The National Operational Wave Observation Plan, 2012 Draft Update



updated December 5, 2012

Note: This Document is the readme tab to an Excel spreadsheet containing the Wave Plan 2012 update which lists active and proposed wave observing locations. If you aren't reading this from within the spreadsheet, you are probably reading it in a pdf file created from the spreadsheet. For the latest information concerning the waves plan update, the spreadsheet, a companion KMZ map file (loads in Google Earth) and a document describing the plan in more detail, please link to http://www.ioos.gov/waves/. This information is being provided in order to encourage feedback on the plan as it is being written. Please send comments to wavesplan@noaa.gov.

Background: The National Operational Wave Observation Plan ("Waves Plan") is an effort under the Interagency Ocean Observation Committee (IOOC) and the Integrated Ocean Observing System (IOOS) to coordinate the wave observing activities and products of IOOS. The first Waves Plan was completed and published in 2009 (Waves Plan 2009). An update led by the IOOS program office, NDBC, the Navy and the US Army Corps of Engineers started in 2012 (Waves Plan 2012) and is a FY15 milestone of the Administration's National Ocean Policy Implementation Plan.

Design Approach: The update to the network is designed to reflects the network changes that have taken place since 2009 and to better recognize the fiscal realities of today. Design features that are different from 2009 include:

- Strategic recommendations for directional sensor upgrades;
- A reassessment of the number, location of, and priority for new locations recommended in 2009
- Tighter integration between wave observations and wave modeling
- Identifying the longest running wave sensors as **Sentinel** locations critical to wave climate studies.

Whereas in the 2009 Waves Plan, every existing wave sensor was automatically included in the design, in the 2012 update, the design is based on the sensors required to create a national perimeter of *Backbone Observations* for deep ocean, shelf, mid-shelf and coastal wave observations. Backbone locations are of the highest priority for long-term sustainment. Although traditionally the responsibility of the federal agencies, backbone locations may be supported by non-federal IOOS partners.

Sensor locations that fall outside the backbone are identified as *Supporting Observations*. Supporting observations may be important, even critical locally, but are not as important from a national perspective. All rover buoys, gauges that are redunudant or too shallow and Environment Canada locations are considered to be Supporting. Supporting Observations are the responsibility of local IOOS regions and partners.

Exploring the Spreadsheet: This workbook provides detailed information including summary tables on existing and proposed wave measurement locations. (The companion KMZ file provides a more visual display - get it here: http://www.ioos.gov/waves/). The listing is based on multiple queries of the NDBC and IOOS observation databases during 2012and on the original 2009 Waves Plan inventory.

Worksheets are locked from change to preserve the integrity of the underlying formulas and layout.

Worksheet tab WavePlan - contains the primary location database. Locations are listed as rows; columns provide parameter details including WMO station number, subnet, location, owner, years of service, etc. Some supporting columns are hidden using the grouping feature in Excel - expand the groups to see all and to get access to web links for each station (rightmost columns, unprotect the worksheet to expand the group).

If you sort the spreadsheet, Column A is to help resort.

By default each column has a filtering button that can be used to quickly display a subset of the rows based on their column values.

The workbook is formatted to print on a few landscape pages with the groups collapsed. We suggest using a filter option on the "Status" column (E) to hide the "Omit" rows (they are filtered by default). These are sensor locations that exist, but which are not included in the Plan.

Proposed locations are identified with WMO-like station numbers beginning with a digit that defines the basin (6-Atlantic,7-Gulf of Mexico, 8-Pacific, 9-Great Lakes) followed by a digit associated with the subnet (1-Offshore, 2-Outer-Shelf, 3-Inner-Shelf, 4-Coastal and 5 Rover Buoy) which is followed by a two digit sequential number.

Network Status: In comparison to the 180 locations in 2009, in 2012 there are 200 active wave sites in the US being operated by a number of data partner organizations and reported through the National Data Buoy Center (http://www.ndbc.noaa.gov). Of these, 157 make up the Backbone and 43 are Supporting observations. An additional 17 of the locations operated by Environment Canada are considered as Supporting since they provide useful wave observations into adjacent, Canadian waters.

Ranking: The table includes proposed locations designed to fill in spatial gaps in the **Backbone Observations**. To help with prioritizing proposed locations and directional sensor upgrades, a point system was established to score/rank each location based on five draft criteria:

- Length of service (>20 yrs, 1 point; >35 yrs, 2 points)
- Proximity to a major US port (<80 km, 1 point)
- Directional capability (directional, 1 pt, High resolution or *First-5* directional, 2 points)
- Proximity to nearest backbone station (>100 km, 1 pt.)
- Network Location (Backbone, 2 pts; Supporting, 1 pt.)

The maximum score under this system is 8 points (6 points for a new location) and although these are draft criteria, it was found to have useful skill in identifying the highest priority network changes and upgrades. Scores can be found in **WavePlan**, **Column L** (supporting data are grouped and collapsed but can be revealed by unprotecting the worksheet).

A logical criteria to add is a measure of the quality of a location's historic record so that the Length of Service score reflects the completeness and accuracy of the record.

Table1 - summarizes the active locations by basin, platform, and whether the location measures wave direction or not.

Table2a summarizes just the Backbone locations. That 66% of the sensors are directional is an increase over the 57% in 2009. There's also been a shift in the observing platforms. In 2009 there were 13 10-m and 12-m discus buoys in use, now down to 4. The number of 6-m ship-like NOMAD buoys is also down from 38 to 23. The 3-m discus buoy (aluminum or foam) is the most popular platform with 73, up from 57. Supporting Observations are summarized in **Table2b**.

Table3 contains summary information of the station count by region and subnet including active, proposed and supporting columns.

Table4 & 5 summarizes the station scoring/ranking information overall (Active and Proposed locations) and separately for Active and Proposed locations based on the criteria described above under **Ranking.**

RA Build-Out - This tab lists any information related to wave observations proivided in the IOOS 10-yr Regional Build-out Plans completed in 2011.

Key - Most acronyns and abbreviations used in the tables

Have a correction, comment, or addition? Please email: wavesplan@noaa.gov.

When using the information in this spreadsheet please acknowledge the **National Operational Wave Observation Plan, 2012 Update**

IOOS National Operational Wave Observation Plan, 2012 - Active and Proposed Locations

		Network	Status	Total Score 0- 8 (Service	Upgrade or	Comment		Latitude	Longitude	Depth	Years of		Buoy/Gauge	Hull	Measurement	Wave	Directional
WMO No.	Station Description	Position	(summer 2012)	Length, Directional,	Deployment Year (1-5)	(as of Summer, 2012)	Owner	(deg)	(deg)	(m)	Data	Subnet	Type	Diameter (m)	Device	Spectra	Upgrade
	Alaskan Coast			Directional,													
46001	Gulf of Alaska 88NM S Kodiak, AK	Backbone	Active	5	5		NDBC	56.300	-148.021	4,206	38.0	Offshore	NOMAD	6	Schaevitz LSOC_	1D	upgrade
46004 46035	Middle Nomad, Canada Bering Sea 310NM N Adak, AK	Supporting Backbone	Canadian Active	4	3		Env. Canada NDBC	50.933 57.051	-136.100 -177.576	3,600	36.3	Offshore Outer-Shelf	NOMAD Discus	6 12	Datawell Hippy Schaevitz I SOC	1D 1D	no upgrade upgrade
46060	West Orca Bay 36NM SSW Valdez AK	Supporting	Active	4	J		NDBC	60.584	-146.784		17.6		Discus	3	DDWM/3DMG	2D	no upgrade
46061	Seal Rocks 55NM S Valdez AK	Backbone	Active	3			NDBC	60.233	-146.834	219	17.6	Coastal	NOMAD	6	Schaevitz LSOC_	1D	no upgrade
46066	S Aleutians 380NM SW Kodiak, AK	Backbone	Active/Offline	3	5	stopped 10/25/2011, no schedule	NDBC	52.737	-154.961	4,542	11.5	Offshore	NOMAD	6	Schaevitz LSOC_	1D	upgrade
46070 46071	SW Bering Sea, AK Western Aleutians, AK	Backbone Backbone	Active Active	3	5	Missing 2010 & 2011, returned to servi	NDBC NDBC	55.003 51.157	175.284 179.050	3,804 1,269	6.2 4.2	Offshore Offshore	NOMAD NOMAD	6	Schaevitz LSOC_ Schaevitz LSOC	1D 1D	upgrade
46072	Central Aleutians 230NM Southwest of Dutch Harbor	Backbone	Active	3	5	IVISSING 2010 & 2011, Telumed to servi	NDBC	51.663	-172.162		10.4	Offshore	NOMAD	6	Schaevitz LSOC_	1D	upgrade upgrade
46073	Southeast Bering Sea	Backbone	Active/Offline	3	4	stopped 4/07/2011, no schedule	NDBC	54.942	-172.029	4,184	5.9	Outer-Shelf	Discus	12	Schaevitz LSOC_	1D	upgrade
46075	Shumagin Islands, AK	Backbone	Active	3			NDBC	53.926	-160.806	2,345		Outer-Shelf	NOMAD	6	Schaevitz LSOC_	1D	no upgrade
46076 46077	Cape Cleare AK Shelikof Strait, AK	Backbone Supporting	Active Active	3	4		NDBC NDBC	59.498 57.920	-147.983 -154.254	201		Outer-Shelf Coastal	NOMAD NOMAD	6	Schaevitz LSOC_ Schaevitz LSOC	1D 1D	upgrade
46078	Albatross Banks, AK	Backbone	Active/Offline	3		stopped 1/18/2012	NDBC	56.074	-152.572			Outer-Shelf	NOMAD	6	Schaevitz LSOC_	1D	no upgrade no upgrade
46080	Northwest Gulf 57NM E Kodiak AK	Backbone	Active	3			NDBC	58.036	-149.985	274	9.9	Outer-Shelf	NOMAD	6	Schaevitz LSOC_	1D	no upgrade
46081	Western Prince William Sound, AK	Supporting	Active	2			NDBC	60.803	-148.263	434	9.2	Coastal	NOMAD	6	Schaevitz LSOC_	1D	no upgrade
46082 46083	Cape Suckling 84NM SE Cordova, AK Fairweather Grounds 92NM SE Yakutat, AK	Backbone Backbone	Active Active	3	4		NDBC NDBC	59.668 58.249	-143.392 -137.993	296 137		Outer-Shelf Outer-Shelf	NOMAD NOMAD	6	Schaevitz LSOC_ Schaevitz LSOC	1D 1D	upgrade
46084	Cape Edgecumbe, AK	Backbone	Active	3	4		NDBC	56.593	-137.993			Outer-Shelf	NOMAD	6	Schaevitz LSOC_	1D	upgrade upgrade
46085	Central Gulf of Alaska Buoy, AK	Backbone	Active	3			NDBC	55.868	-142.492		5.6		NOMAD	6	Schaevitz LSOC_	1D	no upgrade
46108	175 Central Cook Inlet, AK	Backbone	Active	5			CDIP/AOOS	59.757	-152.092	46	1.6	Coastal	Waverider	1	Datawell Hippy	2D	First5
	SouthBrooks, Canada South Moresby, Canada	Supporting	Canadian Canadian	2			Env. Canada Env. Canada	49.734 51.833	-127.918 -131.233		18.6 19.5	Offshore Offshore	Discus Discus	3	Schaevitz LSOC_ Schaevitz LSOC	1D 1D	no upgrade
	North Nomad, Canada	Supporting Supporting	Canadian	3		This is the Test NOMAD for directional	Env. Canada	53.917		3,600	25.2	Offshore	NOMAD	6	Datawell Hippy	1D	no upgrade Testing
46205	West Dixon Entrance, Canada	Supporting	Canadian	3			Env. Canada	54.167	-134.269	2,675	24.1	Offshore	NOMAD	6	Schaevitz LSOC_	1D	no upgrade
46207	East Dellwood, Canada	Supporting	Canadian	3			Env. Canada	50.883	-129.933		23.2		Discus	3	Schaevitz LSOC_	1D	no upgrade
46208 46246	West Moresby, Canada 166 Ocean Station PAPA	Supporting Backbone	Canadian Active	3			Env. Canada CDIP/U-WA	52.517 49.985	-132.668 -145.089	2,950 4,253	22.4 2.5	Offshore Offshore	Discus Waverider	3	Schaevitz LSOC_	1D 2D	no upgrade First5
83010	Proposed - Chukchi Sea, AK	Backbone	Proposed	5	3		Proposed	70.878	-165.244	4,253		Inner-Shelf	waverider	- '	Datawell Hippy	2D	First5
83020	Proposed - Bering Strait, AK	Backbone	Proposed	5	4		Proposed	65.806	-168.726	50	0.0	Inner-Shelf				2D	First5
83030	Proposed - Norton Sound, AK	Backbone	Proposed	5	3		Proposed	63.937	-164.534	20		Inner-Shelf				2D	First5
83040	Proposed - Kokechik Bay, AK	Backbone	Proposed	5	4		Proposed	61.857	-167.158	20		Inner-Shelf				2D	First5
83050 85010	Proposed - Bristol Bay, AK Rover Buoy - Alaska	Backbone Supporting	Proposed Proposed	4	4		Proposed Proposed	57.704 71.321	-159.542 -157.002	50 30		Inner-Shelf Rover Buoy				2D 2D	First5
85020	Rover Buoy - Alaska	Supporting	Proposed	4	4		Proposed	66.955	-165.000	10		Rover Buoy				2D	First5
85030	Rover Buoy - Alaska	Supporting	Proposed	4	4		Proposed	57.917	-152.001	30	0.0	Rover Buoy				2D	First5
85040	Rover Buoy - Alaska	Supporting	Proposed	4	4		Proposed	59.389	-140.062	80		Rover Buoy				2D	First5
85050	Rover Buoy - Alaska Atlantic Coast	Supporting	Proposed	4	4		Proposed	57.926	-136.707	440	0.0	Rover Buoy				2D	First5
41001 41002	150 NM East of Cape Hatteras, NC S Hatteras 250 NM E Charleston, SC	Backbone Backbone	Active Active	6	5		NDBC NDBC	34.729 32.319	-72.678 -75.360	4,426 3,316	36.5 37.5	Offshore Offshore	Discus Discus	3	DDWM/3DMG DDWM/3DMG	2D 2D	upgrade
41002	EDISTO-41 NM SE Charleston, SC	Backbone	Active	4	4		NDBC	32.501	-79.099	3,310		Inner-Shelf	Discus	3	Schaevitz LSOC	1D	upgrade upgrade
41008	Grays Reef 40NM SE Savannah, GA	Backbone	Active	5	3		NDBC	31.402	-80.871	18	24.7		Discus	3	DDWM/3DMG	2D	upgrade
41009	Canaveral 20NM E Cape Canaveral, FL	Backbone	Active	5	1		NDBC/NASA	28.523	-80.184	41		Outer-Shelf	Discis	3	DDWM/3DMG	2D	upgrade
41010 41012	Canaveral E 120NM E Cape Canaveral, FL ST Augustine, FL 40NM ENE St Augustine	Backbone Backbone	Active Active	4	4		NDBC/NASA NDBC/Coastal Storms	28.906 30.042	-78.471 -80.534	873 37	24.1	Offshore Inner-Shelf	NOMAD Discus	6	Schaevitz LSOC_ DDWM/3DMG Ar	1D 2D	upgrade
41013	Frying Pan Shoals, NC	Backbone	Active	3	4	Replaced Frying Pan Shoals FPS7N (1	NDBC/Coastal Stollins	33.436	-77.743	24		Inner-Shelf	Discus	3	DDWM/3DMG Ar	2D	upgrade upgrade
41025	Diamond Shoals	Backbone	Active/Offline	2	4	replaced Diamond Shoals DSLN7 (198	NDBC	35.006	-75.402	68		Outer-Shelf	Discus	3	Schaevitz LSOC_	1D	upgrade
41036	Onslow Bay, NC	Supporting	Active	3	3	Move to 62020 Location	NDBC/UNC	34.211	-76.953	31		Inner-Shelf	Discus	3	DDWM/3DMG Ar	2D	no upgrade
41040 41041	Western Atlantic Middle Atlantic	Backbone Backbone	Active Active	3	3		NDBC NDBC	14.480	-53.039 -45.998	4,801 3,353	7.5 7.5	Offshore Offshore	NOMAD NOMAD	6	Schaevitz LSOC_ Schaevitz LSOC	1D 1D	no upgrade
41043	Southwest Atlantic	Backbone	Active	4	3		NDBC	20.990	-65.010		5.7		Discus	3	DDMW/3DMG	2D	upgrade
41044	South Atlantic	Backbone	Active	3	4		NDBC	21.652	-58.695	5,374	3.6	Offshore	NOMAD	6	Schaevitz LSOC_	1D	upgrade
41046	E Bahamas	Backbone	Active	3		moved	NDBC	23.838	-68.333	5,500	5.2	Offshore	NOMAD	6	Schaevitz LSOC_	1D	no upgrade
41047 41048	NE Bahamas W Bermuda	Backbone Backbone	Active Active	4	4	moved, May 2012, 3m buoy replaced 1	NDBC NDBC	27.517 31.978	-71.483 -69.649	5,221 5,261	5.2 5.2	Offshore Offshore	Discus-F Discus	3	DDMW/3DMG DWPM/ARS Ang	2D L 2D	no upgrade
41049	Atlantic (South)	Backbone	Active	4	5		NDBC	27.500	-63.000	4.885	3.6	Offshore	Discus	3	DWMM/3DMG	2D	upgrade
41060	Woods Hole Northwest Tropical Atlantic Wave Station	Supporting	Active	2			WHOI	14.750	-50.950	4,978	1.0	Offshore	Discus	3		1D	no upgrade
41109	190 New River Inlet, NC	Supporting	Active	5		1 year deployment	CDIP/USACE	34.484	-77.300	13	0.6		Waverider	1	Datawell Hippy	2D	First5
41110 41112	150 Masonboro Inlet, ILM2, NC 132 Fernandina Beach, FL	Backbone Backbone	Active Active	5 5			CDIP/UNCW-CORMP CDIP/Navy	34.141	-77.709 -81.293	16 16	4.7 6.8	Coastal Coastal	Waverider Waverider	1	Datawell Hippy Datawell Hippy	2D 2D	First5
	143 Cape Canaveral nearshore, FL	Backbone	Active	5			CDIP/Navy	28.400	-80.530	10	6.3		Waverider	1	Datawell Hippy	2D	First5
41114	134 Fort Pierce, FL	Backbone	Active	4			CDIP/USACE	27.562	-80.220	16	6.3		Waverider	1	Datawell Hippy	2D	First5
44005	Gulf of Maine 28NM Portsmouth, NH	Backbone	Active	4	5		NDBC	43.204	-69.128	201	34.0	Inner-Shelf	NOMAD	6	Schaevitz LSOC_	1D	upgrade
44007 44008	Portland 12 NM SE Portland, ME Nantucket 54NM SE Nantucket, MA	Backbone Backbone	Active Active	5 6	5 3		NDBC NDBC	43.531 40.500	-70.144 -69.431	24 59	30.8	Coastal Outer-Shelf	Discus Discus	3	MicroStrain 3DM- Angular Rate Ser	1D 2D	upgrade
44008	Delaware Bay 26NM SE Cape May, NJ	Backbone	Active	3	4		NDBC	38.464	-74.702	24		Inner-Shelf	Discus	3	Schaevitz LSOC	1D	upgrade upgrade
44011	Georges Bank 170NM E Hyannis MA	Backbone	Active	4	3		NDBC	41.111	-66.580	87	28.6	Outer-Shelf	Discus	3	Schaevitz LSOC	1D	upgrade
44013	Boston 16NM E Boston, MA	Backbone	Active	4	5		NDBC	42.354	-70.691	55		Coastal	Discus	3	Schaevitz LSOC	1D	upgrade
44014 44017	Virginia Beach 64NM E Virginia Beach, VA 23NM SW Montauk Point, NY	Backbone Backbone	Active/Offline	5	2	stopped 8/20/2011	NDBC/USACE NDBC	36.611 40.692	-74.836 -72.048	54 45		Outer-Shelf Inner-Shelf	Discus Discus-F	3	DWPM/Hippy DD Schaevitz LSOC_	2D 1D	First5
	NE Cape Cod 30NM E Nantucket, MA	Backbone	Active/Offline	3	2	relocated, stopped 3/6/2012	NDBC	42.126	-69.630	45 74		Inner-Shelf	Discus-F	3	DDWM/3DMG	2D	upgrade upgrade
44020	(LLNR 13665) - NANTUCKET SOUND	Backbone	Active	3	4		NDBC	41.443	-70.186	10	3.7		Discus	3	DDWM/3DMG	2D	upgrade
44024	N01-Northeast Channel ((NERACOOS N01)	Backbone	Active	3			NERACOOS	42.312	-65.927	225		Outer-Shelf	Discus-F	2	Summit 34203A	1D	no upgrade
44025	Long Island 33NM S Islip, NY	Backbone	Active	4	3		NDBC	40.250	-73.166	36		Inner-Shelf	Discus-F	3	DDWM/3DMG	2D	upgrade
44027 44029	Jonesport, ME A01 Massachusetts Bay (NERACOOS A01)	Backbone Supporting	Active Active	2	+		NDBC NERACOOS	44.273 42.520	-67.314 -70.570	189 65	9.6	Inner-Shelf Coastal	Discus-F Discus-F	3	Schaevitz LSOC_ Summit 34203A	1D 1D	no upgrade no upgrade
44029	B01 Western Maine Shelf (NERACOOS B01)	Supporting	Active	2			NERACOOS	43.183	-70.370	62	11.4		Discus-F	2	Summit 34203A	1D	no upgrade
44032	E01 Central Maine Shelf (NERACOOS E01)	Supporting	Active	2			NERACOOS	43.715	-69.358	100	11.4	Coastal	Discus-F	2	Summit 34203A	1D	no upgrade
44033 44034	F01 Penobscot Bay (NERACOOS F01) I01 Fastern Maine Shelf (NERACOOS I01)	Supporting	Active	3	1		NERACOOS NERACOOS	44.060 44.110	-69.000 -68.110	110	11.4 11.4	Coastal	Discus-F Discus-F	2	Summit 34203A Summit 34203A	1D 1D	no upgrade
	M01 Jordan Basin (NERACOOS M01)	Supporting Supporting	Active Active	3	+		NERACOOS NERACOOS	44.110		100 285		Coastal Inner-Shelf	Discus-F Discus-F	2	Summit 34203A Summit 34203A		no upgrade no upgrade
14007	mo i corda. Dadiii (NETAOOOO NOT)	pospporting	ACUTO	-		<u> </u>	HENAGOGG	75.464	-01.003	200	11.4	or-oriell	Diacus-i		JOG.1111111 3-7203A	- 10	upgrade

National Operational Wave Observation Plan, 2012 update: Table of Locations

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WMO No.	Station Description	Network Position	Status (summer 2012)	Total Score 0- 8 (Service Length, Directional,	Upgrade or Deployment Year (1-5)	Comment (as of Summer, 2012)	Owner	Latitude (deg)	Longitude (deg)	Depth (m)	Years of Data	Subnet	Buoy/Gauge Type	Hull Diameter (m)	Measurement Device	Wave Spectra	Directional Upgrade
	Central Long Island Sound	Backbone	Active	4			UConnDMS	41.138	-72.655	27	8.9	Coastal	Discus-F	2	TRIAXYS	2D	no upgrade
44040 44041	Western Long Island Sound	Supporting	Active Active	4			UConnDMS	40.956 37.204	-73.580 -76.777	18	6.6	Coastal	Discus-F	2	Neptune Science TRIAXYS	s 1D	no upgrade
44041	Jamestown, VA Potomac, MD	Supporting Supporting	Active	2			Chesapeake Bay Interpretive I Chesapeake Bay Interpretive I	38.033	-76.777	-	5.3 5.3	Coastal Coastal	XYS Watchkeepe		TRIAXYS	2D 2D	no upgrade
44043	Patansco, MD	Supporting	Active	4			Chesapeake Bay Interpretive	39.152	-76.330		5.3	Coastal	XYS Watchkeepe	2	TRIAXYS	2D	no upgrade no upgrade
44056	630 FRF Waverider, Duck, NC	Backbone	Active	6		Was Station #620 and nondirectional <	USACE	36,200	-75,714	17	32.2	Coastal	Waverider	1	Datawell Hippy	2D	First5
	Stingray Point, VA	Supporting	Active	3			Chesapeake Bay Interpretive I	37.552	-76.251	-	4.1	Coastal	XYS Watchkeepe	2	TRIAXYS	2D	no upgrade
44062	Gooses Reef, MD	Backbone	Active	5			Chesapeake Bay Interpretive I	38.553	-76.415	-	2.4	Coastal	XYS Watchkeepe	2	TRIAXYS	2D	no upgrade
44063	Annapolis, MD	Supporting	Active	4			Chesapeake Bay Interpretive	38.963	-76.448	-	2.6	Coastal	XYS Watchkeepe	2	TRIAXYS	2D	no upgrade
	First Landing	Supporting	Active	3			Chesapeake Bay Interpretive I	36.979	-76.043		1.3	Coastal	XYS Watchkeepe	2	TRIAXYS	2D	no upgrade
44065	(LLNR 725) - Entrance to New York Harbor	Backbone	Active	4	2	Replaced Ambrose Light ALSN6 (1989)	NDBC	40.369	-73.703	50	4.1	Coastal	Discus	3	DDWM/3DMG	2D	upgrade
44066	Texas Tower #4	Backbone	Active/Offline	2	2	Stopped 1/9/2012, no schedule	NDBC CDIP/UNC	39.601	-72.618	78		Outer-Shelf		3	Schaevitz LSOC	1D	upgrade
44095 44096	192 Oregon Inlet, NC 186 Cape Charles, VA	Backbone	Active Active	4			CDIP/UNC CDIP/Navy	35.583 37.023	-75.317 -75.810	18	0.7	Coastal Coastal	Waverider Waverider	1	Datawell Hippy	2D 2D	First5
44096	154 Block Island, RI	Supporting Backbone	Active	4			CDIP/NAVY CDIP/USACE	40.981	-75.610	49		Inner-Shelf		1	Datawell Hippy Datawell Hippy	2D	First5
44098	160 Jeffrey's Ledge, NH	Backbone	Active	5			CDIP/UNH	42.801	-70.169	77	4.4	Coastal	Waverider	1	Datawell Hippy	2D	First5
44099	147 Cape Henry, VA	Backbone	Active	5		replaced: 44010 (1994-1995), CHLV2 (CDIP/USACE	36.908	-75.775	19	4.6	Coastal	Waverider	1	Datawell Hippy	2D	First5
44100	26 m FRF waverider	Backbone	Active	4			CDIP/USACE	36.258	-75.591	26	4.7	Coastal	Waverider	1	Datawell Hippy	2D	First5
44137	East Scotia Slope, Canada	Supporting	Canadian	3			Env. Canada	42.300	-62.000	4,000	24.0	Outer-Shelf	NOMAD	6	Schaevitz LSOC	1D	no upgrade
44150	LaHave Bank, Canada	Supporting	Canadian	2			Env. Canada	42.505	-64.018	1,300	6.8	Outer-Shelf	NOMAD	6	Schaevitz LSOC	1D	no upgrade
61010	Proposed - Replaces Sentinel 44004	Backbone	Proposed	5	1	Was 44004	Proposed	38.484	-70.433	1,370		Offshore				2D	First5
61020	Proposed - Bahamas Offshore	Backbone	Proposed	5	2		Proposed	26.000	-76.450	4,700		Offshore				2D	First5
62010	Proposed - Delaware Bay, Outer Shelf	Backbone	Proposed	4	3		Proposed	38.170	-73.780	600		Outer-Shelf			1	2D	First5
62020	Proposed - Onslow Bay, Outer-Shelf	Backbone	Proposed	5	3	Could move 41013 or 41036 to here	Proposed	33.800	-76.570	181		Outer-Shelf			1	2D	First5
62030	Proposed - Georgia/Florida Outer-Shelf	Backbone	Proposed	4	3		Proposed	31.100 24.614	-80.000	100		Outer-Shelf			+	2D	First5
63010 64010	Proposed - Middle Keys, FL Proposed - Montauk Point, NY	Backbone Backbone	Proposed	5	3		Proposed Proposed	41.000	-80.757 -71.800	200 23		Inner-Shelf Coastal	1		+	2D 2D	First5
64020	Proposed - Montauk Point, NY Proposed - Moriches Inlet, NJ	Backbone	Proposed Proposed	4	2		Proposed Proposed	40.720	-71.800	25		Coastal	1		+	2D 2D	First5
64030	Proposed - Montries met, NJ Proposed - Sandy Hook, NJ	Backbone	Proposed	5	1		Proposed	40.720	-73.910	11		Coastal	1		+	2D	First5
64040	Proposed - Barnegat Inlet, NJ	Backbone	Proposed	4	3		Proposed	39.740	-74.050	10		Coastal	1		+	2D	First5
64050	Proposed - Cape May, NJ	Backbone	Proposed	4	2		Proposed	38.850	-74.820	8		Coastal				2D	First5
64060	Proposed - Wallops Island, VA	Backbone	Proposed	4	3		Proposed	37.761	-75.360	11		Coastal				2D	First5
64070	Proposed - Cape Fear, NC	Backbone	Proposed	5	2		Proposed	33.803	-78.058	10		Coastal				2D	First5
64080	Proposed - Charleston, SC	Backbone	Proposed	5	2		Proposed	32.700	-79.600	10		Coastal				2D	First5
64090	Proposed - Savannah, GA	Backbone	Proposed	5	2		Proposed	31.850	-80.520	15		Coastal				2D	First5
64100	Proposed - Jacksonville, FL	Backbone	Proposed	5	2		Proposed	30.340	-81.270	17		Coastal				2D	First5
64110	Proposed - Miami, FL	Backbone	Proposed	6	2		Proposed	25.668	-80.085	50 50		Coastal				2D 2D	First5
64120 65110	Proposed - Key West, FL	Backbone	Proposed	5	4		Proposed	34.932	-81.900			Coastal				2D 2D	First5
65120	Rover Buoy - Atlantic Coast Rover Buoy- Cape Lookout	Supporting Supporting	Proposed Proposed	5	1		Proposed Proposed	34.528	-76.077 -76.433	15 25		Rover Buoy				2D	First5
65130	Rover Buoy - Atlantic Coast	Supporting	Proposed	4	1		Proposed	29.827	-81.155	17		Rover Buoy				2D	First5
65140	Rover Buoy - Atlantic Coast	Supporting	Proposed	5	1		Proposed	26,609	-79,992	110		Rover Buoy				2D	First5
DE002	Coast Del DE002	Backbone	Active	4		data not on NDBC	USACE	38.540	-75.040	10	6.8	Coastal	Pressure	Bottom Mo	Pressure	2D	First5
	111 FRF - Linear Array, Duck, NC	Supporting	Active/Offline	4		data not on NDBC	USACE	36.187	-75.743	9	25.3		Pressure		Pressure	2D	First5
MD002	Ocean City, MD MD002	Backbone	Active	4		data not on NDBC	USACE	38.340	-75.070	9	19.2	Coastal	Pressure	Bottom Mo	Pressure	2D	First5
	Carribean Sea														1-		
41052	VI102 South of St. John, Virgin Islands	Backbone	Active	3			CariCOOS	18.251	-64.763	45	1.6		ODAS	3	Summit 34203A		no upgrade
41053	PR203 San Juan, Puerto Rico	Backbone	Active	4			CariCOOS	18.474	-66.099	36	2.4	Coastal	ODAS	3	Summit 34203A	1D	no upgrade
41115 42056	181 Rincon, Puerto Rico Yucatan Basin	Backbone Backbone	Active Active	6	2		CDIP/CariCOOS NDBC	18.376	-67.280 -84.857	33 4.684	7.6	Coastal Offshore	Waverider Discus	3	Datawell Hippy DDWM/3DMG	2D 2D	First5
42056	Western Caribbean	Backbone	Active	4	4		NDBC NDBC	17.002	-81.501	293	7.0	Offshore	Discus	3	DDWW/3DMG	2D	upgrade
42058	Central Caribbean	Backbone	Active	4	2		NDBC	14.923	-74.918		7.5		Discus	3	DDMW/3DMG	2D	upgrade upgrade
42059	Eastern Caribbean	Backbone	Active	3	4		NDBC	15.006	-67.496	4,900	5.6	Offshore	NOMAD	6	Schaevitz LSOC	1D	upgrade
42060	Eastern Caribbean	Backbone	Active	3	5		NDBC	16.500	-63,500		3.6		NOMAD	6	Schaevitz LSOC	1D	upgrade
42085	PR105 Southeast of Ponce, PR	Backbone	Active	5			CariCOOS	17.860	-66.524	18	3.4	Coastal	ODAS	3	Summit 34203A	2D	no upgrade
	Great Lakes	<u> </u>													•		
45001	Mid Superior 60NM NNE Hancock MI	Backbone	Active	6	4		NDBC	48.064	-87.777	262		Inner-Shelf		3	DDMW/3DMG	2D	upgrade
	N Michigan N Manitou Washington Islands	Backbone	Active	7	3		NDBC	45.344	-86.411	175		Inner-Shelf		2	DDMW/3DMG	2D	upgrade
	N Hurion 37NM NE Alpena MI	Backbone	Active	7	3		NDBC	45.350	-82.838	146		Inner-Shelf		2	DDMW/3DMG	2D	upgrade
45004	78NM EW Marquette MI	Backbone	Active	5	3		NDBC	47.584	-86.587	226		Inner-Shelf		2	Schaevitz LSOC	1D	upgrade
45005 45006	W Erie 28NM NW Cleveland, OH	Backbone	Active	6	4		NDBC	41.677	-82.398	13		Inner-Shelf		3	DDMW/3DMG	2D	upgrade
45006 45007	W Superior 48NM N Ironwood MI S Michigan 43NM SE Milwaukee, WI	Backbone Backbone	Active Active	6	2		NDBC NDBC	47.348 42.676	-89.825 -87.025	178 165		Inner-Shelf		3	Schaevitz LSOC	1D 2D	upgrade
45007 45008	S Huron 43NM SE Milwaukee, WI S Huron 43NM E Oscoda MI	Backbone	Active	6	5		NDBC	42.676	-87.025 -82.415	165 58		Inner-Shelf		3	DWPM/ARS	2D 2D	upgrade
45006	L Ontario 20NM NNE Rochester NY	Backbone	Active	3	3		NDBC NDBC	43.621	-77.406			Inner-Shelf	Discus-F	2	Schaevitz LSOC	1D	upgrade upgrade
45020	Grand Traverse Bay - Station 1	Supporting	Active/Offline	4	,	waiting redeployment, not deployed in 2	U-Mich	44.789	-85.604	150	2.2	Coastal	S2 TIDAS 900 Bu	1	Inertial Wave Se		First5
45022	Little Traverse Bay, MI	Supporting	Active	4	1	g receptoyment, not deployed III 2	U-Mich	45.403	-85.088	120	3.4	Coastal	S2 TIDAS 900 Bu	1	Inertial Wave Se		First5
45023	Portage Canal, MI	Backbone	Active	4			Michigan Technological Unive	47.279	-88.611		0.2		S2 TIDAS 900 Bu	1	Inertial Wave Se		First5
45024	Ludington, MI	Backbone	Active	4			U-Mich	43.977	-86.560	142	1.6	Coastal	S2 TIDAS 900 Bu	1	Inertial Wave Se	n 2D	First5
45025	South Entrance to Keweenaw Waterway, MI	Backbone	Active	4			Michigan Technological Unive	46.950	-88.409	150	0.4	Coastal	S2 TIDAS 900 Bu	1	Inertial Wave Se		First5
45026	St. Joseph, MI - Near Cook Nuclear Plant	Backbone	Active	5			Limno Tech	41.983	-86.617	160	1.5		S2 TIDAS 900 Bu	1	Inertial Wave Se		First5
45132	Port Stanley	Supporting	Canadian	4			Env. Canada	42.483	-81.233	21		Inner-Shelf		3	Schaevitz LSOC		no upgrade
45135	Prince Edward Pt	Supporting	Canadian	3			Env. Canada	43.800	-76.868	68		Inner-Shelf	Discus	3	Schaevitz LSOC	1D	no upgrade
45139	West Lake Ontario	Supporting	Canadian	2			Env. Canada	43.277	-79.540	35		Inner-Shelf		3	Schaevitz LSOC	1D	no upgrade
45142 45147	Port Colborne	Supporting	Canadian	2	-		Env. Canada	42.734 42.417	-79.350	27 6		Inner-Shelf		3	Schaevitz LSOC TRIAXYS	1D 1D	no upgrade
45147 45149	Lake St. Clair Southern Lake Huron	Supporting	Canadian Canadian	3	1		Env. Canada Env. Canada	42.417	-82.668 -82.083	58			XYS Watchkeepe XYS Watchkeepe	2	TRIAXYS	1D 1D	no upgrade
93010	Proposed - Lake Erie	Supporting Backbone	Proposed	6	2		Proposed	43.550	-82.083			Inner-Shelf			INMAIO	2D	no upgrade First5
93010	Proposed - Lake Erie	Backbone	Proposed	5	3	GLOS location	Proposed	42.425	-79.923 -81.520	155		Inner-Shelf			+	2D	First5
93210	Proposed - Lake Michigan	Backbone	Proposed	4	2		Proposed	43.780	-87.050	44		Inner-Shelf			+	2D	First5
95010	Rover Buoy - Lake Erie	Supporting	Proposed	5	3	GLOS location	Proposed	41.852	-83.113			Rover Buoy			1	2D	First5
95020	Rover Buoy - Lake Erie	Supporting	Proposed	4	3	GLOS location	Proposed	42.854	-78.916	170		Rover Buoy				2D	First5
95110	Rover Buoy - Lake Superior	Supporting	Proposed	3	5		Proposed	47.568	-87.885	120		Rover Buoy	,			2D	First5
95120	Rover Buoy - Lake Superior	Supporting	Proposed	5	5		Proposed	46.852	-91.598	170		Rover Buoy				2D	First5
				4	E	-		46,856	-85.066	150		Rover Buoy			1 -	2D	First5
95130 95210	Rover Buoy - Lake Superior Rover Buoy - Lake Michigan	Supporting	Proposed Proposed	4	5		Proposed Proposed	44.040		130		Kovei Buoy	<u> </u>			2D	First5

National Operational Wave Observation Plan, 2012 update: Table of Locations

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WMO No.	Station Description	Network Position	Status (summer 2012)	Total Score 0- 8 (Service Length, Directional,	Upgrade or Deployment Year (1-5)	Comment (as of Summer, 2012)	Owner	Latitude (deg)	Longitude (deg)	Depth (m)	Years of Data	Subnet	Buoy/Gauge Type	Hull Diameter (m) Measurement Device	Wave Spectra	Directional Upgrade
95220	Rover Buoy - Lake Michigan	Supporting	Proposed	4	5		Proposed	42.042	-87.409	140		Rover Buoy			2D	First5
95230	Rover Buoy - Lake Michigan	Supporting	Proposed	5	5	GLOS location	Proposed	44.746	-87.809	170		Rover Buoy			2D	First5
95240 95310	Rover Buoy - Lake Michigan Rover Buoy - Lake Huron	Supporting	Proposed Proposed	4	3	GLOS location GLOS location	Proposed Proposed	43.026 43.819	-87.633 -83.669	100 170		Rover Buoy Rover Buoy		 	2D 2D	First5 First5
95310	Rover Buoy - Lake Huron	Supporting	Proposed	5	3	GLOS location	Proposed	43.019	-82,459	170		Rover Buoy			2D	First5
95410	Rover Buoy - Lake St. Clair	Supporting	Proposed	5	3		Proposed	42.450	-82.830	160		Rover Buoy			2D	First5
95510	Rover Buoy - Lake Ontario	Supporting	Proposed	4	3	GLOS location	Proposed	43.325	-77.537	20		Rover Buoy			2D	First5
95520	Proposed - Lake Ontario	Backbone	Proposed	6	2		Proposed	43.543	-78.891	60		Inner-Shelf			2D	First5
42001	Gulf of Mexico	Deathers	A selicion	5			NDBC	25.900	-89.667	3.274	00.0	Offshore	Diame F	3 DWMM/3DMG	1D	
42001	Middle GoM 180NM S Southwest Pass LA West GoM 240NM SSE Sabine TX	Backbone Backbone	Active Active	5	3	intermitent starting 4/12 - Change to 3N	NDBC	25.790	-89.667	3,274	36.2 36.2	Offshore	Discus-F Discus	10 DWPM/ARS Ang	1D 2D	upgrade no upgrade
42002	E GoM 262NM S Panama City FL	Backbone	Active	6	3	Upgrade to Hippy	NDBC	26.044	-85.612	3,233	35.4		Discus	3 DDWM/3DMG	2D	upgrade
42012	Orange Beach AL Buoy	Backbone	Active	5	2	No data between 1985-2008	NDBC	30.065	-87.555	26	5.1		Discus	3 DDWM/3DMG	2D	upgrade
42019	Freeport TX 60NM S Freeport TX	Backbone	Active	4	1		NDBC	27.913	-95.353	79	22.6	Outer-Shelf	Discus	3 DDWM/3DMG	2D	upgrade
42020	Corpus Chirsti TX 50NM SE Corpus Christi TX	Backbone	Active	4	3		NDBC	26.944	-96.696	88		Inner-Shelf	Discus	3 DDWM/3DMG	2D	upgrade
42035	Galveston 22NM E Galveston TX	Backbone	Active	4	4	Upgrade to Hippy	NDBC	29.232	-94.413	14	19.6	Coastal	Discus	3 DDWM/3DMG	2D	upgrade
42036 42039	West Tampa 106NM WNW Tampa FL Pensacola 115 ESE Pensacola FL	Backbone Backbone	Active Active	3	3	intermitent transmission 5/19	NDBC NDBC	28.500 28.794	-84.517 -86.021	55 291		Inner-Shelf Inner-Shelf	Discus-F Discus	3 DDWM/3DMG 3 Angular Rate Sen	2D 2D	upgrade
42040	Mobile South 64NM S Dauphin Island AL	Backbone	Active	4	1	intermitent transmission 3/19	NDBC	29.185	-88.214	274		Outer-Shelf	Discus	10 DWPM/ARS	2D	upgrade upgrade
42055	Bay of Campeche	Backbone	Active	4	4		NDBC	22.203	-94.000	3,566		Offshore	Discus-F	3 DDWM/3DMG	2D	upgrade
42099	144 ST. Petersburg, offshore, FL	Backbone	Active	5			CDIP/USACE	27.340	-84.275	94	5.5	Inner-Shelf	Waverider	 Datawell Hippy 	2D	First5
42360	BW Pioneer buoy - Walker Ridge 249	Supporting	Active	2			Petrobras	26.700	-90.460	2,499	2.8		Unknown	unknown unknown	1D	no upgrade
72010	Proposed - Replaces Sentinel 42020	Backbone	Proposed	5	2		Proposed	24.914	-83.690	210		Outer-Shelf			2D	First5
72020	Proposed - Northern Florida Escarpment	Backbone	Proposed	4	2		Proposed	27.990	-86.280 -90.200	1,400		Outer-Shelf			2D	First5
72040 72050	Proposed - Timbalier Bay Outer Shelf Proposed - McGrail Bank, Outer Shelf	Backbone Backbone	Proposed Proposed	- 4 - 5	2		Proposed Proposed	28.150 27.913	-90.200 -92.655	270 300		Outer-Shelf Outer-Shelf			2D 2D	First5
73010	Proposed - Florida Canyon, Outer Shelf	Backbone	Proposed	4	4	Replaces 42020 which will no longer ha	Proposed	26.944	-96.696	88		Inner-Shelf			2D	First5
74010	Proposed - Tampa	Backbone	Proposed	6	5		Proposed	27.480	-82.860	9		Coastal			2D	First5
74020	Proposed - Panama City	Backbone	Proposed	5	3		Proposed	29.962	-85.780	30		Coastal			2D	First5
74030	Proposed - Gulfport	Backbone	Proposed	6	1	Old 42007 location	Proposed	30.090	-88.769	15		Coastal			2D	First5
74040	Proposed - New Orleans	Backbone	Proposed	5	3		Proposed	28.892	-89.297	-		Coastal			2D	First5
74050 74060	Proposed - Sabine Proposed - Freeport	Backbone Backbone	Proposed Proposed	5	3		Proposed Proposed	29.628 28.780	-93.550 -95.290	10 20		Coastal Coastal		 	2D 2D	First5 First5
74080	Proposed - Corpus Christi	Backbone	Proposed	5	4		Proposed	27.696	-95.290	12		Coastal			2D	First5
74090	Proposed - Brazos Island	Backbone	Proposed	6	4	Moved to new location	Proposed	26.100	-97.052	20		Coastal			2D	First5
75010	Rover Buoy - Fort Myers	Supporting	Proposed	4	2		Proposed	26.228	-82.176	20		Rover Buoy			2D	First5
LOPL1	Louisiana Offshore Oil Port, LA	Supporting	Active	2		L	ouisiana Offshore Oil Port	28.885	-90.024	30		Coastal	Unknown	unknown unknown	1D	no upgrade
MRSL1	CSI-03 - South of Vermilion Bay	Supporting	Active	3		Tower mounted	CSI-LSU	29.441	-92.061	6	10	Oddotai	ADCP	Bottom Mou ADCP	2D	no upgrade
SPLL1	CSI-06 - Chevron Platform, ST-52B, South of Terrebonne		Active	2		Tower mounted	CSI-LSU	28.867	-90.483	21	11		ADCP	Bottom Mou ADCP	2D	no upgrade
CS-09	CSI-09 - Grand Isle Blocks, LA Pacific Coast	Supporting	Active	3		Tower mounted, not on NDBC	CSI-LSU	29.102	-89.978	16	6	Coastal	ADCP	Bottom Mou ADCP	2D	no upgrade
46002	Oregon 275NM W Coos Bay OR	Backbone	Active	5	2		NDBC	42.589	-130.474	3,374	37	Offshore	Discus	3 Schaevitz LSOC	1D	upgrade
46005	Washington 315NM W Aberdeen WA	Backbone	Active	5	2		NDBC	46.100	-131.001	2,780	36		Discus	3 Schaevitz LSOC_	1D	upgrade
46006	SE PAPA 600NM W Eureka CA	Backbone	Active	5	5		NDBC	40.754	-137.464	4,151		Offshore	Discus	3 Schaevitz LSOC_	1D	upgrade
46011	Santa Maria 21 NM NW Point Arguello CA	Backbone	Active	5	3		NDBC	35.000	-120.992	188		Outer-Shelf	Discus	3 DDWM/3DMG	2D	upgrade
46012 46013	Half Moon Bay 24NM SSW San Francisco CA	Backbone	Active	6	3		NDBC	37.357	-122.881	213		Outer-Shelf	Discus	3 DDWM/3DMG	2D	upgrade
46014	Bodega Bay 48NM NNW San Francisco CA Pt Arena 19NM N Point Arena CA	Backbone Backbone	Active Active	- 4	3		NDBC NDBC	38.225 39.235	-123.317 -123.974	127 284		Outer-Shelf Outer-Shelf	Discus Discus	3 Schaevitz LSOC_ 3 Schaevitz LSOC	1D 1D	upgrade upgrade
46015	Port Orford 16NM W Point Orford OR	Backbone	Active	4	2		NDBC	42.747	-124.847	424		Outer-Shelf	Discus-F	3 DDWM/3DMG	2D	upgrade
46022	Eel river 17NM WSW Eureka CA	Backbone	Active	4	1		NDBC	40.781	-124.542	509		Outer-Shelf	Discus	3 Schaevitz LSOC	1D	upgrade
46025	Santa Monica Basin 33NM WSW, CA	Backbone	Active/Offline	5		stopped 4/11/2011, no schedule, no sta	NDBC	33.746	-119.076	860		Offshore	Discus	3 DDWM/3DMG	2D	no upgrade
46026	San Francisco 18NM W San Francisco CA	Backbone	Active	6	1	Add Hippy, then not need 46247	NDBC	37.759	-122.833	55		Outer-Shelf	Discus	3 DDWM/3DMG	2D	upgrade
46027	St Georges 8NM WNW Cresent City CA Cape San Martin 55NM WNW Morro Bay CA	Backbone	Active	5	3	Add Hippy, then not need 85103	NDBC NDBC	41.850 35.737	-124.381 -121.889	48 1,112		Outer-Shelf	Discus Discus	3 DDWM/3DMG 3 DDWM/3DMG	2D 2D	upgrade
46028 46029	Columbia River Bar 78NM SSW Aberdeen WA	Backbone Backbone	Active Active	5	3		NDBC	46.144	-121.009	135		Outer-Shelf Outer-Shelf	Discus	3 DWPM/Hippy DD		upgrade First5
46036	South Nomad	Supporting	Canadian	3			Env. Canada	48.351	-133.940	3,500	26		NOMAD	6 Schaevitz LSOC	1D	no upgrade
46041	Cape Elizabeth 450NM NW Aberdeen WA	Backbone	Active	4	2		NDBC	47.353	-124.731	115		Outer-Shelf	Discus	3 DDWM/3DMG	1D	upgrade
46042	Monterey 27NM W Monterey Bay CA	Backbone	Active	5			NDBC	36.753	-122.423	2,115		Outer-Shelf	Discus	3 DWPM/Hippy DD	2D	First5
46047	Tanner Bank 121NM W San Diego CA	Backbone	Active	4	2		NDBC	32.433	-119.533	1,394		Offshore	Discus	3 DDWM/3DMG	2D	upgrade
46050 46053	Stonewall Bank 20NM W Newport OR Santa Barbara East 121NM SW Santa Barbara CA	Backbone Backbone	Active Active	3	4	Existed but not included in 2009 plan. r	NDBC NDBC	44.639 34.243	-124.534 -119.856	118 449		Outer-Shelf Outer-Shelf	Discus Discus	3 DDWM/3DMG 3 DDWM/3DMG	1D 1D	upgrade no upgrade
46053	Santa Barbara East 121NM SW Santa Barbara CA Santa Barbara West 38NM W, CA	Backbone	Active	2	4	Existed but not included in 2009 plan, n	NDBC	34.243	-119.856	449		Outer-Shelf	Discus	3 Schaevitz LSOC	1D 1D	upgrade
46059	California 357NM W San Francisco CA	Backbone	Active/Offline	3	2	stopped 5/19/2012	NDBC	38.033	-130.000	4,717	18		Discus	3 Schaevitz LSOC	1D	upgrade
46069	South Santa Rosa Island CA	Backbone	Active	3	5		NDBC	33.670	-120.200	1,005	9		Discus	3 DDWM/3DMG	2D	upgrade
11 40							NDBC	32,498	-117.999	1,856	9	Offshore	Discus	3 Datawell Hippy	2D	First5
46086	San Clemete Basin	Backbone	Active	4						257	8	Coastal	Discus	3 DDWM/3DMG	2D	upgrade
46087	San Clemete Basin Neah Bay WA	Backbone Backbone	Active Active	4	1		NDBC/USCG	48.494	-124.728		0					no upgrade
46087 46088	San Clemete Basin Neah Bay WA New Dungeness- Hein Bank WA	Backbone Backbone Supporting	Active Active Active	4			NDBC/USCG NDBC/USCG	48.494 48.333	-123.167	115	8	Coastal	Discus	3 DDWM/3DMG	2D	
46087 46088 46089	San Clemete Basin Neah Bay WA New Dungeness- Hein Bank WA Tillamook OR	Backbone Backbone Supporting Backbone	Active Active Active Active	4	5		NDBC/USCG NDBC/USCG NDBC/Coastal Storms	48.494 48.333 45.889	-123.167 -125.830	115 2,230	8 8	Coastal Offshore	Discus Discus	3 DDWM/3DMG 3 DDWM/3DMG	2D	upgrade
46087 46088	San Clemete Basin Neah Bay WA New Dungeness- Hein Bank WA	Backbone Backbone Supporting	Active Active Active	4			NDBC/USCG NDBC/USCG	48.494 48.333	-123.167	115	8 8 1	Coastal	Discus	3 DDWM/3DMG		upgrade First5
46087 46088 46089 46114	San Clemete Basin Neah Bay WA New Dungeness- Hein Bank WA Tillamook OR 185 Montery Bay West, CA	Backbone Supporting Backbone Supporting	Active Active Active Active Active Active	4 4 4 3			NDBC/USCG NDBC/USCG NDBC/Coastal Storms CDIP/NDBC	48.494 48.333 45.889 36.717	-123.167 -125.830 -122.350	115 2,230 1,463	8 8 1	Coastal Offshore Outer-Shelf Inner-Shelf	Discus Discus Waverider	3 DDWM/3DMG 3 DDWM/3DMG 1 Datawell Hippy 3 Schaevitz LSOC_	2D 2D	upgrade
46087 46088 46089 46114 46206 46211 46212	San Clemete Basin Neah Bay WA New Dungeness- Hein Bank WA Tillamook OR 185 Montery Bay West, CA LaPerouseBank 036 Grays Harbor, WA 128 Humbolt Bay, South Spit, CA	Backbone Backbone Supporting Backbone Supporting Supporting Backbone Backbone	Active Active Active Active Active Active Canadian Active Active	4 4 4 3 3 7 4			NDBC/USCG NDBC/USCG NDBC/Coastal Storms CDIP/NDBC Env. Canada CDIP/USACE CDIP/USACE	48.494 48.333 45.889 36.717 48.834 46.860 40.753	-123.167 -125.830 -122.350 -126.000 -124.245 -124.313	115 2,230 1,463 73 40 40	8 8 1 24 31 9	Coastal Offshore Outer-Shelf Inner-Shelf Coastal Coastal	Discus Discus Waverider Discus Waverider Waverider Waverider	3 DDWM/3DMG 3 DDWM/3DMG 1 Datawell Hippy 3 Schaevitz LSOC_ 1 Datawell Hippy 1 Datawell Hippy	2D 2D 1D 2D 2D	upgrade First5 no upgrade First5 First5
46087 46088 46089 46114 46206 46211 46212 46213	San Clemete Basin Neah Bay WA New Dungeness- Hein Bank WA Tilliamook OR 1185 Monitery Bay West, CA LaPerouseBank Jo36 Grays Harbor, WA 128 Humbolt Bay, South Spit, CA Jo44 Cape Mendocino, CA	Backbone Backbone Supporting Backbone Supporting Supporting Backbone Backbone Backbone	Active Active Active Active Active Active Canadian Active Active Active	4 4 4 3 3 7 4 4			NDBC/USCG NDBC/USCG NDBC/Coastal Storms CDIP/NDBC Env. Canada CDIP/USACE CDIP/USACE CDIP/CDBW	48.494 48.333 45.889 36.717 48.834 46.860 40.753 40.293	-123.167 -125.830 -122.350 -126.000 -124.245 -124.313 -124.739	115 2,230 1,463 73 40 40 319	8 8 1 24 31 9	Coastal Offshore Outer-Shelf Inner-Shelf Coastal Coastal Outer-Shelf	Discus Discus Waverider Discus Waverider Waverider Waverider Waverider	3 DDWW3DMG 3 DDWW3DMG 1 Datawell Hippy 3 Schaevitz LSOC 1 Datawell Hippy 1 Datawell Hippy 1 Datawell Hippy	2D 2D 1D 2D 2D 2D 2D	upgrade First5 no upgrade First5 First5 First5
46087 46088 46089 46114 46206 46211 46212 46213 46214	San Clemete Basin Neah Bay WA New Dungeness- Hein Bank WA Tilliamook OR 185 Montery Bay West, CA LaPerouseBank 036 Grays Harbor, WA 128 Humbolt Bay, South Spit, CA 094 Cape Mendocino, CA 029 Point Reyes, CA	Backbone Backbone Supporting Backbone Supporting Supporting Backbone Backbone Backbone Backbone Backbone	Active Active Active Active Active Active Canadian Active Active Active Active Active	4 4 4 3 3 7 4 4 5			NDBC/USCG NDBC/USCG NDBC/Coastal Storms CDIP/NDBC Env. Canada CDIP/USACE CDIP/USACE CDIP/CDBW CDIP/CDBW	48.494 48.333 45.889 36.717 48.834 46.860 40.753 40.293 37.946	-123.167 -125.830 -122.350 -126.000 -124.245 -124.313 -124.739 -123.470	115 2,230 1,463 73 40 40 319 550	8 8 1 24 31 9 14 26	Coastal Offshore Outer-Shelf Inner-Shelf Coastal Coastal Outer-Shelf Outer-Shelf	Discus Discus Waverider Discus Waverider Waverider Waverider Waverider Waverider	3 DDWM/3DMG 3 DDWM/3DMG 1 Datawell Hippy 3 Schaevitz LSOC 1 Datawell Hippy 1 Datawell Hippy 1 Datawell Hippy 1 Datawell Hippy	2D 2D 1D 2D 2D 2D 2D 2D	upgrade First5 no upgrade First5 First5 First5 First5
46087 46088 46089 46114 46206 46211 46212 46213 46214 46215	San Clemete Basin Neah Bay WA New Dungeness- Hein Bank WA Tillamook OR 185 Montery Bay West, CA LaPercuseBank 1036 Grays Harbor, WA 128 Humbolt Bay, South Spit, CA 094 Cape Mendocino, CA 029 Point Reyes, CA 076 Diablo Canyon, CA	Backbone Backbone Supporting Backbone Supporting Supporting Supporting Backbone Backbone Backbone Backbone Backbone	Active Active Active Active Active Active Canadian Active Active Active Active Active Active Active	4 4 4 3 3 7 4 4 5 5			NDBC/USCG NDBC/USCG NDBC/USASI DDBC/COSASI CDIP/NDBC Env. Canada CDIP/USACE CDIP/USACE CDIP/USACE CDIP/CDBW CDIP/CDBW CDIP/CDBW CDIP/PGE	48.494 48.333 45.889 36.717 48.834 46.860 40.753 40.293 37.946 35.204	-123.167 -125.830 -122.350 -126.000 -124.245 -124.313 -124.739 -123.470 -120.859	115 2,230 1,463 73 40 40 319 550 23	8 8 1 24 31 9 14 26 30	Coastal Offshore Outer-Shelf Inner-Shelf Coastal Coastal Outer-Shelf Outer-Shelf Coastal	Discus Discus Waverider Discus Waverider Waverider Waverider Waverider Waverider Waverider	3 DDWW3DMG 3 DDWM3DMG 1 Datawell Hippy 3 Schaevitz LSOC 1 Datawell Hippy	2D 2D 1D 2D 2D 2D 2D 2D 2D 2D	upgrade First5 no upgrade First5 First5 First5 First5 First5 First5
46087 46088 46089 46114 46206 46211 46212 46213 46214 46215 46216	San Clemete Basin Neah Bay WA New Dungeness- Hein Bank WA Tillamook OR 185 Montery Bay West, CA LaPerouseBank 036 Grays Harbor, WA 128 Humboit Bay, South Spit, CA 094 Cape Mendocino, CA 029 Point Reyes, CA 076 Diablo Canyon, CA	Backbone Backbone Supporting Supporting Backbone Backbone Backbone Backbone Backbone Backbone Backbone Backbone	Active Active Active Active Active Active Canadian Active Active Active Active Active Active Active Active	4 4 4 3 3 7 4 4 5			NDBC/USCG NDBC/USCS NDBC/Costal Storms CDIP/NDBC Env. Canada CDIP/USACE CDIP/USACE CDIP/CDBW CDIP/CDBW CDIP/CDBW CDIP/CDBWUSACE	48.494 48.333 45.889 36.717 48.834 46.860 40.753 40.293 37.946 35.204 34.333	-123.167 -125.830 -122.350 -126.000 -124.245 -124.313 -124.739 -123.470 -120.859 -119.803	115 2,230 1,463 73 40 40 319 550 23 183	8 8 1 24 31 9 14 26 30	Coastal Offshore Outer-Shelf Inner-Shelf Coastal Coastal Outer-Shelf Outer-Shelf Coastal Coastal Coastal	Discus Discus Waverider Discus Waverider Waverider Waverider Waverider Waverider Waverider Waverider Waverider	3 DDWM/3DMG 3 DDWM/3DMG 1 Datawell Hippy 3 Schaevitz LSOC_ 1 Datawell Hippy	2D 2D 1D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D	upgrade First5 no upgrade First5 First5 First5 First5 First5 First5 First5 First5
46087 46088 46089 46114 46206 46211 46212 46213 46214 46215	San Clemete Basin Neah Bay WA New Dungeness- Hein Bank WA Tillamook OR 185 Montery Bay West, CA LaPercuseBank 128 Humbolt Bay, South Spit, CA 128 Humbolt Bay, South Spit, CA 094 Cape Mendocino, CA 029 Point Reyes, CA 076 Diablo Carnyon, CA 107 Goleta Point, CA 111 Anacapa Passage, CA	Backbone Backbone Supporting Backbone Supporting Backbone Backbone Backbone Backbone Backbone Backbone Backbone Backbone Supporting	Active Active Active Active Active Active Canadian Active Active Active Active Active Active Active	4 4 4 3 3 7 4 4 5 5			NDBC/USCG NDBC/USCG NDBC/USCG NDBC/Coastal Storms CDIP/NDBC Env. Canada CDIP/USACE CDIP/USACE CDIP/CDBW CDIP/CDBW CDIP/CDBW CDIP/CDBW CDIP/CDBW/USACE CDIP/CDBW/USACE	48.494 48.333 45.889 36.717 48.834 46.860 40.753 40.293 37.946 35.204 34.333 34.170	-123.167 -125.830 -122.350 -126.000 -124.245 -124.313 -124.739 -123.470 -120.859 -119.803 -119.436	115 2,230 1,463 73 40 40 319 550 23 183 105	8 8 1 24 31 9 14 26 30 11	Coastal Offshore Outer-Shelf Inner-Shelf Coastal Coastal Outer-Shelf Outer-Shelf Coastal Coastal Coastal Outer-Shelf	Discus Discus Waverider Discus Waverider Waverider Waverider Waverider Waverider Waverider	3 DDVM/3DMG 3 DDVM/3DMG 1 Datawell Hippy 3 Schaevitz LSOC 1 Datawell Hippy	2D 2D 1D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D	upgrade First5 no upgrade First5 First5 First5 First5 First5 First5 First5 First5 First5
46087 46088 46089 46111 46206 46211 46212 46213 46214 46215 46216 46217 46218 46219	San Clemete Basin Neah Bay WA New Dungeness- Hein Bank WA Tillamook OR 185 Montery Bay West, CA LaPerouseBank 036 Grays Harbor, WA 128 Humboit Bay, South Spit, CA 094 Cape Mendocino, CA 029 Point Reyes, CA 076 Diablo Canyon, CA	Backbone Backbone Supporting Supporting Backbone Backbone Backbone Backbone Backbone Backbone Backbone Backbone	Active Active Active Active Active Active Active Canadian Active	4 4 4 3 3 7 4 4 5 5			NDBC/USCG NDBC/USCS NDBC/Costal Storms CDIP/NDBC Env. Canada CDIP/USACE CDIP/USACE CDIP/CDBW CDIP/CDBW CDIP/CDBW CDIP/CDBWUSACE	48.494 48.333 45.889 36.717 48.834 46.860 40.753 40.293 37.946 35.204 34.333	-123.167 -125.830 -122.350 -126.000 -124.245 -124.313 -124.739 -123.470 -120.859 -119.803	115 2,230 1,463 73 40 40 319 550 23 183	8 8 1 24 31 9 14 26 30 11 11 21	Coastal Offshore Outer-Shelf Inner-Shelf Coastal Coastal Outer-Shelf Outer-Shelf Coastal Coastal Coastal	Discus Discus Waverider Discus Waverider	3 DDWM/SDMG 3 DDWM/SDMG 1 Datawell Hippy 3 Schaevitz LSOC 1 Datawell Hippy	2D 2D 1D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D	upgrade First5 no upgrade First5 First5 First5 First5 First5 First5 First5 First5
46087 46088 46089 46114 46206 46211 46213 46213 46214 46215 46216 46217 46218 46219 46221	San Clemete Basin Neah Bay WA New Dungeness- Hein Bank WA Tillamook CR Tillamook CR 185 Monitery Bay West, CA LaPerouseBank 128 Humbolt Bay, South Spit, CA 128 Humbolt Bay, South Spit, CA 109 Point Reyes, CA 1076 Diablo Canyon, CA 107 Goleta Point, CA 111 Anacapa Passage, CA 1071 Harvest, CA 1077 Ban Nicolas Island, CA 1082 Santa Monica Bay, CA	Backbone Backbone Supporting Backbone Supporting Supporting Supporting Backbone Backbone Backbone Backbone Backbone Backbone Supporting Supporting Supporting Backbone Backbone Backbone	Active Active Active Active Active Active Active Canadian Active	4 4 4 4 3 3 7 7 4 4 4 5 5 5 5 7			NDBC/USCG NDBC/USCG NDBC/Coastal Storms CDIP/NDBC Env. Canada CDIP/USACE CDIP/USACE CDIP/USACE CDIP/CDBW CDIP/CDBW CDIP/CDBW CDIP/CDBW/USACE CDIP/CDBW/USACE CDIP/CDBW/USACE CDIP/CDBW/USACE CDIP/CDBW/USACE CDIP/CDBW/USACE	48.494 48.333 45.889 36.717 48.834 46.860 40.753 40.293 37.946 35.204 34.333 34.170 34.454 33.221 33.855	-123.167 -125.830 -122.350 -126.000 -124.245 -124.313 -124.739 -123.470 -120.859 -119.803 -120.781 -119.882 -118.633	115 2,230 1,463 73 40 40 319 550 23 183 105 549 335	8 8 1 24 31 9 14 26 30 11 11 21 22 32	Coastal Offshore Outer-Shelf Inner-Shelf Coastal Coastal Outer-Shelf Outer-Shelf Coastal Outer-Shelf	Discus Discus Waverider Discus Waverider Discus Waverider	3 DDWM/3DMG 3 DDWM/3DMG 1 Datawell Hippy 3 Scheevitz LSOC, Datawell Hippy 1 Datawell Hippy 1 Datawell Hippy 1 Datawell Hippy 2 Datawell Hippy 1 Datawell Hippy 2 Datawell Hippy 3 Datawell Hippy 4 Datawell Hippy 5 Datawell Hippy 6 Datawell Hippy 7 Datawell Hippy 8 Datawell Hippy 9 Datawell Hippy 1 Datawell Hippy	2D 2D 1D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D	upgrade First5 no upgrade First5
46087 46088 46089 46114 46206 46211 46212 46213 46215 46216 46217 46218 46219 46219 46221	San Clemete Basin Neah Bay WA New Dungeness- Hein Bank WA Tillamook OR Tillamook OR 185 Montery Bay West, CA LaPerouseBank 036 Grays Harbor, WA 128 Humbolt Bay, South Spit, CA 094 Cape Mendocino, CA 029 Point Reyes, CA 076 Diablo Canyon, CA 107 Goleta Point, CA 111 Anacapa Passage, CA 071 Harvest, CA 067 San Nicolas Island, CA 028 Santa Monica Bay, CA 028 Santa Monica Bay, CA	Backbone Backbone Supporting Backbone Supporting Backbone	Active	4 4 4 3 3 3 7 4 4 5 5 5 5 4 4 4 5 7 7			NDBC/USCG NDBC/USCG NDBC/USCG NDBC/Coastal Storms CDIP/NDBC Env. Canada CDIP/USACE CDIP/USACE CDIP/CDBW CDIP/CDBW CDIP/CDBW CDIP/CDBW/USACE	48.494 48.333 45.889 36.717 48.834 46.860 40.753 37.946 35.204 35.204 34.333 34.170 34.454 33.221 33.855 33.618	-123.167 -125.830 -122.350 -126.000 -124.245 -124.313 -124.739 -120.859 -119.803 -120.781 -119.883 -118.633 -118.633	115 2,230 1,463 73 40 40 319 550 23 183 105 549 335 363 457	8 8 1 24 31 9 14 26 30 11 11 21 22 32	Coastal Offshore Outer-Shelf Inner-Shelf Coastal Coastal Outer-Shelf Outer-Shelf Coastal Coastal Coastal Outer-Shelf	Discus Discus Waverider Discus Waverider	3 DDWM/3DMG 3 DDWM/3DMG 1 Datawell Hippy 3 Schaevitz LSOC 1 Datawell Hippy	2D 2D 1D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D	upgrade First5 no upgrade First5
46087 46088 46089 46114 46206 46211 46212 46213 46214 46215 46216 46217 46218 46219 46221 46223	San Clemete Basin Neah Bay WA New Dungeness- Hein Bank WA Tillamook OR 1185 Monitery Bay West, CA LaPerouseBank 128 Humbolt Bay, South Spit, CA 129 Point Reyes, CA 129 Point Reyes, CA 107 Goleta Point, CA 107 Goleta Point, CA 111 Anacapa Passage, CA 107 I Harvest, CA 107 San Nicolas Island, CA 108 San Nicolas Island, CA 1092 San Pedro, CA 1092 San Pedro, CA	Backbone Backbone Supporting Backbone Supporting Backbone Supporting Supporting Backbone Backbone Backbone Backbone Backbone Backbone	Active Active Active Active Active Active Active Canadian Active	4 4 4 3 3 7 4 4 5 5 5 4 4 5 7 7			NDBC/USCG NDBC/USCG NDBC/USCG NDBC/Coastal Storms CDIP/NDBC Env. Canada CDIP/USACE CDIP/USACE CDIP/CDBW CDIP/CDBW CDIP/CDBW CDIP/CDBW CDIP/CDBW/USACE	48.494 48.333 45.889 36.717 48.834 46.860 40.753 40.293 37.946 35.204 34.333 34.170 33.221 33.855 33.618 33.459	-123.167 -125.830 -122.350 -126.000 -124.245 -124.313 -124.739 -123.470 -120.859 -119.803 -119.436 -120.781 -119.882 -118.633 -118.633 -118.317 -117.768	115 2,230 1,463 73 40 40 319 550 23 183 105 549 335 363 457 370	8 8 1 24 31 9 14 26 30 11 11 21 22 32 32	Coastal Offshore Outer-Shelf Inner-Shelf Coastal Coastal Outer-Shelf Uter-Shelf Coastal Outer-Shelf Coastal Outer-Shelf Coastal Outer-Shelf Outer-Shelf Outer-Shelf Otter-Shelf Otter-Shelf Outer-Shelf Outer-Shelf Coastal	Discus Discus Discus Waverider Discus Waverider	3 DDVM/SDMG 3 DDVM/SDMG 1 Datawell Hippy 3 Schaevitz LSOC 1 Datawell Hippy 2 Datawell Hippy 4 Datawell Hippy 5 Datawell Hippy 6 Datawell Hippy 7 Datawell Hippy 8 Datawell Hippy 9 Datawell Hippy 1 Datawell Hippy	2D 2D 1D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D	upgrade First5 no upgrade First5
46087 46088 46089 46114 46206 46211 46212 46213 46214 46215 46216 46217 46218 46219 46221 46222 46223 46223	San Clemete Basin Neah Bay WA New Dungeness- Hein Bank WA Tillamook OR Tillamook OR 185 Montery Bay West, CA LaPerouseBank 036 Grays Harbor, WA 128 Humboit Bay, South Spit, CA 094 Cape Mendocino, CA 094 Cape Mendocino, CA 095 Diablo Canyon, CA 1076 Diablo Canyon, CA 111 Anacapa Passage, CA 0111 Anacapa Passage, CA 067 San Nicolas Island, CA 067 San Nicolas Island, CA 068 Santa Monica Bay, CA 092 San Pedro, CA 093 Dana Pedro, CA	Backbone Backbone Supporting Backbone Supporting Backbone	Active	4 4 4 3 3 7 7 4 4 5 5 5 5 4 4 4 5 7 7 7 7 7			NDBC/USCG NDBC/USCG NDBC/USCG NDBC/Coastal Storms CDIP/NDBC Env. Canada CDIP/USACE CDIP/USACE CDIP/CDBW CDIP/CDBW CDIP/CDBW CDIP/CDBW/USACE	48.494 48.333 45.889 36.717 48.834 46.860 40.753 40.293 37.946 35.204 34.333 34.170 34.454 33.221 33.855 33.618 33.459 33.179	-123.167 -125.830 -122.350 -126.000 -124.245 -124.313 -124.739 -123.470 -120.859 -119.803 -119.436 -120.781 -119.882 -118.633 -118.317 -117.768 -117.768	115 2,230 1,463 73 40 40 319 550 23 105 549 335 363 457 370 223	8 8 1 24 31 9 14 26 30 11 11 21 22 32 32 12	Coastal Offshore Outer-Shelf Inner-Shelf Coastal Coastal Outer-Shelf Coastal Outer-Shelf	Discus Waverider Discus Waverider Discus Waverider	3 DDWM/SDMG 3 DDWM/SDMG 1 Datawell Hippy 3 Schaevitz LSOC, Datawell Hippy 1 Datawell Hippy 2 Datawell Hippy 4 Datawell Hippy 5 Datawell Hippy 6 Datawell Hippy 7 Datawell Hippy 8 Datawell Hippy 9 Datawell Hippy 1 Datawell Hippy	2D 2D 1D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D	upgrade First5 no upgrade First5
46087 46088 46089 46114 46206 46211 46213 46214 46215 46216 46219 46221 46221 46222 46223 46224 46224	San Clemete Basin Neah Bay WA New Dungeness- Hein Bank WA Tillamook OR 1185 Monitery Bay West, CA LaPerouseBank 128 Humbolt Bay, South Spit, CA 129 Point Reyes, CA 129 Point Reyes, CA 107 Goleta Point, CA 107 Goleta Point, CA 111 Anacapa Passage, CA 107 I Harvest, CA 107 San Nicolas Island, CA 108 San Nicolas Island, CA 1092 San Pedro, CA 1092 San Pedro, CA	Backbone Backbone Supporting Backbone Supporting Backbone Supporting Supporting Backbone Backbone Backbone Backbone Backbone Backbone	Active Active Active Active Active Active Active Canadian Active	4 4 4 3 3 7 4 4 5 5 5 4 4 5 7 7			NDBC/USCG NDBC/USCG NDBC/USCG NDBC/Coastal Storms CDIP/NDBC Env. Canada CDIP/USACE CDIP/USACE CDIP/CDBW CDIP/CDBW CDIP/CDBW CDIP/CDBW CDIP/CDBW/USACE	48.494 48.333 45.889 36.717 48.834 46.860 40.753 40.293 37.946 35.204 34.333 34.170 33.221 33.855 33.618 33.459	-123.167 -125.830 -122.350 -126.000 -124.245 -124.313 -124.739 -123.470 -120.859 -119.803 -119.436 -120.781 -119.882 -118.633 -118.633 -118.317 -117.768	115 2,230 1,463 73 40 40 319 550 23 183 105 549 335 363 457 370	8 8 8 1 1 24 31 31 9 144 26 30 111 111 221 22 322 32 116 6 12	Coastal Offshore Outer-Shelf Inner-Shelf Coastal Coastal Outer-Shelf Coastal Outer-Shelf	Discus Discus Discus Waverider Discus Waverider	3 DDVM/SDMG 3 DDVM/SDMG 1 Datawell Hippy 3 Schaevitz LSOC 1 Datawell Hippy 2 Datawell Hippy 4 Datawell Hippy 5 Datawell Hippy 6 Datawell Hippy 7 Datawell Hippy 8 Datawell Hippy 9 Datawell Hippy 1 Datawell Hippy	2D 2D 1D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D	upgrade First5 no upgrade First5

National Operational Wave Observation Plan, 2012 update: Table of Locations

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WMO No.	Station Description	Network Position	Status (summer 2012)	Total Score 0- 8 (Service Length, Directional.	Upgrade or Deployment Year (1-5)	Comment (as of Summer, 2012)	Owner	Latitude (deg)	Longitude (deg)	Depth (m)	Years of Data Subnet	Buoy/Gauge Type	Hull Diameter (m)	Measurement Device	Wave Spectra	Directional Upgrade
46232	191 Point Loma South, CA	Backbone	Active	5			CDIP/CDBW	32,530	-117.431	1.143	5 Outer-Shelf	Waverider	1	Datawell Hippy	2D	First5
46236	156 Monterey Canyon, outer, CA	Supporting	Active	4			CDIP/CDBW/USACE	36,761	-121.947	168	6 Coastal	Waverider	1	Datawell Hippy	2D	First5
46237	142 San Francisco bar, CA	Backbone	Active	5			CDIP/USACE	37,781	-122.599	15	5 Coastal	Waverider	1	Datawell Hippy	2D	First5
46238	167 San Nicolas Island North, CA	Supporting	Active	3			CDIP/Navy	33.405	-119.467	772	2 Offshore	Waverider	1	Datawell Hippy	2D	First5
46239	157 Point Sur, CA	Supporting	Active	3			CDIP/CDBW/USACE	36.338	-122.101	366	4 Outer-Shelf	Waverider	1	Datawell Hippy	2D	First5
46240	158 Cabrillo Point, Monterey Bay, CA	Supporting	Active	3			CDIP/Hopkins Marine Lab	36.626	-121.907	19	4 Coastal	Waverider	1	Datawell Hippy	2D	First5
46242	043 Camp Pendleton Nearshore, CA	Supporting	Active	4			CDIP/Navy	33.220	-117.440	20	5 Coastal	Waverider	1	Datawell Hippy	2D	First5
46243	162 Clatsop Spit, OR	Backbone	Active	5			CDIP/USACE	46.200	-124.117	25	3 Coastal	Waverider	1	Datawell Hippy	2D	First5
46244	168 Humboldt Bay, North Spit, CA	Supporting	Active	3			CDIP/USACE	40.888	-124.357	112	3 Outer-Shelf	Waverider	1	Datawell Hippy	2D	First5
46247	180 San Francisco Offshore, CA	Supporting	Active	4			CDIP/USACE	37.753	-122.833	53	2 Coastal	Waverider	1	Datawell Hippy	2D	First5
46248	179 Astoria Canyon, OR	Supporting	Active	3			CDIP/USACE	46.133	-124.667	192	2 Outer-Shelf	Waverider	1	Datawell Hippy	2D	First5
46249	182 Santa Cruz Island South, CA	Supporting	Active	4			CDIP/Navy	33.821	-119.708	1,737	2 Offshore	Waverider	1	Datawell Hippy	2D	First5
81010	Proposed - Santa Cruz Offshore	Backbone	Proposed	5	3		Proposed	33.330	-123.090	4,300	Offshore				2D	First5
85100	Rover Buoy - Pacific Coast	Supporting	Proposed	3	4		Proposed	47.901	-124.667	20	Rover Buoy				2D	First5
85101	Rover Buoy - Pacific Coast	Supporting	Proposed	4	4		Proposed	44.623	-124.114	30	Rover Buoy				2D	First5
85102	Rover Buoy - Pacific Coast	Supporting	Proposed	5	4		Proposed	42.867	-124.569	20	Rover Buoy				2D	First5
85103	Rover Buoy - Pacific Coast	Supporting	Proposed	4	4	Add Hippy to 46027, not need 85103	Proposed	41.797	-124.307	20	Rover Buoy				2D	First5
LJPC1	073 Scripps Pier, La Jolla, CA	Supporting	Active	4			CDIP	32.867	-117.257	6	37 Coastal	Pressure	Pier mount	Pressure	1D	no upgrade
	Pacific Islands							•		•						
32012	Woods Hole Stratus Wave Station	Backbone	Active	4			WHOI	-19.713	-85.585	4,440	Offshore		2		2D	no upgrade
51000	(LLNR 28007.5) - Northern Hawaii	Backbone	Active	3	2	Dual Station with 51100	NDBC	23.546	-154.056		4 Offshore	Discus-F	3	DDWM/3DMG	2D	upgrade
51001	NW Hawaii 170NM WNW Kauai, HI	Backbone	Active/Offline	6		stopped 12/25/2009, dual location with	NDBC	23.432	-162.208	3,252	29 Offshore	Discus	3	Datawell Hippy	2D	First5
51002	SW Hawaii 215NM SSE Hilo, HI	Backbone	Active	4	5		NDBC	17.094	-157.820	5,002	28 Offshore	Discus	3	Schaevitz LSOC_	1D	upgrade
51003	W Hawaii 205NM SW Honolulu, HI	Backbone	Active	4	3		NDBC	19.018	-160.582	4,920	28 Offshore	Discus	3	Schaevitz LSOC_	1D	upgrade
51004	SE Hawaii 185NM SE Hilo, HI	Backbone	Active	5	3		NDBC	17.525	-152.382	4,901	28 Offshore	Discus	3	DDWM/3DMG	2D	upgrade
51100	Northern Hawaii	Backbone	Active	3	5	Dual Station with 51000	NDBC	23.558	-153.900	4,755	4 Offshore	Discus	3	DDWM/3DMG	2D	upgrade
51101	(LLNR 28009) - NW Hawaii	Backbone	Active	4	5	Dual station with 51001	NDBC	24.321	-162.058	4,792	4 Offshore	Discus	3	DDWM/3DMG	2D	upgrade
51201	106 Waimea Bay, HI	Backbone	Active	5			CDIP/PacIOOS	21.673	-158.116	200	11 Coastal	Waverider	1	Datawell Hippy	2D	First5
51202	098 Mokapu Point, HI	Backbone	Active	5			CDIP/PacIOOS	21.415	-157.678	100	12 Coastal	Waverider	1	Datawell Hippy	2D	First5
51203	146 Kaumalapau, Lanai, HI	Backbone	Active	6			CDIP/PacIOOS	20.788	-157.010	201	6 Coastal	Waverider	1	Datawell Hippy	2D	First5
51204	165 Barbers Point, HI	Backbone	Active	5			CDIP/PacIOOS	21.281	-158.124	3,000	2 Offshore	Waverider	1	Datawell Hippy	2D	First5
51205	187 Pauwela, Maui, HI	Backbone	Active	6			CDIP/PacIOOS	21.020	-156.427	213	1 Coastal	Waverider	1	Datawell Hippy	2D	First5
51206	188 Hilo, Hawaii, HI	Backbone	Active	6			CDIP/PacIOOS	19.781	-154.968	347	1 Coastal	Waverider	1	Datawell Hippy	2D	First5
51207	198 Kaneohe Bay, HI	Supporting	Active	4			CDIP/PacIOOS	21.478	-157.753	81	0 Coastal	Waverider	1	Datawell Hippy	2D	First5
52200	121 Ipan, Guam	Backbone	Active	5			CDIP/PacIOOS	13.354	144.788	200	9 Outer-Shelf	Waverider	1	Datawell Hippy	2D	First5
52201	163 Kalo Majuro, Marshall Islands	Backbone	Active	5			CDIP/NSF	7.092	171.394	465	3 Coastal	Waverider	1	Datawell Hippy	2D	First5
52202	196 Ritidian Point, Guam	Backbone	Active	5			CDIP/PacIOOS	13.683	144.812	515	0 Coastal	Waverider	1	Datawell Hippy	2D	First5
52211	197 Tanapag, Saipan, CNMI	Backbone	Active	5			CDIP/PacIOOS	15.267	145.662	475	0 Coastal	Waverider	1	Datawell Hippy	2D	First5
81020	Proposed - Christmas Island DWA	Backbone	Proposed	4	2	51028 ended 4/08, Proposed	Proposed	0.000	-153.913	4,572	10 Offshore				2D	First5
84110	Proposed - Tutuila, American Samoa	Backbone	Proposed	5	3	PacIOOS location (2013)	Proposed	-14.400	-170.660	2,500	Coastal				2D	First5
84130	Proposed - Koror Palau	Backbone	Proposed	5	4	PacIOOS location (2014)	Proposed	7.117	135.150		Coastal				2D	First5
84140	Rover Buoy - Hanalei, Kauai, HI	Supporting	Proposed	5	4	PacIOOS location (2014)	Proposed	22.270	-159.510	122	Rover Buoy				2D	First5
84160	Rover Buoy - Midway Atoll, HI	Supporting	Proposed	4	2	PacIOOS location (2013)	Proposed	28.180	-177.360	200	Rover Buov				2D	First5

Table 1. Summary of Active Wave Observing Platforms Discus Nomad 3-m Other Buoy Configurations Shallow **Bottom Mount** Pier Mount Unknown Total Region 1.12 1.75 <u>~</u> 12 9 6 3 8 Atlantic Coast 8 27 8 12 66 Non-Directional 10 26 12 40 Directional 17 Gulf of Mexico Non-Directional 8 Directional 14 Pacific Coast 27 58 Non-Directional 12 14 15 29 Directional 44 Alaskan Coast 28 Non-Directional 25 19 Directional Pacific Islands 19 Non-Directional Directional 21 **Great Lakes** Non-Directional 12 Directional Caribbean Non-directional Directional Total 87 56 218 9 Non-directional 34 53 30 83 135 56 Directional Canadian Note: Number of Canadian sites is included in the totals

Table 2a. Summ (diameters in m)	ary o	of Ac	tive Ba	ckbone	Wav	ve Ol	oserv	/ing	Platf	orms	5		
(diamotoro in m)	Dis	cus	Nomad	Discus		Othe	er Buo	y Con	figura	tions			
Region	12	10	6	3	2.5	2.4	2	1.8	1.75	1.12	6.0	Bottom Mount	Total
Atlantic Coast			6	25		1	1		1		10	2	46
Non-Directional			6	9			1						16
Directional				16		1			1	1	10	2	30
Gulf of Mexico		2		9							1		12
Non-Directional Directional		2		1 8							1		1 11
Pacific Coast				25							16		41
Non-Directional Directional				11 14							16		11 30
Alaskan Coast	2		14								2		18
Non-Directional Directional	2		14								2		16 2
Pacific Islands				7		1					10		18
Non-Directional Directional		•••••		2 5		1					10		2 16
Great Lakes				5		4				4			13
Non-Directional Directional				1 4		2 2				4			3 10
Caribbean			2	3	3						1		9
Non-directional Directional			2	3	2 1						1		4 5
Total	2	2	22	74	•	6	1		1	4	40	2	_
Non-directional		_	22	24	2	2	1			<u>'</u>	,,,		53
Directional	†	2		50	1	4			1	4	40	2	104

Table 2b. Summa	ary c	of Ac	tive S	upporti	ng V	/ave	Obse	ervat	ion F	latfo	rms				
(diameters in m)	Dis	cus	Nomad	Discus		Othe	r Buo	v Conf	figurat	ions		Ş	Shallov	v	
Region	12	10	6	3	2.5	2.4	~ 240	1.8	1.75	1.12	6.0	Bottom Mount	Pier Mount	Unknown	Total
Atlantic Coast			2	2			7		6		2	1			20
Non-Directional Directional			2	<u>1</u> 1			7		6		2	1			10 10
Gulf of Mexico												3		2	5
Non-Directional Directional												3		2	2 3
Pacific Coast			1	2							13		1		17
Non-Directional Directional			1	<u>1</u> 1							13		1		3 14
Alaskan Coast			5	5											10
Non-Directional Directional			5	4 1											9 1
Pacific Islands											1				1
Non-Directional Directional					•••••			•••••			1				1
Great Lakes				4					2	2					8
Non-Directional Directional				4					2	2					6 2
Caribbean															
Non-directional Directional				•	•••••			•••••							
Total			8	13			7		8	2	16	4	1	2	61
Non-directional Directional			8	10 3			7		2 6	2	16	4	1	2	30 31

Note: Table totals include Canadian sites, which are also totaled in the bottom row

Canadian

Table 3. Summary of Proposed and Active Wave Observation Locations

				•																																
														Sub	net																	To	tal			
			0	ffsho	re					Out	ter-SI	helf					Inn	er-SI	nelf					С	oasta	al										
Region	Backbone Design	Exists	Proposed	Directional Upgrade	Supporting	Sentinel	Sentinel, Supporting	Backbone Design	Exists	Proposed	Directional Upgrade	Supporting	Sentinel	Sentinel, Supporting	Backbone Design	Exists	Proposed	Directional Upgrade	Supporting	Sentinel	Sentinel, Supporting	Backbone Design	Exists	Proposed	Directional Upgrade	Supporting	Sentinel	Sentinel, Supporting	Backbone Design	Exists	Proposed	Directional Upgrade	Supporting	Sentinel	Sentinel, Supporting	Rover Buoy
Atlantic Coast	13	11	2	8	1	3		10	7	3	5	2	4	1	11	10	1	8	2	4		30	18	12	5	15	4	1	64	46	18	26	20	15	2	4
Gulf of Mexico	4	4		3	1	3		6	2	4	2		1		5	4	1	3		1		10	2	8	2	4			25	12	13	10	5	5		1
Pacific Coast	11	10	1	7	3	6	1	23	23		12	5	17						1		1	8	8		1	8	2	1	42	41	1	20	17	25	3	4
Alaskan Coast	7	7		5	7	1	5	9	9		6		1		5		5					2	2			3			23	18	5	11	10	2	5	5
Pacific Islands	10	9	1	6		4		1	1													10	8	2		1			21	18	3	6	1	4		2
Great Lakes															13	9	4	9	6	8	2	4	4			2			17	13	4	9	8	8	2	13
Caribbean	5	5		5																		4	4						9	9		5				
Total	50	46	4	34	12	17	6	49	42	7	25	7	23	1	34	23	11	20	9	13	3	68	46	22	8	33	6	2	201	157	44	87	61	59	12	29

Table 4. Ranking of Active & Proposed Wave Observing Locations, including Proposed Rover Buoys

						Ran	king	3						
Region	1	2			3	•	4	;	5	6	j	7	T	otal
Atlantic Coast			11		17		31		24		5			88
Backbone		3		11		25		20		5			64	
Supporting		8		6		6		4					24	
Gulf of Mexico			3		3		10		10		5			31
Backbone				1		9		10		5			25	
Supporting		3		2		1							6	
Pacific Coast			1		13		21		22		2		1	63
Backbone		1		4		10		21		2		4	42	
Supporting				9		11		1					21	
Alaskan Coast			4		18		8		8					38
Backbone				14		1		8					23	
Supporting		4		4		7							15	
Pacific Islands					2		7		11		4			24
Backbone				2		5		10		4			21	
Supporting						2		1					3	
Great Lakes			3		4		15		8		6		2	38
Backbone				1		5		3		6		2	17	
Supporting		3		3		10		5					21	
Caribbean					3		4		1		1			9
Backbone				3		4		1		1			9	
Supporting														
Total			22		60		96		84		23		6	291
Backbone		4		36		59		73		23		6	20	
Supporting		18		24		37		11					90	

Ranking Criteria (0-8 pts) - Sentinel location: >20 yrs,1 pt., > 30 yrs, 2 pt.; Backbone Location: 2 pt, Supporting: 1 pt.; Port < 80 km: 1 pt; No other Backbone Buoy<100km: 1 pt; Directional: 1 pt, First-5 Directional: 2 pt

Table 5a. Ranking of Active Wave Observing Locations

	l					Ran	king	1						
Region	1	2			3	·	4	·	5	•	6	7		Total
Atlantic Coast			11		17		23		11		4			66
Backbone		3		11		18		10		4				46
Supporting		8		6		5		1						20
Gulf of Mexico			3		3		6		3		2			17
Backbone				1		6		3		2				12
Supporting		3		2									П	5
Pacific Coast			1		12		19		20		2		4	58
Backbone		1		4		10		20		2		4		41
Supporting				8		9								17
Alaskan Coast			4		18		3		3					28
Backbone				14		1		3						18
Supporting		4		4		2								10
Pacific Islands					2		5		8		4			19
Backbone				2		4		8		4				18
Supporting						1								1
Great Lakes			3		3		7		2		4		2	21
Backbone				1		4		2		4		2		13
Supporting		3		2		3								8
Caribbean					3		4		1		1			9
Backbone				3		4		1		1				9
Supporting														
Total			22		58		67		48		17		6	218
Backbone		4		36		47		47		17		6		157
Supporting		18		22		20		1						61

Ranking Criteria (0-8 pts) - Sentinel location: >20 yrs,1 pt., > 30 yrs, 2 pt.; Backbone Location: 2 pt, Supporting: 1 pt.; Port < 80 km: 1 pt; No other Backbone Buoy<100km: 1 pt; Directional: 1 pt, First-5 Directional: 2 pt

Table 5b. Ranking of Proposed Wave Observing Locations, including Proposed Rover Buoys

				Ranking	9			
Region	1	2	3	4	5	6	7	Total
Atlantic Coast				8	13	1		2
Backbone				7	10	1		18
Supporting				1	3			4
Gulf of Mexico				4	7	3		14
Backbone				3	7	3		13
Supporting				1				1
Pacific Coast			1	2	2			5
Backbone					1			1
Supporting			1	2	1			4
Alaskan Coast				5	5			10
Backbone					5			5
Supporting				5				5
Pacific Islands				2	3			5
Backbone				1	2			3
Supporting				1	1			2
Great Lakes			1	8	6	2		17
Backbone				1	1	2		4
Supporting			1	7	5			13
Caribbean								
Backbone								
Supporting								
Total			2	29	36	6		73
Backbone				12	26	6		44
Supporting			2	17	10			29

Ranking Criteria (0-8 pts) - Sentinel location: >20 yrs,1 pt., > 30 yrs, 2 pt.; Backbone Location: 2 pt, Supporting: 1 pt.; Port < 80 km: 1 pt; No other Backbone Buoy<100km: 1 pt; Directional: 1 pt, First-5 Directional: 2 pt

Table 6. Active Wave Observing Locations: Total Scores

				Score				Total
Region	1	2	3	4	5	6	7	Stations
Atlantic Coast		11	17	23	11	4		66
Gulf of Mexico		3	3	6	3	2		17
Pacific Coast		1	12	19	20	2	4	58
Alaskan Coast		4	18	3	3			28
Pacific Islands			2	5	8	4		19
Great Lakes		3	3	7	2	4	2	21
Caribbean			3	4	1	1		9
Total		22	58	67	48	17	6	218
Percent	0%	10%	27%	31%	22%	8%	3%	

Includes 17 Supporting Canadian Buoys

Regional	
Association	Wave Observation Information Extracted from the 2011 Regional Build-Out Plans
SCCOOS	15 datawells (3 nearshore, 9 shelf, 3 offshore) . Capital cost 900k, O&M 540k
AOOS	15 datawells, one per area (100kmx100km)
CariCOOS	1 plain waverider, 2 waveriders with ADCP, 6 GoMOOS buoys
CenCOOS	assume existing buoys sustained, one mobile Datawell, 3 ADCP w/waves for harbors/entrances
GCOOS	10 multipurpose buoys >50m depth with waves. Couldn't tell from their map where these would go.
GLOS	wave sites not specified, used plan provided by Meadows. Build out plan does include 1 buoy/lake and sustain
	what's there
MARACOOS	50 estuary moorings, 14 Offshore moorings, 20 on platforms of opportunity - total 85
NERACOOS	CDIP - sufficient number to satisfy national wave plan - but exact number not clear; in addition: multipurpose
	buoys - 15 ocean, 15 nearshore/estuary, 15 shore/pier based - all with wave sensors
PacIOOS	CDIP - 11 new buoys in addition to the 8 they already have
	Models/Observations are integrated. Fixed platform statement mentions waveriders with bold comment: Note: We support the National waves plan, but a waverider buoy is not a multipurpose buoy and presently lacks capabilities to measure winds as well as other meteorological parameters. SECOORA will coordinate with NDBC waves plan within the SE region to leverage each others plan on locating resources. Therefore, the number of necessary buoys for column C (Fixed multipurpose) would decrease if Nat'l wave plan is implemented. 50 pier/coastal stations with waves; 11 Ports and Harbors - 44 stations; 50 new multipurpose mooring stations
	w/waves; 24 buoys of National Waves Plan; add 4 bottom mount ADCPs to existing 4 on west shelf florida + 2 existing SC (waves? maybe)
NANOOS	SWAN wave model plans; 15 Datawell buoys (3 open ocean, 9 shelf, 3 coastal) - 7 exist, need 8 - 5 spares

Key to ACRONYMS used

3DMG <u>MicroStrain 3DM-G sensor</u>

ADCP Acoustic Doppler Current Profiler

AMPS NDBC payload package

AOOS <u>Alaska Ocean Observing System</u>

ARES <u>NDBC payload package</u>
ARS Angular Rate Sensor

CariCOOS Caribbean Coastal Ocean Observing System
CBIBS Chesapeake Bay Interpretive Buoy System
CDBW California Dept of Boating and Waterways

CDIP Coastal Data Information Program (operated by the Scripps Institution of

Oceanography

CenCOOS Central and Northern California Ocean Observing System

Coastal Storms Coastal Storms Program (NOAA)

CORMP UNCW Coastal Ocean Research and Monitoring Program
CSI-LSU Coastal Studies Institute Louisanna State University

DACT NDBC payload package

DCMP Delaware Coastal Management Program
DDWM Digital Directional Wave Module (DDWM)

DISCUS-F Discus Buoy Foam

DWPM Directional Wave Processing Module
GCOOS Gulf of Mexico Ocean Observing System

GLOS Great Lakes Observing System

GoMOOS Gulf of Maine Ocean Observing System, now the Gulf of Maine Moored Buoy

Program

IOOS Integrated Ocean Observing System

Joint Oceanographic Commission on Oceanography and Marine Meteorology

JCOMM (under the International Ocean Commission)

LimnoTech Inc., Ann Arbor Michigan

MARACOOS Mid-Atlantic Coastal Ocean Observing System

MARS NDBC payload package

NANOOS Northwest Association of Networked Ocean Observing Systems

NASA National Aeronautic and Space Administration

NDBC NOAA National Data Buoy Center

NERACOOS Northeast Regional Association of Coastal Ocean Observing Systems

NOAA National Oceanic and Atmospheric Administration

NSF National Science Foundation

Pacific Islands Ocean Obsering System

PGE Pacific Gas and Electric

SCCOOS Southern California Coastal Ocean Observing System
SECOORA Southeast Coastal Ocean Observing Regional Association

TRIAXYS Axys Technologies Directional Wave Sensor

UConnDMS University of Connecticut, Department of Marine Sciences

U-Mich University of Michigan UNC University of North Carolina

UNCW University of North Carolina, Wilmington

UNH University of New Hampshire

USACE United States Army Corps of Engineers

USCar University of South Carolina U-WA University of Washington

VIMS Virginia Institute of Marine Science