

LDEO Office of Marine Operations:  
*R/V Marcus G. Langseth*



*Who Works at LDEO OMO :*

- 1) Sean Higgins –Director
- 2) Jesus Gaytan- Technical Services
- 3) John Kinkela- Marine Operations
- 4) Marty Klein- Port Engineer
- 5) Admin Staff: 4 – Purchasing,  
Crewing, Finance
- 6) Marine Technical Staff: 8
- 7) Chief Scientist : Anne Becel

## *What Does OMO Do Before Project:*

- 1) Interface with PI's for Projects
- 2) Science Support Planning
- 3) Environmental Permitting and Acoustic Modeling
- 4) Vessel Clearances (if necessary)
- 5) Coordinate with OBSIC (if necessary)
- 6) Coordinate and Hire Protected Species Observes
- 7) Schedule and Port Call Logistics –When and Where are coming and going from
- 8) Coordinate Project with Ship's Crew – Route Planning, risk assessments, evaluate communications.

## *What Does OMO Do During Project:*

- 1) Interface with PI's for Projects Continuously
- 2) Execute Science Support Plan and collect multiple copies of all data (MCS,SBP, MB, ADCP, Mag,Gravity, etc
- 3) Enforce Requirements of Environmental Permits
- 4) Follow Vessel Clearance Requirements
- 5) Support OBSIC Techs (Deployment and Retrieval)
- 6) Work Closely with 5 Protected Species Observers
- 7) Continuously communicate with Captain, Chief Engineer and Chief Science Officer
- 8) Monitor daily using Multiseis Software and and variety of communications .

## *What Does OMO After Project:*

- 1) Collect Information from PI's, Techs, Crew on performance of project
- 2) Ensure reporting to US State Dept. or Coastal State for any vessel clearance requirements from OMO or PI get completed
- 3) All raw data transferred to R2R for QA/QC and long-term archiving
- 4) Assist with QA/QC with PI's as necessary on MCS data
- 5) Final 90-day report to NOAA NMFS from Protected Species Observers

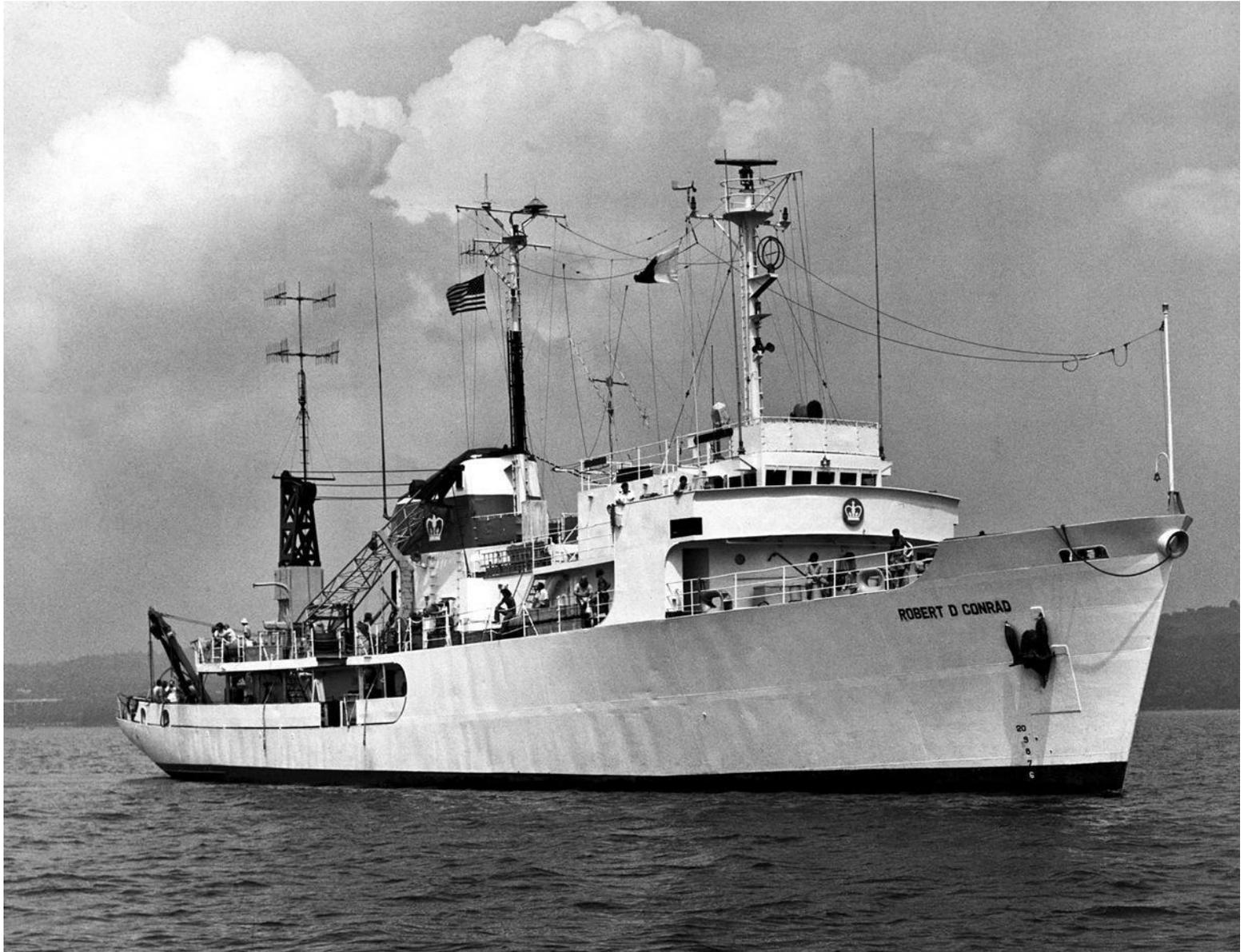
# LDEO Ships: R/V Vema (1953-1981)

Lamont-Doherty Earth Observatory  
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# LDEO Ships: R/V Conrad (1962-89)

Lamont-Doherty Earth Observatory  
COLUMBIA UNIVERSITY | EARTH INSTITUTE



# LDEO Ships: R/V Ewing (1990-2005)

Lamont-Doherty Earth Observatory  
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# R/V Marcus G. Langseth (2007- Present)

Lamont-Doherty Earth Observatory  
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# R/V Langseth Specifications

## Research Vessel Marcus G. Langseth Specifications

Built	1991 (Western Legend)
Conversion	2007 (Marcus G. Langseth)
Length (LOA)	71.5 m/235 ft
Beam (moulded)	17.0 m/ 56 ft
Draft (max)	5.9 m/19.5 ft
Lightship Displacement	2698 LT
Full Load Displacement	4125 LT
Crew	~20
Scientific Personnel	~35
Speed Cruising/Full	11/13 Kts
Range	13,500 Nm
Main Engines	2 x Bergen BRG-6 Diesel
Horsepower	2650kW/ 3550 Hp (each)



Processed multibeam data, showing iceberg gouges on the Chukchi Shelf. The depths are color-coded: Blue is deep and red is shallow.

# Langseth MCS Capability

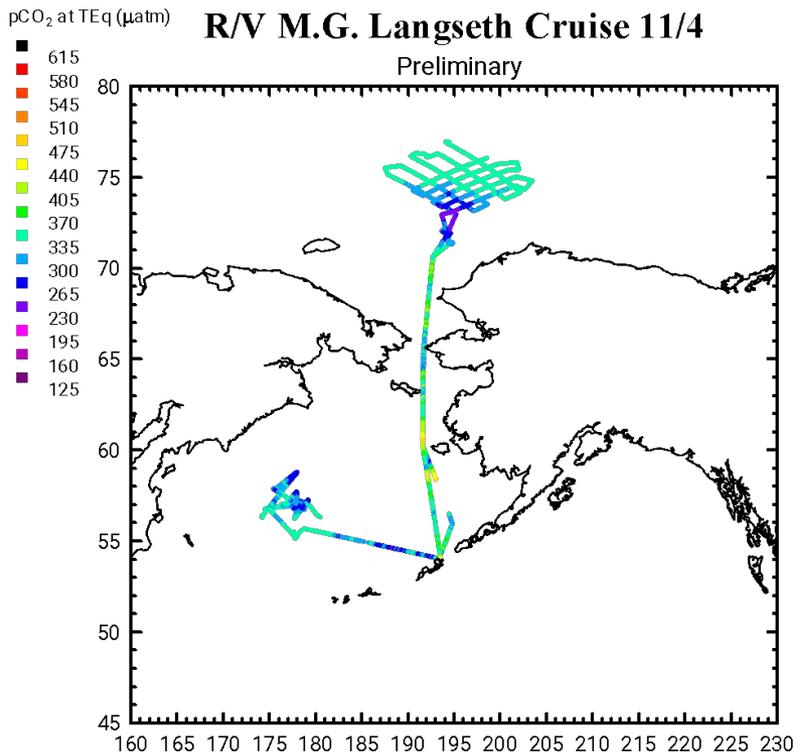
## Multi-Channel Seismic

- Four identical 9-airgun arrays. Each has 1650 cubic inches volume.
- Up to four 6 km streamers for 3D MCS



## Other Acoustic Sources

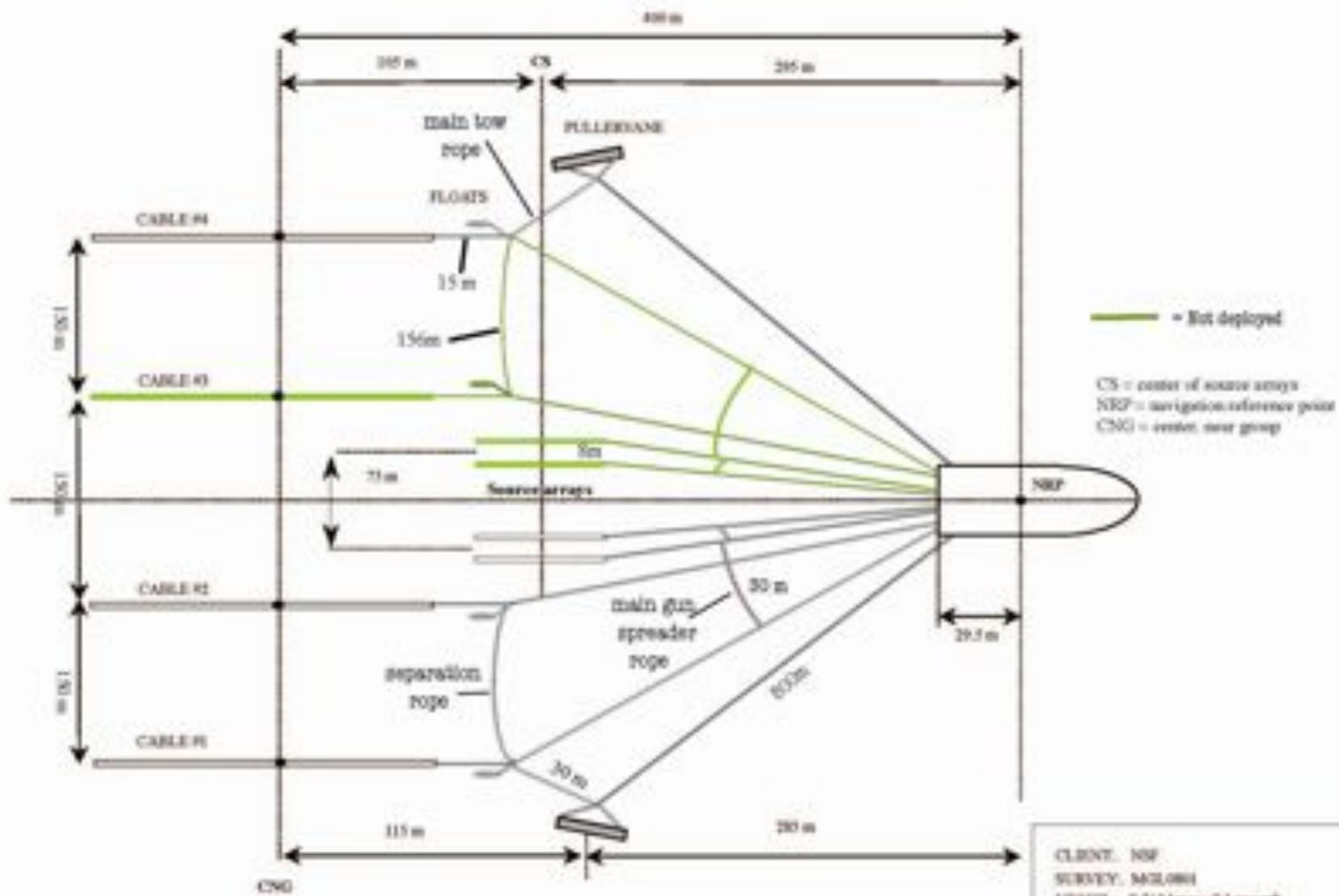
- Kongsberg EM 122 Swath Bathymetric Sonar (12 kHz)
- Knudson 320 B/R sub-bottom profiler (2.0-6.0 kHz)
- Acoustic Doppler Current Profilers (ADCP Teledyne 75)



## Other Routine Data Sets

- Gravity Anomaly
- Magnetic Anomaly
- Surface water pCO<sub>2</sub>

# TOWING CONFIGURATION AND OFFSETS

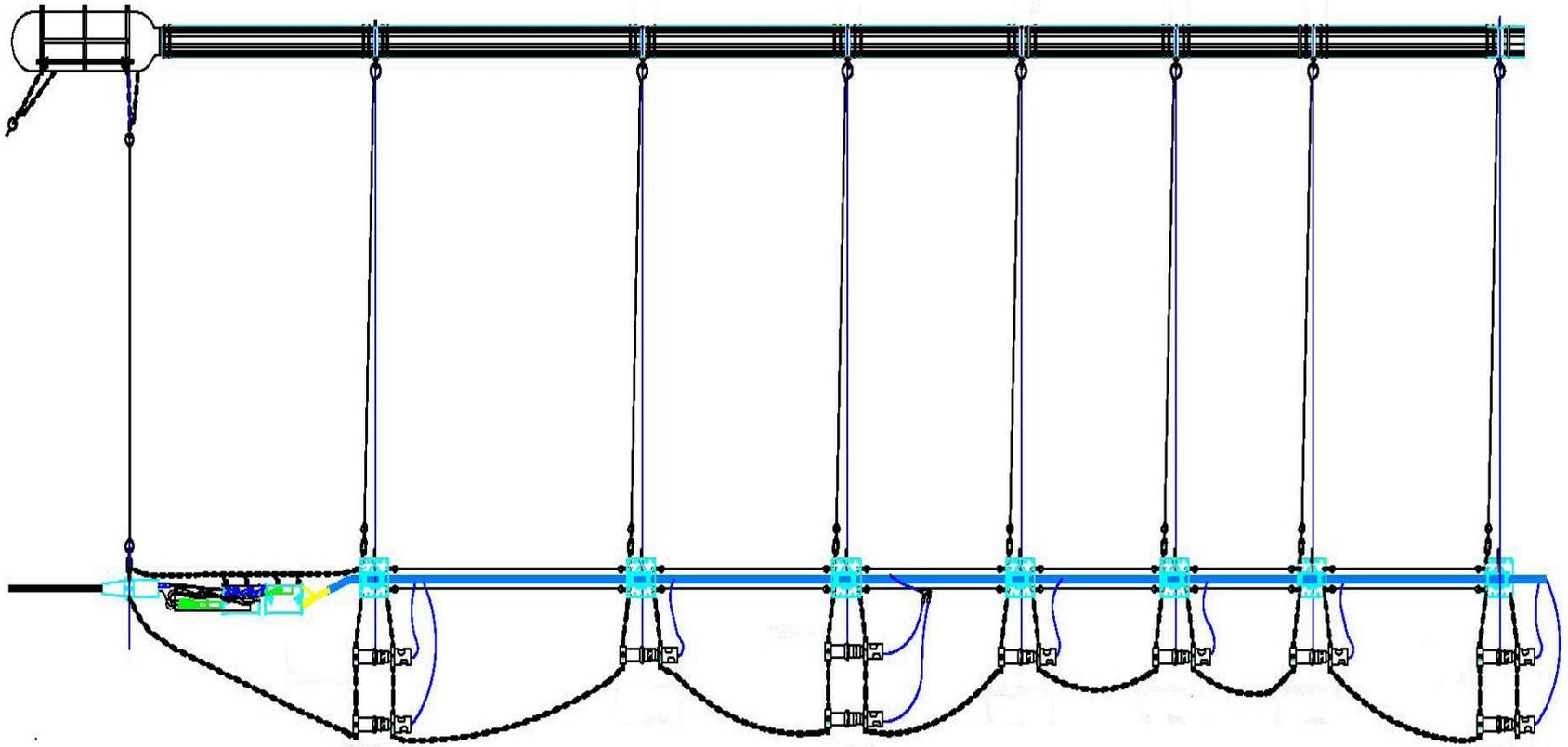




# Langseth Sound Source Arrays



# Seismic source array



# Hydrophone Streamers



Langseth Maximum Array:  
4 hydrophone streamers  
6 kilometers long each

# Ocean Bottom Seismometers



# Langseth Main Lab

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Requirements: IHA and BO

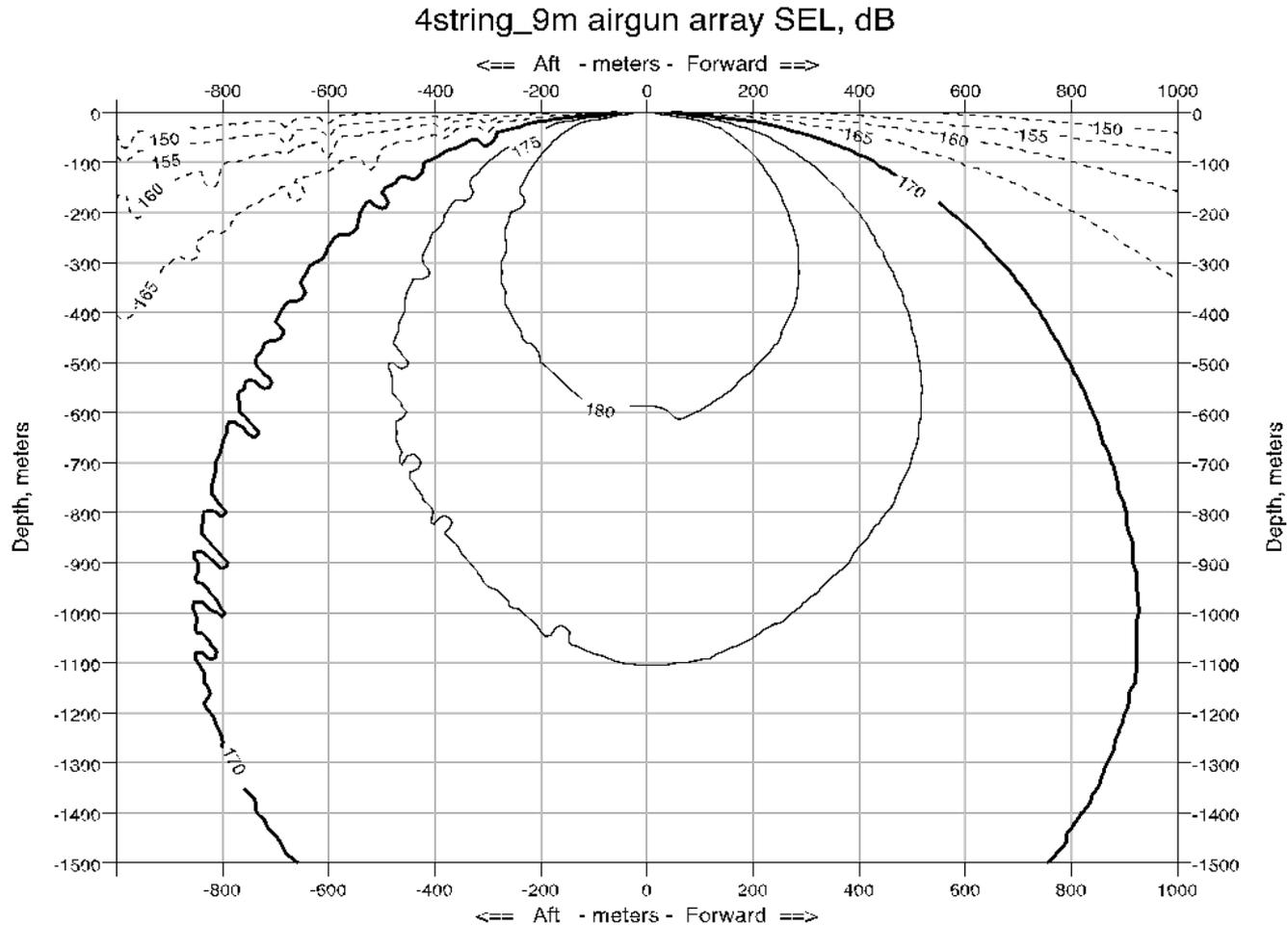
Every US/NSF Funded Project Requires:

Environmental Assessment (EA) to be submitted 6 months before project start.

At a minimum, authorizations from NOAA National Marine Fisheries Service :

**IHA** => Incidental Harassment Authorization under Marine Mammal Protection Act

**BO** => Biological Opinion under the Endangered Species Act.



## Estimate of “Takes” from Environmental Assessment

Species	Reported density <sup>1</sup> (#/1000 km <sup>2</sup> ) in depth range (m)			Ensonified area (1000 km <sup>2</sup> ) in depth range (m)			Calculated Take <sup>2</sup> in depth range (m)				% Regional pop'n <sup>3</sup>	Requeste Level B Te Authorizat
	<100	100-1000	>1000	<100	100-1000	>1000	<100	100-1000	>1000	All		
<b>Mysticetes</b>												
<i>North Atlantic right whale</i>	0	0	0	19.65	9.64	45.75	0	0	0	0	0	0
<i>Humpback whale</i>	0.68	0.60	1.02	19.65	9.64	45.75	13	6	47	66	0.57	66
<i>Minke whale</i>	0.02	0.02	0.04	19.65	9.64	45.75	0	0	2	2	0.01	2
<i>Sei whale</i>	0	0	0	19.65	9.64	45.75	0	0	0	0	0	0
<i>Fin whale</i>	<0.01	0.01	0.01	19.65	9.64	45.75	0	0	0	1	<0.01	1
<i>Blue whale</i>	0	0	0	19.65	9.64	45.75	0	0	0	0	0	0
<b>Odontocetes</b>												
<i>Sperm whale</i>	0.04	0.61	3.01	19.65	9.64	45.75	1	6	138	144	1.09	144
<i>Pygmy/dwarf sperm whale</i>	0.60	0.52	0.89	19.65	9.64	45.75	12	5	41	57	14.49	57
<i>Beaked whales<sup>4</sup></i>	<0.01	0.11	0.54	19.65	9.64	45.75	0	1	25	26	0.74	26
<i>Rough-toothed dolphin</i>	0.28	0.25	0.42	19.65	9.64	45.75	6	2	19	27	N/A	27
<i>Bottlenose dolphin</i>	34.5	328.5	52.8	19.65	9.64	45.75	677	3167	2417	6261	6.66	6261
<i>Pantropical spotted dolphin</i>	13.1	11.4	19.5	19.65	9.64	45.75	257	110	893	1260	28.39	1260
<i>Atlantic spotted dolphin</i>	237.8	84.9	69.2	19.65	9.64	45.75	4674	819	3167	8660	16.99	8660
<i>Spinner dolphin<sup>5</sup></i>	0	0	0	19.65	9.64	45.75	0	0	0	0	0	0
<i>Striped dolphin</i>	<0.01	0.34	2.01	19.65	9.64	45.75	0	3	92	95	0.10	95
<i>Clymene dolphin</i>	6.26	5.46	9.32	19.65	9.64	45.75	123	53	427	602	N/A	602
<i>Common dolphin</i>	6.75	130.5	28.0	19.65	9.64	45.75	133	1258	1283	2674	2.21	2674
<i>Atlantic white-sided dolphin</i>	0	0	0	19.65	9.64	45.75	0	0	0	0	0	0
<i>Fraser's dolphin<sup>6</sup></i>	0	0	0	19.65	9.64	45.75	0	0	0	0	0	0
<i>Risso's dolphin</i>	2.08	5.33	1.92	19.65	9.64	45.75	41	51	88	180	0.88	180
<i>Melon-headed whale<sup>7</sup></i>	0	0	0	19.65	9.64	45.75	0	0	0	0	0	0
<i>Pygmy killer whale<sup>8</sup></i>	0	0	0	19.65	9.64	45.75	0	0	0	0	0	0
<i>False killer whale<sup>9</sup></i>	0	0	0	19.65	9.64	45.75	0	0	0	0	0	0
<i>Killer whale<sup>9</sup></i>	0	0	0	19.65	9.64	45.75	0	0	0	0	0	0
<i>Pilot whale</i>	2.68	52.3	19.8	19.65	9.64	45.75	53	504	908	1465	0.19	1465
<i>Harbor porpoise</i>	0	0	0	19.65	9.64	45.75	0	0	0	0	0	0



MARCUS G. LANGSETH

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NO 001033

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