



Ocean Observatories Initiative



# Pioneer Array Micro-siting Meeting

June 7, 2011

Coastal Institute

University of Rhode Island



# PIONEER ARRAY MICRO-SITING MEETING AGENDA



- Welcome, Introduction
- Pioneer Array Timeline
- Pioneer Array
  - Description
  - Revisions and rationale
- Report on written comments
- Update on Pioneer Array schedule & activities
- Opportunity for questions and answers



## PIONEER ARRAY TIMELINE

- Programmatic EA June 2008
- FONSI PEA February 2009
- Draft Site Specific EA August 2010
- Final EA & FONSI January 2011
- **Micro-siting Public Meetings** October 2010  
November 2010  
**June 2011**
- Test Deployment September 2011 – April 2012 (pending)
- USACE & USCG Permits Winter/Spring 2012
- Deployments 2012, 2013, 2014



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# Pioneer Array: Description of Equipment

# Pioneer Array Design

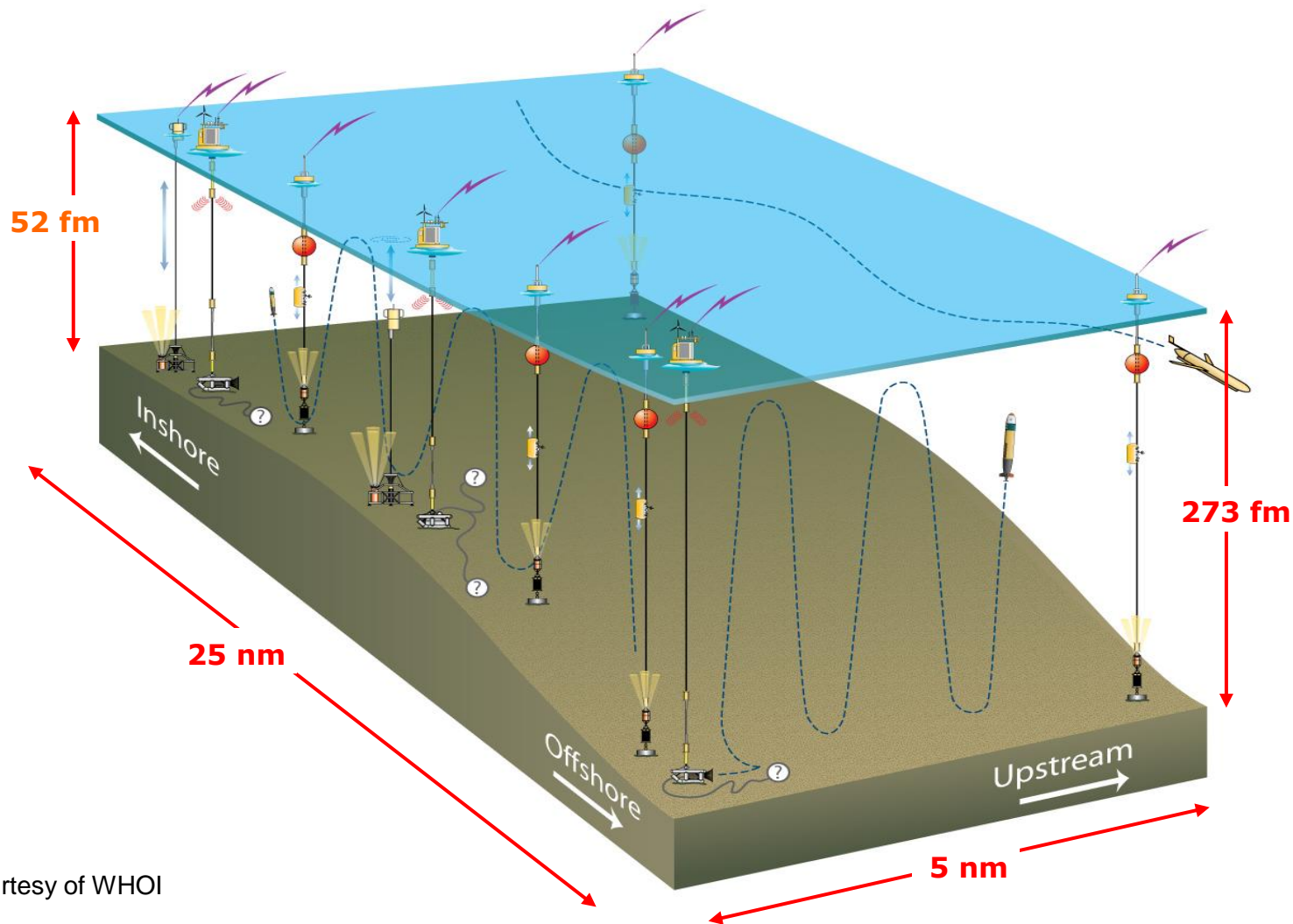
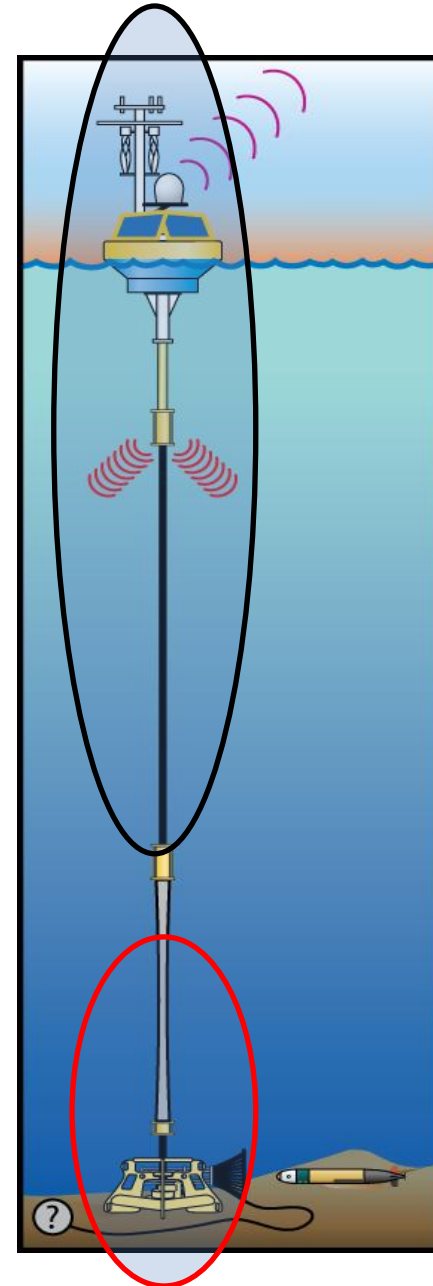


Figure courtesy of WHOI

# Surface Mooring

- Instrumented buoy
  - Surface meteorology, waves
  - Carbon dioxide (air and sea)
- Subsurface instrument frame
  - Temperature and salinity
  - Dissolved oxygen, pH
  - Currents
  - Optical properties
  - Chlorophyll, organic matter, Nitrate
- **Multi-Function Node**
  - Temperature and salinity
  - Dissolved oxygen
  - Currents
  - Optical properties
  - Acoustic zooplankton sensor
  - Connection for additional sensors
- **AUV dock**
  - Inshore and Offshore sites only
  - Offload data and recharge AUV



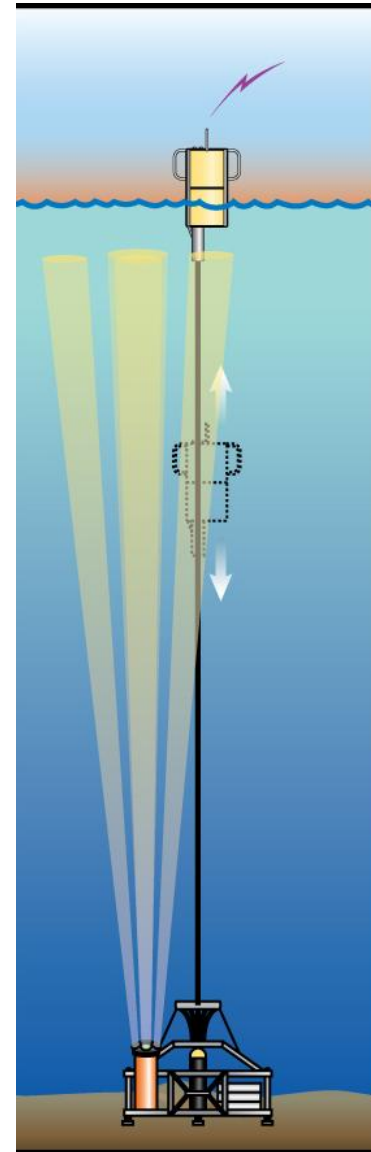
# Moored (wire-following) Profiler

- Telemetry buoy
  - Satellite telemetry to shore
- Subsurface sphere
  - Maintains taut wire
- Subsurface profiling body
  - Temperature and salinity
  - Dissolved oxygen
  - Currents
  - Optical properties
  - Chlorophyll, organic matter
- Subsurface instrument frame
  - Water-column currents



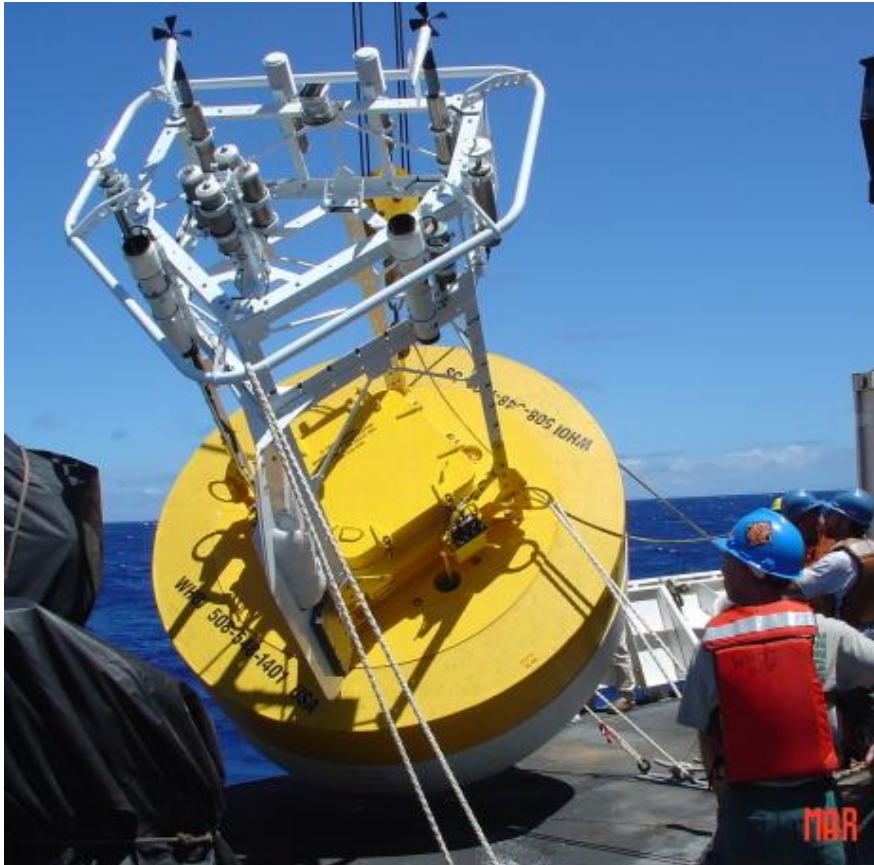
# Winched (surface-piercing) Profiler

- Profiling Body
  - Telemetry to shore
  - Temperature and salinity
  - Dissolved oxygen
  - Dissolved carbon dioxide
  - Currents
  - Optical properties
  - Chlorophyll, organic matter
  - Nitrate
- Bottom frame
  - Water column currents



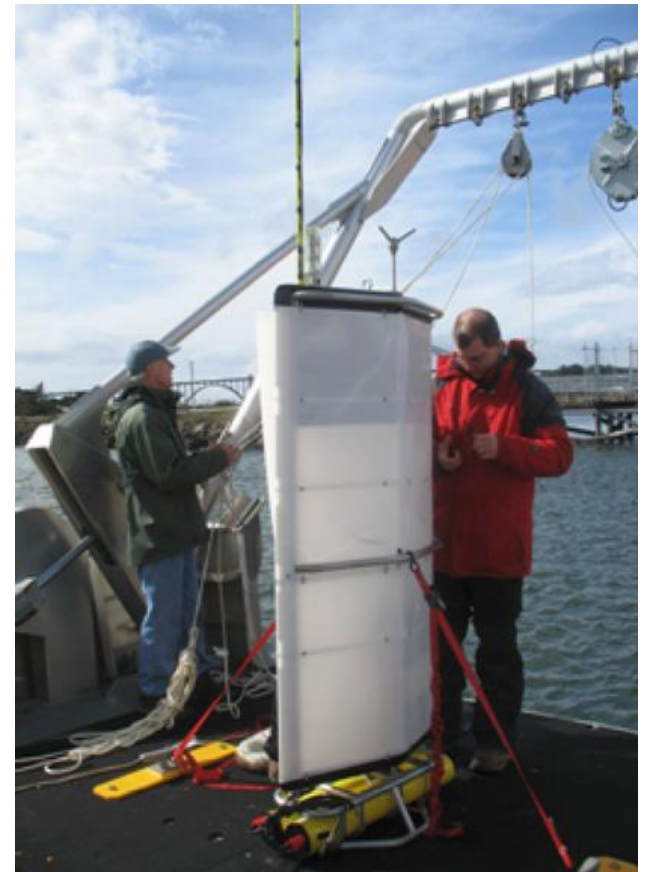


# Representative Buoys



Instrumented Buoy

Winched Profiler



# Representative Buoys



Telemetry Buoy



# Gliders and AUVs

- Gliders and AUVs
  - Temperature, salinity and pressure
  - Dissolved oxygen
  - Currents
  - Optical properties
  - Chlorophyll, organic matter
  - Nutrients (AUVs only)



Representative  
AUV




Representative Glider





# PIONEER ARRAY INSTALLATION SCHEDULE

OOI Installation Schedule		2011				2012				2013				2014			
		Q1 J F M	Q2 A M J	Q3 J A S	Q4 O N D	Q1 J F M	Q2 A M J	Q3 J A S	Q4 O N D	Q1 J F M	Q2 A M J	Q3 J A S	Q4 O N D	Q1 J F M	Q2 A M J	Q3 J A S	Q4 O N D
Coastal Array	Pioneer							 				   					
L e g e n d		 Installation	 Data Flow	 Commissioning	 Gliders Deployed	 AUVs Deployed											

**Legend**



Installation



Data Flow



Commissioning



Gliders  
Deployed



AUVs  
Deployed

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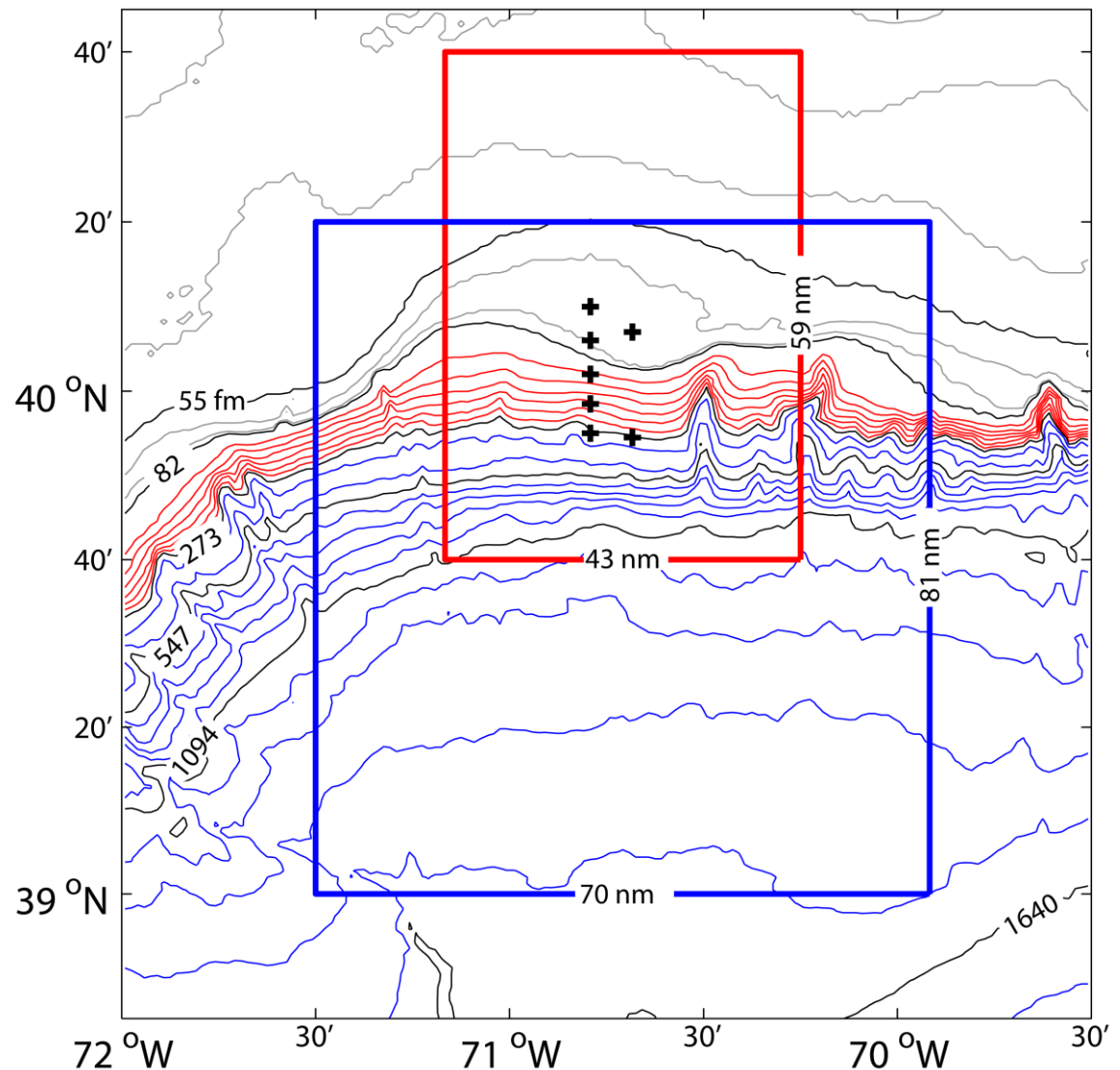
# Pioneer Array: Micro-siting Revisions

# Pioneer Array (Nov 2010)

Moored Array  
15 nm x 5 nm

AUV Operations  
43 nm x 59 nm

Glider Operations  
70 nm x 81 nm

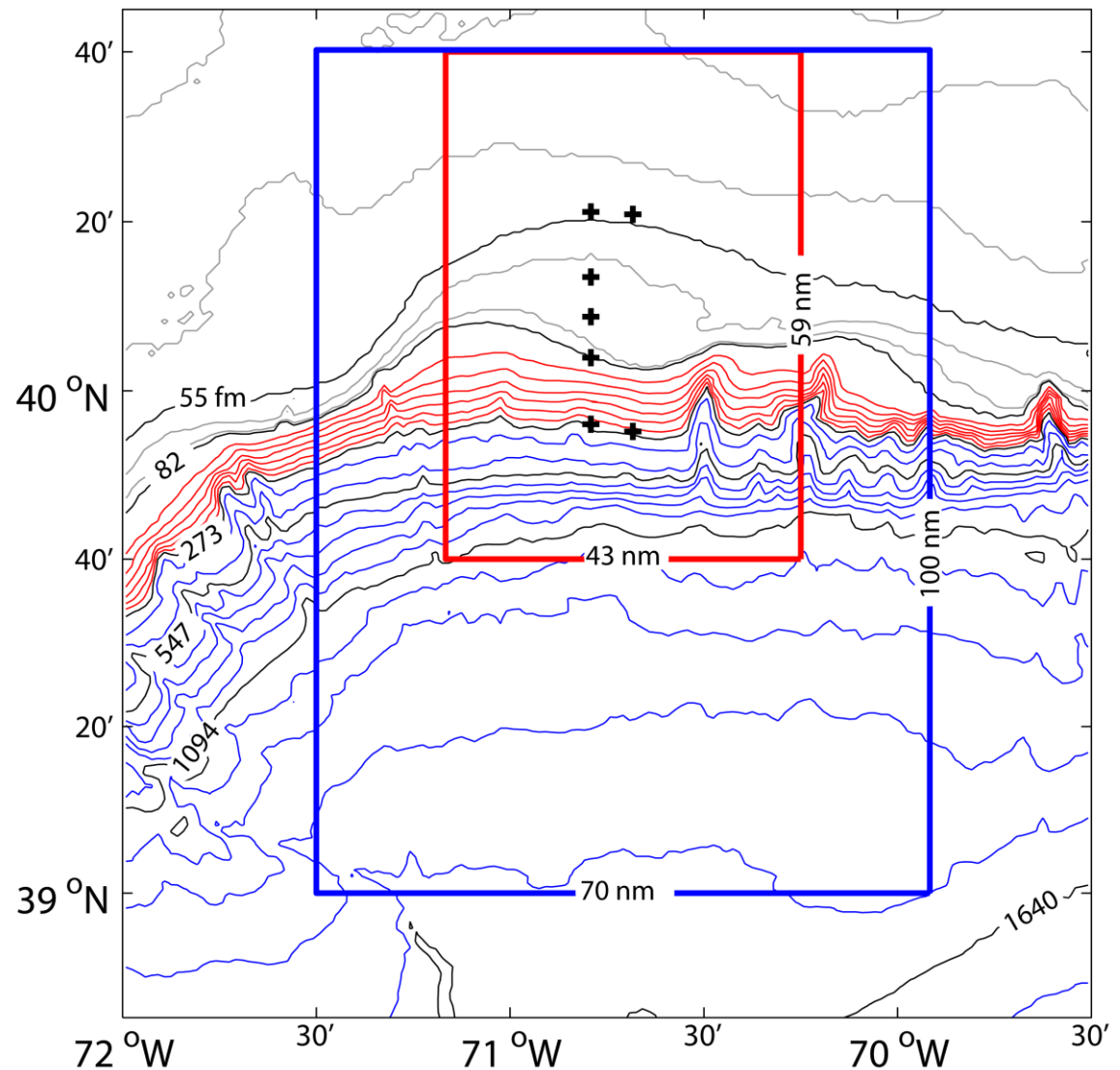


# Revised Pioneer Array (April 2011)

Moored Array  
25 nm x 5 nm

AUV Operations  
43 nm x 59 nm

Glider Operations  
70 nm x 100 nm



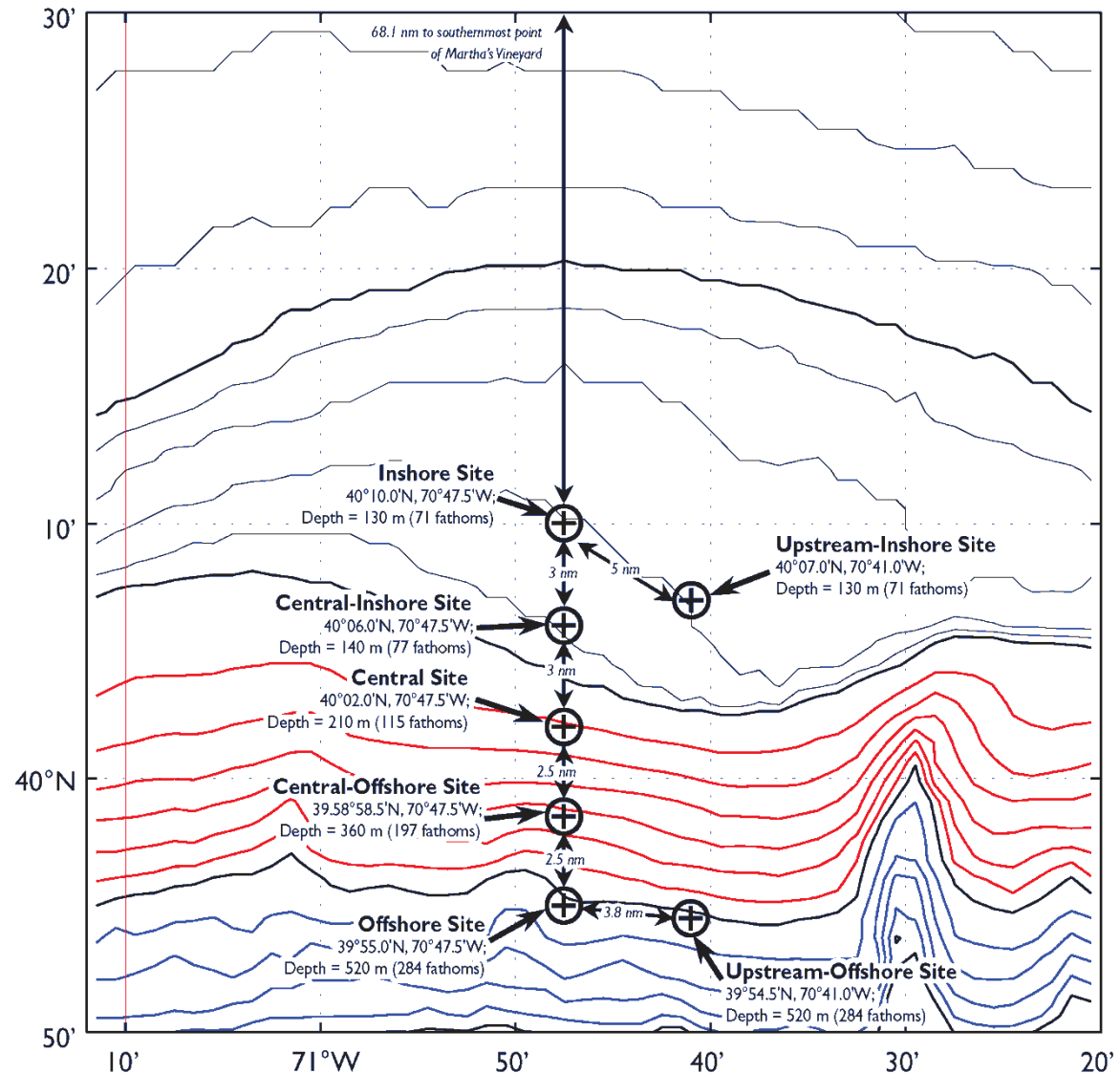
# Pioneer Moored Array (Nov 2010)

North/South extent 15 nm  
East/West extent 5 nm

Distance between moorings  
3.5 nm to 6 nm

Buffer Zone Radius 0.5nm

Distance between Buffer  
Zones 2.5 nm to 5 nm  
(see chart)





# Revised Moored Array (April 2011)

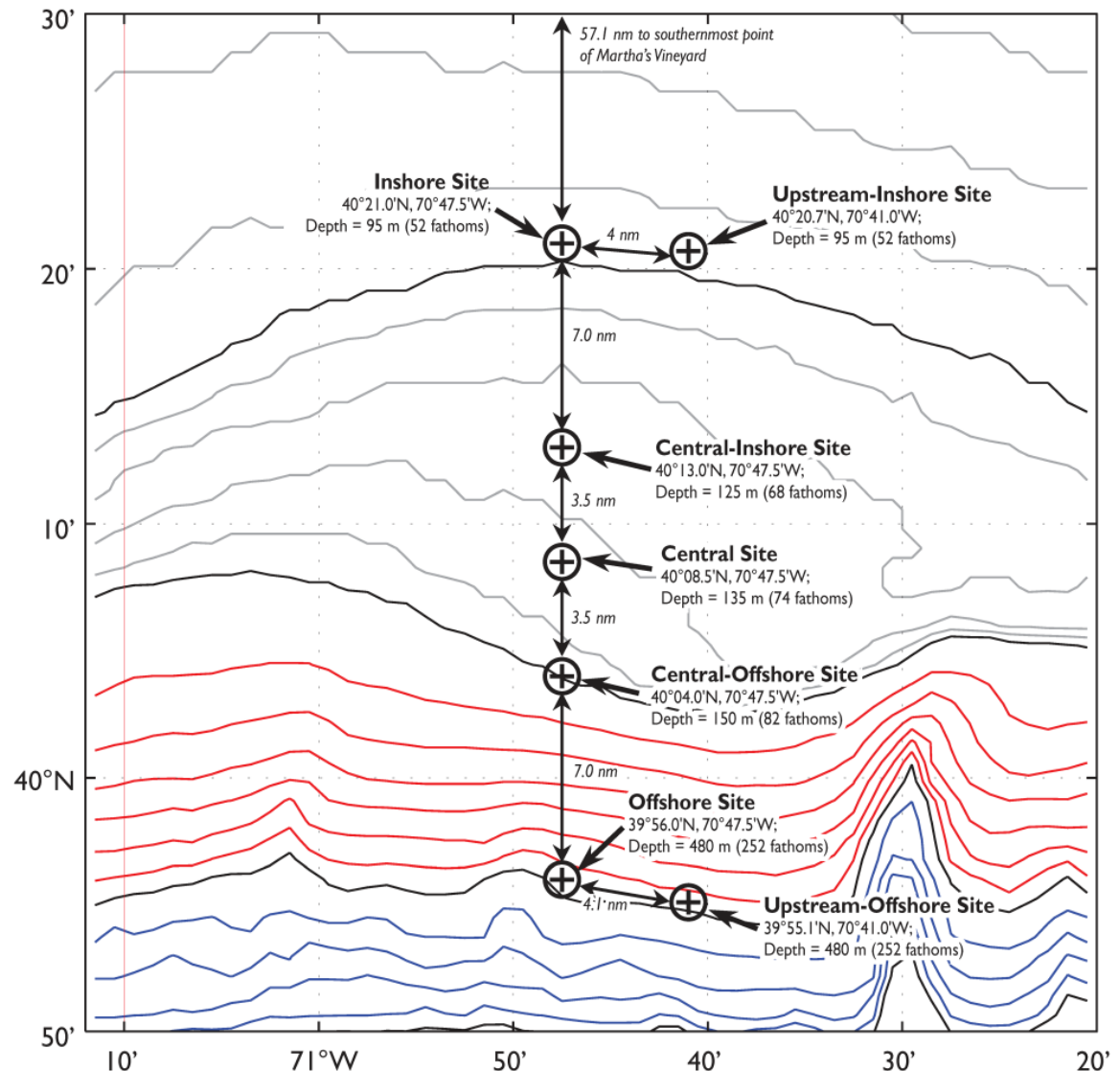
North/South extent 25 nm  
East/West extent 5 nm

Distance between moorings  
4.5 nm to 8 nm

Buffer Zone Radius 0.5nm

Distance between Buffer  
Zones 3.5 nm to 7 nm  
(see chart)

\* Crosses indicate representative  
locations only; precise locations are  
not yet determined



# Navigation Safety

Pioneer Array buoys will follow U.S. Coast Guard Private Aids to Navigation (PATON) regulations:

- Reflective panel and designation letter on hull
- USCG approved lighting (strobed marine lantern)
- Passive Radar reflector (on all buoys)
- Contact information on buoy hull
- Inclusion on the Notice to Mariners, Local Notice to Mariners, and Light List,
- Location marked on NOAA digital charts

# Navigation Safety

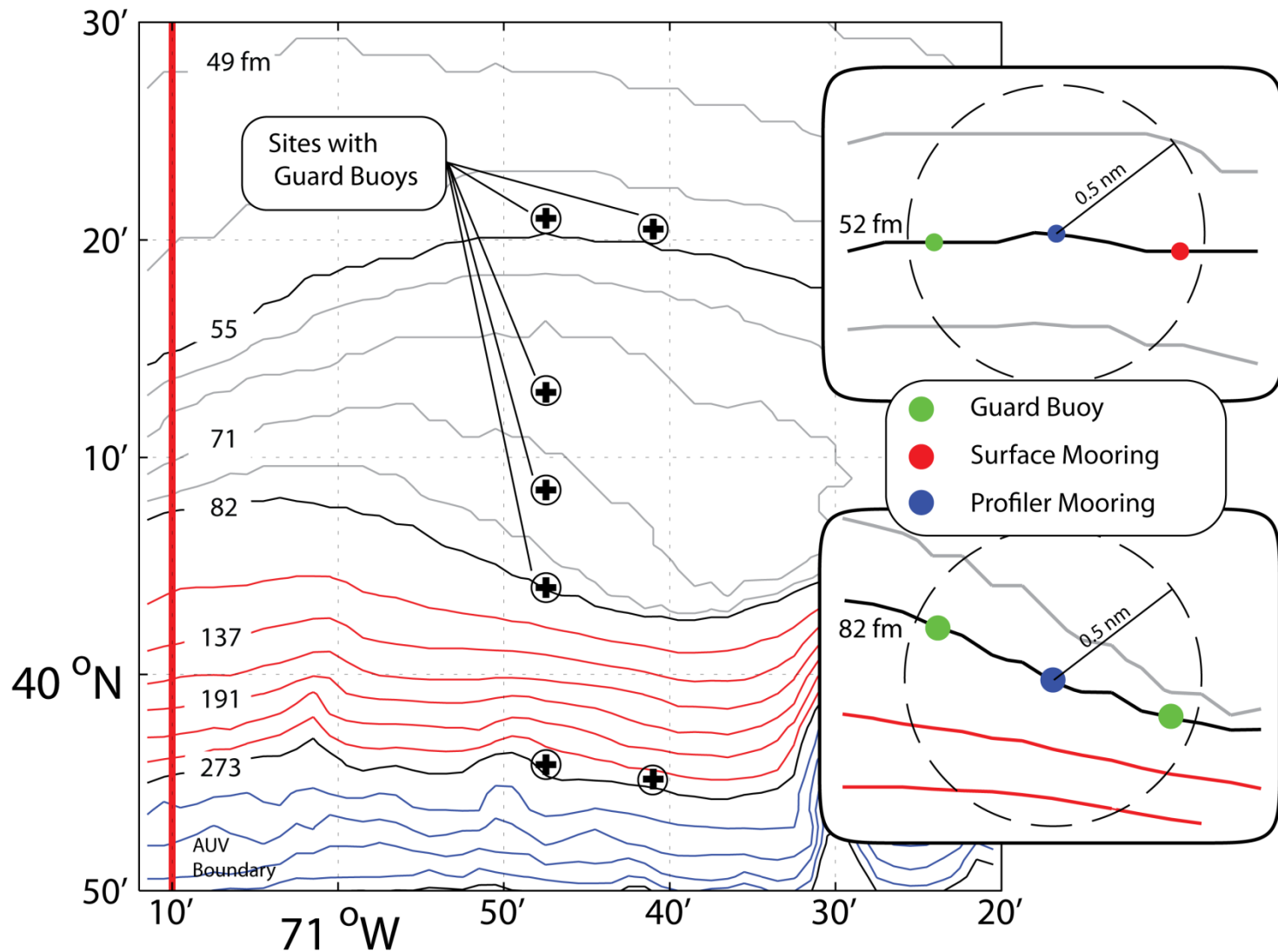
In addition, OOI will also provide:

- Active radar pinger (on some buoys)
- Recommended Area to be Avoided (voluntary buffer zone of 0.5 nm radius around each mooring site)
- Guard buoys to delineate Area to be Avoided for sites shallower than 250 fm.
- Boat Trax (broadcasts buoy positions to nearby, receiver-equipped boats)



Representative  
Guard Buoy

# Guard Buoys in the Revised Array



# Revised Moored Array Description

Site	Name	Location of Site Center	Depth fm (meters)	Surface Mooring	Moored Profiler	Winched Profiler	Guard Buoy
1	Upstream Inshore	40°20.7'N 70°41.0'W	52 (95)	0	1	0	2
2	Inshore	40°21.0'N, 70°47.5'W	52 (95)	1	0	1	1
3	Central Inshore	40°13.0'N, 70°47.5'W	68 (125)	0	1	0	2
4	Central	40°08.5'N, 70°47.5'W	74 (135)	1	0	1	1
5	Central Offshore	40°04.0'N, 70°47.5'W	82 (150)	0	1	0	2
6	Offshore	39°56.0'N, 70°47.5'W	252 (480)	1	1	0	0
7	Upstream Offshore	39°55.1'N 70°41.0'W	252 (480)	0	1	0	0
Science Moorings (10)				3	5	2	--
Guard Buoys (8)				--	--	--	8



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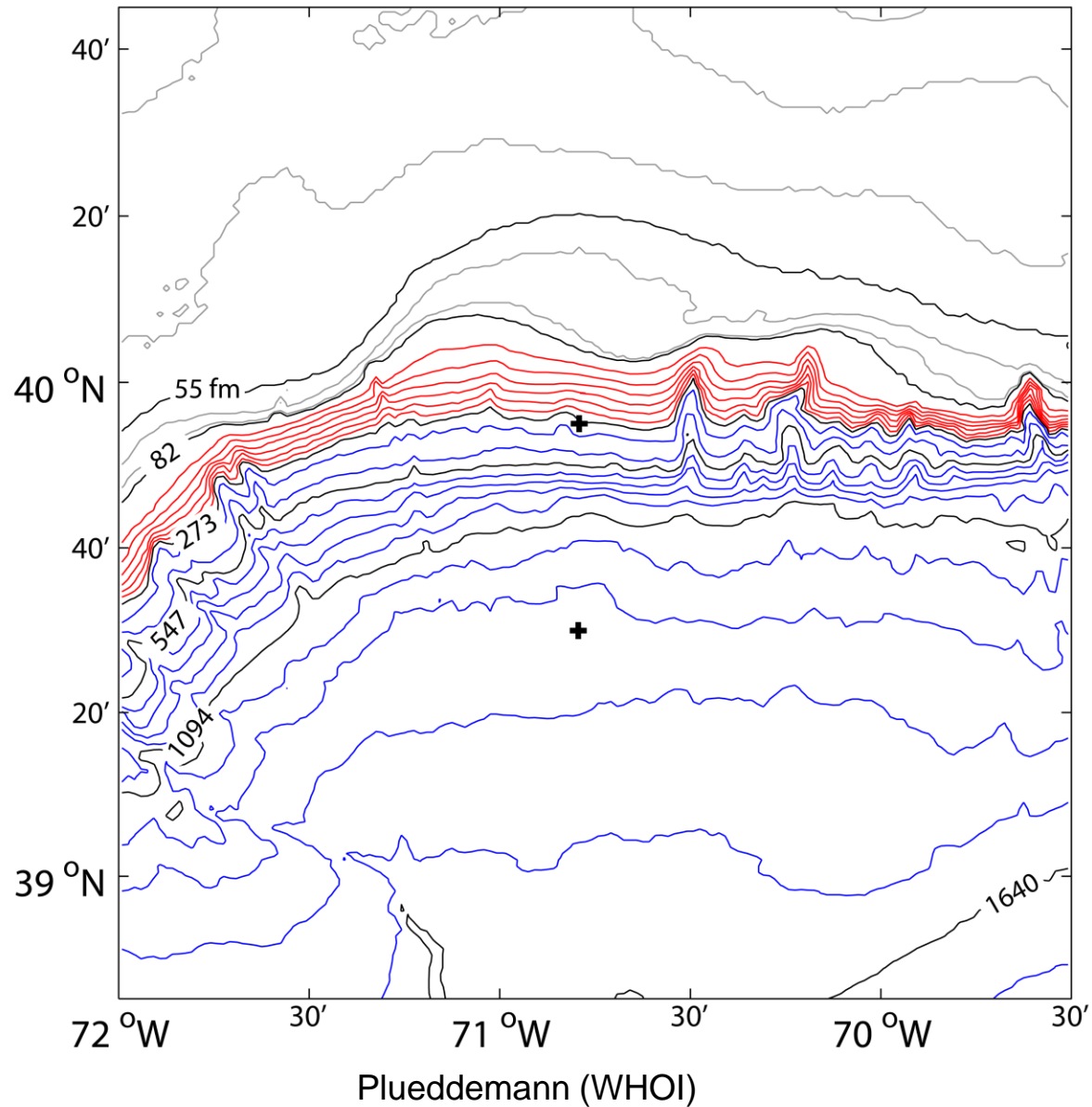
# Ocean Observatories Initiative Test Deployments

## What, When, Where

# OOI Test Deployments: 2011-2012

- Shelfbreak site, 39° 55.0' N, 70° 47.5' W
  - two moorings at 285 fm (520 m)
  - Surface mooring
  - Moored profiler
- Deep Ocean site, 39° 30.0' N, 70° 47.5' W
  - one mooring at 1356 fm (2480 m)
  - Moored profiler (hybrid type)
- Time frame
  - Deploy September 2011
  - Recover April 2012

# Test Deployment Locations







# PIONEER ARRAY COMMENTS

- SEE MATRIX



## PIONEER ARRAY Schedule and Activities

- Science Outreach Day at Whaling Museum
  - September 17<sup>th</sup> – 10am to 2pm
  - Specific Session for Test Update and Q&A
- Test Moorings Deployed – September 22, 2011
- Apply for permit – Winter/Spring 2012
- Meeting in June 2012 to update everyone on test lessons learned and any modifications
- Deploy Gliders – June 2012
- Pioneer Moorings Deployed – 2013, 2014



# PIONEER ARRAY Q&A

- Questions & Answers
- Info
  - <http://www.oceanobservatories.org/about/environmental-compliance/>
  - Monthly emails
  - Meetings
  - We respond to phone calls and emails
    - [Jmcgover@nsf.gov](mailto:Jmcgover@nsf.gov) 703-292-7591