THE OFCC – A SUCCESSFUL MODEL FOR SHARING THE SEABED

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Abstract: The Oregon Fishermen's Cable Committee (OFCC) is a construct of self-regulation and cooperation between trawl fishermen and cable system owners. The domain of the OFCC is the trawl grounds in the waters of coastal Oregon bounded by the 10 m and 1500 m isobaths, which coincides with the buried segments of member cables from the shore ends to the end of burial at the continental slope seaward of the shelf break. The goal of the OFCC is to maximize the quality of cable installations to preserve fishing grounds and reduce risk, both to fishermen and to member cables. These goals are met by strong cooperation between fishermen and cable owners from planning to permitting, through installation and ongoing operation and maintenance. In 20 years, with 10 major systems, comprising 13 segments and 1200 km of cables installed within Oregon trawl grounds, 99.91% burial has been achieved, only 30 km^2 of seafloor lost to trawl fishing and there have been no external aggression faults to OFCC cables. This remarkable success serves the global marketplace, as Oregon has become the leading landing point for US west coast cables.

1. INTRODUCTION

Twenty years ago representatives of Oregon-based trawl fishermen and the owners of the NorthStar cable system undertook a radical experiment: collaboration instead of confrontation. These pioneers sought, through self-regulation, an alternative to the traditional construct which pitted the two industries against each other for the use of the seabed. They wanted to replace the hazard of entanglement, cable fault risk, threat of legal action and potential for economic penalties with a model that focused on cooperation to ensure reasonable and safe access for both industries. The outcome of that radical experiment was the OFCC – the Oregon Fishermen's Cable Committee and the results have been remarkable. The OFCC now has nine cable members with an equal number of fisherman directors representing the main ports with trawl fleets in Oregon. Fishermen and cable owners collaborate in all phases of system development including permitting, route planning, surveying, installation, inspection, operations and maintenance. Cable and fishing operations are conducted on the basis of prescribed obligations, to each party's mutual benefit. The OFCC has facilitated seven international, four domestic and two scientific cable landings, making Oregon the leading US west coast submarine cable system gateway. Cable owners have been rewarded with a perfect record of cable security – there have been no external aggression faults on OFCC cables. Likewise, the Oregon trawl fleet has been able to fish their grounds with few constraints and little uncertainty. The OFCC has evolved along with the cable industry, from early owner members as traditional service providers, to academic institutions, and now to content providers and technology companies. This nimbleness bodes well for the future, even as the next generation of fishermen and cable owners rely on the benefits of an enduring OFCC model.

This paper will provide a retrospective of the OFCC's first two decades. It will tell the story of the OFCC's origins, detail the legal

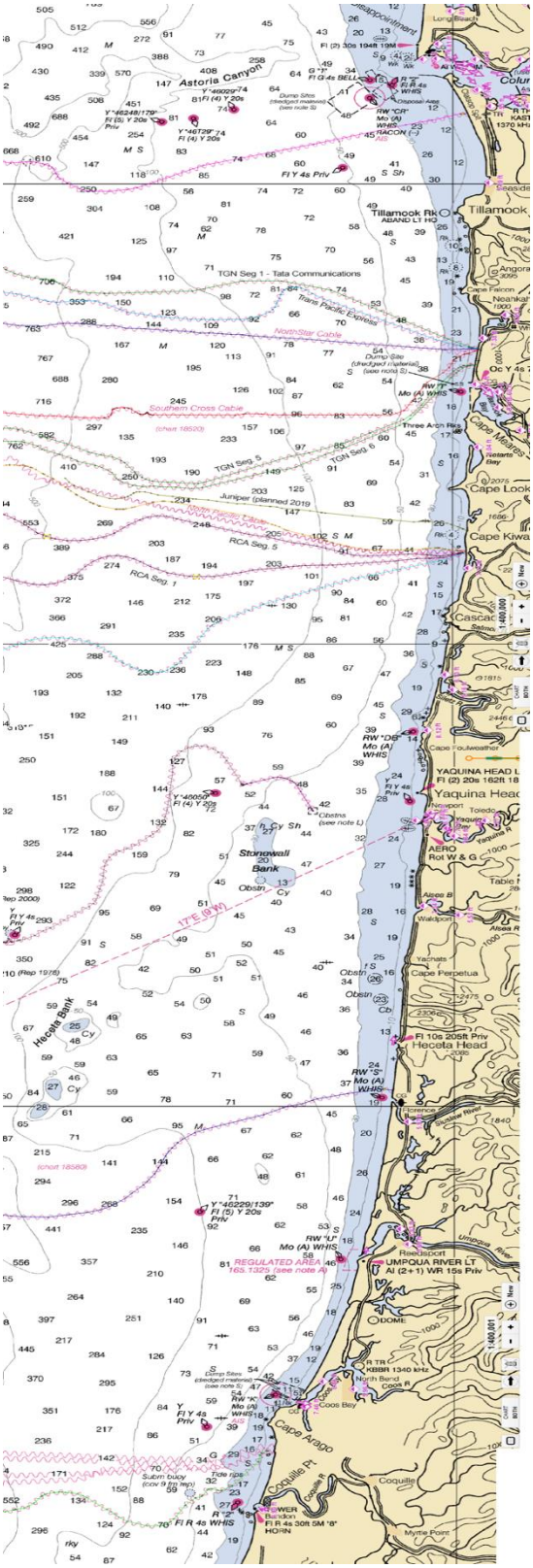

Figure 1. OFCC cables and trawl grounds.

construct, describe the operating model, provide key performance metrics and give anecdotes that demonstrate the model in action. The paper will close with a look to the future for the OFCC as the undersea cable and fishing industries inevitably evolve and adapt.

2. HISTORY

The OFCC was formed in July of 1998 following discussions between a few Oregon trawl fishermen and representatives of World Communications, Inc. (WCI). WCI was planning a new cable from Oregon to Alaska called NorthStar. The trawl fishermen were motivated by a desire to avoid the loss of fishing grounds by the new submarine cable. WCI had a desire to minimize disruption to the fishing fleet, obtain permits in a timely fashion and mitigate external aggression risk to the cable. The Oregon Division of State Lands (now Department of State Lands, "DSL"), lead permitting agency for Oregon, wisely put the fishermen and cable project developers together and urged them to "work it out." A concise agreement was negotiated and signed, the goal of which was to reduce conflicts and promote communication. When presented to DSL, the quality and fairness of the agreement was self-evident because the fishermen endorsed WCI's project. DSL issued the permits shortly thereafter. OFCC operations were thus begun with fishermen/cable owner collaboration on the NorthStar installation, publicizing the agreement, and training fishermen in procedures to safely fish around cables, a requirement of fisherman membership. In 2000, MCI/WorldCom, the landing party for the Southern Cross Cable Network, became interested in the OFCC model. They had a landing planned for Monterey Bay, California, but permitting issues were delaying the project.

An agreement very similar to the one with WCI was negotiated with the OFCC and in less than two months Southern Cross was permitted, enabling the relocation of the Monterey Bay landing to Nedonna Beach, Oregon. The OFCC has since grown to 10 member cables with 13 Oregon segments and landings. See Figure 1.

3. ORGANIZATION

The OFCC, a non-profit mutual benefit corporation registered in the State of Oregon, provides the mechanism for cooperation between the cable owners and the Oregon trawl fleet by facilitating the shared use of the seafloor in the waters of coastal Oregon from shore out to the seaward extent of trawl fishing, which is approximately the 1500 m isobath. The model is codified in two standard agreements:

- Agreements between the OFCC and each cable owner which stipulate the obligations of the cable owners;
- Individual fisherman's agreement with the OFCC, including a release of liability

Oversight of the OFCC is provided by a board of directors comprised of fishermen and cable owner representatives and a non-voting submarine cable subject matter expert. The duties of the board are outlined in Table 1A. In addition to the usual fiduciary, administrative, legal and strategic responsibilities, the board ensures there is good communication with the trawl fleet about member cable systems, education about procedures and training of cable owners for hotline events. Day-to-day activities are managed by a paid executive director who is

TABLE 1. OBLIGATIONS OF THE PARTIES

A. OFCC	B. OFCC Signatory Cable Owners	C. Individual Fisherman's Agreement
Serve as the organizational construct for the coordination and communication of the OFCC agreement between the cable owners, fishermen representatives and signatory fishermen Board consists of representatives of each cable owner, fishermen representatives equal to the number of cable owners, and a non-voting submarine cable subject matter expert; fishermen representatives have 1 vote in addition to the number of owner representatives Approve new members, the annual operating budget and any changes to the OFCC agreement and operating protocols Manage the OFCC financial, administrative, communications and training tasks Manage investigations related to sacrificed gear claims Ensure the functionality through training, simulations and drills of hotlines and emergency response Act on behalf of OFCC members for permit applications and other requests of local, state or federal agencies	Release any claims against OFCC signatory vessel owners and operators who comply with the protocols established by the OFCC Fund all direct OFCC expenses related to route survey, installation, post lay inspection activities and burial verification activities Fund share of OFCC annual operating costs; share calculation relates to the number of landings Fund share (by cable owner) of $200k sacrificed gear fund Fund share (by cable owner) of $64k operating reserve fund Install systems in accordance with OFCC protocols for routing and burial Conduct ROV burial verification of the installed system at the time of PLIB or within the first five years Maintain 24 hour hotline Reimburse sacrificed gear fund in the event of a sacrificed gear claim	Follow OFCC procedures while operating near cables Maintain awareness of the location of OFCC cables and information relative to their physical security, including know cable exposures In the event of a potential snag, call the cable hotline to describe the event and obtain direction regarding sacrificing gear In the event of sacrificed gear, fully cooperate with the investigation and provide all requested documentation to validate a claim

also a fisherman representative. The executive director organizes board meetings, manages the finances, hosts port meetings, promulgates route position lists (RPLs), coordinates fisherman support of survey, installation, post lay inspection and burial (PLIB) and survey verification activities and otherwise implements operationally the direction of the board. The board also provides information to local, State and Federal authorities in support of permit applications for new OFFC cable projects.

OFCC general operating activities are supported financially by the cable owner members. Each owner's obligation is determined by formula for shares related to the number of cable landings. The 2018 OFCC operating budget was $254,028.27 or $23,093.48 per share.

Costs for project-specific activities, such as support for a new cable system installation, are borne by the new cable owner. These can include fishermen observers on route survey, installation and inspection vessels, guard boats and attendance at route planning meetings and reviews. Start-up costs can range from $100,000 to $240,000, depending upon the complexity of the requirements. The fishermen play an integral role in the planning and installation work; their knowledge of the seafloor and operating environment has helped the cable companies achieve exceptional installations, particularly with respect to burial quality.

The OFCC maintains a sacrificed gear fund which is currently valued at $200,000. Each new member pays $25,000 into the fund. The fund is available to immediately replace the gear of a member trawler that reports a trawl hang near a cable and is directed to sacrifice his gear by the cable owner. The OFCC subsequently conducts an investigation into the event. If it is determined that the fisherman followed the operational protocols, he will also receive an additional payment for liquidated damages in the amount of 50% of the gear claim. If not, the payment is declared a bridge loan and will be repaid. The sacrificed gear fund is recharged by the owner of the cable involved in a particular claim.

The cable owner's obligations as signatories to the OFCC agreement are listed in Table 1B. Underpinning the OFCC model is the release from liability of trawl fishermen that are signatories of the individual fisherman's agreement and who comply with the procedures when operating near cables. OFCC cable owners also must comply with specific technical requirements, including optimizing cable routes, using state-of-the-art technology to achieve 1 m burial from shore out to an agreed end of burial point, guard boats to assist during lays and to protect cable exposures and post lay burial inspection and burial.

The fisherman's obligations are listed in Table 1C. Most importantly, the fishermen agree to follow the OFCC procedures when operating near fiber optic cables (Reference 1). The key elements of these procedures include:

- Have an electronic navigation system, including plotter, with the most current nautical data and cable routes
- Record any tows made near cables
- Closely monitor ground speed when operating near cables
- Do not tow in contact with the seafloor within designated safety zones surrounding known cable exposures
- Actions to take if the vessel is snagged near a cable

4. KEY ACTIVITIES

The OFCC provides significant value-added support for the development of new cable systems within the Oregon trawl grounds. The principal activities are described below.

Route Planning: The development of new cable projects has evolved to a very engaged, cooperative process among fishermen and owners. Fishermen familiar with the grounds of the proposed route load the route position list (RPL) onto their plotters and assess the seabed for rocks, reefs and other hindrances to burial based on their direct experience. Adjustments to the route to avoid known hazards and excessive slope angles (>10°) are proposed to the owner's cable engineering team. In some cases the cable owner commissions an OFCC member fishing vessel equipped with a high quality echo sounder and mapping software to conduct a reconnaissance run along the route to help inform the RPL for the planned route survey. This iterative process has shown, time and time again, the value of fishermen input in achieving the optimal route.

Liaison: The OFCC annually conducts meetings at the main fishing ports along the Oregon coast. An update of new cable installation projects is presented and training is provided on the procedures for trawling near OFCC cables (Reference 1). These protocols are reinforced each year to ensure fishermen understand the procedures to follow while operating near cables and what to do if the vessel "hangs up" near a cable. The meetings provide an opportunity to distribute thumb drives with the latest RPLs of OFCC cables in the formats of the most common fishing/navigation plotting programs. Cable awareness charts, laminated procedures and other tools are also provided, as well as the contact information for each cable network operating center (NOC) and the OFCC on-call representative.

The OFCC regularly works with member cable NOCs to provide training for handling emergency hotline calls from a fishing vessel that may be hung up near a fiber-optic cable. This training includes realistic simulations in which a fisherman provides a set of coordinates for the NOC technicians to plot and assess risk.

The OFCC maintains a database of Oregon fishing vessels, vessel owners and captains. This list is very dynamic as participants move in, out and across the Oregon trawl fishery.
In the case of a sacrificed gear event, the OFCC conducts a comprehensive investigation to ensure that the claim is valid. The integrity of this program is known throughout the fleet. To be eligible for the OFCC replacement gear and associated benefits, the vessel captain must cooperate fully in the investigation and provide all requested information. The OFCC also makes sure that the vessel is provided new gear, equivalent to the fishing gear that was sacrificed, in an expedited manner.

Support of Permitting: The OFCC attends meetings and provides letters of support for new OFCC cables during permitting. This includes providing information on route design and cable installation techniques, attending local hearings and providing testimony in support of the applicant to the Oregon State Land Board. The OFCC has had a good relationship with the State of Oregon, and has successfully obtained letters from the last three governors welcoming new cables to Oregon.

Construction Support: OFCC fishermen provide expert support of system construction activities. For example, fishermen board

members serve as the OFCC shipboard representatives on all route survey, pre-lay grapnel runs (PLGR), cable lay and burial, PLIB and periodic inspection work. The representatives share their expertise and knowledge of the seafloor as well as their understanding of fishing practices. Their insights have routinely contributed to material improvements in the quality of each phase of marine installation. The representatives also ensure the work is performed in accordance with the OFCC agreement. The OFCC coordinates the provision of member fishing vessels for guard boat duty and other installation support. The new cable system owner pays for these OFCC services in accordance with agreed rates.

At a project's completion, the OFCC provides the as-built RPL to the fishing fleet, including identification of any special cable protection zones such as shown in Figure 2. The figure depicts a red .40 nm radius safety zone at a Known Cable Exposure (KCE) in waters >300 fms and a .25 nm radius safety zone around a KCE in <300 fms. The OFCC restricts trawling in these areas. A .25 nm radius precautionary area shown in yellow indicates there is no cable exposure but that fishermen should exercise extra care.

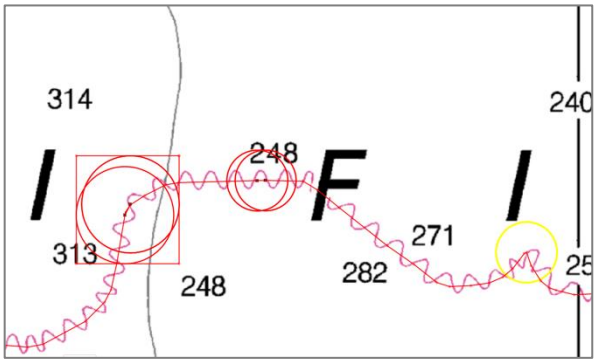

Figure 2. Three types of OFCC cable protection zones.

Special Projects: Occasionally the OFCC performs special projects that benefit the fishing industry or submarine cable industry. Some examples include:

- Recovery of US Navy anchors that were abandoned in the fishing grounds enabling the reopening of approximately 4 nm² that had been closed to trawl fishing.
- Recovery of several nets that had been sacrificed and later determined not to be a threat to submarine cables. This project was funded through the NOAA derelict gear program with a matching contribution from TyCom (now SubCom). The salvaged gear was sold back to the fishermen after recovery and the funds were credited back to the cable companies that had initially paid the gear claim.
- Hosts outreach events for government leaders, key state agency staff and other invited stakeholders.

5. RESULTS

Table 2 lists the OFCC cables and provides the relevant system installation statistics. There are 10 systems with a total of 13 Oregon segments and landings. NorthStar, the first OFCC cable, had an RFPA in 1999; the RFPA of Hawaiki, the newest OFCC member system, was 2018. The cross shelf segment lengths within the OFCC trawl grounds range from 42.61 km to 103.58 km and average 81.9 km. The end of burial depths range from 1684 m to 1280 m and average 1454 m.

Of critical importance to both the system owners and the signatory fishermen are the burial results achieved within the OFCC process. All OFCC cables were installed with a target of at least 1 m burial from the shore

end to the agreed end of burial. Of the total 1195.52 km laid in the trawl grounds, 1.106 km has been identified as exposed cable. This represents an overall OFCC burial success rate of 99.91%, with a range of 99.61% to 100% among individual segments. The 1106 m of unburied cable resulted in 20 known cable exposures (KCE) and 30.04 km^2 lost to trawl fishing. All KCEs are plotted on the thumb drives with as-laid charts provided to the fishermen.

There were 23 hotline calls from fishermen regarding hangs during the period 2001 to 2011. Eight of these calls resulted in system owners directing the fisherman to jettison their gear in accordance with the fisherman's agreement and OFCC protocols. The eight sacrificed gear claims ranged in cost from $37,250 to $76,530, for an average of $55,728. These claims include the cost of the sacrificed gear and liquidated damages.

Table 3 summarizes the hotline calls and sacrificed gear claims. There have been no hotline calls or gear claims since 2011.Since inception in 1999, no OFCC cables have had an external aggression fault.

6. OFCC IN ACTION

Several stories demonstrate the effectiveness of the OFCC in action.

Sacrificed Gear Claim: The F/V *Ocean Beaut* hung up near an OFCC cable in December 2006. The skipper had attended OFCC training luncheons and installed the OFCC cable route positions on his navigation plotter. He followed the OFCC protocols for fishing around cables and had an OFCC binder with information for trawlers on board, including the "wheelhouse sticker" produced by the OFCC with the hotline phone numbers for each cable. He called the hotline, provided the relevant information and when the position of his vessel relative to the cable

TABLE 2. OFCC CABLE SYSTEM INSTALLATION DATA

System	Landing Party	RFPA	Oregon Landings	Cable in Trawl Grounds (km)	Unburied Cable (km)	% Burial	End of Burial (Depth; m)	Known Cable Exposures	Area Lost to Trawl Fishing (km^2)
NorthStar	Alaska Communications	1999	1	76.31	0.00	100.0	1503	0	0
Southern Cross	Southern Cross Cable Network	2000	1	84.89	0.308	99.637	1448	2	3.94
Tata TGN-Pacific	Tata Communications	2002	3	259.90	0.386	99.809	1446 1500 1507	4	6.38
Alaska United West	GCI	2004	1	82.11	0.061	99.926	1505	2	3.60
Trans-Pacific Express	Verizon	2008	1	82.02	0.062	99.925	1350	1	2.30
AKORN	Alaska Communications	2009	1	78.33	0.079	99.903	1313	1	2.33
Regional Cabled Array	US National Science Foundation	2015	2	303.37	0.024	99.992	1428 1346	5	6.34
FASTER	Google	2016	1	42.61	0.167	99.608	1684	4	3.46
New Cross Pacific	Microsoft	2018	1	82.56	0.00	100.0	1500	0	
Hawaiki	Hawaiki Cable Company	2018	1	103.58	0.020	99.981	1280	1	1.68
	Totals		13	1195.52	1.106	99.908		20	30.04

indicated he was possibly hung up on the cable, he obeyed the request of the cable owner to cut away his gear. The OFCC initiated an investigation of the incident as soon as the vessel returned to port. At the same time, replacement gear was immediately purchased for the vessel from the sacrificed gear fund so the vessel could return to fishing. When the investigation was complete, the OFCC Board concluded that the claim was legitimate and awarded the liquidated damages payment to the vessel owner.

Hot Line Calls: A more common scenario is when fishermen, following the procedures, call the cable hotline to report that they are hung up near a cable. After consultation via the hotline, most have been able to safely lift their gear without risking the submarine cable. For example, in 2011 a trawl fisherman hung up near an OFCC cable and called the cable hotline number for that cable. An OFCC representative was patched into the call. The fisherman provided his position, which plotted .28 nm north of the cable. The tow had been northward, so the trawl gear was to the south. The OFCC representative queried the skipper on the depth of water, amount of trawl warps out, and the lengths of other components of his trawl gear and entered the data into a spreadsheet called the Gear Distance Calculator, a tool that estimates the distance from the vessel to the gear. The calculation estimated the fishing gear to be .47 nm from the vessel. By subtracting the distance the vessel was from the cable, the distance the gear was south of the cable could be estimated. With this information, the cable owner was comfortable asking the fisherman to carefully recover a 50 fathom increment of trawl warps and then provide an updated position. This position was plotted and the Gear Distance Calculator updated to derive an updated estimate of the approximate location of the gear. These steps were repeated five more times until it was clear that the vessel no longer had enough warps out to reach the cable and the gear was safely recovered.

Fraudulent Gear Claim: The OFCC had one fraudulent gear claim in January of 2007 and the outcome demonstrates the value of the established investigation process. A vessel radioed the US Coast Guard to report he thought he was hung up on a submarine cable. The USCG connected the fisherman with the hotline number for the cable system's NOC. The vessel reported her position which plotted being 90 meters from the cable. After analysis by the NOC and OFCC representative, the skipper was requested to cut away the gear. When the vessel returned to port, the OFCC interviewed the skipper and crew, obtained the vessel's plotter and vessel monitoring system (VMS) data and took photos of the plotter, winches and logbook. The skipper signed the OFCC sacrificed gear claim documents and replacement trawl wire was purchased using sacrificed gear funds. During the ensuing investigation, the OFCC determined that other member fishermen had seen the vessel hung up off the north Washington coast and observed the vessel transiting south in Washington waters without a net on her stern, net reel or a port trawl door.

TABLE 3. OFCC HOTLINE CALLS

Period	Hot line calls	Sacrificed Gear Claims	Cost	Average Cost Per Claim
1998-2011	23	8	$445,829	$55,728
2012-2018	0	0	0	0

Further analysis of the plotter and VMS data were inconsistent with the representations of the captain and crew. The OFCC Board convened, considered all the data and decided to give the captain a chance to admit to fraud and make restitution, otherwise the authorities would be brought into the matter. When confronted, the skipper admitted the attempted fraud and agreed to repay the OFCC for all related costs, which he did. This incident provided a powerful lesson, both to the individual captain and to the entire fleet and enhanced the standing of the OFCC as a serious, capable and measured organization that represents its constituents well.

7. CONCLUSION

Oregon is the least populous of the three US west coast states, has a large continental shelf, the largest trawl fleet and Portland, its largest population center, is 80 miles inland. Despite these apparent deficiencies as a cable landing when compared to Washington and California, Oregon has become the premier US west coast submarine cable gateway, having attracted half of all west coast systems since 1998 (Reference 2). The OFCC is a key reason for this attractiveness. The OFCC process reduces the risk of external aggression by optimizing routing and improving the quality of marine installations. OFCC protocols encourage trawl fishermen to operate safely around cables. Oregon's permitting regime is straightforward and efficient and relies, in part, on compliance with the protocols of the OFCC as a standard for qualifying projects. The Oregon trawl fishermen know their environment; they are a sophisticated group represented by enlightened leadership. Oregon cable owners have embraced the OFCC model. Together these groups with otherwise opposing interests have created a compelling model for sharing the seabed. While there are financial and in-kind costs as a cable owner to support the operation of the OFCC, the benefit is substantial and easy to measure: no external aggression faults for best in class cable security. The OFCC has also matured: there have been no hot line calls since 2011, evidence that communication and training efforts have resulted in a well-educated fleet of trawl vessel owners and operators.

In the 20 years since the founding of the OFCC, the submarine cable industry has experienced a sea change, from traditional telecommunications companies to private investors as service providers to content providers to scientific observing systems. The OFCC has adapted to these changes and evolved to remain relevant and critical to the process of successfully bringing new systems to the shores of Oregon and facilitating their long term economic sustainability.

8.0 ACKNOWLEDGEMENTS

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9. REFERENCES

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