> Other: _____ |

Computer skills you use in your business? *(Check all that apply)*

- | | | |
|--|--|--|
| <input type="checkbox"/> Word Processing | <input type="checkbox"/> Spreadsheets | <input type="checkbox"/> Presentations |
| <input type="checkbox"/> Database | <input type="checkbox"/> Digital photography | <input type="checkbox"/> Other: _____ |

Internet/Web use in your business

Do you use the Internet/Web in your business? Yes (go to question a.) No (Skip a. and go to b.)

a. If you checked "Yes," how many of these services do you use? (Check all that apply)

- Send and receive email
- Look up information on the World Wide Web (for example, health, education or other)
- Purchase items/services online
- Sell items/services online
- Online work (e.g., reports, updates to databases on the Web, apply for permits online, etc.)
- Take classes online Other (specify): _____

b. If you checked "No," check all that apply:

- I use a public computer to access the Internet I prefer personal interaction
- I'm concerned about privacy and personal security Other: _____

Are you interested in getting training on the use of the Internet/Web in your business?

Yes No What training would you suggest? _____

Are you interested in getting more business management training? Yes No

What training would you suggest? _____

Internet connections in your business

Do you have an Internet connection at your place of business? Yes No

If you checked "Yes," what kind of connection do you use and what does it cost each month?

(Check all that apply)

- Dial up over telephone line \$ _____ Wireless (satellite) \$ _____
- ISDN \$ _____ Wireless (land-based) \$ _____
- DSL \$ _____ T1, T3, OC3 \$ _____
- Cable modem \$ _____ Other (specify _____) \$ _____

Importance of Internet access in your business (Check only one)

- Critical Very important Somewhat important Not important

Importance of Internet connection speed in your business (Check only one)

- Critical Very important Somewhat important Not important

Would you be willing to pay for additional Internet connection speed? Yes No

What would be a reasonable price for high-speed (broadband) Internet access for your business? (Check only one)
(Broadband can be many times faster than dial-up).

- Less than \$20 \$20 to \$29 \$30 to \$39 \$40 to \$49 \$50 to \$59 \$60 or more

Which of the following services do you see as important for your business?

(Check all that apply - UNDERLINE or CIRCLE the ones you don't recognize)

- Wireless (satellite) T1 T-3/DS-3
- Wireless (land-based) DSL Fast Ethernet
- Cable Gigabit Ethernet Video Conferencing
- Virtual Private Network ISDN Other (specify _____)

Do you have a business Website: Yes No

If you checked "Yes," where do you host your business Website: Onsite At an ISP

Rate your business Internet Service Provider (ISP) (Check only one)

- Excellent Good List your ISP(s): _____
- Fair Poor _____

New Economy Business Skills

Help us assess your current and future business training needs. Please indicate the business skills you would like to acquire or need to know more about. Please check all that apply.

- Building and operating a business
Tools and techniques needed to start a business.
- Improve Your Home or Small Business
Tools and techniques needed to grow a business. The basics of running a successful business in times of change.
- Marketing strategy
Tools to take your idea to market and make it a success. Techniques for pricing your product or service. Assessing demand and finding your target market.
- Business Communications
Techniques to ensure that your communication style is positive clear, concise, and to the point, and that your listening is sharp.
- Sales
Skills and strategies associated with selling products and services to customers and closing the deal.
- Finance and Accounting for the business manager
Key financial principles of the business world. How to obtain financial assistance for growing your business.
- Management and Leadership
Techniques for business planning, organizing, motivating, innovating, facilitating and controlling.
- Credit sales
Using credit card sales in your business.
- Interviewing and hiring the right people
Conducting more successful interviews and making better hiring decisions.
- Achieving balance at work and at home
Creating balance in your life.
- Business law
Business contract fundamentals.
- E-commerce
E-commerce involves technical skills as well as other skills such as business, project management, communication, creative design, marketing, ordering, selling, fulfillment, support, and direct one-on-one marketing
- Web site design and maintenance
Fundamentals of Web design and maintenance using a Web authoring tool.

What are your concerns or comments?

Voice – Local/Long Distance/Cellular

Internet/World Wide Web

Video/Television

Other (for example, training)

I have no concerns or comments to share at this time.

Please provide any additional comments or thoughts on this page

Appendix 5 -- Endnotes

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- ¹ QuickFacts, U.S. Census Bureau, <http://quickfacts.census.gov/qfd/states/41/41015.html>, retrieved April 15, 2007
- ² Oregon Labor Management System, <http://www.qualityinfo.org/olmisj/ArticleReader?itemid=00004304>, retrieved March, 2007
- ³ Forecasts of Curry County Populations by Age, 2005 – 2035, Note: Base population of July 1, 2000. Totals estimated by PRC, PSU and age-sex details estimated by OEA based on Census Bureau's distributions. Oregon's age-sex detail may not match with the short-term forecast released in the OEA's Economic and Revenue Forecast. Prepared by Office of Economic Analysis, Department of Administrative Services, State of Oregon, Release: April 2004, <http://www.oregon.gov/DAS/OEA/demographic.shtml>, retrieved June 2005
- ⁴ BEARFACTS, Bureau of Economic Analysis, <http://www.bea.gov/ea/regional/bearfacts/action.cfm?fips=41015&areatype=41015&yearin=2004>, retrieved April 13, 2007
- ⁵ Curry County Oregon, Wikipedia, http://en.wikipedia.org/wiki/Curry_County,_Oregon
- ⁶ Bureau of Economic Regional Analysis, <http://www.bea.gov/ea/regional/reis/>
- ⁷ *ibid*, BEA
- ⁸ “High-Speed Services for Internet Access: Status as of June 30, 2006”, Industry Analysis and Technology Division Wireline Competition Bureau, http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-270128A1.doc, January 2007
- ⁹ Report to the Oregon JCLIMT, pages 15 – 22, some content from that report reproduced here.
- ¹⁰ ORS 759.016, <http://www.leg.state.or.us/ors/759.html>
- ¹¹ ORS 759.016, <http://www.leg.state.or.us/ors/759.html>
- ¹² ORS 285B.413, <http://www.leg.state.or.us/ors/285b.html>
- ¹³ ORS 285A.020, <http://www.leg.state.or.us/ors/285a.html>
- ¹⁴ ORS 410.706, <http://www.leg.state.or.us/ors/401.html>
- ¹⁵ *ibid*, “Federal Communications Commission Releases Data on High-Speed Data Services”
- ¹⁶ “Oregon ranks 24th in broadband subscribers,” The Business Journal – Portland, <http://www.bizjournals.com/portland/stories/2003/05/19/daily41.html>, May 22, 2003
- ¹⁷ “The State Broadband Index: An Assessment of State Policies Impacting Broadband Deployment and Demand,” TechNet, http://www.technet.org/resources/State_Broadband_Index.pdf, July 17, 2003
- ¹⁸ “Northeast States Lead in High-Speed Internet Penetration, *Top Broadband States also Highest in Per-Capita Income*,” <http://www.leichtmanresearch.com/press/103003release.html>, Leichtman Research Group, Inc., October 30, 2003
- ¹⁹ “From Silicon Forest to Internet Forest: A Vision for the Oregon Economy,” a draft concept paper on the next potential wave of economic development in Oregon, revised on February 16, 2006, <http://www.ortcc.org/PDF/InternetForest2-16-06.pdf>, retrieved February 17, 2006

²⁰ Cell Tower Location Map for Oregon, <http://www.celltowerinfo.com/picts/Cell%20Tower%20Location%20Map-%20Oregon.jpg>, retrieved July, 2005

²¹ Office of Rural Health, 2003 Oregon Population Density Map, <http://www.ohsu.edu/oregonruralhealth/2003ordensitymap.pdf>, retrieved December 2005

²² Oregon Economic and Community Development Department, Chris Tamarin, Telecommunications Coordinator

²³ *ibid*, OECDD

²⁴ “The Nine States of Oregon,” <http://www.oregonlive.com/special/ninestates/>, Jeff Mapes, Alex Pulaski and Gail Kinsey Hill, The Oregonian, November 2, 2003

²⁵ “Building an Economy for Quality Job”, http://www.oregonbusinessplan.org/plan_economy.html, Oregon Business Plan

²⁶ Source: Phillip Barker, IT Director, Curry County, Spring 2007.

²⁷ A Primer on Bits, Telegeography, http://www.telegeography.com/ee/free_resources/figures/ib-06.php, retrieved January 2006

²⁸ *ibid*, BEARFACTS