"NSF Ocean Sciences Update"

Ocean Carbon & Biogeochemistry (OCB)

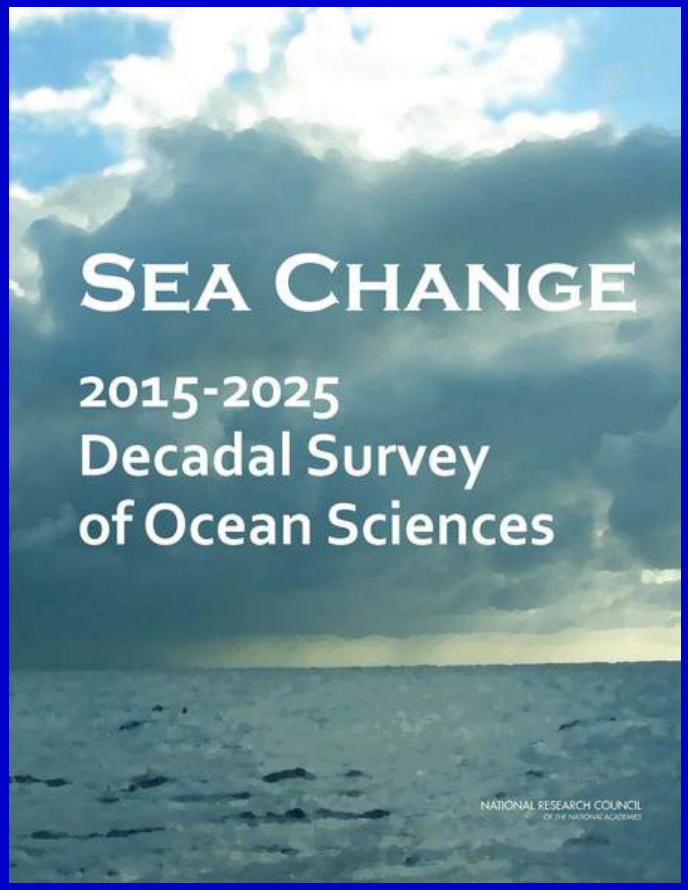
WHOI

July 20, 2015

Rick Murray

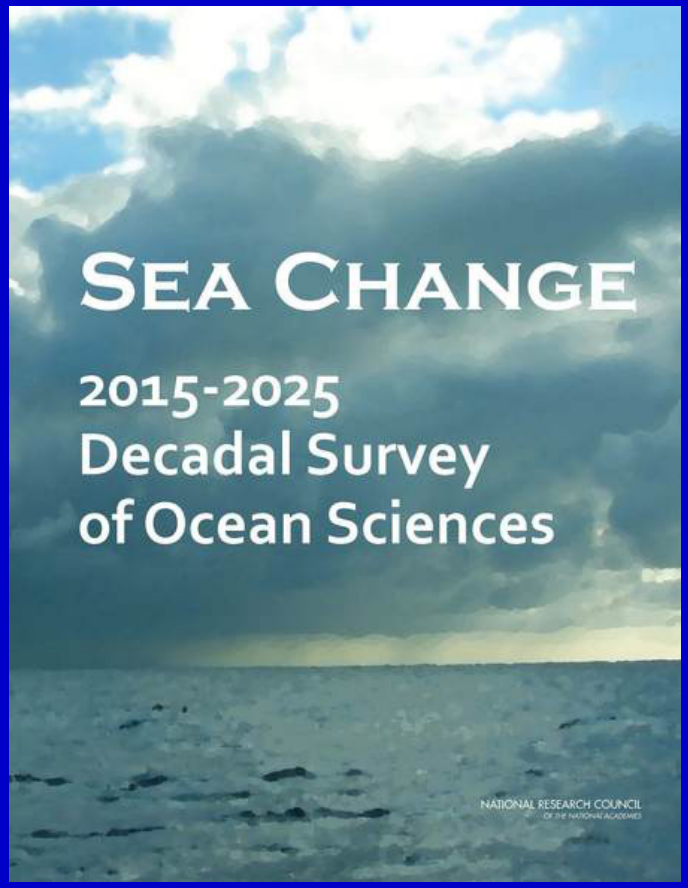
Division Director, Ocean Sciences

NSF in a post-"Sea Change" Ocean: How Much…and Doing What?



Decadal Survey of Ocean Sciences, 2015-2025

NRC/NAS, Released Jan. 23, 2015



2013: David Conover, Div. Dir.

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2015 - : Digestion, Planning, & Implementation

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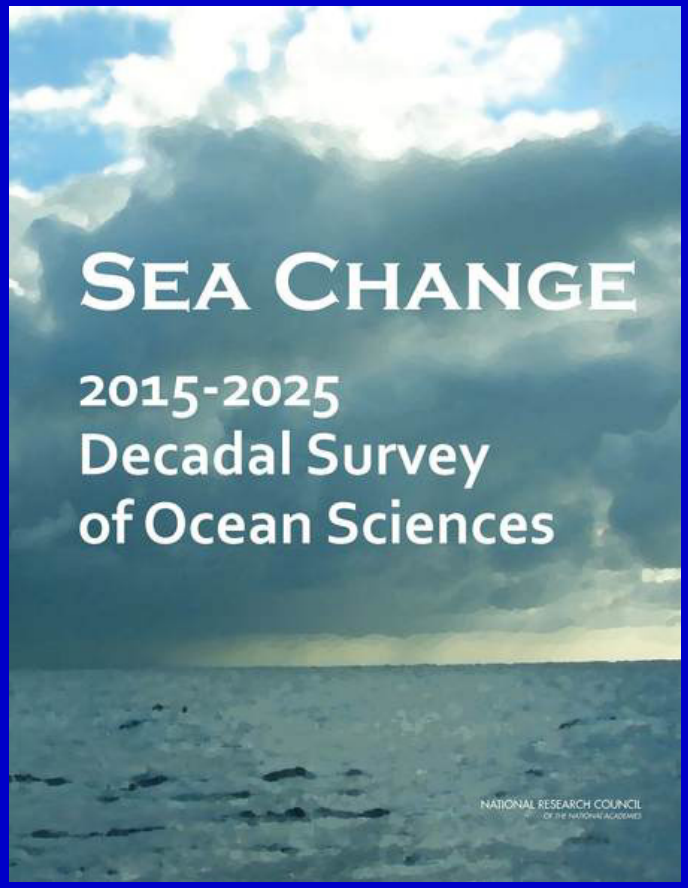

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NSF "reply"
May 11, 2015

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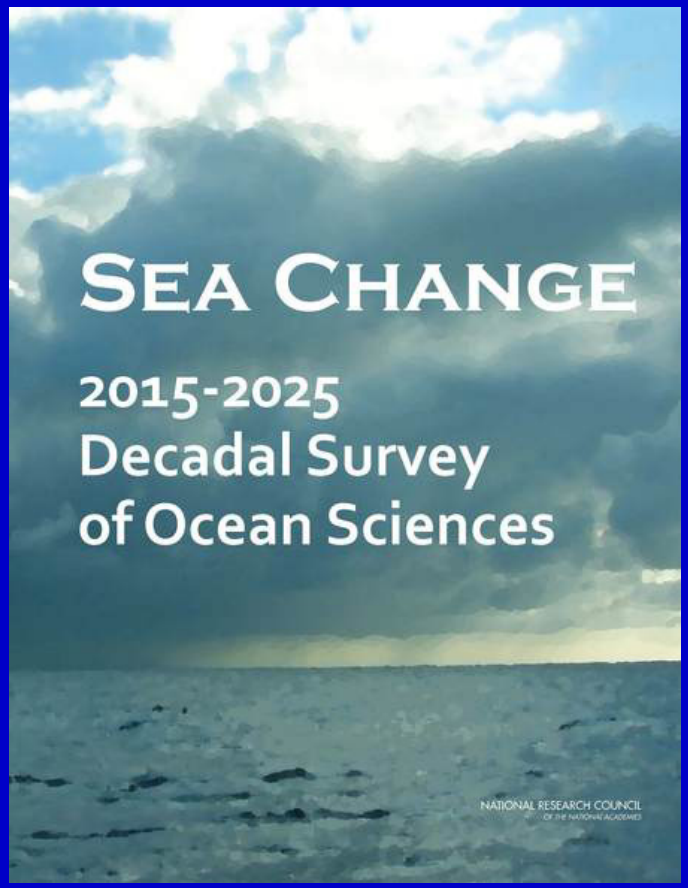
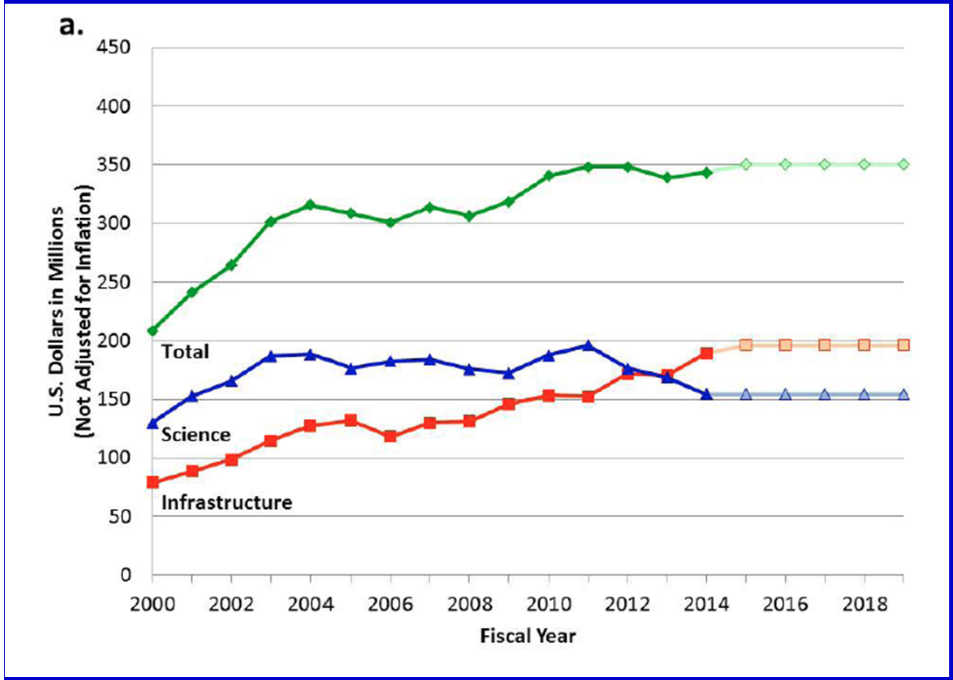


Budget Trends

Sea Change (2014)



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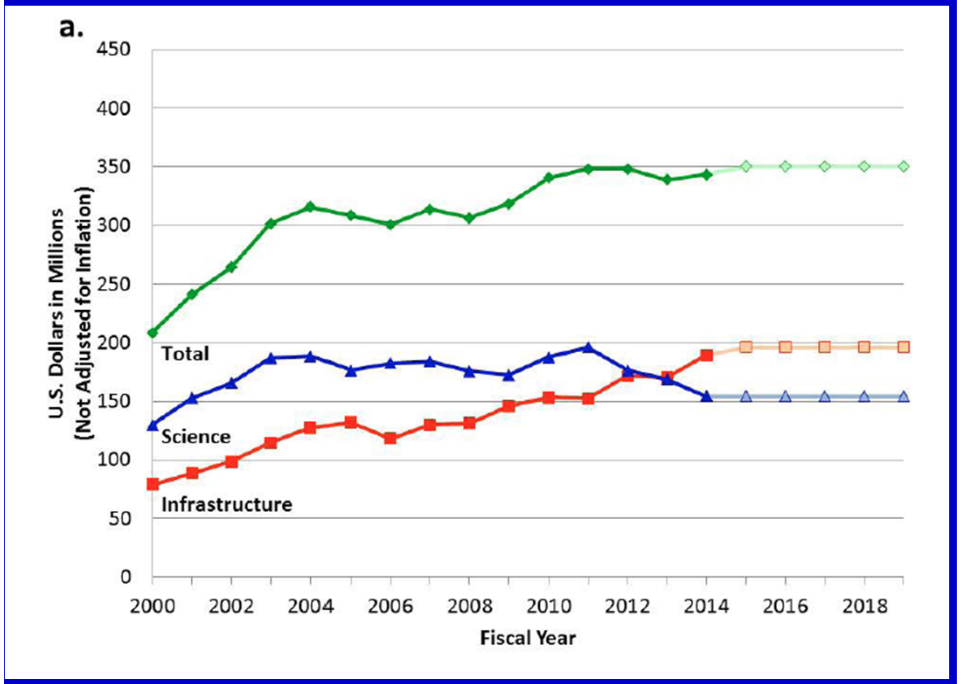

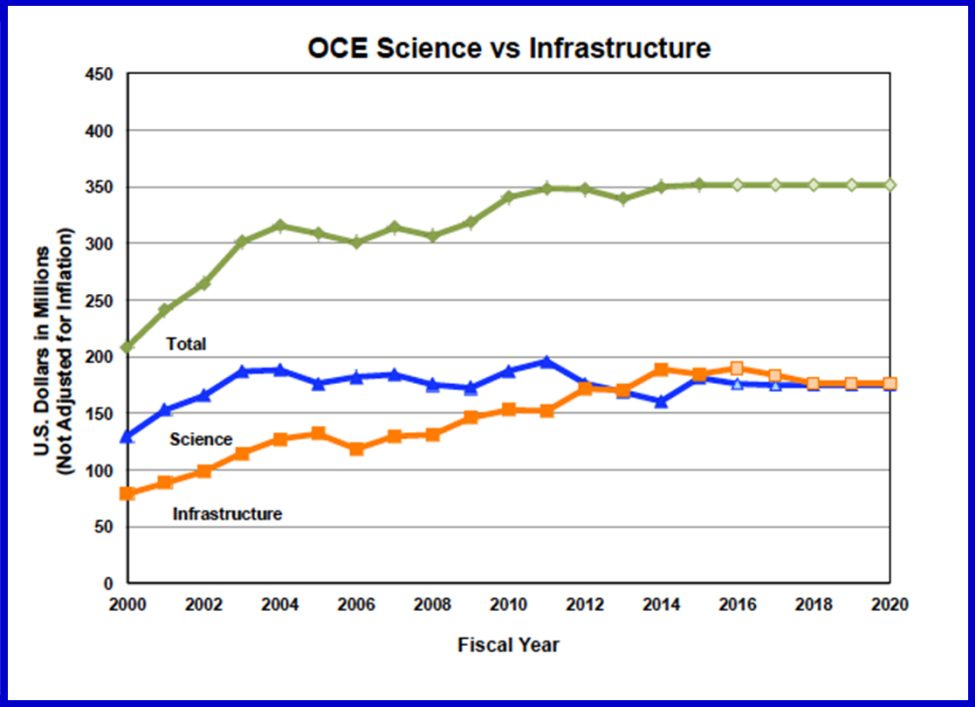

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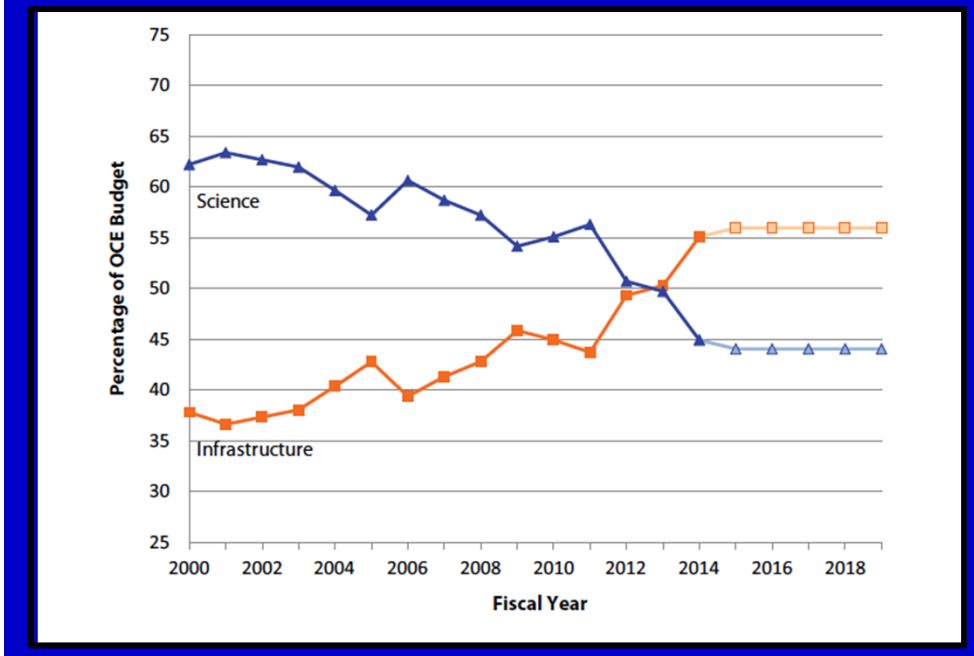

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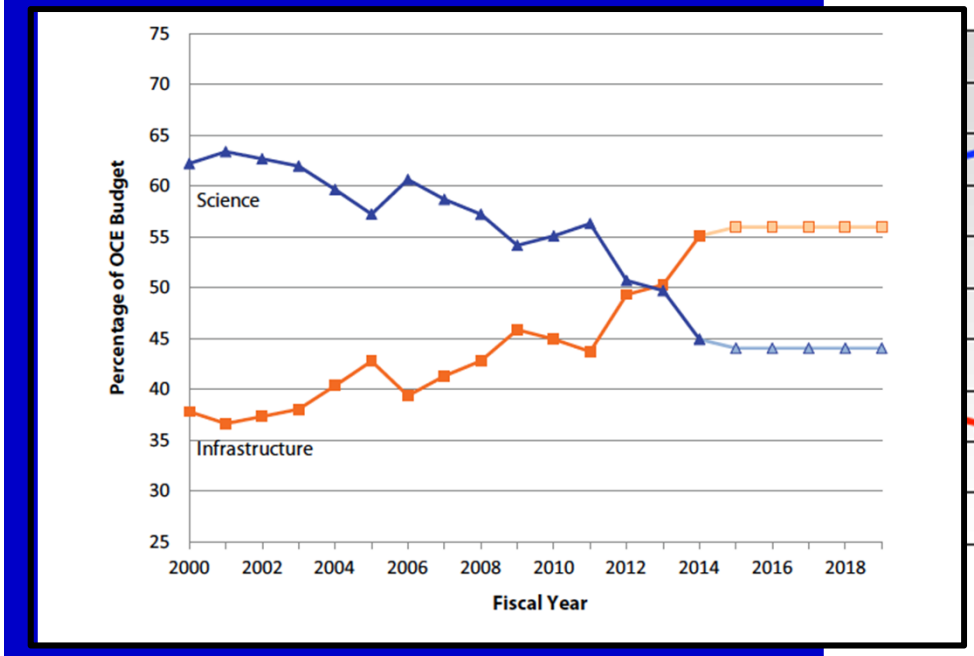

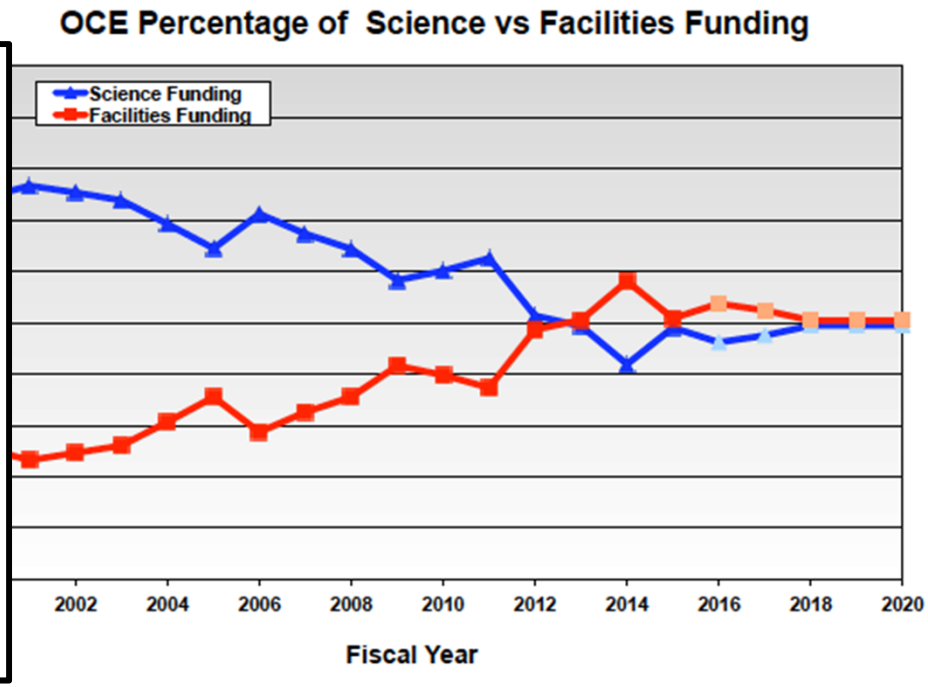

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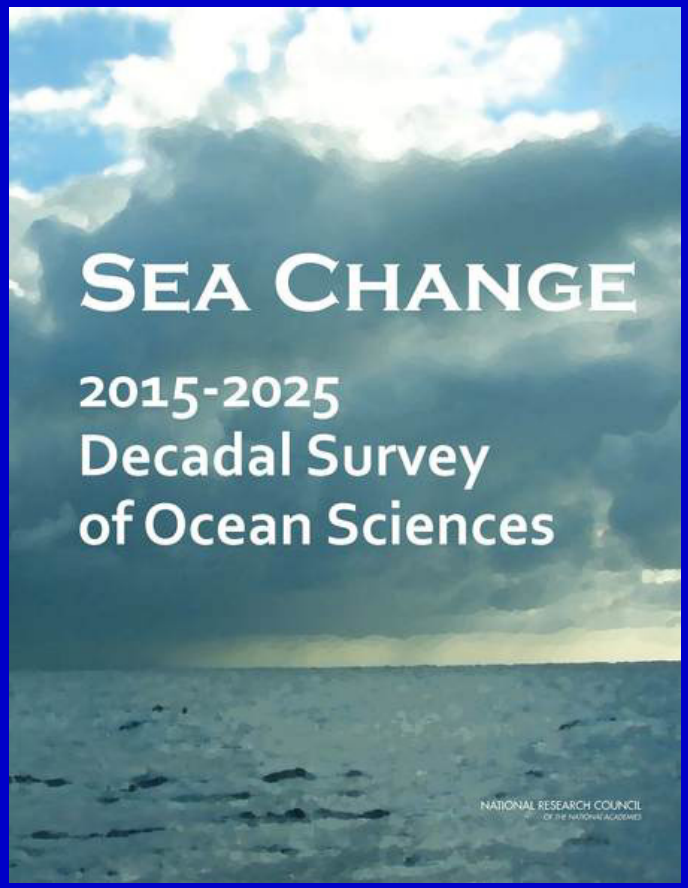

"Sea Change": Science Priorities

- **Rates, mechanisms, impacts, etc….sea level rise?**
- **Coastal, estuarine ecosystems and linkages.**
- **Ocean biogeochemistry & physics…and climate.**
- **Biodiversity & resilience of ecosystems, & changes.**
- **Marine food webs in the coming century.**
- **Formation and evolution of ocean basins.**
- **Geohazards ('quakes, tsunamis, landslides volc.).**

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"Sea Change": Science Priorities

- ***As noted by the report, these are not prioritized.***
- ***"Rather, they are ordered from the ocean surface, through the water column, to the seafloor."***

…AND…

- ***NSF has in the past, and will continue in the future, fund excellent ocean science regardless of topic, maintaining the highest standards of external and internal review.***

"Sea Change": Other Key Aspects

- *Cyber-infrastructure (CI) throughout OCE.*
- *Governance & community engagement of OOI.*
- *Technology and development.*
- *Partnerships (interagency, private, etc.)*

The Path Forward: Guiding Principles

- ***Think about what we <u>can</u> do – not what we can't.***

The Path Forward: Guiding Principles

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- ***Think about what we <u>can</u> do – not what we can't.***
- ***Oceanography isn't a laminated brochure…***
- ***Failure can be a good thing…***
- ***Eradicate the phrase "alternative career".***

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Mapping of Science and Infrastructure

Table 3-2 Alignment of current NSF-funded ocean research infrastructure to the eight decadal science priorities. A "C" indicates a critical asset, while "I" indicates an important asset. The approach taken to reach this alignment is discussed in the text. A list of other critical or important infrastructure is also included.

		1. Sea level change	2. Coastal and estuarine oceans	3. Ocean and climate variability	4. Biodiversity and marine ecosystems	5. Marine food webs	6. Ocean basins	7. Geohazards	8. Subseafloor environment
Fleet and Other Ships	Global/Ocean	C	I	C	C/I	C/I	C	C	C
	Regional/Coastal	I	C	C/I	C	C			
	3-D Seismic Ship						C/I	C	I
	Ice-Capable	C/I	I	C	C/I	C/I	I		
IODP	*JOIDES Resolution*	I		I			C	C	C
OOI	Coastal	I	I	I					
	Global			I					
	Cabled						I	I	I
Vehicles	*Alvin*				I	I			I
	ROVs						I	I	C
	AUVs		I		I	I	I		
	Gliders	I	I	I	I				
Other	OBSs						I	C	
	Field Stations / Marine Labs	I	C	I	C	C/I			
Other Critical or Important Infrastructure Assets		Argo, tide gauges, satellites, ice-ocean models, coring facilities and core repositories, mission-specific drilling platforms (MSPs)	River gauges, hydrologic models, satellites, coring facilities and core repositories	Argo, modeling, surface weather analyses, satellites, coring facilities and core repositories, acoustic tomography, MSPs	Fisheries surveys and vessels, sequencing facilities, manned/unmanned vehicles, satellites	Fisheries surveys and vessels, taxonomy, isotope facilities, manned/unmanned vehicles, satellites	global seismograph arrays, magnetotellurics, manned/unmanned vehicles, *Chikyu* , MSPs	Interferometric synthetic aperture radar, seafloor geodesy, satellites, magnetotellurics, coring, manned/unmanned vehicles, *Chikyu* , MSPs	Sequencing facilities, manned/unmanned vehicles, *Chikyu* , MSPs

Mapping of Science and Infrastructure

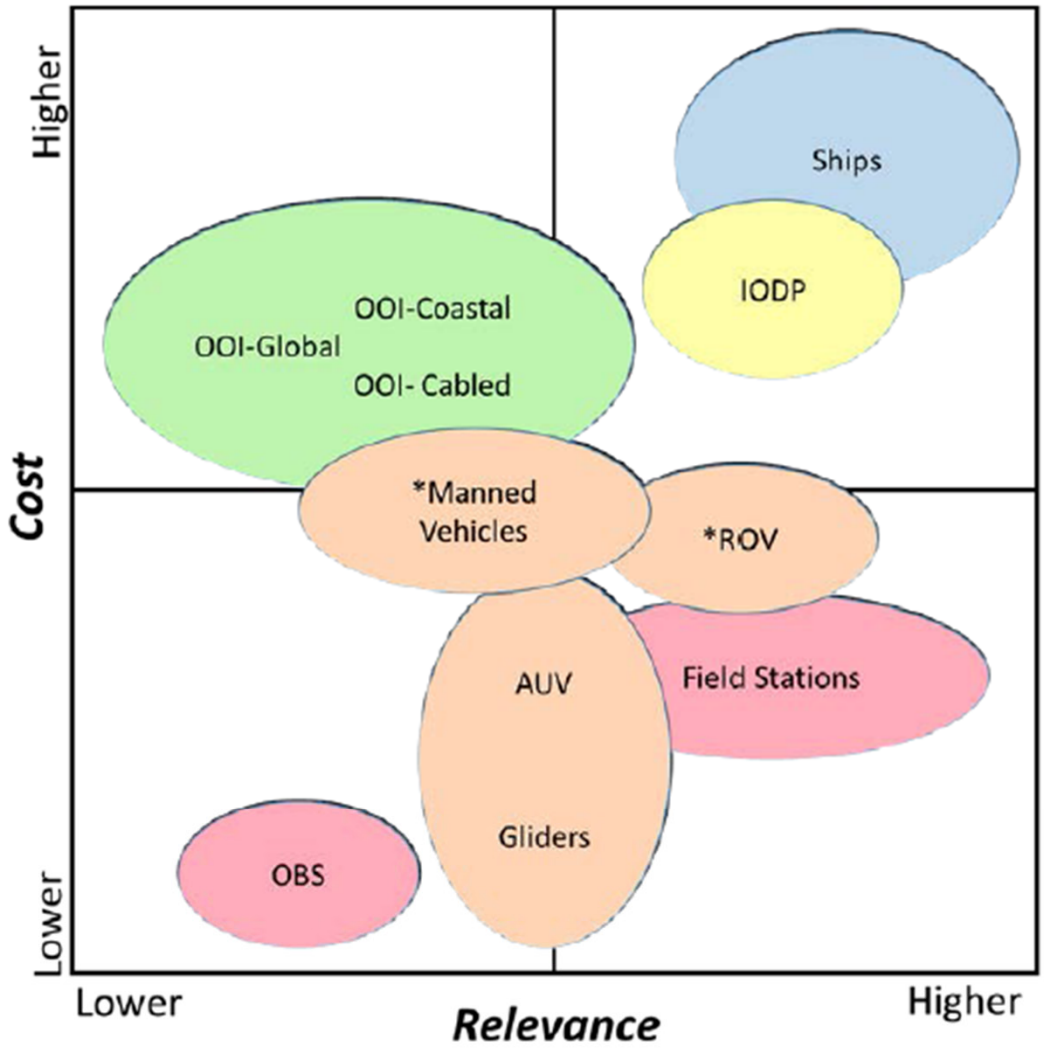

Figure 3-9 Relative cost versus relevance of the infrastructure presented in Table 3-2 (colors are keyed to the same infrastructure). Ships are clustered into one group for this figure. The asterisk next to manned vehicles and ROVs indicates that costs increase if the costs of necessary support vessels are included.