CHAPTER 1: TELECOMMUNICATIONS INFRASTRUCTURE

Taking steps to ensure your community has adequate telecommunications is the logical starting point in the process. Today, broadband communications is an essential service—it is no longer a luxury.

Having said that, infrastructure is not everything. You cannot retain talented people and attract new entrepreneurs just because your city or county has quality broadband. Indeed, what the Oregon coast has to offer these people—"the creative class"—is a good quality of life. People will live and work on the Oregon coast because:

- They believe they can improve their quality of life, and
- They believe they can run their business from here.

Telecommunications infrastructure is a means to an end. The ultimate objective is to: (a) improve the standard of living on the Oregon coast, and, (b) bring the benefits of broadband to residents in all our rural communities.

Getting Started: Form a Local Telecommunications Committee

We strongly recommend local governments on the Oregon coast form local telecommunications committees. This strategy to diversify the coastal economy will only work if local leaders take ownership of the effort and implement the strategy from the bottom up.

A local telecommunications committee can anchor your community effort. It provides a focal point for people with telecommunications and business expertise from your community to come together to improve the quality of broadband infrastructure, enhance public awareness of the benefits of broadband, and spearhead partnerships to train coastal residents for the "New Economy."

Who Should Be Involved?

Potential participants include:

- Elected officials and local government staff
- Tribal representatives
- Local people with telecommunications expertise
- Local educators (high school and community college)
- People from the health care sector
- Realtors, members of the development community
- Computer and Internet consultants and salespeople
- Local Internet Service Providers (ISPs) and other telecommunications providers

We recommend you be inclusive. Encourage private sector people with a direct interest in telecommunications to participate. Those professionals add great legitimacy to a local process. So, gather your local IT (information technology) talent, start holding meetings, and see what happens.

A Sample Agenda for a Local Telecommunications Committee:

° Develop a vision for what the local community wants to achieve through telecommunications

° Inventory existing local and regional telecommunications infrastructure

° Define gaps in telecommunications infrastructure

° Develop action plans in partnership with the private sector to fill those infrastructure gaps

° Spearhead local efforts to educate the community about broadband

° Set up an ongoing longer term process to update your local telecommunications inventory

° Integrate your efforts with your community's economic development program

° Coordinate with local high schools and community colleges to promote adequate IT and office skills training opportunities

Becoming a Cutting-Edge Telecommunications Community

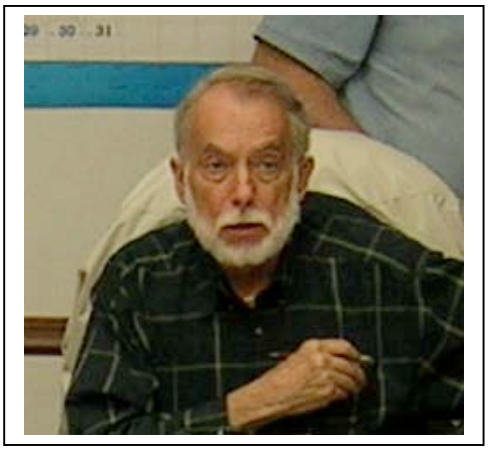
We recommend that community leaders on the Oregon coast seek to make their city and county a "cutting-edge" telecommunications community. What does that mean? It means that your community has roughly the same quality of broadband services available that is offered in major urban centers (reliable/redundant broadband at competitive prices). Over the course of the last year, the OCZMA staff and the OCZMA Technical Team has participated in the City of Florence's Telecommunications Task Force. The City of Florence in seeking to have a broadband network in their community—wireline and wireless—that will allow any person or business to take full advantage of telecommunications. The Florence Telecommunications Task Force initiated a Request for Information (RFI) process that solicits ideas and proposals from the private sector about how to form partnerships to achieve that status. The City of Florence's RFI is included in the Appendices *(see Appendix B)*. The RFI provides a template that your community Telecommunications Committee can adapt to fit the circumstances of your community. We also recommend that you read the interview with Linda Weight, Librarian about the Siuslaw Public Library in Florence included in the Appendices *(see Appendix G)* for more details.

But first, we strongly recommend you read the Telecommunications Primer. The Telecommunications Primer outlines, in laymen's terms, the fundamental things you need to know about telecommunications and broadband technology.

The City of Florence's Telecommunications Task Force

Several years ago community leaders in Florence, Oregon realized that advanced telecommunications—broadband—offered a promising new way to improve the quality of life in their community. In March 2002 the City of Florence City Council passed a resolution establishing the Florence Telecommunications Task Force to work on these issues.

The Florence Telecommunications Task Force was comprised of knowledgeable local people with backgrounds in telecommunications and other professional fields such as university administration.



In February 2003, the Task Force submitted a report to the City of Florence entitled *Florence Network Engineering Options*. The Task Force recommended the deployment of two fiber optic rings (SONET rings) to connect the larger consumers of bandwidth in Florence (i.e., City Hall, the Port of Siuslaw, the Chamber of Commerce, the Siuslaw Public Library, and the Justice Center).

The City of Florence did not take action. Momentum stalled and Florence's Telecommunications Task Force suspended their work.

Coastwide Telecommunications Process Begins

In the spring of 2004, OCZMA Director Onno Husing approached Rodger Bennett, the City Manager of Florence. Husing asked if the City of Florence's Telecommunications Task Force could restart, this time with additional technical and staff assistance from OCZMA. Rodger Bennett checked with the Task Force and they were eager to restart their process.

Over the course of the last year, the Florence Telecommunications Task Force held a number of outstanding meetings. The meetings were marked by spirited exchanges about what the City of Florence wanted to achieve through the process. And, this time around, every effort was made to include people from the private sector. These telecommunication professionals, with their varied perspectives, energized the Task Force and provided valuable expertise.

The telecommunications world evolved a lot since February 2003. In particular, the capability of wireless broadband technologies increased dramatically. The Florence Telecommunications Task Force decided to rethink their entire approach. After several meetings, the decision was make to issue a Request for Information (RFI) to the private sector. The RFI asked the private sector to help the City of Florence define how the town can become a "cutting-edge telecommunications community." The local leaders involved in the Florence Telecommunications Task Force want the City of Florence to be known as a community that can advertise itself to the world as a great place for knowledge-based businesses.

It is an ambitious approach. From a telecommunications infrastructure perspective, Florence is already quite well-served. However, through research and dialogue, Task Force members learned there is a whole additional level of telecommunications infrastructure that is worth pursuing. Task Force members are working to define what that advanced level of telecommunications infrastructure is, and, how to achieve that level of sophistication.

Keeping an Open Mind: The RFI Process

Task Force members are open-minded about how to stimulate the deployment of cutting-edge telecommunications infrastructure in Florence. There is a preference to form public-private partnerships to get the job done (if public involvement is necessary). And, if public dollars are used, the new infrastructure is likely to support an open-network that any firm can provide services over for a fee. The Task Force is dedicated to stimulating telecommunications competition in Florence because competition in the local market will enhance the quality of services and keep prices for these services competitive.

The RFI process has attracted diverse suggestions about how to proceed. On June 24, 2005, the City of Florence issued the RFI on city letterhead. The preparation of the RFI was a collaborative effort of OCZMA's Technical Team (special thanks to Ben Doty) and Florence's Telecommunications Task Force. OCZMA's Technical Team prepared the generic RFI template. The Task Force in Florence developed information about Florence to give potential responders information they needed to write a quality response.

The RFI is, essentially, a set of questions directed to the private sector. The RFI asks responders to explain how they would deploy a telecommunications system(s) to meet Florence's objectives. The RFI process may lead to the drafting of a Request for Proposal (RFP) or a series of RFPs from the City of Florence.

On July 22, 2005 the Florence Telecommunications Task Force held a responders meeting. Four potential responders attended. The deadline for formal written submissions to the RFI was August 5, 2005. The City of Florence received a total of five formal written responses from different private sector firms. Many other firms have signaled their strong interest in the process and are likely to respond to RFPs if and when they are issued.

In a nutshell, the responding companies: (a) provided their statement of qualifications, (b) explained their past accomplishments, and (c) recommended courses of action based on their business models and skill sets. A wide range of potential valid approaches was submitted. One firm is recommending that the City of Florence partner with them to deploy a Fiber-to-the-Home system (see the Telecommunications Primer). Other responders, for example, Charter Communications, suggested an incremental approach of building upon existing telecommunications infrastructure.

Indeed, there are a number of different legitimate ways to enhance telecommunication deployments in Florence. So, as the process moves forward, the challenge for the Telecommunications Task Force will be selecting among a number of coherent deployment strategies. The Task Force is seeking to narrow the range of choices, select preferred alternatives, and begin drafting an RFP—if an RFP is necessary—to make Florence's vision a

reality. The Task Force has begun interviewing the respondents to the RFI, and potentially others.

Florence's Process a Model For Other Communities

From the beginning of the Oregon Coast Telecommunications Economic Development Strategy project in 2004, it was clear the Florence Telecommunications Task Force was a special group. The Task Force has the expertise and the confidence to take their process a long way. The addition of Frank Casazza to the group in the spring of 2005 *(see Appendix F for interview with Frank Casazza)* introduced even more energy and expertise into the process.

Florence's Telecommunications Task Force is pioneering solutions. Telecommunication committees in other communities can benefit by learning what the Florence Task Force is accomplishing.

But, each community must develop their own vision. We recommend local telecommunication committees do not hurry through their deliberations. Important education occurs during the meetings. The process itself is very important. Keep your process transparent and inclusive. Find ways to share what you are learning with the community at large.

A Primer on Broadband

This primer provides a brief history of telecommunications and the bare essentials of what local leaders need to know about telecommunications. The framework of this primer was adapted from several impressive telecommunication primers. In particular, inspiration was drawn from an outstanding telecommunications primer published in the on-line newsletter Broadbandreports.com.

A Brief History Of Telecommunications: How It All Began

Samuel Morse developed the first workable telegraph in 1837. The world got smaller when people could tap messages to each other via telegraph lines. The telegraph was a "killer application" quickly adopted around the world.

Then came Alexander Graham Bell and the telephone. Through the Twentieth Century, the public telephone network steadily grew throughout the country and improved with new technologies and capabilities.

The Internet became part of our lives in the 1990s. Developed by the U.S. Military in the 1980s, the Internet was designed to provide a dispersed communications network capable of surviving a major attack. The civilian uses were obvious. The Internet today has grown into a worldwide data network enabling communications between millions of computers. The Internet is increasingly essential for business, governments, and individuals.

Digital vs. Analog

Standard phone service and television uses "analog" technology. The Internet uses "digital" technology. There is a huge difference. Digital data transformation technologies can move vast amounts of data, very quickly. Basic voice analog transmission technologies can only move limited amounts of data. Analog is the past and digital is the future.

Defining Broadband

There is not a single definition of what constitutes "broadband." In general, broadband means any communications technology offering a better transmission rate than that available over the standard voice grade telephone line. It is a communication service with enough capacity—a big enough "pipe"—to move large amounts of data.

The transmission capacity of broadband is expressed in numerical terms. The basic unit of measurement is bits per second. The key question is, "How many thousands (Kbps), millions (Mbps), or billions (Gbps) of bits can you move in a second?" The more bits per second (bps) you have, the faster you can transmit data. The data transmission capacity of a dial-up connection over a standard voice grade telephone line is 56 Kbps or less. 56 Kbps is still a very modest amount of bandwidth for today's Internet applications.

Many people believe 500 Kbps—or, one-half megabit (Mbps)— qualifies as broadband. It takes 500 Kbps to do two-way, real time, videoconferencing. Because live video conferencing (and video streaming) is so useful, 500 Kbps is a good place to draw the line when defining the lowest grade of broadband.

Today, most quality broadband offerings start at 1 Mbps (often pronounced "one meg"). A business with substantial bandwidth needs can usually operate with a 10 Mbps network access connection. Large networked campuses (education or business establishments) commonly use 100 Mbps or 1 Gbps (billion bits per second).

Why is Broadband So Important?

° With broadband, you can rapidly surf the web the way the Internet was meant to be experienced, with a high-quality web experience.

° With broadband, you can rapidly download massive and complex documents and images.

° With broadband, you can smoothly run all the new bandwidth-hungry applications such as the latest games.

° With broadband, you can video conference in real time.

° With broadband, you can watch video over the Internet on your computer.

° With broadband, you can start to make the transition to Digital TV and high definition television (HDTV) and Voice over Internet Protocol (VoIP) known as computer phoning.

° With broadband, you can do tele-medicine, distance learning, e-government, enhance public safety, E-commerce, and engage in other activities that improve the quality of life and the standard of living.

Once people experience broadband they almost never go back to dialup modems. The growth rates of people getting on-line in America have leveled off because so many people have already gone on-line. Surveys show dialup users are rapidly shifting to broadband when there is access to reasonably priced broadband.

The Digital Divide: What Is It?

The "**digital divide**" is all about not having access to computers and not having access to the Internet. A digital divide exists between urban and rural areas, higher and lower income brackets, and between education levels.

Today, not having broadband is a deal killer for many businesses thinking about coming to a rural community.

In Rural America about half of the Internet users still rely on dialup modem connections (*Source: Pew's Internet and the American Life Project*). Some people choose to stay with dialup modems, even when broadband is available. Why? Dialup is cheaper. And, some people only make limited use of the Internet (e.g., e-mail). In that case, dialup works for them. But, for many other rural people who want and need broadband, <u>not</u> having access to broadband is a serious limitation.

The Different Technologies

Dialup Modems

Do you recall the first time you used e-mail? E-mail was a killer application that drove the expansion of the Internet.

To get on-line you pushed a button that interrupted your phone line. The "modem" noisily dialed you into the Internet through your ISP (Internet Service Provider). Once connected, you could send and receive e-mail over the phone lines, and, if you had patience, you could surf the web. When finished, you "logged off" the Internet and your phone or your fax machine was back in action.

For simple e-mail, dialup modem service is adequate. But, dialup has at least two major disadvantages: (1) you lose access to your phone or fax line when you are on-line, and (2) it takes a lot of time to download web pages and documents (especially complex documents with tables and images).

That is why broadband was created. Broadband moves information remarkably fast. Broadband is always on and it does not tie up your phone line.

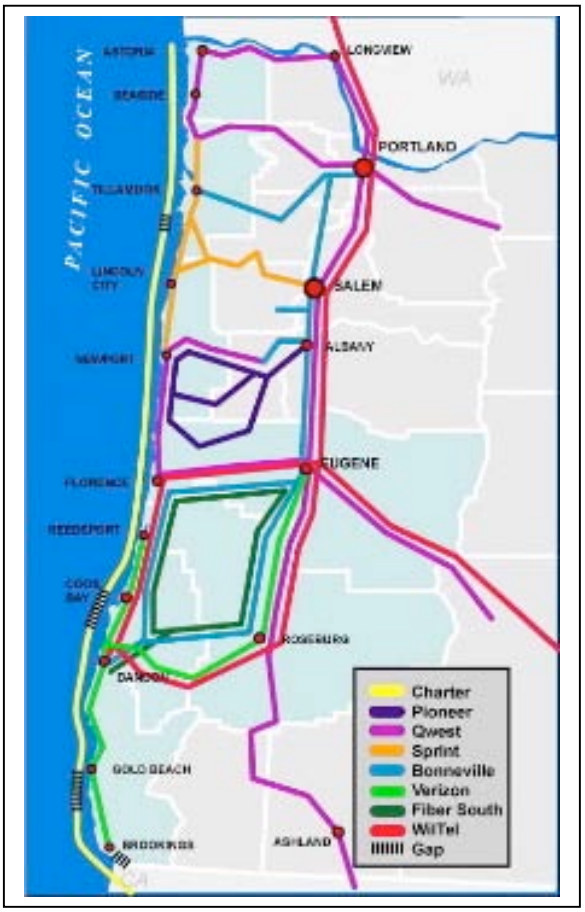
DSL (Digital Subscriber Line)…The Phone Companies

Many people believe the term "DSL" is synonymous with broadband. It is not. DSL is a type of broadband.

DSL service is provided over telephone lines. For decades, phone companies operated copper-based wire phone networks. Copper works great for the transmission of phone traffic (using analog technology).

The Internet was created in the 1980s and deployed in the 1990s. Copper-based phone lines were developed during an earlier era. The copper analog voice telephone network was <u>not</u> designed to carry digital traffic.

Dialup modem technology was invented so people could send digital data transmissions through conventional phone lines. DSL technology enables phone companies to send enough additional signals through their copper lines to provide customers broadband Internet access services.



Today, people are demanding more and more bandwidth. As a result, they are turning away from the slower dialup modems and toward broadband. People want web pages to download quickly. People need to send and receive large complex documents. And, more people are beginning to use their computer and the Internet to view video. Each of the new web-based applications—for instance, video games— demands more and more bandwidth to operate and the demand increase is exponential.

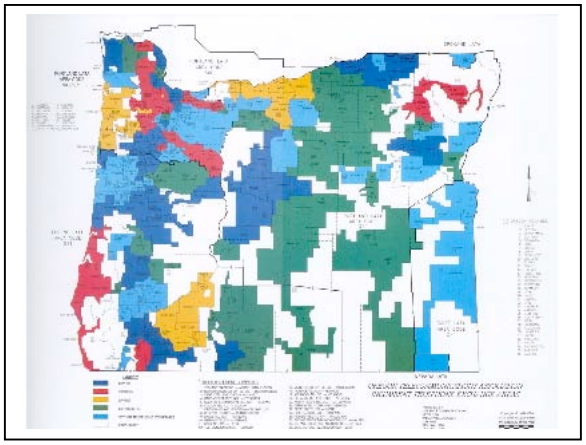
Note: There are different "flavors" or tiers of DSL. For a fee, phone companies can scale up your DSL service to make it a business class service. Even though DSL runs on a "legacy system" (a copper network), it can still provide impressive levels of bandwidth.

DSL, however, has a limited range. Most DSL signals lose their force three miles from where the signal originates. Because of DSL's limited range, phone companies typically only offer DSL to their customers in cities and towns. They find it is too costly to purchase the equipment needed to extend DSL signals to sparsely populated rural customers. That is a reason there is a digital divide in America between rural areas and urban areas—it is the inherent limitations of DSL.

Note: Pioneer Telephone Cooperative, however, an Incumbent Local Exchange Carrier (ILEC) on the Central Coast, offers DSL to 100% of their customers. That is quite remarkable because Pioneer Telephone Cooperative serves very rural areas between Waldport and Philomath. Pioneer Telephone Cooperative invested in an extensive network of ninety Digital Subscriber Line Access Multiplexers (DSLAMs) to extend DSL service to these sparsely populated areas. When asked how they can do that, Pioneer representatives replied, "We are a cooperative that is dedicated to serving our members. We have a very different business model than the for-profit companies that have to answer to shareholders."

Note: An enlarged version of the above Oregon Coast Fiber Companies Area Representation Map is included in the Appendices *(see Appendix C)*.

On the Oregon coast there is a patchwork of telephone companies—big and small—serving as ILECs. These include: Verizon, Qwest, Sprint, CenturyTel, Pioneer Telephone Cooperative, Nehalem Telecommunications, Inc. Map to the right shows the ILEC territories in Western Oregon.



Note: An enlargement of this map with readable legends is included in the Appendices *(see Appendix D).*

HFC (Hybrid Fiber Coax)…The Cable Companies

HFC is a broadband technology and service offered by cable TV companies.

As the name "hybrid" suggests, HFC is a mixture of fiber optic cables and coaxial cables. Fiber optic cables, which transmit data over glass, are deployed to neighborhoods. Then, the cable TV companies use a coaxial cable to bring their service the rest of the way to the customer's home or business.

On the Oregon coast, Charter Communications, Inc. is the major cable TV provider. Several other cable TV firms have a small presence on the coast. Today, along Highway 101, Charter offers broadband the entire length of the Oregon coast.

Charter offers a combined cable TV service and a broadband product called "Charter Pipeline." This trend happened everywhere in the cable TV industry. As demand for broadband increased, cable TV companies upgraded their cable networks to offer TV and broadband Internet. And, one can expect Charter and other cable companies to be offering phone service over the Internet as well (Voice over Internet Protocol).

Remember, cable TV companies compete directly with satellite TV companies. So, the addition of broadband service gives cable TV customers another reason to choose cable TV over satellite TV.

Today, most cable modem broadband service is considered a "residential" grade service. What does that mean? Most residential or personal use of the Internet focuses on **downloading** or receiving information. In contrast, businesses usually need to send out ("**upload**") as much information as they receive, sometimes even more.

Cable TV networks were designed to deliver cable TV, which is a one-way transmission medium. As a result, most cable TV Internet offerings are at 0.5 Mbps (500 Kbps) to download but only around 200 Kbps to upload. This unbalanced system is known as an "asymmetric" system. Most "cable modem" broadband services work fine for residential use but not for business use. Again, businesses usually require symmetrical broadband systems.

Note: Most DSL products are also asymmetric. Again, though, business-class DSL service usually provides enough bandwidth in each direction to satisfy most business needs.

Charter Communications, Inc. representatives report that Charter is undertaking a major upgrade of their infrastructure on the Oregon coast. As such, they may soon be offering business-class symmetrical broadband service (for additional fees) to many residential neighborhoods on the Oregon coast. And, nationally, the cable industry is working hard to deploy the next-generation of cable modem service which will greatly enhance the performance of cable modem broadband service.

The extension of business-class broadband to residential neighborhoods will represent a big challenge to phone companies (ILECs) offering DSL. Competition in general benefits communities and consumers because it keeps prices competitive and forces companies to update their systems.

The phone companies are responding to this challenge by forging alliances with the satellite TV companies. Sprint and Quest now offer bundled packages of DSL and satellite TV subscriptions for around $139.00 a month.

Fiber to the Home (FTTH)

Many see Fiber to the Home (FTTH) or Fiber to the Premises (FTTP) as the wave of the future. But, no one is quite sure when that will happen. Nothing beats fiber optic cable as a digital transmission medium. Fiber optic cables are made of glass and carry digital traffic by light. That is why fiber is so incredibly fast.

The price of fiber optic cable has decreased substantially. And, fiber is secure and immune to interference. Fiber is the preferred method to carry long-haul digital traffic because of the remarkably low signal loss over great distances.

Perhaps most important, fiber optic cables have an unfathomably large capacity to move data.

Fiber optic cables are not likely to become obsolete soon. What is changing rapidly is the technology attached to the fiber. Engineers keep devising new ways to send larger volumes of data over the same strands of fiber. So, if a community or company undertakes a fiber deployment (even a limited deployment), that fiber is likely to retain its value for the foreseeable future.

Even though the cost of fiber has decreased, many still believe it is prohibitively expensive to implement FTTH in most settings. In addition, many also believe providing that huge scale of bandwidth to residential customers is unnecessary.

However, other forward-thinking and risk tolerant companies and some communities such as Jackson, Tennessee, and Provo, Utah are deploying FTTH. Also, in Utah, the Utopia Project is deploying FTTH to 17 different communities at the same time in the same project! In Oregon, Verizon (an ILEC) is deploying FTTH in sections of Tigard, Beaverton and Hillsboro. The City of Monmouth, Oregon is about to do a FTTH deployment and on the Oregon coast, the City of Bandon (which also runs a city electric cooperative) has just formalized an agreement to deploy FTTH in partnership with Comspan (a firm headquartered in Roseburg, Oregon). The City of Bandon will use funds from the State of Oregon's Special Public Works Fund (SPWF) to finance the project.

The Florence Telecommunications Task Force is actively considering a FTTH deployment among its range of options. The jury is still out on the practicality of deploying FTTH for small communities. But, because many communities around the country are beginning to undertake FTTH programs, in the near future there should be much greater clarity about the practicality of FTTH.

Note: You do not need FTTH in your community to be a cutting-edge telecommunications community. But, because the demand for bandwidth is escalating exponentially with no end in sight, companies and communities should at least consider leapfrogging ahead by deploying FTTH in downtown or business centers. The viability of FTTH depends on the size and concentration of a market, terrain, demographics, other logistics and, the income levels of the potential customers.

A rule of thumb is emerging that if a FTTH "overbuild" is carried out, you need approximately a third of the homes and businesses to take the service to make it financially viable.

FTTH aside, cutting-edge telecommunication communities do need good connections to fiber optic lines to route local Internet traffic to the outside world. Communities should seek to be located along a "**fiber optic ring.**" Fiber optic rings are redundant systems that protect against interruption because digital traffic is automatically re-routed when cables get cut or damaged (that is why they are called "self healing rings"). When you are on a self-healing fiber optic ring, customers do not even notice when the fiber optic line is cut or damaged.

Wireless Broadband

There have been startling advances in wireless broadband technologies and the cost is dropping rapidly. Today, you can use your credit card and become a Wireless Internet Service Provider (WISP) for about $25,000. Because entry expenses are so low, a host of new firms have entered the wireless market. The level of sophistication among these ISPs varies greatly. Wireless broadband is proving to be the cost-effective way to serve sparsely populated areas. Wireless broadband is inexpensive to deploy because you do not need to string wires or dig up streets to reach homes and businesses. Always recall though, wireless broadband providers need access to fiber optic land lines (wirelines) to route traffic back to the Internet. As a result, wireless broadband will not eclipse or replace fiber. Instead, for the foreseeable future, the two technologies (fiber and wireless) are likely to be deployed in tandem.

Two Kinds of Wireless: Fixed Wireless & Wi-Fi Hotspots

Fixed Wireless. One type of wireless broadband is a fixed wireless system. A WISP (a wireless Internet service provider) will erect a tower (or attach to someone else's tower or building) and locate a receiving dish at the customer's house or business. To deliver point-to-point wireless broadband, they must establish an unbroken "line-of-sight" between the WISP's facility and the customer's receiver. That line of sight can be miles long as long as the line-of-sight remains clear. Foliage on trees will interrupt the signal.

Wi-Fi Hot Spots. The other type of wireless broadband is called "Wi-Fi" hotspots. Wi-Fi hotspots issue a "cloud" of broadband connectivity over a small area in a coffee shop, library or hotel. "Enabled" laptop computers (with wireless capability) and all manner of PDA devices can access these clouds of broadband.

Traditionally, Wi-Fi deployments have a very limited range. That is why they are called "Wi-Fi hot spots." For $5,000 or less, people who own recreational vehicle (RV) parks, restaurants, cyber cafés, motels, can establish a Wi-Fi hot spot for their customers. Some provide access for a fee, others do not charge for access. There is a new trend to expand the range of Wi-Fi through "mesh networks." Mesh-networks, in effect, create overlapping Wi-Fi signals that blanket large areas with seamless Wi-Fi clouds of broadband. Mesh networks mimic, on a smaller scale, what cell-phone companies do when they deploy cell phone coverage. These clouds of broadband can be scaled up or down to cover an entire community, a downtown, a well-traveled corridor, a school, a business or college campus.

For example, the Oregon International Port of Coos Bay is partnering with ORCA Communications (the Coquille Tribe) to deploy a mesh network on the waterfront in Charleston. And, the *Wall Street Journal* reports communities, such as Chaska, Minnesota (population 22,500), a blue collar suburb of Minneapolis, have deployed a mesh network providing Wi-Fi over their entire community. The City of Chaska charges subscribers $16 a month for access to the service (a low cost) and the entire network only cost the city $800,000. Chaska officials expect to retire the debt for their system in five years. 2,000 of the 7,500 homes in Chaska have taken the service (people are dropping their dialup and cable modem services).

The next generation Wi-Fi wireless technology—WiMAX—is in the first phase of certification testing (802.16-224). There is another much anticipated mobile 802.16e specification that is close to being finalized. The power of WiMAX is said to be remarkable. WiMAX promoters claim WiMAX will issue clouds of broadband many miles wide—as far as 30 miles in flat terrain. WiMAX boosters also claim WiMAX signals will penetrate buildings, trees, and other dense objects.

Once WiMAX is fully developed and deployed, it should replace Wi-Fi. Intel is among the major companies pioneering this amazing new technology. So, we must take WiMAX very seriously. Having said that, many credible people think there is a lot of unwarranted hype surrounding WiMAX.

Here is something important to consider. People thinking about deploying wireless mesh network deployments based on Wi-Fi may run the risk that their network could rapidly become obsolete when WiMAX matures. Some experts believe, however, Wi-Fi hot spots will still be important because the current generation of computer notebooks can connect with Wi-Fi technology. Those deploying these wireless technologies should consider establishing a Wi-Fi WiMAX hybrid network. The longer distance capacity of WiMAX will be used to link Wi-Fi hot spots. Later on, if there is a need to upgrade more of the network to WiMAX, those upgrades could be accomplished on a gradual basis depending on demand. Because the trials of WiMAX technology are now underway, in a year we should know how WiMAX technologies will change telecommunications.

In the near term, because conventional wireless deployments are relatively inexpensive and so useful (even if used to connect public safety agencies), many believe the risk of deploying these wireless networks is worth assuming.

BPL (Broadband over Power Lines)

Broadband over Power Lines (BPL) is currently under development and still in its infancy. As the name suggests, BPL uses power lines to provide broadband. Advantages of BPL include the use of wires already in place. The disadvantages are BPL increases radio-frequency interference for shortwave and amateur bands.

BPL is something to watch in the next few years. In time BPL could constitute another significant form of competition to broadband providers if technological breakthroughs occur. In the meantime, do not wait for BPL to mature as a technology before taking steps to improve broadband in your community.

Satellite Broadband

For many truly remote locations, getting broadband beamed down from a satellite has been the only way to get broadband, though service prices are often higher than DSL, Cable Modem or Fixed Wireless services. Industry watchers do not see satellite broadband as a preferred broadband technology except for truly remote communities.

Celullar (Cell Phone) Technologies

It is remarkable how quickly cell phones have worked their way to the center of American life. As a result, to be a cutting-edge telecommunications community or region, you need good cell phone coverage. Cell phone service became popular because companies offered affordable flat-fee plans (often times, with unlimited calling) and, of course, cell phones are so useful. Today, cell phones are the principal phone or the only phone in many households and businesses. This has had an enormous impact on traditional phone companies.

In the late 1990s, cellular companies began to offer data services (access to the Internet) through their wireless networks (in addition to traditional cell phone service). The speeds of the early cellular wireless data services were modest (40 Kbps). Still, the technology offered wireless access to the Internet which is a big deal. People with PDAs (personal digital assistance) could check e-mails and send messages.

Of course, cellular wireless technologies keep advancing. By 2004, wireless companies began offering speeds of 100 Kbps (upload and download). Today, cell phone companies (mostly in urban areas) provide 60 Kbps (upload) and 100-150 Kbps (download). This enables "camera phones" to send images over the Internet.

Here is some really important news. The next generation of cellular data services (the continuation of "3 G"—a cellular phone technology which provides access to the Internet at data speeds that begin to approach broadband levels of service) is just coming on line at 400 to 800 Kbps to download with a peak of 1.5 mbps. These speeds begin to approach low levels or moderate levels of broadband. The Internet works great at this speed. It is unlikely, though, that this technology can handle images and video (streaming video and real-time video conferencing(because these applications require higher levels of bandwidth. Again, video conferencing takes at least 400 Kbps upload and download. Vendors of this new technology are claiming the new cellular technology will support these video services. Some doubt they can. However, it is important to note that wireless systems tend to get overloaded pretty quickly when many subscribers access the system at the same time. Under those circumstances, video applications will rapidly decline in quality.

Looking to the near future, expect cellular phone companies like Sprint, Verizon, Cingular, Clearwire, and Edge Wireless (to name just a few) to deploy this new generation of cellular service aggressively in urban areas. For instance, the City of Portland just got this service. Big cellular companies have just started advertising campaigns for this upgraded service in major media markets. For rural areas in Oregon, these late-breaking advances in cellular data technologies could deliver fairly good access to the Internet in many rural places that currently do not have access to broadband. And, at these speeds, VoIP (Voice over Internet Protocol) will be possible through cellular networks. Indeed, this is a significant development.

It will be interesting to see what happens when mobile Wi-MAX technologies matures in the next year or two or three. Wi-MAX will enter the marketplace and

compete head-to-head with the cellular companies offering wireless Internet service. Many people anticipate some kind of convergence of these technologies will take place.

Customer Service Still Matters

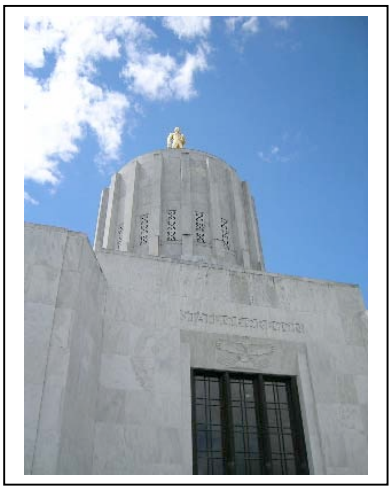
There is a human tendency to try to pick the winners of the great broadband race.

Regardless of the technology, the companies and/or communities—big and small—that can offer good network service and customer service will be in a strong position to compete.

If your community is choosing a company or companies to partner with in a telecommunications deployment, ask if they plan to have a physical presence in the community. What kind of network support do they plan to have? What kind of customer service system will be in your community? Some network and customer service functions can be accomplished from other locations. But, hopefully, a company will have some local staff presence. All systems need to be serviced and customers using the service need to feel like their needs are being met.

The Quarrel over Municipal Broadband Networks

In recent years some companies—largely broadband service providers—have battled local governments over municipal broadband deployments.



These firms object to local governments getting into the broadband deployment business because they believe it constitutes unfair and unnecessary competition. The battle has been fought on several fronts: state legislatures, the courts, and, the ballot box. These companies are asking state legislatures for bans or major curbs on public telecommunication deployments.

In the past, local governments undertaking municipal telecommunication deployments did so because they believed the private sector was not providing adequate telecommunication services to their community. These days, a growing number of community leaders see broadband as an essential service, not a luxury.

Companies cannot raise the capital or make the business case to deploy broadband to all rural communities that want it. For-profit companies must focus on markets where they can make the quickest and best return on their investment. Profitable markets are found, of course, primarily in densely populated urban areas.

There has been a sea change in the way many local governments approach municipal telecommunication deployments. Today, local government officials are inclined to seek partnerships with the private sector rather than build and run their own, exclusive public networks. And, when communities deploy telecommunication networks, they are likely to

establish open networks that independent ISPs and others can ride to provide last-mile broadband service to the community. This collaborative approach stimulates competition in the community.

And, more recently, municipalities are deploying wireless mesh networks to link city agencies (public works, police, fire, ambulance, etc.) to an interoperable, portable communications network.

Note: Many technology companies support municipal broadband deployments. Leading firms like Intel and Dell (equipment manufacturers) understand that broadband will become ubiquitous in Rural America through public-private partnerships. Opposition to municipal telecommunication deployments comes from a select group of companies that deploy broadband as the core of their business.

How can your community avoid this controversy and still take steps to become a cutting-edge telecommunications community? It is easy. Direct your local telecommunications committee to partner with the private sector in everything it does. Private sector involvement in your local telecommunications committee (from the local ILEC down to local ISPs) will strengthen your local telecommunications committee efforts and give the committee added credibility in your community.

An Assessment of the Oregon Coast's Infrastructure

People and businesses on the Oregon coast are fortunate. Today, most population centers along the Highway 101 corridor on the Oregon coast are connected to or near large networks of fiber optic cables. In places, the companies that have deployed these fiber optic cables have formed fiber optic rings. As the name "ring" suggests, these cables form a large circle. So, if a fiber optic cable is cut or damaged, the digital traffic on that fiber optic cable is instantly re-routed. For example, Qwest has a major fiber optic ring serving Clatsop County. Pioneer Telephone Cooperative has a fiber optic ring serving their customers. For other sub-regions of the Oregon coast, even if communities are not directly on a fiber optic ring, they still have access to a high quality long-haul fiber route that can move telecommunications/digital traffic to and from the Oregon coast.

Therefore, for most of the Oregon coast, the basic framework for a world-class telecommunications infrastructure is already in place. This network of fiber optic cables provides a strong platform upon which further telecommunication enhancements can be mounted. The only area of the coast lacking fiber backbone network route redundancy is Curry County and southern Coos County.

The general location of these major fiber routes and fiber optic rings are illustrated on the map located on Page 38. The precise location of these fiber routes has been omitted. After 9-11, there are concerns about publishing information about telecommunications infrastructure. The outline of coastal fiber optic infrastructure in this report does not betray secrets. These fiber routes are quite well known and we have outlined at a level of detail that is good enough for our purposes (education & policy making). The map of fiber infrastructure was developed through a series of interviews and by examining maps issued by a number of telecommunication companies and the State of Oregon.

Below we provide brief narrative explanations of the fiber infrastructure. These descriptions are ordered from north-to-south, county-by-county on the Oregon coast. Please note, however, that upgrades to this telecommunications infrastructure (new fiber deployments between cities and within cities) occur on a regular basis. Therefore, the outline of fiber infrastructure in this report will be outdated soon after the report's release. Here is an example of how quickly telecommunications infrastructure inventories and market studies get out-dated. When companies or communities apply to the U.S. Department of Agriculture's (USDA) Rural Utility Service (RUS) for loans, if their market information is greater than six months old, RUS will not accept that information. That is why local telecommunication committees should keep regular track of telecommunications infrastructure improvements and the service offerings of telecommunication providers in their area over time. This way, current information will be on hand for economic development purposes.

And, we offer the following disclaimer. **OCZMA does not warrant the accuracy or completeness of this schematic inventory of fiber optic infrastructure**. There may be additional fiber optic infrastructure on the Oregon coast. The location of that infrastructure may not be disclosed for proprietary reasons and/or for security reasons.

What About Very Rural Areas Located off Highway 101?

The map of major fiber infrastructure shows a network of fiber optic cables, mostly along the major transportation routes. As you leave the coastal cities, however, DSL service provided by the phone companies (ILECs) drops off dramatically (with the exception of the rural region served by Pioneer Telephone Cooperative). In addition, the deployment of cable modem broadband service from Charter Communications, Inc. and other cable companies drops off dramatically beyond the coastal cities because Charter's cable network is deployed to the more populated neighborhoods along the Highway 101 corridor.

As described in the telecommunications primer, the more rural areas of the Oregon coast—the unincorporated communities and the truly remote residences—are good candidates for the provision of point-to-point wireless services. And, in time, these rural communities will be excellent candidates for WiMAX deployments when WiMAX technology matures. In addition, satellite broadband is improving. So, for the most difficult terrain in the most remote areas, satellite broadband may remain the best option for the foreseeable future.

Here is the key thing to remember. Wireless broadband providers must have network access to backhaul Internet traffic to the worldwide web. We anticipate incumbent telecommunication

providers, and/or, independent ISPs will reach this rural customer base with wireless broadband soon (in the places they have not reached already).

The major incumbent telecommunication providers (firms like Charter and Sprint) often partner with the local ISPs and WISPs to serve these sparsely populated areas. The larger firms provide access to their fiber optic networks for a fee. The large firms are likely to continue these partnerships because the local ISPs are in a much better position to provide good customer service to these rural customers. So, it is a win-win situation for the large companies and the local ISPs or WISPs. The way the next major phase of rural broadband deployments on the Oregon coast and elsewhere in Rural America is likely to happen is through these kinds of partnerships.

In summary, even though the more remote areas on the Oregon coast located away from Highway 101 do not have direct access to fiber optic cables, the presence of nearby fiber optic cable backbones on the Oregon coast will make it possible to get wireless broadband to many of these rural areas.

A County-by-County Telecommunications Assessment

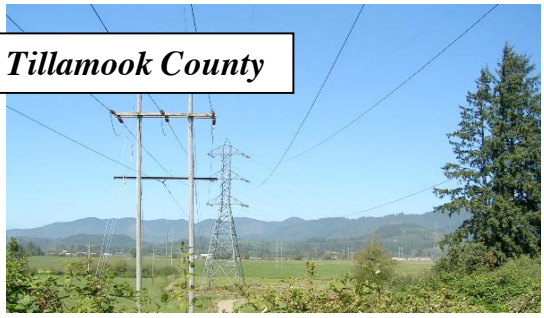
Clatsop County

In 2003, Qwest deployed a major self-healing fiber optic ring serving Clatsop County. This major telecommunications infrastructure was installed primarily because of Oregon state legislation known as SB 622. Under SB 622, the Oregon Legislature authorized Qwest to forgo paying fines to the Oregon Public Utility Commission (for shortcomings in service) if Qwest invested those funds into Qwest's telecommunications infrastructure in rural areas.

Clatsop County formed a telecommunications advocacy group and lobbied Qwest to deploy a fiber optic ring to serve Clatsop County. As the map of ILECs (see Page 24) on the Oregon coast shows, Qwest is the ILEC in Clatsop County. By all accounts, Qwest did an outstanding job of optimizing the SB 622 opportunity around the State of Oregon. As a result, SB 622 sparked the deployment of important fiber optic infrastructure in many rural regions of Oregon—where Qwest is the ILEC (including Clatsop County) well before Qwest would have deployed infrastructure.

As such, because Clatsop County has this self-healing fiber optic cable infrastructure, Clatsop County is poised to be a great place to carry out knowledge-based businesses (at least in the cities connected to the ring). And, Clatsop County's close proximity to the City of Portland and the Silicon Forest makes Clatsop County an ideal setting to implement the Oregon Coast Telecommunications Economic Development Strategy.

Tillamook County



In 2004, Sprint—the major ILEC for most of Tillamook County— deployed a fiber optic cable that runs to Rockaway Beach along Highway 101 south to Lincoln City, and, then east along Highway 22 and Highway 18 into the Willamette Valley. Sprint's fiber optic deployment

constitutes a major investment for Tillamook County (and Northern Lincoln County). This fiber optic deployment enables Sprint to offer DSL in many coastal cities in Tillamook County. And, of course, Sprint's fiber plant enables independent ISPs or WISPs to partner with Sprint to carry their wireless digital traffic over Sprint's fiber optic lines to gain access to the worldwide web.

Nehalem Telecommunications, Inc. is the ILEC for an enclave of communities in northern Tillamook County. Nehalem Telecommunications, Inc. provides DSL in the cities of Nehalem, Wheeler, and Manzanita. Reportedly, Nehalem Telecommunications, Inc. serves 1,400 phone customers in those three cities. Out of these 1,400 customers, 400 have taken DSL service. The mayors from those three north Tillamook County communities have expressed a strong interest in augmenting the DSL service with additional wireless broadband coverage.

And, in 2005, Tillamook Lightwave—a public non-profit entity managed by the Port of Tillamook Bay (in partnership with Tillamook County and Tillamook County Public Utility District)—gained access to a major regional fiber optic network operated by LS Networks. LS Networks (formerly NoaNet) leases fiber optic capacity (surplus dark fiber) from the Bonneville Power Administration (BPA).

What does this mean? The LS Networks fiber gives Tillamook County a second, major fiber optic route leading to the Willamette Valley (in addition to Sprint's recent fiber deployment). It took several years, but, in 2005 Tillamook Lightwave used federal grants to deploy a fiber network linking Tillamook County's health clinics, some schools in the City of Tillamook, Tillamook County's 9-1-1 Center in Tillamook, the hospital in Tillamook, and the Port of Tillamook Bay's Industrial Park.

And, in 2005, Tillamook Lightwave issued an RFP for the management of this fiber optic network. In late August 2005, the Board of Tillamook Lightwave awarded the management contract to the Oregon coast-based Coastcom (headquartered in Newport). Coastcom will be responsible for fiber maintenance and restoration of Tillamook Lightwave's network and the building out of fiber laterals and the management of network connections.

Tillamook Lightwave's fiber optic network in the City of Tillamook provides competition to incumbent providers of telecommunications service (especially for business-class customers). Indeed, Tillamook Lightwave's fiber network will also provide competitive pricing for wholesale Internet access that local ISPs can use, and competitive pricing on circuits that local businesses need. Tillamook Lightwave's system also provides opportunities to collaborate with other incumbent telecommunication companies (large and small). For instance, Tillamook Lightwave partnered with Charter Communications, Inc. when Charter deployed fiber in the City of Tillamook. Because of these recent developments, expect to see major new efforts by a number of WISPs to deploy point-to-point wireless and other kinds of wireless broadband solutions to the sparsely populated areas of Tillamook County.

Like Clatsop County, Tillamook County's close proximity to Portland and Washington County and other knowledge-based businesses (the heart of the Silicon Forest) makes Tillamook County an ideal place to attract branch offices from the Silicon Forest.

Lincoln County

Lincoln County has a complicated telecommunications infrastructure scenario. Four ILECs operate in Lincoln County. Sprint's territory encompasses Northern Lincoln County (see the description of Tillamook County above) including Lincoln City. Sprint has a self-healing fiber optic ring connecting Lincoln City to Tillamook and back east to the Willamette Valley on Highway 22 and from Lincoln City on Highway 18.

CenturyTel is the ILEC in Depoe Bay and Gleneden Beach. Qwest is the ILEC south of Depoe Bay and in Newport. South of the Yaquina Bay Bridge in Newport, Pioneer Telephone Cooperative is the ILEC that serves southern Lincoln County (including the unincorporated community of Seal Rock and the City of Waldport).

Another entity with important fiber assets in Lincoln County is Central Lincoln PUD. Central Lincoln PUD is a publicly owned, not for profit electric utility serving a 120-mile long section of the Oregon coast. Central Lincoln PUD's area includes portions of Lincoln, Lane, Douglas and Coos counties and the cities of Depoe Bay, Siletz, Toledo, Newport, Waldport, Yachats, Florence, Dunes City and Reedsport. Central Lincoln PUD employs a fiber optic/microwave system to communicate with their various offices, warehouses, substations and other sites.

Central Lincoln PUD constructed part of this system on their own, and parts of the system were developed as joint ventures with other entities. They report their system has grown steadily as they developed more communication needs to support their electric distribution system. Central Lincoln PUD has three main areas of operation: Newport, Florence, and Reedsport. Their communications system currently consists of fiber optic cable systems in each of those main areas, and those areas are linked together via their digital microwave equipment.

Central Lincoln PUD plans to integrate their system more fully with Bonneville Power Administration's (BPA) system (like Tillamook PUD, Central Lincoln PUD purchases their power from BPA). BPA currently has a fiber optic system that runs to the Oregon coast from the Willamette Valley within a few miles of Central Lincoln PUD's Florence office. They also built a fiber optic connection from their current northern division termination point in Yachats to their Florence office. This fiber plant provides a redundant path for their operational needs beyond their digital microwave deployments.

Central Lincoln PUD also plans to build fiber optic connections (spurs) to and from their substations to their fiber routes or BPA fiber routes. The nine planned spurs will bring additional substations into their Supervisory Control and Data Acquisition (SCADA) system. As their communications system is built and upgraded, at times Central Lincoln PUD will have surplus fiber capacity that they are allowed under law to lease to outside entities. The Board of Central Lincoln PUD must find that there is a surplus to lease and then they would also determine the lease rates to access that "dark fiber." Central Lincoln PUD, cannot, under law, provide telecommunications services to non-governmental entities. Central Lincoln PUD can only lease "dark fiber." Any interconnection to their surplus dark fiber may require a line extension, electronic equipment, and a co-location agreement. These costs must be assumed by the outside entity. In any event, future fiber deployments by Central Lincoln PUD could become important new telecommunication deployments in Lincoln, western Lane and western Douglas counties.

In addition to their fiber assets, Central Lincoln PUD—like other power companies—operates an important network of power poles and other electricity transmission infrastructure. So, for instance, if the City of Florence or another coastal city within Central Lincoln PUD's territory, decides to partner with an entity to undertake a Fiber to the Home (FTTH) build, the ready-access to the Central Lincoln PUDs electricity infrastructure (through pole attachment agreements) should make a FTTH deployment more feasible. The same is true, of course, in

Tillamook County with Tillamook PUD and further south with Coos-Curry Electric Cooperative (CCEC).

Lincoln County was an early leader in making telecommunications available for local services when they created a public-private partnership called CoastNet. The local CoastNet contractor is CoastCom, a company affiliated with Action Networks, Inc. based in Newport. They provide fiber optic and wireless telecommunications services to governmental, educational and business customers throughout Lincoln County, including Lincoln City. Most of the fiber optic capacity of CoastNet comes from the Central Lincoln PUD under an inter-governmental agreement between the PUD and the County. The fiber optic link from Depoe Bay to Lincoln City is leased from Charter Communications, Inc. Public and non-profit users include the Lincoln County School District, Oregon Coast Community College and Samaritan Health Services. CoastCom offers service on fiber optic links to Corvallis, Salem, Eugene and Portland through their interconnection with LS Networks fiber optic cables. CoastNet also offers telecommunications services on CoastNet fiber optic links from Newport to Florence where they interconnect with Preferred Connections, Inc. (PCINW). PCINW is contractor for the Fiber South Consortium network and has recently begun to offer services from Reedsport to Eugene and is expected to activate their fiber links between Florence and Eugene later this year.

South of Newport, again, Pioneer Telephone Cooperative has deployed a fiber optic loop running from Philomath (their headquarters) to Newport, south to Waldport, and then east along Highway 34 back to Waldport. Pioneer's fiber optic ring, and its status as a customer-owned cooperative, enabled Pioneer to serve their rural customer base with DSL service over 100% of their territory. In addition, Pioneer has a second fiber optic cable ring running south to Yachats, east up the Yachats River road to rural communities such as Deadwood. In addition, Pioneer Telephone Cooperative deployed a fiber optic line running south to Sea Lion Caves to provide service to homes along Highway 101 South of Yachats to the Sea Lion Caves.

Lincoln County is also served by Charter Communications, Inc. along Highway 101 (cable TV and cable modem Internet service), by Alsea Cable in Waldport and by Millennium Cable TV in the City of Depoe Bay.

Western Lane County

The City of Florence has the distinction of being home to three long haul fiber optic cable providers. Qwest is the ILEC in Florence and provides DSL service to about 90% of the City of Florence. Qwest has fiber running east along Highway 126 to Eugene. LS Networks as a POP (a point of presence) employs their leased access to BPA's system. Qwest has a fiber optic ring, which connects Eugene-Florence-Newport-Corvallis and back to Eugene. In addition, Charter Communications, Inc. has fiber in Florence which provides cable TV and cable modem service in most of the residential areas in Florence. OregonFastNet, a WISP, is also providing point-to-point wireless service to many residences and businesses in Florence. Even though the City of Florence is seeking to become a cutting-edge telecommunications community, compared to many rural communities, Florence is a fairly well-served community. Qwest is the ILEC down to the border of Douglas County.

Western Douglas County

The communities of Reedsport and Gardiner have Verizon as their ILEC. Verizon has fiber running down Highway 101. Again, Central Lincoln PUD has fiber optic cable serving their power system in Reedsport. In addition, as stated above, there is a new opportunity in the works to get access to fiber through the Fiber South Consortium because that network has finally received the financing it needs to activate that system.

Coos County

The ILEC in Coos County is Verizon. Again, Verizon has a fiber optic ring that runs south into Coos County along Highway 101 through Coos Bay and to the City of Coquille (which is located along Highway 42). Verizon's fiber optic cable continues east along Highway 42 to Roseburg and then north along the 1-5 corridor to Eugene where it closes the loop as shown on the map.

The Coquille Tribe, through a company known as ORCA, is operated by the Coquille Economic Development Corporation (CEDCO), is a member of LS Networks. ORCA has been deploying fiber optic rings in the Coos Bay/North Bend area now for the last several years. ORCA currently uses DSL, frame relay, T-1, DS-3, wireless and direct fiber connectivity on the southern Oregon coast to provide a comprehensive network for end-users in the region. The fiber backbone ORCA employs is built as two rings in Coos Bay and North Bend with multiple laterals throughout the cities. Many of their large users of bandwidth have opted for direct fiber connectivity based on their needs. ORCA reports their backbone was planned to pass as many of the large data users as possible during initial construction. ORCA added laterals as they needed to reach users willing to pay the additional installation charges.

ORCA reports that the use of multiple last miles solutions to the end-users from Reedsport south to Brookings Harbor and east to Powers has substantially increased ORCA's service area. This expanded reach has enabled ORCA clients to benefit from ORCA's route redundant fiber ring to upstream providers in Eugene and Portland. The availability of the local loop only minimizes local risks of network outages. By having redundancy to upstream providers, ORCA's clients are protected from outages caused by storms, power outages and other unforeseen events. Looking north to Florence—and indeed, in reviewing regional infrastructure you have to look across county lines—the City of Florence has route redundancy through Qwest (brought in from Eugene) and also from LS Networks. These networks are connected south to Coos Bay.

ORCA reports that they contract out all infrastructure builds to utility contractors in Oregon and conduct all planning, engineering, and program management in-house. ORCA does have interconnect and re-sale agreements with Qwest and therefore can utilize Qwest services to broaden the service in the Florence area. And, quite significantly, ORCA has deployed the first and only pure ethernet network on the Oregon coast (in 2002). Because the operations and support center is located in Coos Bay with headquarters in North Bend, and because of ORCA's access to fiber networks through Qwest and LS Networks, ORCA is poised to expand their presence on the southern Oregon coast. Again, in the all-important arena of customer service, having this type of expertise and staff available locally is one of ORCA's most important assets.

South of Coos Bay, Verizon continues as the ILEC down to the California border. The City of Bandon is a special case on the Oregon coast. The City of Bandon operates its own city electricity network. And, the City of Bandon has just formalized an agreement with Comspan in Roseburg to undertake the first Fiber-to-the-Home build on the Oregon coast in Bandon. In the months ahead, all eyes will be on Bandon to see how that project goes. As a result, once the FTTH build has been accomplished, the City of Bandon will be the Oregon coast's leading telecommunications community. If things go well in Bandon—which means, if the customer base taking the service exceeds the levels needed to pay the public financing to underwrite the project—we anticipate other coastal communities (for example, Florence, would begin strongly considering deploying FFTH).

Curry County

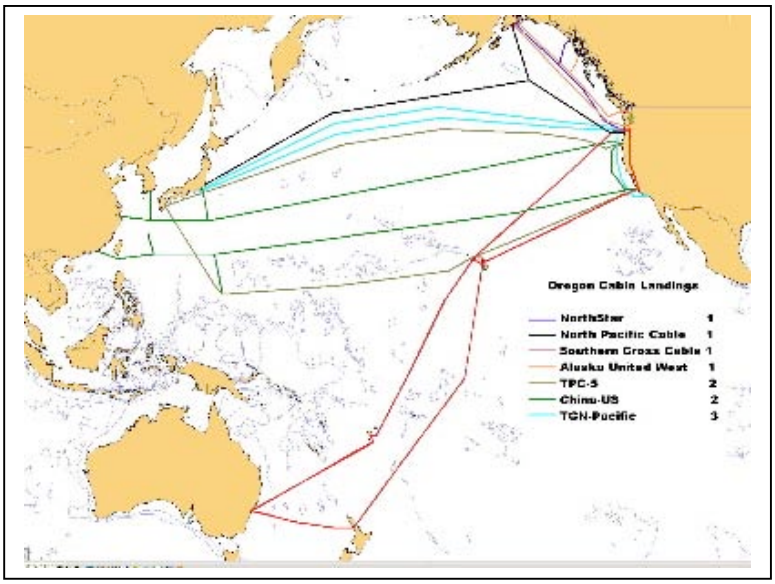
Verizon is the ILEC serving all of Curry County. Verizon's fiber ends in Brookings. In addition, Charter Communications, Inc. has fiber running south which ends in Brookings. As a result, Curry county has the major disadvantage of being the only county on the Oregon coast without access to self-healing fiber optic routes. Various individuals interviewed during this process all agree the southern Oregon coast (South of Coos Bay) is the only major underserved region on the Oregon coast.

In discussions with Charter Communications, Inc. officials, they signaled they would be interested in improving their fiber optic cable plant in that region. In the past, Charter bought out existing cable TV systems so it is a patchwork system in need of upgrading. Charter representatives explained that they literally need to field test all the fiber they purchased on the southern Oregon coast before they can develop their plan to upgrade that fiber plant. Charter's fiber plant crosses the California border and terminates in Crescent City.

And, Verizon officials have said to staff at the Oregon Public Utility Commission (OPUC) and others that Verizon intends to upgrade their fiber optic system leading down into Curry County in the near future. In Curry County, each year, people in communities like Brookings, Gold Beach and Port Orford have been experiencing major outages in phone service, Internet, and critical financial services like ATM service on an average of once a year because of the tenuous nature of Verizon's telecommunications infrastructure south of Coos Bay.

Taking a look at the telecommunications infrastructure on the entire Oregon coast, southern Coos County and Curry County is the only sub-region of the Oregon coast that lack the opportunity to achieve route redundancy. Other telecommunication experts also maintain that Verizon's existing fiber infrastructure is also very close to being fully utilized in this area. So, even though Verizon's customers may not be experiencing declines in service quality, any additional broadband demands (which are inevitable) will begin to impact service because there is a limited amount of "headroom" in Verizon's service. And, companies wishing to have high quality Internet—dedicated ethernet service—for instance, do not have those services available through Verizon.

Submarine Fiber Optic Cables on the Oregon Coast



A number of major trans-oceanic fiber optic cables make landfall on the Oregon coast at Bandon in Coos County, and, at Nedonna Beach and Pacific City in Tillamook County. In addition, there is a cable landing in Astoria. These undersea cables, which originate in places like Alaska and China, are global information super-highways carrying international digital traffic. However, these fiber optic superhighways connect up with other major telecommunication fiber optic cables along the I-5 corridor. They do not provide "off-ramps" connecting up to coastal communities.

Note: An enlargement of the Oregon Cable Landings map found on Page 40 with readable legends is included in the Appendices *(see Appendix E).*

The lack of local access to these trans-oceanic fiber optic cables is interesting to note, but it makes little difference. What is far more important is the presence of fiber optic lines and rings

on land that connect the Oregon coast. That network—especially when it is a ring—provides the connectivity coastal communities need to take full advantage of the New Economy.