APPENDIX B:

SUPPLEMENTAL ENVIRONMENTAL REPORT (SER) FOR THE OOI (APRIL 2009)

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SUPPLEMENTAL ENVIRONMENTAL REPORT

FOR THE

OCEAN OBSERVATORIES INITIATIVE

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SUPPLEMENTAL ENVIRONMENTAL REPORT
OCEAN OBSERVATORIES INITIATIVE

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1. PURPOSE AND NEED

This Supplemental Environmental Report (SER) has been prepared to assess the potential impacts on the human and natural environment associated with proposed modifications in the design, installation and operation of the Ocean Observatories Initiative (OOI) that were previously assessed in a Programmatic Environmental Assessment (PEA) (National Science Foundation [NSF] 2008). The PEA analysis concluded that installation and operation of the proposed OOI as presented in the 2008 Final PEA would not have a significant impact on the environment and a Finding of No Significant Impact (FONSI) was signed on February 4, 2009 (NSF 2009) (Appendix A).

The purpose of this SER is to determine if the proposed OOI design modifications would result in significant impacts to the environment not previously assessed in the PEA, including cumulative impacts. If the proposed modifications to the OOI would result in potentially significant impacts or impacts that were not addressed in the PEA and further analysis were deemed necessary, then in accordance with the National Environmental Policy Act (NEPA) (42 United States Code §4321 *et seq*.) and the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (Title 40 Code of Federal Regulations §§1500-1508), a Supplemental Environmental Assessment or an Environmental Impact Statement would need to be prepared and distributed for review and comment. This SER will be distributed to federal, state, and local agencies and organizations for review and comment.

1.1 BACKGROUND AND 2008 PEA

The following is a brief summary and background based upon the information provided in the 2008 PEA. For a full and detailed description of the purpose, goals, and design of the OOI, please refer to the PEA (NSF 2008).

To provide the U.S. ocean sciences research community with the basic sensors and infrastructure required to make sustained, long-term, and adaptive measurements in the oceans, the NSF's Ocean Sciences Division developed the OOI from community-wide, national, and international scientific planning efforts. OOI builds upon recent technological advances, experience with existing ocean observatories, and lessons learned from several successful pilot and test bed projects. The OOI would be an interactive, globally distributed and integrated network of cutting-edge technological capabilities for ocean observatories. This network of sensors would enable the next generation of complex ocean studies at the coastal, regional, and global scale.

The OOI infrastructure includes cables, buoys, deployment platforms, moorings, junction boxes, electric power generation (solar, wind, fuel cells, and/or diesel), mobile assets (i.e., autonomous underwater vehicles [AUVs] and gliders), and two-way communications systems. This large-scale infrastructure would support sensors located at the sea surface, in the water column, and at or beneath the seafloor.

1.2 COASTAL, REGIONAL, AND GLOBAL SCALES

As described in detail in the PEA, the OOI design is based upon three main physical infrastructure elements across global, regional, and coastal scales. At the global and coastal scales, mooring observatories would provide locally generated power to seafloor and platform instruments and sensors and use a satellite link to shore and the Internet. Up to four Global-scale Nodes (GSN) or buoy sites were originally proposed for ocean sensing in the Eastern Pacific and Atlantic oceans. The Regional-scale Nodes (RSN) off the coast of Washington and Oregon would consist of seafloor observatories with various chemical, biological, and geological sensors linked with submarine cables to shore that provide power and Internet connectivity. Coastal-scale Nodes (CSN) would be represented by the Endurance Array off the coast of Washington and Oregon and the Pioneer Array off the coast of Massachusetts. In addition, there would be an integration of mobile assets such as AUVs and gliders with the GSN, RSN, and CSN observatories.

2. DESCRIPTION OF THE OOI

The following sections provide a summary of the OOI elements addressed in the 2008 PEA and describe in detail the proposed OOI design modifications being addressed in this SER. For a detailed description of the OOI components and their installation and operation, please refer to the 2008 PEA (NSF 2008).

2.1 COASTAL-SCALE NODES (CSN)

As assessed in the 2008 PEA, the CSN consists of two elements: a long-term Endurance Array off Washington and Oregon and a relocatable Pioneer Array in the Mid-Atlantic Bight south of Massachusetts.

2.1.1 Endurance Array

2.1.1.1 Endurance Array – Previously Assessed Components (refer to Section 2.2.1 in 2008 PEA)

The Endurance Array would be comprised of two lines of moorings, one located off the coast of central Oregon (Newport Line), and a second at a contrasting site off central Washington (Grays Harbor Line) (Figure 1). Both lines would consist of surface and subsurface moorings and would employ gliders. The 80-, 150-, and 500-meter (m) moorings on the Newport Line would be cabled and connected to the backbone cable of the RSN via NP2. Specifically, each line would contain:

Grays Harbor Line

- two paired surface/subsurface moorings at 25 and 80 m, and
- one subsurface mooring at 150 m.

Newport Line

- three paired surface/subsurface moorings at 25, 80, and 500 m; and
- one subsurface mooring at 150 m.

Up to six autonomous underwater gliders would also carry multidisciplinary sensor suites along cross-shelf glider lines (Figure 1).

2.1.1.2 Grays Harbor Line – Proposed Design Modifications

The proposed modifications to the Grays Harbor Line (Figure 1 and Table 1) include:

- Addition of a 500-m profiler mooring site on the Grays Harbor Line.
- Cabled connection between the Subduction Zone node (N4a) and the 80- and 500-m moorings on the Grays Harbor Line via nodes N4b and N4c.
- Surface buoys at 80- and 500-m sites would be powered by methanol fuel cells if the Grays Harbor Line is not cabled to the RSN (see Section 2.2.2, RSN Proposed Design Modifications for additional details).
- Additional non-active acoustic sensors.

The following discussion provides further details regarding these modifications.

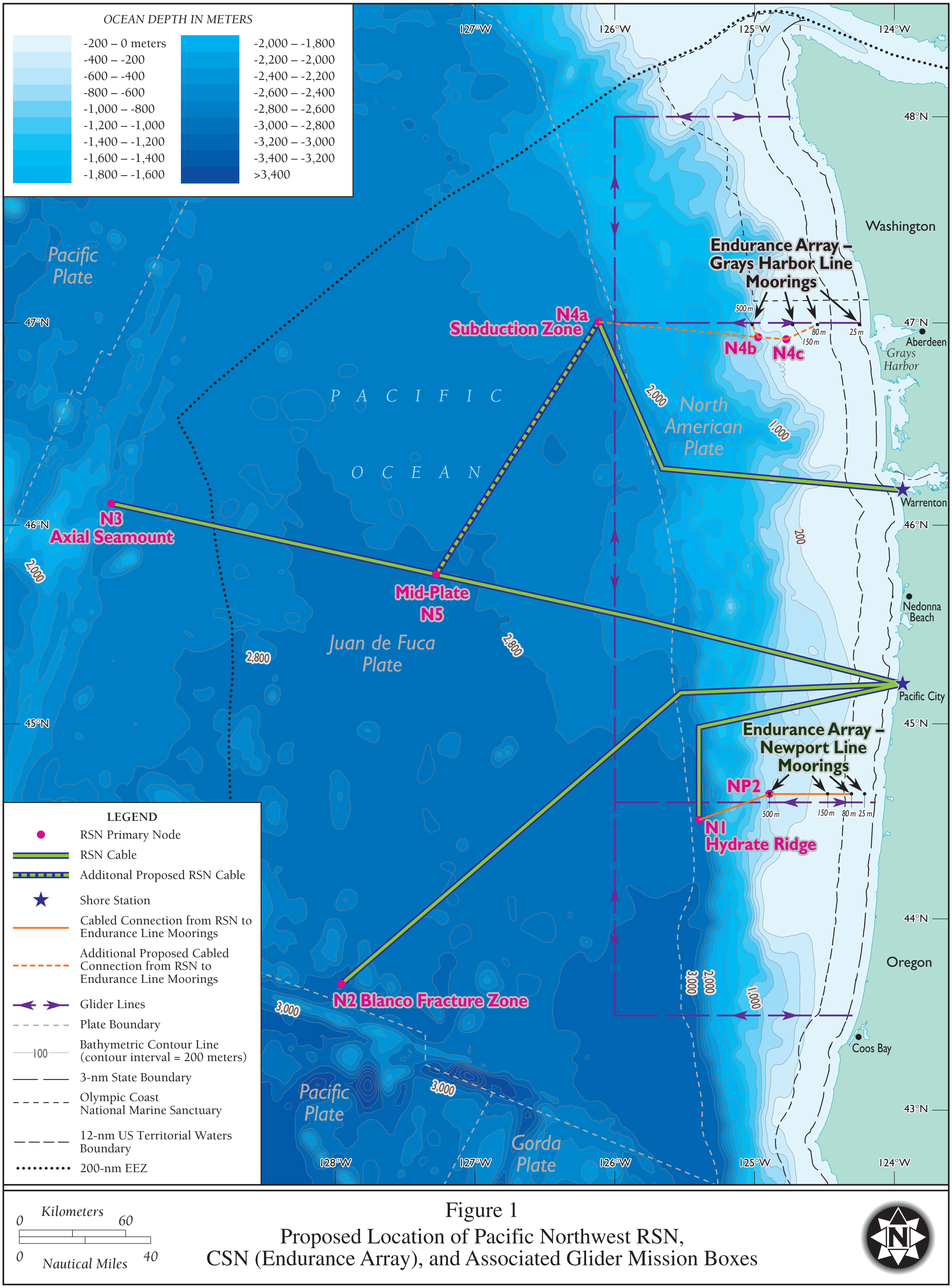

Figure 1
Proposed Location of Pacific Northwest RSN,
CSN (Endurance Array), and Associated Glider Mission Boxes

Table 1. Summary of Previously Assessed and Proposed Modifications to CSN Infrastructure

Component	*2008 PEA*	*Proposed Design Modifications*
ENDURANCE ARRAY		
Grays Harbor Line Moorings	• 3 paired surface/subsurface (@ 25, 80, and 150 m)	• 4 paired surface/subsurface at 25, 80, 150, and 500 m • 2 cabled subsurface (80 & 500 m) to RSN N4a • Addition of non-active acoustic sensors to moorings.
Newport Line Moorings	• 1 paired surface/subsurface (25 m) • 2 paired surface/cabled subsurface (80 & 500 m) • 1 cabled subsurface (150 m) to RSN N1	• Addition of non-active acoustic sensors to moorings & benthic nodes.
Gliders	• 6 gliders	No change.
PIONEER ARRAY		
Moorings	• 4 paired surface/subsurface • 4 subsurface	• Addition of non-active acoustic sensors to moorings.
AUVs & Gliders	• 3 AUVs and 10 gliders	No change.

Sources: NSF 2008; Consortium for Ocean Leadership 2009.

Addition of 500-m Profiler Mooring

The surface profiler mooring at the 500-m water depth would have the same design as the 80-m mooring described in the 2008 PEA. Specifically, the vertical mooring would provide long-term observations of shelf processes, extending from the air-sea interface through the water column to the bottom, and benthic instrumentation packages or nodes would provide sampling on and near the seafloor. The surface moorings would generate power and support two-way telemetry. The surface moorings would also provide the capability to collect surface meteorology and air-sea flux data and would support high-power, high-bandwidth, multidisciplinary science instrumentation in the buoy well and at 5 m beneath the surface. Sensors may be located in the water column between the seafloor and surface, or on the buoy tower. Control and data signals to and from sensors below the buoy flow along copper conductors built into the mooring strength member elements. Vertical profiling moorings would carry multidisciplinary core sensor suites, and the profilers would have additional payload and power capacity for future sensor additions. With connection to the RSN cable, vertical profiling can be made continuously.

At the seafloor, a Multi Function Node (MFN) or benthic "sled", terminates the bottom of the mooring and would provide the necessary anchoring weight. The weight is provided by a releasable cast steel anchor fitted with a secondary anchor recovery line pack. The MFN has a metal frame with an approximate 4-m^2 footprint, is 1 m high, and houses a rechargeable battery pack to provide power for intermittent seafloor needs. The MFN would provide data and power ports for benthic instrumentation. Batteries and electronics are housed in one or more aluminum pressure-tolerant housings.

80- and 500-m Moorings Powered by Methanol Fuel Cells

Pure 100% methanol (M100) would be used in the proposed fuel cells. An alcohol, methanol is a clear, odorless, volatile liquid, and mixes completely in water. Based on a review of existing information on the fate and transport of methanol in the environment, it was determined that methanol was unlikely to accumulate in surface water in the event of an accidental spill of a fuel cell. In surface water, the complete solubility of methanol would result in rapid wave-, wind-, and tide-induced dilution to low concentrations. Relative to conventional gasoline and diesel fuel, methanol is significantly less toxic to marine life than oil or gasoline and is considered a safer and more environmentally benign fuel (American

Methanol Institute 1999). As previously assessed in the PEA, the use of methanol as fuel cells with other components of the OOI network would not have significant impacts on the marine environment. Therefore, there would be no significant impacts to the marine environment with the proposed use of methanol fuel cells on the 500- and 80-m mooring sites if they are not cabled to the RSN (Primary Node N4a, see Figure 1).

<u>Additional Scientific Sensors</u>

With the increased focus on carbon cycling, climate change, and ocean acidification, additional scientific sensors would be added to both lines of the Endurance Array infrastructure. None of these sensors would utilize active acoustic sources. They would be attached to the Endurance Array moorings and/or benthic nodes and would sample the water. As the 2008 PEA determined that the use of non-acoustic scientific sensors would have no impact on the marine environment, there would be no impacts to the marine environment with the addition of these sensors on the Endurance Array.

2.1.2 Pioneer Array

2.1.2.1 Pioneer Array – Previously Assessed Components

The Pioneer Array would consist of (refer to Section 2.2.1 in 2008 PEA):

- 4 electrical-optical-mechanical (EOM) paired surface/subsurface moorings with local power generation, satellite communications capabilities, and benthic nodes;
- 4 subsurface profiling moorings that would be internally powered and communicate acoustically with the EOM moorings;
- 3 AUVs with two docking stations for power transfer and communications; and
- 10 gliders.

2.1.2.2 Pioneer Array – Proposed Design Modifications

The only change proposed for the Pioneer Array is the addition of scientific sensors on the vertical moorings. None of these sensors would utilize active acoustic sources. They would be attached to the Pioneer Array moorings and would sample the water. As the 2008 PEA determined that the use of non-acoustic scientific sensors would have no impact on the marine environment, there would be no impacts to the marine environment with the addition of these sensors on the Pioneer Array.

2.2 REGIONAL-SCALE NODES (RSN)

2.2.1 RSN –Previously Assessed Components

As assessed in the 2008 PEA (refer to Section 2.2.2), the RSN would be comprised of four components (Figure 1): shore stations, primary infrastructure, secondary infrastructure, and tertiary infrastructure.

<u>Primary Infrastructure (Backbone Cable and Primary Nodes)</u>

The Primary Infrastructure includes:

- 1,238 km of backbone cable of up to four types of standard submarine telecommunications electrical-optical cable: Lightweight (LW), Special Applications (SPA), Light-Wire Armored (LWA), and Double Armored (DA) (472 km of which would be buried and 766 km would be laid on the seafloor) (refer to Table 2-3 in the 2008 PEA), and
- five Primary Nodes (N1, N2, N3, N4, and N5) (Figure 1).

The Primary and Secondary Nodes function as gateways between the backbone cable and the Secondary Infrastructure. Each node would be enclosed in a trawl-resistant frame (TRF), which protects the electronic equipment of each node from fishing activities. The TRF is 4.5 m long, 3.6 m wide, 1.3 m high and weighs 4,800 kilograms in air.

<u>Secondary Infrastructure</u>

The electrical and EOM cables connecting the Primary Infrastructure to the Secondary Infrastructure would be ~25 millimeters (mm) in diameter and would be placed on the seafloor. Low-voltage nodes (LVNs) interconnect sensors, their associated junction boxes (Jboxes), and Primary and Secondary nodes. The LVN includes a pressure housing attached to a frame (TRF if required) that would sit on the seafloor. A typical LVN has a 1 x 1 m base and be 2 m high.

<u>Tertiary Infrastructure</u>

The electrical and EOM cables connecting the components within the Tertiary Infrastructure (e.g., Jboxes to sensors) and the Secondary Infrastructure to the Tertiary Infrastructure would be ~25 mm in diameter and would be placed on the seafloor.

2.2.2 RSN – Proposed Design Modifications

The following are the proposed modifications to the RSN (Figure 1 and Table 1):

- The addition of 165 kilometers (km) of backbone cable (LW and LWA) laid on the seafloor to connect Mid-Plate Node (N5) and Subduction Zone Node (N4a).
- Cable connection from the RSN Node N4a to the 500- and 80-m sites on the Grays Harbor Line by way of two additional primary nodes (N4b and N4c) and two LVNs adjacent to the 80- and 500-m moorings and associated cabling between the nodes. These connections would entail the laying of secondary cable (25 mm in diameter) including 90 km between N4a and N4b, 15 km between N4b and N4c, 100 m between N4b and the LVN at the Grays Harbor Line 500-m mooring, and 17 km between N4c and the LVN at the Grays Harbor Line 80-m mooring.
- The addition of two secondary nodes (now called primary nodes), two LVNs, two low-power Jboxes (LPJboxes), and an associated 122 km of 25-mm in diameter cable connecting the components.

The total Primary, Secondary, and Tertiary infrastructure assessed in the 2008 PEA and the proposed modifications assessed in this SER are listed in Table 2.

Table 2. Summary of Installation Requirements for Previously Assessed and Proposed Modifications to RSN Infrastructure

Equipment	*Amount* *2008 PEA*	*SER Design Modifications*	*Total*
PRIMARY INFRASTRUCTURE			
Primary Nodes (ea)	5	0	5
Total Cable to Install (km)	1,238	165	1,403
By Cable Type			
DA (km)	228	0	228
LWA (km)	257	83	340
SPA (km)	384	0	384
LW (km)	369	82	451
Mode of Cable Installation			
Buried (km)	472	0	472
Surface (km)	766	165	931

Table 2. Summary of Installation Requirements for Previously Assessed and Proposed Modifications to RSN Infrastructure

Equipment	*Amount* *2008 PEA*	*SER Design Modifications*	*Total*
SECONDARY INFRASTRUCTURE			
Secondary Nodes (ea)	3	2	5
LVNs (ea)	18	2	20
Cable (km)	163.95	122.1	286.05
TERTIARY INFRASTRUCTURE			
LPJboxes (ea)	9	3	12
MPJboxes (ea)	16	0	16
Cable (km)	119.6	0.16	119.76

Sources: NSF 2008; Consortium for Ocean Leadership 2009.

2.3 GLOBAL-SCALE NODES (GSN)

2.3.1 GSN – Previously Assessed Components

The 2008 PEA (refer to Section 2.2.3) assessed three strategic high-latitude sites and one mid-latitude site as comprising the initial GSN (Figure 2):

1. Station Papa in the southern Gulf of Alaska – 50° N, 145° W; depth = 4,250 m
2. Southern Ocean off Chile – 55° S, 90° W; depth = 4,800 m
3. Irminger Sea southeast of Greenland – 60° N, 39° W; depth = 2,800 m
4. Mid-Atlantic Ridge – 23° N, 43.5° W; depth = 4,460 m

Station Papa, Southern Ocean, and Irminger Sea would all have an acoustically linked discus buoy, one subsurface and two flanking subsurface moorings, and five gliders. The Mid-Atlantic site would have the Extended Draft Platform with a benthic node, one subsurface and two flanking subsurface moorings, and five gliders.

2.3.2 GSN – Proposed Design Modifications

A fifth GSN site would be added to the OOI network. It would be located in the Argentine Basin at 42° South, 42° West at a depth of 5,200 m (Figure 2). The infrastructure at the Argentine Basin site would be the same as that previously described and assessed in the 2008 PEA for the high latitude GSN sites (refer to Section 2.2.3.1 of the PEA) and would include one acoustically linked surface mooring with subsurface profiler mooring, two mesoscale flanking moorings, and three gliders.

In addition, as with the Endurance and Pioneer arrays, the GSN sites would include additional non-active acoustic sensors to the moorings for all GSN sites.

Figure 2
Proposed Location of the GSN

2.4 INSTALLATION AND OPERATION & MAINTENANCE (O&M)

The methods for the installation of infrastructure of the OOI and conducting routine O&M activities that were described in the 2008 PEA (refer to Section 2.2.6 of the PEA) would be used for the proposed design modifications assessed in this SER. Installation and O&M activities use standard methods and procedures currently used by the undersea telecommunications industry. With the addition of the proposed design modifications, the installation of the CSN, RSN, and GSN components of the OOI Network is expected to take an additional 29 days for a total of 230 days at sea (DAS) and involve four classes of vessels (Table 3). Annual O&M operations for the OOI Network with the design modifications would take an additional 31 days for a total of 261 DAS for all locations.

Table 3. Estimated DAS for Installation and Annual O&M of Proposed CSN, RSN, and GSN

Infrastructure	*Vessel Class*[1]	*Total Install DAS*[2]	*Total O&M DAS*
REGIONAL-SCALED NODES	Cable Laying/Repair	30 + **3** = 33	20 + **2** = 22
	Global	30 + **3 = 33**[3]	60 + **6 = 66**[3]
COASTAL-SCALED NODES			
Pioneer Array	Intermediate	13	12
	Intermediate	8	18
Endurance (Newport Line)	Global	7[3]	7[3]
	Intermediate	10	15
Endurance (Grays Harbor Line)	Intermediate	5	10
GLOBAL-SCALED NODES			
Argentine Basin	**Global**	**23**	**23**
Station Papa	Global	19	19
Southern Ocean	Global	23	23
Irminger Sea	Global	23	23
Mid-Atlantic Ridge	Global	19[3]	23[3]
	Supply/Tug	14	0
Subtotals by vessel class	Cable Laying/Repair	30	20
	Supply/Tug	14	0
	Global	121	155
	Intermediate	77	96
	Total DAS	**230**	**261**

Note: **Bold** = added based on proposed design modifications.

[1]The approximate range for length overall of the classes of vessels: Cable-laying 450-500 ft.; Global 235-280 ft.; Anchor Handling/Supply Tug 120-220 ft.; Intermediate 170-200 ft.

[2]DAS includes transit time to and from the CSN, RSN, or GSN site and proposed activities at each site. The values (+ x) are the additional DAS for the proposed design modifications.

[3]An ROV would be used for the same number of days during the install and O&M activities.

2.4.1 Summary of Infrastructure under the Proposed Action

The infrastructure and siting characteristics for the CSN, RSN, and GSN and proposed design modifications are summarized in Table 4.

Table 4. Summary of the Previously Assessed and Proposed Modifications to the OOI Infrastructure

Component	*2008 PEA*	*Proposed Design Modifications**
COASTAL SCALE NODES (CSN)		
Endurance Array		
Grays Harbor Line Moorings	• 3 paired surface/subsurface (@ 25, 80, and 150 m)	• 4 paired surface/subsurface (@ 25, 80, 150, and 500 m) • 2 cabled subsurface (80 & 500 m) to RSN N4 •
Newport Line Moorings	• 1 paired surface/subsurface (25 m) • 2 paired surface/cabled subsurface (80 & 500 m) • 1 cabled subsurface (150 m) to RSN N1	Additional scientific sensors, no other changes.
AUVs and Gliders	6 gliders	No change.
Pioneer Array		
Moorings	• 4 paired surface/subsurface • 4 subsurface	Additional scientific sensors, no other changes.
AUVs and Gliders	3 AUVs and 10 gliders	
REGIONAL SCALE NODES (RSN)		
Cable Configuration	Mid-plate star	
Primary Infrastructure Cable Length	1,238 km	+ 165 km = total 1,403 km
Shore Stations	Warrenton and Pacific City, OR	No change.
Primary Nodes	5	No change.
Moorings	5 subsurface	No change.
GLOBAL SCALE NODES (GSN)		
Station Papa		
Buoys	1 acoustically linked discus buoy	No change.
Moorings	1 subsurface & 2 flanking subsurface	Additional scientific sensors, no other changes.
AUVs and Gliders	5 gliders	
Southern Ocean		
Buoys	1 acoustically linked discus buoy	No change.
Moorings	1 subsurface & 2 flanking subsurface	Additional scientific sensors, no other changes.
AUVs and Gliders	5 gliders	
Irminger Sea		
Buoys	1 acoustically linked discus buoy	No change.
Moorings	1 subsurface & 2 flanking subsurface	Additional scientific sensors, no other changes.
AUVs and Gliders	5 gliders	
Mid-Atlantic Ridge		
Buoys	1 EDP with 1 benthic node	No change.
Moorings	1 subsurface & 2 flanking subsurface	Additional scientific sensors, no other changes.
AUVs and Gliders	5 gliders	
Argentine Basin		
Buoys		1 acoustically linked discus buoy
Moorings		1 subsurface & 2 flanking subsurface
AUVs and Gliders		3 gliders

2.4.2 Special Operating Procedures (SOPs) and Mitigation and Monitoring Measures for Installation and O&M of the OOI

The SOPs within the 2008 PEA (refer to Table 2-9 of the PEA) and the mitigation and monitoring measures required from National Marine Fisheries Service (NMFS) (NMFS 2008) would be implemented as part of the proposed design modifications to avoid and minimize any potential impact to biological resources and commercial fishing activities.

3. POTENTIAL IMPACTS WITH IMPLEMENTATION OF PROPOSED OOI DESIGN MODIFICATIONS

3.1 COASTAL SCALE NODES (CSN) AND REGIONAL SCALE NODES (RSN)

The Region of Influence (ROI) would not change under the proposed OOI design modifications. Therefore, the affected environment for all resource areas will be the same as that previously discussed in the 2008 PEA.

3.1.1 Installation and O&M Activities

Under the proposed OOI design modifications, RSN installation and O&M activities would take an additional 6 and 8 DAS, respectively, over what was previously assessed in the 2008 PEA; there would be no change in the proposed CSN and RSN installation and O&M activities. The installation of one additional mooring (at 500 m depth) on the Grays Harbor Line and the laying of approximately 287 km of cable would impact an estimated 1 ha of additional EFH above the 98 ha previously assessed in the 2008 PEA. This would not result in adverse impacts to EFH. The installation of one additional mooring approximately 20 km from the nearest mooring previously assessed in the 2008 PEA would not significantly increase the potential for entanglement by marine mammals. With implementation of the SOPs listed in the 2008 PEA (refer to Table 2-9 of the PEA) and the mitigation and monitoring measures listed in the 4 November 2008 Letter of Concurrence from the Office of Protected Resources, NMFS (NMFS 2008), the laying of an additional 287 km of cable would not result in significant impacts to marine mammals.

Due to the nature and extent of the proposed modifications to the OOI infrastructure (e.g., the addition of one additional CSN mooring off the coast of Washington, laying of an additional 13% length of cable associated with the RSN, and the addition of scientific sensors on previously assessed moorings), potential impacts to air quality, water quality, geological resources, socioeconomics, and cultural resources would be discountable. In addition, the proposed modifications to the OOI would not change the cumulative effects analysis as presented in the 2008 PEA since no additional regional cumulative projects have been proposed since the completion of the 2008 PEA and the proposed modifications would not result in any cumulative effects not previously assessed. Therefore, there would be no additional impacts on any resource area with implementation of the proposed OOI design modifications, the FONSI for the 2008 PEA is still warranted (NSF 2009), and additional NEPA documentation is not necessary.

3.1.2 Gliders and AUVs

Under the proposed OOI design modifications, there would be no change in the number or use of gliders associated with the CSN. Therefore there would be no additional impacts.

3.1.3 Active Acoustic Sources

Although there would be acoustic sensors associated with the additional mooring on the Grays Harbor Line, these acoustics sources would be the same as those on the Newport Line that were previously assessed in PEA. As presented in the PEA and the resulting FONSI (NSF 2008, 2009), the use of those acoustic sources as part of the OOI network would not result in significant impacts to the marine environment. As no additional types of active acoustic sources are proposed, there would be no significant impacts to the marine environment with the implementation of the proposed OOI design modifications.

3.2 GLOBAL SCALE NODES (GSN)

As the proposed additional GSN site is within the southern hemisphere oceans near South America, the marine biodiversity at the Argentine Basin GSN site is expected to be similar to that found in the previously assessed Southern Ocean GSN off the coast of Chile. Marine mammal species expected in the area include Antarctic and dwarf minke whales, pygmy right whale, long-finned pilot whale, southern bottlenose dolphin, killer whale, spectacled porpoise, and dusky dolphin. Six whale species listed as endangered under the Endangered Species Act may potentially occur within the vicinity of the proposed Argentine Basin GSN: blue, fin, humpback, sei, southern right, and sperm (Sea Around Us Project 2007).

3.2.1 Installation and O&M Activities

The vessels and activity associated with installation of the Argentine Basin GSN discus buoy, three subsurface moorings, and associated scientific sensors on the sea floor may cause marine species to temporarily avoid the immediate vicinity, but this impact would not be significant due to the small scale and temporary nature of the proposed activities (estimated time to deploy a discus surface mooring with one vessel is 12-24 hours). The vessel used for mooring deployment would move very slowly during the activity and would not pose a collision threat to marine mammals. Entanglement of marine species is not likely because the rigidity of the mooring cables and the ability of marine species to detect and avoid the mooring lines. Once installed at ~5,200 m on the seabed, the proposed discus buoy anchor, flanking mooring anchors, and scientific sensors would be equivalent to other hard structures on the seabed, again posing no risk of adverse effect on marine organisms.

3.2.2 Gliders

The use of up to five gliders within a survey area of hundreds of square km around the Argentine Basin GSN is not expected to affect marine species as the proposed gliders move within the water column similar to a dolphin or whale. Gliders are sealed, contain no motors, fuels, or hazardous materials; and move at very slow speeds (~0.5 knot), thereby eliminating the potential for collisions with marine mammals.

3.2.3 Active Acoustic Sources

As stated in the 2008 PEA, the proposed active acoustic sources associated with the GSNs, including the proposed Argentine Basin GSN, would generally operate at frequencies much higher than those frequencies considered audible by fish and marine mammals. The acoustic Doppler velocimeter, bio-acoustic profiler, and the acoustic Doppler current profiler would all operate at frequencies greater than 180 kilohertz (kHz), with most operating at frequencies greater than 200 kHz. For the multibeam echosounder, sub-bottom profiler, altimeters, acoustic modems, and tracking pingers operating at frequencies between 2 and 170 kHz, fish and marine mammals would not be disturbed by any of these proposed acoustic sources given their low duty cycles, the brief period when an individual animal would potentially be within the very narrow beam of the source, and the relatively low source levels of the pingers and acoustic modems. Therefore, implementation of the proposed deployment of the Argentine Basin GSN is not expected to result in significant acoustic impacts to fish and marine mammals, including ESA-listed species.

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