Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Navy											Date: May 2017	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0603721N *I Environmental Protection*							
COST ($ in Millions)	**Prior Years**	**FY 2016**	**FY 2017**	**FY 2018 Base**	**FY 2018 OCO**	**FY 2018 Total**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**Cost To Complete**	**Total Cost**
Total Program Element	423.000	19.286	20.343	20.214	-	20.214	23.606	23.703	21.040	21.465	Continuing	Continuing
0401: *Shipboard Waste Mgmt*	342.775	8.390	8.195	7.920	-	7.920	8.989	9.018	9.212	9.399	Continuing	Continuing
0817: *Environmental Sustainability Development (NESDI)*	38.748	5.604	6.822	4.782	-	4.782	6.072	6.266	6.337	6.465	Continuing	Continuing
9204: *Marine Mammal Research*	41.477	5.292	5.326	4.512	-	4.512	5.545	5.419	5.491	5.601	Continuing	Continuing
9205: *Marine Mammal Settlement*	0.000	0.000	0.000	3.000	-	3.000	3.000	3.000	0.000	0.000	0.000	9.000

A. Mission Description and Budget Item Justification

This program develops and evaluates processes, hardware, systems, operational procedures, scientific methods, and environmental studies that will allow the Navy to operate in U.S., foreign, and international waters, air, space, and land areas while complying with environmental laws, regulations, Executive Orders, policies and international agreements.

Many environmental laws, regulations, and policies impose restrictions on Navy training and testing, vessels, aircraft, and facilities that interfere with operations and/or increase the cost of operations. The Navy must be able to conduct its national security mission in compliance with applicable environmental requirements in the U.S. and abroad without compromising performance, safety, or health, while simultaneously minimizing the cost of compliance. The projects for this program element support the Navy's compliance with the (a) Clean Water Act, (b) Act to Prevent Pollution from Ships, (c) International Convention for the Prevention of Pollution from Ships (MARPOL 73/78), (d) DoD 4715.6 R1, Regulations on Vessels Owned or Operated by the Department of Defense, (e) OPNAV M-5090.1, Environmental and Natural Resources Program Manual,(f) 40 CFR Part 9 and Chapter VII (Uniform National Discharge Standards [UNDS] Phase I Standard), (EO) 13148, Greening the Government Through Leadership in Environmental Management, (g) Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, (h) National Invasive Species Act of 1996, (i) 33 CFR 151 Subpart D-Ballast Water Management for Control of Nonindigenous Species in Waters of the United States, (j) Clean Air Act, (k) Federal Insecticide, Fungicide, and Rodenticide Act, (l) Marine Mammal Protection Act, and (m) Endangered Species Act. References (a) through (m) establish Level I environmental protection requirements. Project 0401 supports RDT&E efforts that enable Navy ships and submarines to comply with laws, regulations, and policies in six major areas: (1) Liquid Wastes, (2) UNDS Rulemaking, (3) Hazardous Materials and Pollution Prevention, (4) Hull Antifouling Paints, (5) Technical Authority, and (6) Ballast Water Exchange Improvements. Project 0817 supports RDT&E to develop and validate technologies to enable Navy facilities to comply with environmental laws, regulations, and policies in a cost-effective manner.

The MMR program is responsible for applied research and works to address the Navy's key research needs and transition the results and technologies for use within the Navy's at-sea environmental compliance and permitting processes in compliance with the Marine Mammal Protection Act and the Endangered Species Act, with the goals of improving marine species impact analysis (including marine mammal take estimates), mitigation measures and monitoring capabilities. Key points of the MMR mission are: (1) Improve the best available science regarding the potential impacts to marine species from Navy activities, (2) Expand the technology and methods

Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Navy	Date: May 2017
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603721N *I Environmental Protection*

available to the U.S. Navy marine species monitoring program (3) Preserve core Navy readiness capabilities. The RDT&E efforts funded under the MMR program allow the Navy to avoid or reduce the chances of costly litigation for non-compliance.

B. Program Change Summary ($ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	19.289	20.343	20.951	-	20.951
Current President's Budget	19.286	20.343	20.214	-	20.214
Total Adjustments	-0.003	0.000	-0.737	-	-0.737
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.003	0.000			
• Program Adjustments	0.000	0.000	-0.035	-	-0.035
• Rate/Misc Adjustments	0.000	0.000	-0.702	-	-0.702

Change Summary Explanation

The FY 2018 funding request was reduced by $0.212 million to account for the availability of prior year execution balances.

$3.000M added in FY 2018 in accordance with settlement agreement under Marine Mammal Protection Act (new project created).

Technical: Not applicable.
Schedule: Not applicable.

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy			Date: May 2017
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603721N / *Environmental Protection*	Project (Number/Name) 0401 / *Shipboard Waste Mgmt*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
0401: *Shipboard Waste Mgmt*	342.775	8.390	8.195	7.920	-	7.920	8.989	9.018	9.212	9.399	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Navy ships and submarines must routinely operate in U.S., international, and foreign waters, and visit numerous U.S. and foreign ports. No body of water is without environmental restrictions that impact the movements and operations of Navy vessels. Environmental requirements tend to be most restrictive in port and in coastal waters, where the Navy's increasing littoral presence places ships and submarines in discharge-restricted waters for longer periods of time. Growing international cooperation in addressing global environmental concerns is resulting in expanding areas of ocean considered environmentally susceptible, where special prohibitions on ship discharges and operations are imposed. Navy vessels must comply with applicable environmental legal requirements while maintaining continued access to all waters for operations, exercises, training, and port access. The large crews and limited on-board space of Navy ships and submarines severely constrain their ability to hold wastes for return to port for shore side disposal.

The Shipboard Waste Management RDT&E project evaluates and develops shipboard environmental equipment, systems, technologies, processes, and practices to comply with environmental laws, regulations, Executive Orders, international agreements, foreign-country requirements, and DoD and Navy policies. The project focuses on providing engineering criteria, design guidance, and performance specifications for selecting, procuring, installing, integrating, and operating environmental equipment and systems on Navy ships and submarines, and on defining and developing processes, procedures and logistics support requirements. Environmental equipment, systems, processes and practices must meet legal and environmental requirements and be reliable, maintainable and achievable at sea, and impose no or low manning burden. Environmental equipment and systems must meet Navy-unique shipboard requirements (performance, space, weight, shock, vibration, electromagnetic compatibility, manning, automation, etc.), incorporate integrated logistics support, minimize life-cycle cost, and include validated acquisition, design, installation, and operating documentation. Shipboard processes and practices must be feasible and must be compatible with ship and submarine operational, maintenance, manning, habitability, health, and safety requirements. It also addresses afloat environmental issues other than shipboard wastes, e.g., access to environmental data for planning Fleet operations and exercises.

The Afloat Environmental Quality Program supports the designated Technical Warrant Holder for Environmental Systems & Materials Engineering, with responsibility and accountability for ensuring that ships and submarines are designed and upgraded, and can be operated, in compliance with existing and anticipated environmental requirements while minimizing total ownership cost and manning. This responsibility encompasses legacy platforms and new vessel designs, as well as Fleet operations exercises, and training.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Technical Authority	3.084	2.587	2.410	0.000	2.410
Articles:	-	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603721N / *Environmental Protection*	**Project (Number/Name)** 0401 / *Shipboard Waste Mgmt*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Description: Funding in FY17 and FY18 is reduced from FY16 levels to account for reductions in the overall shipboard waste management funding line and support critical needs in the ballast water management area. ***FY 2016 Accomplishments:*** - Reviewed emergent air emission processes and technologies to enable effective compliance at minimal life cycle cost and risk to operations. - Investigated availability and feasibility of rapid water tank residuals treatment technologies. - Reviewed emergent ship oil spills and other discharge violations to determine root cause. - Identified opportunities to reduce the risk of future oil spill violations. - Met with NATO and foreign Navy data exchange partners to leverage lessons learned on afloat environmental compliance. - Worked with Fleet, acquisition programs, and technical authorities to review and provide comments on environmental issues, risks, and opportunities so as minimize the cost and risk to the Navy. - Continued development of environmental equipment/system requirements documentation, design criteria/ guidance, specification standards, and certification protocols. ***FY 2017 Plans:*** - Identify waste management systems for detailed acquisition and evaluation. - Perform studies of rapid water tank design and operation to determine the risk to the environment from residuals and how it may be reduced. - Review emergent ship spills and other discharge violations to determine root cause. - Identify opportunities to reduce the risk of future oil spill violations. - Meet with NATO and foreign Navy data exchange partners to leverage lessons learned on afloat environmental compliance. - Work with Fleet, acquisition programs, and technical authorities to review and provide comments on issues, risks, and opportunities so as minimize the cost and risk to the Navy. - Continue development of environmental equipment/system requirements documentation, design criteria/ guidance, specification standards, and certification protocols. - Investigate impact of the use of environmentally sound refrigerants on refrigeration systems. - Perform assessments of emergent air emission processes and technologies to enable effective compliance at minimal life cycle cost and risk to operations. ***FY 2018 Base Plans:***					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603721N / *Environmental Protection*	**Project (Number/Name)** 0401 / *Shipboard Waste Mgmt*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
- Assess emergent commercial of the shelf air emissions management processes and technologies to enable effective compliance at minimal life cycle cost and risk to operations. - Identify waste management systems for detailed acquisition and evaluation. - Perform a study of rapid water tank residuals treatment methods and technologies when integrated with tank design and operation. - Work with Fleet, acquisition programs, and technical authorities to review and provide comments on issues, risks, and opportunities so as minimize the cost and risk to the Navy. - Review emergent ship spills and other oil spill discharge violations and determine root causes. - Identify opportunities to reduce the risk of future violations. - Meet with NATO and foreign Navy data exchange partners to leverage lessons learned on afloat environmental compliance. - Continue development of environmental equipment/system requirements documentation, design criteria/ guidance, specification standards, and certification protocols. ***FY 2018 OCO Plans:*** N/A					
Title: Liquid Wastes	2.122	2.050	2.030	0.000	2.030
Articles:	-	-	-	-	-
FY 2016 Accomplishments: - Performed assessments of emergent commercial off the shelf Marine Pollution Control processes and technologies that would enable effective compliance at minimal life cycle cost and risk to operations. - Identified systems for detailed acquisition and evaluation. Oil Pollution Abatement: - Continued shipboard evaluation of LCS oil water separator. - Performed laboratory testing of commercial off the shelf centrifugal oil water separator. - Completed a full scale laboratory evaluation of electrocoagulation technology for breaking bilgewater emulsions to facilitate oil/water separation. - Developed draft protocols for membrane regeneration. Performed shipboard demonstration of draft protocols on a DDG-51 class ship. Non-Oily Waste:					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603721N / *Environmental Protection*	**Project (Number/Name)** 0401 / *Shipboard Waste Mgmt*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
- Completed laboratory evaluation of a new commercial hydrogen sulfide gas sensor to improve reliability and reduce maintenance. - Performed laboratory evaluation of commercial membrane bioreactor to support procurement specification development. - Performed laboratory evaluation of grease pretreatment subsystem to support procurement specification development - Initiated laboratory evaluation of sludge pretreatment subsystem to support procurement specification development.					
FY 2017 Plans: - Perform assessments of emergent commercial off the shelf Marine Pollution Control processes and technologies that would enable effective compliance at minimal life cycle cost and risk to operations. - Identify systems for detailed acquisition and evaluation. Oil Pollution Abatement: - Complete laboratory testing of commercial off-the-shelf oil water separator (OWS). - Prepare for shipboard and Navy ship environmental testing of commercial centrifugal OWS. - Begin development of specifications for Navy centrifugal OWS. - Finalize and document shipboard evaluation of LCS oil water separator. - Develop and document requirements and procedures for regenerating membrane systems. - Begin development of specifications for Navy small ship oil water separator and issue sources sought. - Conduct laboratory performance testing of 10NP/OWMS performance using Navy standard protocol. Non-Oily Waste: - Develop, test and evaluate membrane bioreactor layup and startup procedures and tools. - Evaluate microbial biosensor to assess bioreactor health for maintenance of marine sanitation device. - Perform laboratory evaluation of advanced grease pretreatment subsystem to support procurement specification development. - Initiate long-term assessment of sewage and graywater piping scale development, prevention and cleaning - Complete laboratory evaluation of sludge pretreatment subsystem to support procurement specification development.					
FY 2018 Base Plans:					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603721N / *Environmental Protection*	**Project (Number/Name)** 0401 / *Shipboard Waste Mgmt*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
- Perform assessments of emergent commercial off the shelf Marine Pollution Control processes and technologies that would enable effective compliance at minimal life cycle cost and risk to operations. Identify systems for detailed acquisition and evaluation Oil Pollution Abatement: - Initiate shipboard evaluation of centrifugal oil water separator. - Finalize and demonstrate in the Fleet procedures for regenerating membrane systems. - Refine specifications for Navy small ship OWS. - Investigate commercial oil content monitors for potential new discharge standard. Non-Oily Waste: - Complete test and evaluation of membrane bioreactor layup and startup procedures and tools. - Continue evaluation of microbial biosensor to assess bioreactor health. - Complete shipboard evaluation of grease pretreatment system and refine requirements for grease pretreatment for a Navy shipboard system. - Complete documentation for new hydrogen sulfide gas sensor. - Continue long-term assessment of sewage and graywater piping development, prevention and cleaning. - Draft procurement specification for Navy suitable marine sanitation devices. - Issue sources sought based on procurement as specification for Navy ship suitable marine sanitation devices. - Prepare for and initiate shipboard evaluation of grease pretreatment system. ***FY 2018 OCO Plans:*** N/A					
Title: Hazardous Material Control and Management ***Articles:*** ***Description:*** Hazardous Material Control and Management (HMC&M) funding in FY17 was reduced to support critical Ballast Water Management tasking related to acquisition of a commercial treatment system. FY18 funding for HMC&M reflects estimated inflation rates from FY16 and supports the execution of more complex shipboard evaluations in FY18. Unlike FY18, FY17 shipboard evaluations do not require modification of shipboard piping. ***FY 2016 Accomplishments:*** - Performed assessments of hazardous material management processes and pollution prevention technologies that would enable effective compliance at minimal life cycle cost and risk to operations.	1.061 -	1.016 -	1.100 -	0.000 -	1.100 -

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603721N / *Environmental Protection*	**Project (Number/Name)** 0401 / *Shipboard Waste Mgmt*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
- Revised the NAVSEA Hazardous Material Avoidance Process to include link to health hazard assessments and in-service systems. - Identified, researched, and evaluated less hazardous or non-hazardous substitutes for high-risk hazardous materials. - Assessed universal manual cleaner dispensers to determine Navy ship suitability and reduce costs. - Drafted commercial item description for manual cleaner dispensers. - Identified manual cleaner dispenser candidates suitable for shipboard evaluation. - Completed development of Navy Submarine Hazardous Material Inventory and Management System.					
FY 2017 Plans: - Perform assessments of emergent commercial off the shelf hazardous material management processes and pollution prevention technologies that would enable effective compliance at minimal life cycle cost and risk to operations. - Identify hazardous material control/pollution prevention systems for detailed acquisition and evaluation. - Issue and provide training on the NAVSEA Hazardous Material Avoidance Process. - Identify, research, and evaluate less hazardous or non-hazardous substitutes for high-risk hazardous materials. - Acquire, install and perform shipboard evaluation of manual cleaner dispensers. - Finalize commercial item description for manual cleaner dispensers. - Identify suitable automatic cleaner dispensers and test in the laboratory. - Draft commercial item description for automatic cleaner dispensers. - Identify automatic cleaner dispensers candidates suitable for shipboard evaluation. - Evaluate Navy Submarine Hazardous Material Inventory and Management System in the Fleet.					
FY 2018 Base Plans: - Perform assessments of emergent commercial off the shelf hazardous material management processes and pollution prevention technologies that would enable effective compliance at minimal life cycle cost and risk to operations. - Identify hazardous material control/pollution prevention systems for detailed acquisition and evaluation. - Revise the NAVSEA Hazardous Material Avoidance Process. - Identify, research, and evaluate less hazardous or non-hazardous substitutes for high-risk hazardous materials. - Acquire, install and perform shipboard evaluation of automated cleaner dispensers. - Finalize commercial item description for automatic cleaner dispensers.					
FY 2018 OCO Plans:					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603721N / *Environmental Protection*	**Project (Number/Name)** 0401 / *Shipboard Waste Mgmt*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
N/A					
Title: Solid Waste Management	0.965	0.978	1.039	0.000	1.039
Articles:	-	-	-	-	-
FY 2016 Accomplishments: - In FY16, Shipboard Waste Management Program Objective Memorandum segregated Solid Waste from the Technical Authority Program. - Performed assessments of emergent commercial off the shelf solid waste management processes and technologies that would enable effective compliance at minimal life cycle cost and risk to operations. - Acquired shipboard solid waste converter for laboratory evaluation. - Initiated contract for marine solid waste incinerator (MSWI) for laboratory evaluation. - Solicitation executed for compact thermal destruction unit (CTDU) suitable for smaller Navy ships for laboratory evaluation. - Prepared test facility for laboratory evaluation.					
FY 2017 Plans: -Perform extensive full scale laboratory long term endurance testing of shipboard solid waste converter evaluating effectiveness and reliability. - Acquire and initiate full scale laboratory long term endurance testing of MSWI, evaluating effectiveness and reliability. - Acquire and perform full scale laboratory long term endurance testing of CTDU, evaluating effectiveness and reliability. -Provide periodic assessment of performance, reliability, operability, maintainability and Navy ship suitability of laboratory evaluated systems. - Acquire and evaluate large drum compactor					
FY 2018 Base Plans: - Perform assessments of emergent commercial off the shelf solid waste management processes and technologies that would enable effective compliance at minimal life cycle cost and risk to operations. - Identify solid waste systems for detailed acquisition and evaluation. - Complete laboratory test and evaluation and prepare final reports on the Act to Prevent Pollution from Ships (APPS) compliant CTDU. - Begin installation and testing preparation for the shipboard evaluation and Navy ship environmental testing of convertor, MSWI and/or CTDU based on laboratory test results.					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603721N / *Environmental Protection*	**Project (Number/Name)** 0401 / *Shipboard Waste Mgmt*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
- Refine Navy ship acquisition requirements for APPS compliant solid waste processing systems. ***FY 2018 OCO Plans:*** N/A					
Title: Ballast Water Management	0.965	1.368	1.173	0.000	1.173
Articles:	-	-	-	-	-
Description: TA and HMC&M funding in FY17 and FY18 was reduced to support critical Ballast Water Management tasking related to acquisition of a commercial treatment system. ***FY 2016 Accomplishments:*** - Conducted research evaluating ballast water treatment hardware/systems in preparation for anticipated ballast water requirements in DOD Manual 4715.06. - Identified ballast water treatment systems for detailed acquisition and evaluation. - Drafted Navy procedures and criteria for test and evaluation and eventual certification of systems and ship installations. - Identified ballast water treatment system test and evaluation facilities. - Developed ballast water treatment system requirements. - Prepared draft Design Practice Criteria manual for ballast water treatment systems. ***FY 2017 Plans:*** - Perform assessments of emergent commercial off the shelf ballast water treatment systems that would enable effective compliance at minimal life cycle cost and risk to operations. - Identify systems for detailed acquisition and evaluation. - Acquire a commercial ballast water treatment system for laboratory evaluation. - Perform full scale evaluation of commercial ballast water treatment systems to assess system performance, reliability, operability and maintainability, and suitability as a Navy shipboard system. - Determine ship services, consumables, manning required to run and maintain ballast water treatment systems. - Refine Navy procedures and criteria for test and evaluation and eventual certification of systems and ship installations. - Refine ballast water treatment system requirements. ***FY 2018 Base Plans:*** - Perform assessments of emergent commercial off the shelf ballast water treatment systems that would enable effective compliance at minimal life cycle cost and risk to operations. - Identify systems for detailed acquisition and evaluation.					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603721N / *Environmental Protection*	**Project (Number/Name)** 0401 / *Shipboard Waste Mgmt*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
- Acquire a commercial ballast water treatment system for laboratory evaluation. - Continue full scale evaluation of a commercial ballast water treatment system to assess system performance, reliability, operability and maintainability, and suitability as a Navy shipboard system. - Determine ship services, consumables, manning required to run and maintain ballast water treatment systems. - Refine Navy procedures and criteria for test and evaluation and eventual certification of systems and ship installations. - Refine ballast water treatment system acquisition specification. - Refine design and installation guidance for meeting ballast water discharge standards requirements. ***FY 2018 OCO Plans:*** N/A					
Title: Non-Copper Antifouling	0.193	0.196	0.168	0.000	0.168
Articles:	-	-	-	-	-
FY 2016 Accomplishments: - In FY16, Shipboard Waste Management Program Objective Memorandum segregated Non-Copper Antifouling from the Technical Authority Program. - Identified advanced antifouling coating systems for test and evaluation. - Prepared samples and executed release rate testing in accordance with standard/ASTM test methods. - Prepared sample and began execution of in-situ testing in accordance with standard test methods. ***FY 2017 Plans:*** - Compare results to release rates associated with legacy, qualified coating systems (copper ablative coatings). - Identify coatings with copper release rates equal to or lower than legacy systems. - Prepare final report with recommendations for follow-on copper release testing. - Continue execution in-situ testing and provide periods reports on performance. - Identify techniques for mitigation of copper discharges from drydocks using a copper-free antifouling topcoat. ***FY 2018 Base Plans:*** - Continue execution in-situ testing and provide periods reports on performance. - Evaluate NAVSEA screening and qualification test requirements for fouling release (with and without biocides) and antifouling coatings. - Identify gaps; develop and execute testing to fill gaps. - Compare results from historical qualification tests with full scale data plus Office of Naval Research (ONR) Intersite Calibration Study and Fouling Release Coating Study data. - Prepare final report with recommendations.					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
- Draft qualification procedure modifications as needed. ***FY 2018 OCO Plans:*** N/A					
Accomplishments/Planned Programs Subtotals	8.390	8.195	7.920	0.000	7.920

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

RDT&E Contracts are Competitive Procurements.

E. Performance Metrics

Quarterly Program Reviews

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy			Date: May 2017
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603721N / *Environmental Protection*	Project (Number/Name) 0817 / *Environmental Sustainability Development (NESDI)*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
0817: *Environmental Sustainability Development (NESDI)*	38.748	5.604	6.822	4.782	-	4.782	6.072	6.266	6.337	6.465	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Inherent to the realization of the vision outlined in Sea Power 21 are certain environmental consequences that will, to a lesser or greater degree, be an impact on the Navy's ability to fully achieve the strategy outlined in the Navy Capability Pillars (NCP) SEA SHIELD, SEA STRIKE, SEA BASING and FORCEnet and the supporting initiatives of SEA WARRIOR, SEA TRIAL and SEA ENTERPRISE. Readiness and training are primary considerations for determining whether any fighting force is at its peak proficiency. The ability to train our forces in a realistic environment is paramount. Today's reality requires training and operating within environmental constraints (national and international laws and agreements), and searching for alternatives to comply with and alleviate those constraints. Moreover, as we develop new systems and technologies in support of Sea Power 21, the Navy must anticipate potential environmental regulations which, while not currently an issue, could in the future adversely impact our ability to protect and sustain our forces at home and abroad.

This program identifies pervasive Navy shore side environmental requirements and develops and validates information, new processes, and technologies that address requirements that pose significant impact on Naval shore activities in complying with environmental laws, regulations, orders, and policies. The goal of the program is to maximize opportunities for significant cost savings while minimizing personnel liabilities, operational costs, and regulatory oversight and preserving or enhancing the ability of Naval shore activities to accomplish their required missions and functions in support of the Navy's transformational strategy.

EEC-2 MAXIMIZE TRAINING AND TESTING RANGE REQUIREMENTS WITHIN ENVIRONMENTAL CONSTRAINTS: This capability addresses environmental impacts and restrictions at Navy land and sea ranges, including munitions testing and manufacturing, to ensure Navy ranges are available to conduct required training and testing operations for the Fleet. Investments in EEC-2 provide validated knowledge, models, and processes to mitigate environmental impacts, restrictions, and costs at Navy training and test ranges to maximize the availability and utilization of the ranges. The results support operational readiness by providing the tools and technologies necessary for sustaining and managing Navy land and sea ranges related to unexploded ordnance (UXO) and munitions, encroachment, air quality, airborne noise, water quality, and wetlands. Capabilities gained include the ability to assess and determine the risks from underwater UXO, the evaluation and prioritization of ordnance contaminated sites for evaluation in environmental programs and the implementation of range specific best management practices by evaluating and modeling available process, procedures, and technologies.

EEC-3 PLATFORM MAINTENANCE AND REPAIR WITH MINIMAL ENVIRONMENTAL FOOTPRINT: This capability focuses on minimizing or eliminating environmental impact related to Navy and Marine Corps weapon system repair and maintenance operations. Investments in EEC-3 provide valid knowledge, models, processes, and technologies to minimize regulated emissions, discharges and hazardous material usage during the repair and maintenance of ships, submarines, and surface/ sub-surface vehicles and aircraft and air vehicles. The program supports Fleet operational readiness and Navy acquisition communities by investing in information to understand emerging environmental requirements and to develop innovative processes and technologies that result in savings while reducing the fleet environmental

constraints related to platform maintenance. Capabilities and benefits gained include, but are not limited to, the reduction in the usage of heavy metals used in metal finishing (chromium and cadmium), reduced hazardous air pollutant (HAP) emissions, the development of best management practices and tools to minimize the use of hazardous materials, and the generation of hazardous wastes associated with maintaining and repairing ships, submarines, aircraft, and unmanned vehicles. Results of program investments will be leveraged across weapon system and platform acquisition to ensure continued reduction in lifecycle costs and long-term environmental compliance burdens to the Fleet.

EEC-4. SUPPORT SHORE READINESS WITHIN ENVIRONMENTAL CONSTRAINTS: Naval shore establishment requires the capability to operate and maintain facilities and provide waterfront and airfield services to the fleet while complying with applicable environmental regulations and minimizing environmental impacts and costs. The program invests in knowledge and innovative processes and technologies that minimize infrastructure and operational costs, regulated emissions, while minimizing discharges and hazardous material usage from ship (waterfront) and aviation operations. Capabilities and benefits gained under EEC-4 include, reduced costs associated with wastewater treatment, elimination/reduction in the use of HAPs, ozone depleting substances (ODSs), volatile organic compounds (VOCs) and the associated reporting requirements, reduced hazardous waste and disposal costs, and improved storm water management.

EEC-5. COST-EFFECTIVE MANAGEMENT OF ENVIRONMENTAL REGULATORY REQUIREMENTS: The environmental compliance regulations require base managers to permit, monitor and report on many processes associated with weapon system and platform operations. Naval shore environmental managers require the capability to efficiently and cost effectively manage these compliance requirements. Under EEC-5, the program invests in improved data collection, methods, and models to assess environmental impacts and ecological risk assessments of Naval Operations on harbors, U.S. waterways, and surrounding communities. Benefits include gaining standardized technical environmental management improvements/techniques related to source control, assessment, and monitoring. EEC-5 also provides validated knowledge, models, processes and technologies to improve environmental monitoring and reporting, and to reduce the cost of compliance with regulations applicable to coastal contamination and contaminated sediments.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Maximize Training & Testing Requirements Within Environmental Constraints	0.719	1.334	0.850	0.000	0.850
Articles:	-	-	-	-	-
FY 2016 Accomplishments: FY16 funding: - Provided funding for the validated knowledge, models, and processes to mitigate environmental impacts, restrictions, and costs of Navy training and test ranges to maximize the availability and utilization of the ranges. - Completed new tasks for multi-spectral weapon impact detection system and underwater low environmental impact munitions breaching technology to better characterize environmental impacts of munitions on training ranges and munitions response sites.					
FY 2017 Plans: FY17 funds support validated knowledge, models, and processes to mitigate environmental impacts, restrictions, and costs of Navy training and test ranges to maximize the availability and utilization of the ranges.					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603721N / *Environmental Protection*	**Project (Number/Name)** 0817 / *Environmental Sustainability Development (NESDI)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
- Increase in funding will support new/continuation of tasks related to multi-spectral weapon impact detection system and underwater low environmental impact munitions breaching technology to better characterize environmental impacts of munitions on training ranges and munitions response sites. - Continue x-ray inspection system to demilitarize targets and analysis of the long-term fate of munitions constituents from unexploded ordnance. ***FY 2018 Base Plans:*** FY18 funds will be applied to: - Continue providing validated knowledge, models, and processes to mitigate environmental impacts, restrictions, and costs of Navy training and test ranges to maximize the availability and utilization of the ranges. - Continue underwater low environmental impact munitions breaching technology to better characterize environmental impacts of munitions on training ranges and munitions response sites. - Continue x-ray inspection system to demilitarize targets. ***FY 2018 OCO Plans:*** N/A					
Title: Platform Maintenance and Repair With Minimal Environmental Footprint	1.263	1.376	1.064	0.000	1.064
Articles:	-	-	-	-	-
FY 2016 Accomplishments: FY16 funding was applied to the substantial backlog to: - Completed all aviation sustainment projects related to chrome alternatives and cadmium reductions, and the elimination of overspray in shipbuilding and facilities maintenance operations and projects on trivalent chromium conversion coating-enhanced coloration of aluminum substrates. - Completed tasks for the projects mobile pier facility waste water treatment system and advanced nonchromate primers and coatings. - Completed cadmium and chromium elimination and aqueous cleaning projects. ***FY 2017 Plans:*** - Continue all aviation sustainment projects related to chrome alternatives and cadmium reductions, continue the elimination of overspray in shipbuilding and facilities maintenance operations. - Continue low volatile organic compound, low hazardous air pollutant wipe solvent and paint thinner validation, trivalent chromium conversion coating enhanced coloration of aluminum substrates, non-isocyanate					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603721N / *Environmental Protection*	**Project (Number/Name)** 0817 / *Environmental Sustainability Development (NESDI)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
polyurethane free formulation for aircraft and support equipment, and multi-functional surface preparation technology for maintenance painting in shipyards. ***FY 2018 Base Plans:*** FY18 funds will be applied to: - Continue aviation sustainment projects related to chrome alternatives and cadmium reductions. - Continue the elimination of overspray in shipbuilding and facilities maintenance operations. - Continue non-isocyanate polyurethane free formulation for aircraft and support equipment, and multi-functional surface preparation technology for maintenance painting in shipyards. ***FY 2018 OCO Plans:*** N/A					
Title: Support Shore Readiness within Environmental Constraints	1.939	1.833	1.187	0.000	1.187
Articles:	-	-	-	-	-
FY 2016 Accomplishments: - Completed tasks that provided systems and processes to minimize regulated emissions, discharges and hazardous material usage resulting specifically from waterfront support, aviation support, and other base operations. Completed oil boom fouling control. - Completed dry dock sediment management, treatment of ship heavy metal contaminated oily waste and the evaluation of compliance options for NPDES permits for cooling water intake structures. ***FY 2017 Plans:*** - Continue providing systems and processes to minimize regulated emissions, discharges and hazardous material usage resulting specifically from waterfront support, aviation support, and other base operations. -Continue biofouling reduction of ship cooling water systems, closed-loop cooling water system to accommodate ship cooling water needs, evaluation of compliance options for Clean Water Act permits for cooling water intake structures, optimization of ship to shore regulated garbage management, improved dewatering of dredge sediment, diverless deployment system for in-situ sediment samplers, and quantification of Polychlorinated Biphenyl (PCB) paint volatilization from ship cutting operations. ***FY 2018 Base Plans:*** FY18 funds will be applied to: - Continue providing systems and processes to minimize regulated emissions, discharges and hazardous material usage resulting specifically from waterfront support, aviation support, and other base operations.					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603721N / *Environmental Protection*	**Project (Number/Name)** 0817 / *Environmental Sustainability Development (NESDI)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
- Continue optimization of ship to shore regulated garbage management, improved dewatering of dredge sediment and demonstration of new strategies for enhanced monitored natural recovery at Navy sediment sites. ***FY 2018 OCO Plans:*** N/A					
Title: Cost-Effective Management of Environmental Regulatory Requirements	1.683	2.279	1.681	0.000	1.681
Articles:	-	-	-	-	-
FY 2016 Accomplishments: FY16 funding: - Provided validated knowledge, models, processes and systems to improve environmental monitoring and reporting, and reduce the cost of compliance with regulations applicable to coastal contamination and contaminated sediments. - Completed tasks for sustainable remediation of low pH aquifers and aquifers with a continuing contaminant source using proton reduction technology, aerobic bio-augmentation for remediation of RDX contaminated groundwater, reduce the cost of compliance with coastal contamination and contaminated sediment and demonstration of improved method for quantifying algae biomass to meet nutrient numeric endpoint permit compliance. - Completed projects for coral reef assessment technology, vapor intrusion prevention and improved treatment of contaminated storm-water.					
FY 2017 Plans: FY17 funds support validated knowledge, models, processes and systems to improve environmental monitoring and reporting, and reduce the cost of compliance with regulations applicable to coastal contamination and contaminated sediments. - In compliance with environmental policy and regulations, funding supports storm-water sampling and treatment demonstrations, perfluorochemicals from DoD sites conceptual site model development, autonomous benthic ecology monitoring system, and management tools for radiological compounds in environmental media. - Provide funding for coral reef assessment technology project, vapor intrusion prevention and improved treatment of contaminated storm-water.					
FY 2018 Base Plans: FY18 funds will be applied to:					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603721N / *Environmental Protection*	**Project (Number/Name)** 0817 / *Environmental Sustainability Development (NESDI)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
- Continue providing validated knowledge, models, processes and systems to improve environmental monitoring and reporting, and reduce the cost of compliance with regulations and management of coastal contamination and contaminated sediments. - Continue stormwater sampling and treatment demonstrations, perfluorochemicals from DoD sites conceptual site model development and treatment study, autonomous benthic ecology monitoring system, and management tools for radiological compounds in environmental media. ***FY 2018 OCO Plans:*** N/A					
Accomplishments/Planned Programs Subtotals	5.604	6.822	4.782	0.000	4.782

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

This project is categorized as Non-ACAT (Non Acquisition). The project delivers a broad spectrum of products that require a variety of acquisition processes to implement. Equipment products for naval stations and other mission funded activities are often procured directly through the base operating budget. Equipment products for Shipyards and other Navy Working Capital Fund (NWCF) activities costing over $250K are procured through their Capital Investment Program (CIP). For both types of activities, equipment products costing less than $250K, and process changes not requiring the purchase of new equipment such as consumable material or product substitutions, are funded through the activity's operating budgets. Occasionally there is a technology that must be implemented as a specialized facility. These are acquired through the Military Construction (MILCON) Program. All these acquisition processes are pursued using a common strategy that satisfies the needs of all the critical stakeholders: 1) fleet end user; 2) funding sponsor for the Navy end user; 3) other stakeholders with cognizance over the Navy process or operation being changed, 4) cognizant environmental federal, state, and local regulators; and 5) the private or government organization that will produce the product.

E. Performance Metrics

Quarterly Budget Reviews

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy			Date: May 2017
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603721N / *Environmental Protection*	Project (Number/Name) 9204 / *Marine Mammal Research*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
9204: *Marine Mammal Research*	41.477	5.292	5.326	4.512	-	4.512	5.545	5.419	5.491	5.601	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Navy has been and will continue to be subject to litigation with regard to the potential injuring, killing or biologically significant disturbance of marine animals by the use of intense underwater sound. Since Fleet operation and training areas coincide with known or probable habitats, migration routes, or breeding areas of marine mammals and other protected marine species, the possibility exists that such incidents are likely to continue in the future. The increasing public interest and pressure has resulted in escalating Fleet costs. For example, Fleet and SYSCOM development activities have been interrupted; modified, or altogether cancelled and environmental regulations have, among other things, required new ship construction shock trials to obtain Federal permits and conduct extensive environmental planning that can take several years to complete. The incorporation of mitigation measures in Fleet training operations to minimize the potential adverse effects on protected marine animals can significantly reduce the realism of these operations. In addition, the testing, evaluation, and deployment of new sonar detection and monitoring systems that use active acoustics are under intense public scrutiny for their potential adverse effects on whales and other marine mammals. Navy needs scientific evidence to substantiate its claims of limited or inconsequential adverse effects to marine life from operations.

This project primarily focuses on the development of planning, monitoring, and mitigating tools to aid the Fleet in minimizing contact with and the potential harassment of protected marine animals during operations, exercises, training, and undersea surveillance and weapons testing. These new capabilities will encompass historical and newly acquired data and analytical models that together can predict marine animal habitats (where they are likely to be), and their natural and expected behavior (diving patterns, prey localization, calling activity, etc.). This project consists of three major areas that will help ensure Navy compliance with the Marine Mammal Protection Act (MMPA) and Endangered Species Act (ESA).
These areas are (1) Marine Ecology and Population Dynamics - determine the likelihood of the presence of marine mammals or other protected species by developing habitat and ecological models. Refine marine animal survey techniques to optimize the accuracy of abundance estimates in small ocean regions of Navy interest.
(2) Criteria, Thresholds, and Mitigation - Establish criteria and thresholds from which to measure potential impact on marine mammals and other marine species from Navy training operations. Determine the effectiveness and usefulness of various mitigation measures in relation to the potential impact of Navy operations on marine mammals; and (3) Mitigation Methodologies - Determine the observation, detection and classification measures required to develop effective monitoring and mitigation procedures for Fleet and SYSCOM use. Focus on improving marine animal monitoring capabilities over current methods by developing new technologies or improving existing technologies that improve monitoring and mitigation effectiveness, reduce cost and minimize impacts on readiness activities.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Marine Ecology and Population Dynamics	0.707	0.871	0.815	0.000	0.815
Articles:	-	-	-	-	-
FY 2016 Accomplishments:					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603721N / *Environmental Protection*	**Project (Number/Name)** 9204 / *Marine Mammal Research*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Continued research on ecosystems status and habitat use by marine species of Navy interest; sensor and tag development; with a priority emphasis on the population structure of beaked whales in the vicinity of Navy training ranges. Worked with the Navy Marine Species Density data program to develop tools and methods to improve the abundance estimates and density distribution data, consistent with the best standards of the expert community.					
FY 2017 Plans: Funding within this topic area will increase slightly in FY17 to continue research on the ecology and habitat of marine species of Navy interest, with a priority emphasis on the population structure of beaked whales and other sound sensitive species in the vicinity of Navy training ranges. Continue to develop tools and methods to improve the abundance estimates and density distribution data including passive acoustic based density estimates, consistent with the best standards of the expert community. Two additional projects that were delayed in FY15 and FY16 will allow the development of new tools to assess the population size and study marine mammal habitat necessary for Navy environmental compliance in southern California. These projects will enable the Fleets and SYSCOMS to collect future data required for environmental compliance at reduced costs. Funding in this topic areas, allows the Navy to meet environmental compliance requirements for impact analysis and avoid costly litigation. Funding in this topic area is particularly important because baseline habitat and movement patterns were a focus of litigation for the HSTT EIS. Plaintiffs sued the Navy for not adequately identifying and avoiding biologically important areas to marine mammals. Continued funding in these topic areas is necessary to support future compliance documents and is also a requirement of a settlement agreement with the California Coastal Commission for the Hawaii - Southern California Training and Testing (HSTT) EIS/OEIS. Any reduction in funding would result in non-compliance with the settlement agreement and would subject the Navy to costly litigation.					
FY 2018 Base Plans: Funding within this topic area will decrease slightly in FY18 to continue research on the ecology and habitat of marine species of Navy interest, with a priority emphasis on the population structure of beaked whales and other sound sensitive species in the vicinity of Navy training ranges. Continue to develop tools and methods to improve the abundance estimates and density distribution data including passive acoustic based density estimates, consistent with the best standards of the expert community. These projects will enable the Fleets and SYSCOMS to collect future data required for environmental compliance at reduced costs. Funding in this topic					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603721N / *Environmental Protection*	**Project (Number/Name)** 9204 / *Marine Mammal Research*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
areas, allows the Navy to meet environmental compliance requirements for impact analysis and avoid costly litigation. ***FY 2018 OCO Plans:*** N/A					
Title: Criteria and Thresholds, Physiology and Behavior, and Effects of Sound	1.760	2.732	2.486	0.000	2.486
Articles:	-	-	-	-	-
FY 2016 Accomplishments: Funding applied to the required focus area supported the refinement of criteria and thresholds for our at-sea training and testing permits which are required in FY18. Projects are often 1-2 year efforts and must be initiated in FY16 or they would jeopardize the ability to obtain authorization from regulatory agencies to conduct training and testing activities. Additional funding was required for the Navy's Southern California Behavioral Response project to support the close out and final analysis of field data collected over the past five years. Overall, the program continued research to determine what constitutes biologically significant behavioral response to Navy-generated sound on individuals with respect to the disruption of natural behavior patterns, ascertaining the short and long-term effects of such disruptions and documenting avoidance behaviors. Research regarding anatomically derived hearing properties for large whales continued since this is a priority of the regulator. Funding in these focus areas allowed the Navy to meet environmental compliance requirements for impacts analysis and avoid costly litigation.					
FY 2017 Plans: Funding within this topic area will increase significantly in FY17 to continue to support research necessary to develop new criteria and thresholds for our Phase IV permits. These criteria and thresholds will need to be negotiated with the regulatory agencies in 2020. Since Projects are often 3-5 year efforts, they must be initiated and/or continued in FY17 in order to support this deadline. Any delay or reduction in funding in FY17 would jeopardize the Navy ability to develop appropriate criteria and thresholds needed to obtain authorization from regulatory agencies to continue to conduct training and testing activities. Additional funding is also required for the Navy Southern California Behavioral Response Study to support the additional year of effort that resulted from reduced funding in FY15. Funding in FY17 will support the analysis/synthesis of field data collected over the past five years and the development of a summary report on the behavioral effects of tactical sonar on marine mammals. Overall, the program will continue research to determine what constitutes behavioral response to Navy-generated sound on individuals with respect to the disruption of natural behavior patterns, and studying the short and long-term effects of such disturbance. Funding in this topic area is particularly important because					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603721N / *Environmental Protection*	**Project (Number/Name)** 9204 / *Marine Mammal Research*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
of criteria and thresholds the effect of behavioral harassment on marine mammals are the focus litigation against Navy training and testing activities. Continued funding in these topics areas is a requirement of a settlement agreement with the California Coastal Commission for the Hawaii - Southern California Training and Testing (HSTT) EIS/OEIS. Any reduction in funding would result in non-compliance with the settlement agreement and would subject the Navy to costly litigation. ***FY 2018 Base Plans:*** Funding within this topic area will decrease slightly in FY18 to continue to support research necessary to develop new criteria and thresholds for our Phase IV permits. These criteria and thresholds will need to be negotiated with the regulatory agencies in 2020. Since Projects are often 3-5 year efforts, they must be initiated and/or continued in FY18 in order to support this deadline. Any delay or reduction in funding in FY18 would jeopardize the Navy ability to develop appropriate criteria and thresholds needed to obtain authorization from regulatory agencies to continue to conduct training and testing activities. Overall, the program will continue research to determine what constitutes behavioral response to Navy-generated sound on individuals with respect to the disruption of natural behavior patterns, and studying the short and long-term effects of such disturbance. Funding in this topic area is particularly important because of criteria and thresholds the effects of behavioral harassment on marine mammals are the focus litigation against Navy training and testing activities. Continued funding in these topics areas is a requirement of a settlement agreement with the California Coastal Commission for the Hawaii - Southern California Training and Testing (HSTT) EIS/OEIS. Any reduction in funding would result in non-compliance with the settlement agreement and would subject the Navy to costly litigation. ***FY 2018 OCO Plans:*** N/A					
Title: Mitigation Methodologies: Monitoring, New Technology, and Risk Assess	2.825	1.723	1.211	0.000	1.211
Articles:	-	-	-	-	-
FY 2016 Accomplishments: Supported our ongoing permit requirements to monitor the effects of at-sea training and testing activities, increased investment is required in this focus area to remain in compliance. Overall, the MMR program continued to fund monitoring capabilities of marine animals to include the development of new technologies and improvements to existing technologies. In particular, investment in the use of UUV and AAVs increased as these platforms have recently become more mature and are able to be leveraged to meet monitoring requirements with some modifications to their hardware. MMR Program completed the refinement of the High-Frequency Recording Package (HARP) which is our most common passive acoustic recording system in Navy-wide use for acoustic monitoring. Improvements to this system increased the duration of deployments, increased the					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603721N / *Environmental Protection*	Project (Number/Name) 9204 / *Marine Mammal Research*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
bandwidth and accuracy of recordings and reduce lifecycle maintenance costs. Increased funding in FY16 accelerated the transition of new or improved lower cost monitoring technologies to the Fleets and SYCOMs to reduce the impacts on readiness activities that current monitoring and mitigation technologies have.					
FY 2017 Plans: Funding within this topic area will decrease in FY17 as a result of the intended transition of costs associated with aspects of the M3R system to the Fleets and SYSCOMS and a shift in priority to accelerate projects funded under the Criteria and Thresholds, Physiology and Behavior, and Effects of Sound topic. To support our ongoing permit requirements to monitor the effects of at-sea training and testing activities, continued investment is required in this focus area to remain in compliance. Overall, the MMR program will continue to fund monitoring capabilities of marine animals to include the development of new technologies and improvements to existing technologies. In particular, investment in the use of UUV and AAVs will increase as these platforms have recently become more mature and are able to be leveraged to meet monitoring requirements with some modifications to their hardware. The Navy is also working to refine the High-Frequency Recording Package (HARP) which is our most common passive acoustic recording system in Navy-wide use for acoustic monitoring. Improvements to this system will increase the duration of deployments, increase the bandwidth and accuracy of recordings, and reduce lifecycle maintenance costs. Continued funding in FY17 will be used to accelerate the transition of new or improved lower cost monitoring technologies to the Fleets and SYCOMs to reduce the impacts on readiness activities that current monitoring and mitigation technologies have. Funding in this topic area is particularly important because of the Navy lack of additional mitigation tools beyond lookouts were a focus of litigation for the HSTT EIS. Continued funding in these topics areas is necessary to support future compliance documents and is also a requirement of a settlement agreement with the California Coastal Commission for the Hawaii - Southern California Training and Testing (HSTT) EIS/OEIS. Any reduction in funding would result in non-compliance with the settlement agreement and would subject the Navy to costly litigation.					
FY 2018 Base Plans: Funding within this topic area will decrease slightly in FY18. To support our ongoing permit requirements to monitor the effects of at-sea training and testing activities, continued investment is required in this focus area to remain in compliance. Overall, the MMR program will continue to fund monitoring capabilities of marine animals to include the development of new technologies and improvements to existing technologies. In particular, investment in the use of PAM technologies will increase as these platforms become more mature and are able to be leveraged to meet monitoring requirements. Continued funding in FY18 will be used to accelerate the transition of new or improved lower cost monitoring technologies to the Fleets and SYCOMs to reduce the impacts on readiness activities that current monitoring and mitigation technologies have. Funding in this					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603721N / *Environmental Protection*	**Project (Number/Name)** 9204 / *Marine Mammal Research*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
topic area is particularly important because of the Navy lack of additional mitigation tools beyond lookouts were a focus of litigation for the HSTT EIS. Continued funding in these topics areas is necessary to support future compliance documents and is also a requirement of a settlement agreement with the California Coastal Commission for the Hawaii - Southern California Training and Testing (HSTT) EIS/OEIS. Any reduction in funding would result in non-compliance with the settlement agreement and would subject the Navy to costly litigation. ***FY 2018 OCO Plans:*** N/A					
Accomplishments/Planned Programs Subtotals	5.292	5.326	4.512	0.000	4.512

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

RDTEN Contracts are Competitive Procurements.

E. Performance Metrics

Quarterly Program Reviews

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy			Date: May 2017
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603721N / *Environmental Protection*	Project (Number/Name) 9205 / *Marine Mammal Settlement*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
9205: *Marine Mammal Settlement*	0.000	0.000	0.000	3.000	-	3.000	3.000	3.000	0.000	0.000	0.000	9.000
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Navy developed the Surveillance Towed Array Sensory System (SURTASS) Low Frequency Active (LFA) sonar system to meet the requirement for improved capability to detect quieter and harder to find foreign submarines at greater distances. The Navy employs SURTASS LFA systems onboard up to four U.S. Navy surveillance ships for routine training, testing, and military operations in the Atlantic, Pacific, and Indian Oceans and the Mediterranean Sea. Employment of these systems has been the subject of litigation over the last two decades. The U.S. Navy, the National Oceanic and Atmospheric Administration (NOAA), and the Natural Resources Defense Council et al. entered into a settlement agreement, which has been filed with the U.S. District Court for the Northern District of California, to resolve claims alleged by the plaintiffs that the Navy and NOAA violated the Marine Mammal Protection Act (MMPA), the Endangered Species Act (ESA), and the National Environmental Policy Act (NEPA). The purpose of this funding is to comply with the terms of the settlement agreement filed with the court. Under the terms of the settlement, the Navy agrees to spend $9M over the course of three years from fiscal year 2018 through 2020 to fund research projects within the following research topic areas: 1) Developing capacity to protect acoustic habitats, including in national marine sanctuaries managed under the National Marine Sanctuaries Act 16 U.S.C. 1431 et seq., and high-risk areas for protected species; 2) improve marine mammal density and distribution modeling in data poor areas to assist with the identification of areas of biological importance; and 3) density data collection. Funding of this research will ensure compliance with the settlement agreement and will ensure that SURTASS training, testing and operational activities are able to proceed without interruption.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: MARINE MAMMAL SETTLEMENT	0.000	0.000	3.000	0.000	3.000
Articles:	-	-	-	-	-
FY 2016 Accomplishments: N/A					
FY 2017 Plans: N/A					
FY 2018 Base Plans: The "developing capacity to protect acoustic habitats, including in national marine sanctuaries managed under the National Marine Sanctuaries Act 16 U.S.C. 1431 et seq., and high-risk areas for protected species" research topic will be funded at minimum $2.5 million per year for each of the three fiscal years and will be managed jointly and by mutual agreement by Navy and NOAA. This may include: a) deployment of calibrated passive acoustic recording devices in acoustic habitats, including in National Marine Sanctuaries (NMS) and high risk					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603721N / *Environmental Protection*	**Project (Number/Name)** 9205 / *Marine Mammal Settlement*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
areas in the U.S. territorial sea and U.S. Exclusive Economic zone. Choices of sites may vary from year to year. Archiving of all data should occur within federal, publicly accessible, passive acoustic data archives at the National Centers for Environmental Information. In support of the "marine mammal density and distribution modeling in data-poor areas" research topic, a multi-year working group will be established to coordinate the advancement of density spatial modeling methods using visual and acoustic survey data among the federal agencies. The working group will identify and address priority issues in modeling that are common to federal agencies and academic researchers. This effort will include stakeholder involved with end-users including environmental NGOs and subject-matter experts on marine species. This project will receive approximately $250-350K in funding per year, up to a total of $1M over the course of the three year funding period. The project "support the identification of areas of biological importance" will receive a one-time funding contribution of approximately $300K to NOAA. This project will consist of convening an expert working group in FY20 to conduct a rigorous elicitation process to attempt to identify important biological areas for marine mammals using the best available data, including but not limited to any marine mammal density estimates or data developed under this agreement. The "density data collection" topic will receive any remaining funding available from the $9M after the other topics have been funded. This may range from $100-200K per year. ***FY 2018 OCO Plans:*** N/A					
Accomplishments/Planned Programs Subtotals	0.000	0.000	3.000	0.000	3.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

RDTEN Contracts are Competitive Procurements.

E. Performance Metrics

Quarterly Program Reviews