Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy											Date: March 2019	
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 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	461.403	23.237	19.811	20.564	-	20.564	20.172	20.585	20.945	21.357	Continuing	Continuing
0401: *Shipboard Waste Mgmt*	359.356	7.889	7.776	7.979	-	7.979	8.810	8.991	9.143	9.321	Continuing	Continuing
0817: *Environmental Sustainability Development (NESDI)*	49.952	4.747	4.266	4.440	-	4.440	6.087	6.203	6.323	6.450	Continuing	Continuing
2015: *Environmental Restoration RDT&E*	0.000	2.525	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	2.525
9204: *Marine Mammal Research*	52.095	4.478	4.769	5.145	-	5.145	5.275	5.391	5.479	5.586	Continuing	Continuing
9205: *Marine Mammal Settlement*	0.000	3.000	3.000	3.000	-	3.000	0.000	0.000	0.000	0.000	0.000	9.000
9999: *Congressional Adds*	0.000	0.598	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.598

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 (PE) 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, (d) DoD Regulations on Vessels Owned or Operated by the Department of Defense, (e) OPNAV Environmental and Natural Resources Program Manual, (f) 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) 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, (n) Comprehensive Environmental Response, Compensation, and Liability Act, and (o) Resource Conservation and Recovery Act. References (a) through (m) establish Level I environmental protection requirements. Project 0401, Shipboard Waste Management, supports 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, Environmental Sustainability Development, supports the development and validation of technologies to enable Navy facilities to comply with environmental laws, regulations, and policies in a cost-effective manner.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy	Date: March 2019
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*

The Marine Mammal Research (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 available to the U.S. Navy marine species monitoring program (3) Preserve core Navy readiness capabilities. The This funding allows the Navy to avoid or reduce the chances of costly litigation for non-compliance.

$3.000M added in FY 2018 and FY2019 in accordance with settlement agreement under Marine Mammal Protection Act (new project created).

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	20.214	19.811	20.351	-	20.351
Current President's Budget	23.237	19.811	20.564	-	20.564
Total Adjustments	3.023	0.000	0.213	-	0.213
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	2.525	0.000			
• SBIR/STTR Transfer	-0.099	0.000			
• Program Adjustments	0.000	0.000	0.000	-	0.000
• Rate/Misc Adjustments	-0.001	0.000	0.213	-	0.213
• Congressional Add Adjustments	0.598	-	-	-	-

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2018	FY 2019
Project: 9999: *Congressional Adds*		
Congressional Add: *Program Increase*	0.598	0.000
Congressional Add Subtotals for Project: 9999	0.598	0.000
Congressional Add Totals for all Projects	0.598	0.000

Change Summary Explanation

The FY 2019 funding request was reduced by ($.104) million to reflect the Department of Navy's effort to support the Office of Management and Budget directed reforms for Efficiency and Effectiveness that include a lean, accountable, more efficient government.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy	Date: March 2019
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*

Technical: FY19: TA reduced to support Ballast Water Management tasking related to procurement and testing of Navy approved Ballast Water Treatment System. Liquid Waste decrease due to completion of shipboard piping modifications for long-term assessment of sewage and graywater piping development, prevention, and cleaning. Non-copper Anti-fouling decrease reflects completion of in-situ testing of antifouling coatings.
Schedule: Not applicable.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy											Date: March 2019	
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 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
0401: *Shipboard Waste Mgmt*	359.356	7.889	7.776	7.979	-	7.979	8.810	8.991	9.143	9.321	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.

Project 0401, Shipboard Waste Management, 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 Holders 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 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**
Title: Technical Authority (TA)	1.654	1.500	1.450	0.000	1.450
Articles:	-	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Description: Funding in support of TA utilized to develop waste stream design criteria and guidance. This includes system/technology selection, processing capacity, interfaces, shipboard integration, test and qualification protocols, processes and practices, and performance specifications. ***FY 2019 Plans:*** - Develop and finalize DDG oil spill guidance to improve response to spills and content of spill messages - Continue market research on commercial waste management systems for detailed acquisition and evaluation. - 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. - Incorporate emergent ship spills and other oil spill discharge violations into the oil spill database. - Based on oil spill root cause analysis, identify solutions to reduce future risk. - Gain Fleet concurrence on oil spill risk reduction implementation plans. - 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, complete draft specifications on waste management equipment, standards, and certification protocols. - Update model of legacy US Navy engine air emissions. - Investigate impact of the use of environmentally sound refrigerants on refrigeration systems. ***FY 2020 Base Plans:*** -Implement DDG oil spill guidance and incorporate feedback from the Fleet. - Select commercial waste management systems for detailed acquisition and evaluation. - 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 to update the oil spill database by monitoring ship spills and other oil spill discharge violations. - Continue to analyze oil spill root causes, and prepare policy and/or hardware solutions to reduce future oil spills. - Meet with NATO and foreign Navy data exchange partners to leverage lessons learned on afloat environmental compliance. - Develop environmental equipment/system requirements documentation, design criteria/guidance, standards, and certification protocols based on evolving regulations and policy.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- Perform annual assessments of emergent air emission processes and technologies to enable effective compliance at minimal life cycle cost and risk to operations. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** FY20 decrease of $0.050 due to completion of draft hazardous material equipment handling specification.					
Title: Liquid Wastes	2.354	2.275	2.321	0.000	2.321
Articles:	-	-	-	-	-
Description: Navy ships must be able to operate anywhere in the world, train realistically, and visit any port without operational, safety, or health constraints arising due to international, Federal, and local environmental regulations. This effort addresses liquid wastes in two (2) major areas: Marine Sanitation Devices (MSDs) and Marine Pollution Control Devices. ***FY 2019 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: - Initiate shipboard evaluation of a commercial centrifugal Oil Water Separator (OWS) including system inspection and operational checks. - Adjudicate comments on militarized Navy centrifugal OWS specification and finalize document for publishing. - Demonstrate software modifications to secondary treatment system for OWS membrane regeneration, update Fleet procedure, as appropriate, and assess chemical cleaners Non-Oily Waste: - Initiate laboratory evaluation of Navy performance standard leveraging an Army procured commercial marine sanitation device for laboratory evaluation using Navy performance standards. - Continue long-term assessment of sewage and graywater piping development, prevention and cleaning.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- Finalize shipboard installation package, address cybersecurity requirements, and initiate shipboard evaluation of a vacuum instrumentation isolation ***FY 2020 Base 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 shipboard evaluation of a commercial centrifugal oil water separator (OWS) - Initiate removal of centrifugal OWS from test ship platform; restore test ship platform to original configuration - Initiate laboratory evaluation of new Tank Level Indicator technology - Initiate development of Commercial Item Descriptions (CIDs) for bilge cleaners - Initiate laboratory evaluation of Navy militarized OWS. Non-Oily Waste (NOW): - Continue long-term assessment of sewage and graywater piping development, prevention and cleaning. - Determine requirements for detergents/cleaners for NOW treatment systems - Complete shipboard evaluation of Vacuum Instrumentation Isolation - Initiate laboratory evaluation of alternative vacuum pumps. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase of $0.046 is for the completion of the centrifugal OWS shipboard evaluation and the cost to restore the shipboard test platform to the original configuration.					
Title: Hazardous Material Control and Management	0.995	1.015	0.937	0.000	0.937
Articles:	-	-	-	-	-
Description: A wide variety of Hazardous Materials (HM) are used to construct, operate and maintain Navy ships and submarines. These HMs include cleaning compounds, solvents, adhesives, sealants, corrosion preventive compounds, acids, alkalis, oxidizers, lubricants, functional fluids, and many other products. HM addresses environmental, safety and health risks to ship construction workers, Ship's Force (S/F), and shipyard workers.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
FY20 decrease due to reduction in number of system evaluations. ***FY 2019 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. - Procure, install and perform laboratory evaluation of Medical waste processing equipment for special solid waste (Feminine Hygiene Products, Pilot Urine bags, etc.) ***FY 2020 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. - Identify, research, and evaluate less hazardous or non-hazardous substitutes for high-risk hazardous materials. - Acquire, install and perform shipboard evaluation of Medical waste processing equipment for special solid waste (Feminine Hygiene Products, Pilot Urine bags, etc.) ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** FY20 decrease of $0.078 due to completion of paint can recycling evaluation efforts.					
Title: Ballast Water Management	1.736	1.836	2.021	0.000	2.021
Articles:	-	-	-	-	-
Description: The National Invasive Species Act (NISA) requires the Secretary of Defense to implement a Ballast Water Management (BWM) program to minimize the risk of introduction of unwanted species and pathogens from releases of ballast water.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
FY20 increase to support BWM tasking related to testing of both commercial and modified commercial BWTS. ***FY 2019 Plans:*** - Perform assessments of emergent commercial off the shelf BWTS that would enable effective compliance at minimal life cycle cost and risk to operations. - Identify systems for detailed acquisition and evaluation. - Acquire modified commercial BWTS(s) for evaluation. - Continue full scale evaluation of commercial BWTS(s) 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 ballast water treatment system performance specification. ***FY 2020 Base Plans:*** - Continue assessments of emergent commercial off the shelf BWTS that would enable effective compliance at minimal life cycle cost and risk to operations. - Identify systems for detailed acquisition and evaluation. - Continue full scale evaluation of one commercial BWTS to assess system performance, reliability, operability and maintainability, and suitability as a Navy shipboard system. - Begin full scale evaluation of modified commercial BWTSs to assess system performance, reliability, operability and maintainability, and suitability as a Navy shipboard system. - Refine Navy ship installation guidance for meeting ballast water discharge standards considering damage control and stability requirements. - Acquire rapid tank management system for initial land based testing. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** FY20 increase of $0.185 to support BWM tasking related to testing of both commercial and modified commercial BWTSs.					
Title: Solid Waste Management	1.000	1.050	1.150	0.000	1.150
Articles:	-	-	-	-	-
Description: Solid Waste Management supports the Act to Prevent Pollution from Ships (APPS) which regulates all garbage discharges from ships at sea.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
FY 2019 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. - Begin installation and testing preparation for the shipboard evaluation and Navy ship environmental testing of convertor, Marine Solid Waste Incinerator and/or Micro Auto Gasification System based on laboratory test results. - Refine Navy ship acquisition requirements for APPS compliant solid waste processing systems. ***FY 2020 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 with emphasis on Submarine solid waste equipment. - Begin installation and testing preparation for the shipboard evaluation and Navy ship environmental testing of Innovative Submarine solid waste equipment. - Refine Navy ship acquisition requirements for APPS compliant solid waste processing systems. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** FY20 increase to investigate and spearhead design, integration and testing of innovative Submarine solid waste equipment.					
Title: Non-Copper Antifouling ***Articles:*** ***Description:*** The copper discharges from underwater hull coatings remain a regulatory concern. The effort focuses on characterizing advanced coating systems and their suitability for Navy-unique operational factors such as speed time profiles, drydocking intervals, and maintenance practices. ***FY 2019 Plans:*** - Complete in-situ testing and provide final report on performance. - Complete evaluation of NAVSEA screening and qualification test requirements for fouling release (with and without biocides) and antifouling coatings.	0.150 -	0.100 -	0.100 -	0.000 -	0.100 -

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- 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. - Finalize qualification procedure modifications as needed. ***FY 2020 Base Plans:*** - Prepare and submit final report on QPL testing of the 11 coatings. Results from historical qualification tests, ship patch testing will be included in the evaluation. - Initiate Navy assessment of risk in terms of transport of nonindigenous species, underwater hull/niche areas; evaluate historical hull/propeller fouling and cleaning reports; evaluate in context of ship active periods as well as coating type and age; evaluate in context of PLANNED changeover in hull fouling rating evaluation criteria Execute targeted inspections; and evaluate in context of existing and emerging country-specific requirements as well as IMO requirements. ***FY 2020 OCO Plans:*** N/A					
Accomplishments/Planned Programs Subtotals	7.889	7.776	7.979	0.000	7.979

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-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603721N / *Environmental Protection*	Project (Number/Name) 0401 / *Shipboard Waste Mgmt*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Ancillary Hardware Development	Various	Misc. Contracts : Not Specified	19.149	0.000		0.000		0.000		-		0.000	0.000	19.149	Continuing
Primary Hardware Development	C/CPFF	Oceaneering : Not Specified	1.000	0.000		0.000		0.000		-		0.000	0.000	1.000	Continuing
Systems Engineering	C/CPFF	John J. McMullen & Son : Not Specified	4.487	0.000		0.000		0.000		-		0.000	0.000	4.487	Continuing
		Subtotal	24.636	0.000		0.000		0.000		-		0.000	0.000	24.636	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Software Development	WR	SPAWAR : Charleston, SC	10.838	0.000		0.000		0.000		-		0.000	0.000	10.838	Continuing
		Subtotal	10.838	0.000		0.000		0.000		-		0.000	0.000	10.838	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	MIPR	US Army Corps of Engineers : Norfolk, VA	0.687	0.000		0.000		0.000		-		0.000	0.000	0.687	-
Developmental Test & Evaluation	WR	NSWCCD, Bethesda, MD : Bethesda, MD	214.666	6.250	Nov 2017	6.800	Nov 2018	7.600	Nov 2019	-		7.600	Continuing	Continuing	Continuing
Developmental Test & Evaluation	WR	NSWCIHD : Indian Head, MD	1.086	0.000		0.000		0.000		-		0.000	0.000	1.086	-
Developmental Test & Evaluation	WR	NRL,Wash,DC : Wash,DC	32.576	0.948	Nov 2017	0.500	Nov 2018	0.100	Nov 2019	-		0.100	Continuing	Continuing	Continuing
Developmental Test & Evaluation	WR	NSWCPD, Philladelphia, PA : Philladelphia, PA	0.472	0.441	Nov 2017	0.301	Nov 2018	0.279	Nov 2019	-		0.279	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603721N / *Environmental Protection*	Project (Number/Name) 0401 / *Shipboard Waste Mgmt*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	SPAWARSYSCEN : SD,CA	12.308	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Developmental Test & Evaluation	WR	Misc. Govt Labs : TBD	23.225	0.250	Nov 2017	0.175	Nov 2018	0.000	Nov 2019	-		0.000	0.000	23.650	-
Developmental Test & Evaluation	C/CPFF	SAIC : San Diego, CA	15.570	0.000		0.000		0.000		-		0.000	0.000	15.570	-
Developmental Test & Evaluation	C/CPFF	Misc. Contracts : TBD	13.103	0.000		0.000		0.000		-		0.000	0.000	13.103	-
Process Control Engineering	C/CPFF	M. Rosenblatt & Sons : Arlington, VA	6.547	0.000		0.000		0.000		-		0.000	0.000	6.547	Continuing
Developmental Test & Evaluation	C/CPFF	ONR : Arlington, VA	0.400	0.000		0.000		0.000		-		0.000	0.000	0.400	Continuing
Developmental Test & Evaluation	WR	Naval Postgraduate School : Monterey, CA	1.800	0.000		0.000		0.000		-		0.000	0.000	1.800	Continuing
Process Control Engineering	MIPR	EPA, Hdqtrs : Washington, DC	0.840	0.000		0.000		0.000		-		0.000	0.000	0.840	Continuing
		Subtotal	323.280	7.889		7.776		7.979		-		7.979	Continuing	Continuing	N/A

Remarks

Increased funding to NSWCCD greater than 2% for testing and evaluation of the centrifugal Oil Water Separator shipboard evaluation and the cost to restore the shipboard test platform to the original configuration; Ballast Water Management tasking related to testing of both commercial and modified commercial BWTSs; and to investigate and spearhead design, integration and testing of innovative Submarine solid waste equipment.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Travel	Allot	NAVSEA HQ : Washington, DC	0.375	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
SBIR Assessment	TBD	Not Specified : Not Specified	0.227	0.000		0.000		0.000		-		0.000	0.000	0.227	Continuing
		Subtotal	0.602	0.000		0.000		0.000		-		0.000	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603721N / *Environmental Protection*	Project (Number/Name) 0401 / *Shipboard Waste Mgmt*	

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	359.356	7.889		7.776		7.979		-		7.979	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603721N / *Environmental Protection*	**Project (Number/Name)** 0401 / *Shipboard Waste Mgmt*

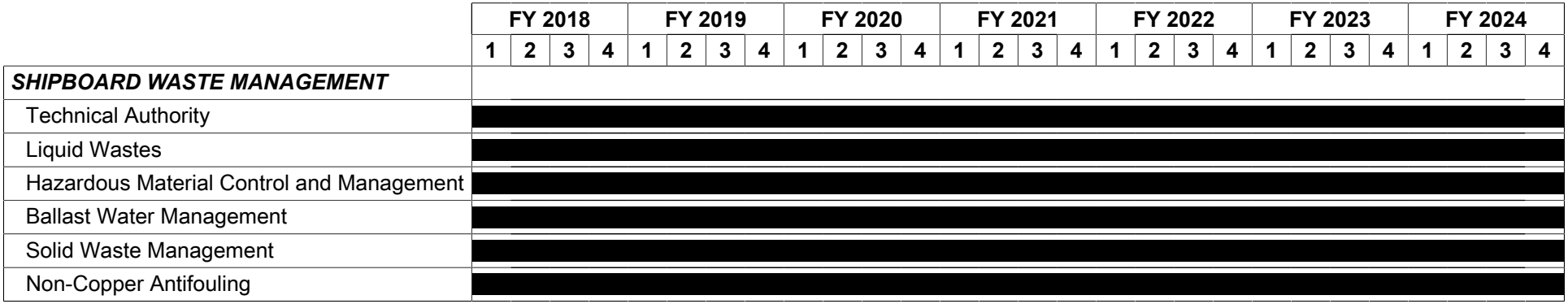

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603721N / *Environmental Protection*	**Project (Number/Name)** 0401 / *Shipboard Waste Mgmt*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
SHIPBOARD WASTE MANAGEMENT				
Technical Authority	1	2018	4	2024
Liquid Wastes	1	2018	4	2024
Hazardous Material Control and Management	1	2018	4	2024
Ballast Water Management	1	2018	4	2024
Solid Waste Management	1	2018	4	2024
Non-Copper Antifouling	1	2018	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
0817: *Environmental Sustainability Development (NESDI)*	49.952	4.747	4.266	4.440	-	4.440	6.087	6.203	6.323	6.450	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.

Environmental Enabling Capabilities -2 (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.

Environmental Enabling Capabilities-3 (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

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603721N / *Environmental Protection*	**Project (Number/Name)** 0817 / *Environmental Sustainability Development (NESDI)*

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.

Environmental Enabling Capabilities-4 (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.

Environmental Enabling Capabilities-5 (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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Maximize Training & Testing Requirements Within Environmental Constraints	0.850	0.735	0.705	0.000	0.705
Articles:	-	-	-	-	-
FY 2019 Plans: FY 2019 Base Plans: - 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 the initiative: Analysis of the Long-Term Fate of Munitions Constituents on Terrestrial Sites. - Complete the initiatives: X-ray inspection system to demilitarize targets. - Program to begin to evaluate Cost Effective Main Charge Remediation of Insensitive Munitions for Range Clearance.					
FY 2020 Base Plans: FY 2020 Base Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
-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 to evaluate the feasibility of Cost Effective Main Charge Remediation of Insensitive Munitions for Range Clearance. - Complete the initiatives: Analysis of the Long-Term Fate of Munitions Constituents on Terrestrial Sites. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Funding for this budget item decreased from $0.735M to $0.705M ($0.030M) due to completion of X-ray inspection system to demilitarize targets.					
Title: Platform Maintenance and Repair With Minimal Environmental Footprint	1.064	1.007	0.953	0.000	0.953
Articles:	-	-	-	-	-
FY 2019 Plans: FY 2019 Base Plans: - Continue providing innovative solutions for difficult and persistent shipyard environmental compliance issues. - Continue the initiatives: Demonstration Of Non-Chromated Adhesive Bond Primer For Metal Repair Bonding, Non-Isocyanate Polyurethane-Free Formulation Coatings for Aircraft and Support Equipment, Multi-Functional Surface Preparation Technology for Maintenance Painting, Demonstration of Optimized non-NMP (n-Methyl-2-pyrrolidone) Solvents for Immersion Chemical Depainting, Initiation Decision Report of Laser Coating Removal on Naval Aircraft Components, Elimination of Hexavalent Chromium from Magnesium Conversion Coating Processes at Fleet Readiness Centers, Low VOC Primers for Ground Support Equipment Application. - Complete the initiatives: User Friendly Oxygen Cleaning Alternatives to Navy Oxygen Cleaning (NOC), Enhanced Trivalent Chromium Pretreatment for Improved Coloration and Corrosion Performance of Aluminum Substrates, Naval Air Systems Command Solutions for Engine Washing. - Program to begin to examine Electromagnetic Interference Shielding Tape, Replacement of Cadmium in GSE Avionics Applications. ***FY 2020 Base Plans:*** FY2020 Base Plans: - Continue evaluations and demonstrations of innovative solutions for difficult and persistent aviation and shipyard platform sustainment issues related to hexavalent chrome, cadmium, volatile organic compounds					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
(VOC) hazardous air pollutants (HAP) and other hazardous compounds at Naval Aviation Systems Command Fleet Readiness Centers and the Navy's shipyards. - Continue providing innovative solutions for difficult and persistent shipyard environmental compliance issues. - Continue evaluating the feasibility of Electromagnetic Interference Shielding Tape, Replacement of Cadmium in GSE Avionics Applications. - Continue the initiatives: Elimination of Hexavalent Chromium from Magnesium Conversion Coating Processes at Fleet Readiness Centers, Low VOC Primers for Ground Support Equipment Application. - Complete the initiatives: Demonstration of Non-Chromated Adhesive Bond Primer For Metal Repair Bonding, Non-Isocyanate Polyurethane-Free Formulation Coatings for Aircraft and Support Equipment, Multi-Functional Surface Preparation Technology for Maintenance Painting, Demonstration of Optimized non-NMP (n-Methyl-2-pyrrolidone) Solvents for Immersion Chemical Depainting, Initiation Decision Report of Laser Coating Removal on Naval Aircraft Components. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Funding for this budget item decreased from $1.007M to $0.953M (-$0.054M) due to completion of User Friendly Oxygen Cleaning alternatives to Navy Oxygen Cleaning (NOC), Enhanced Trivalent Chromium Pretreatment for improved coloration and corrosion performance of aluminum substrates, and Naval Air Systems Command Solutions for engine washing.					
Title: Support Shore Readiness within Environmental Constraints	1.187	1.039	1.068	0.000	1.068
Articles:	-	-	-	-	-
FY 2019 Plans: FY 2019 Base Plans: - Continue the initiatives: Demonstration of New Strategies for Enhanced Monitored Natural Recovery at Navy Sediment Sites, Improved Dewatering of Dredged Sediment, NPDES Copper Effluent Control System. - 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. - Complete the initiatives: Analysis of Regulated Garbage Management Processes to Ensure Compliance with Animal and Plant Health Inspection Service Regulations, Evaluation and Implementation of Compliance Options for NPDES Cooling Water Intake Structures at Existing Facilities, Quantification of Polychlorinated Biphenyls (PCB) Paint Volatilization, Diver-less Deployment System for In-Situ Sediment Samplers.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- Under Pier Sediment Pile Assessment Tools to be evaluated and started. ***FY 2020 Base Plans:*** FY 2020 Base Plans: - Continue evaluations and demonstrations of innovative solutions to minimize regulated emissions, discharges and hazardous material usage resulting specifically from waterfront support, aviation support, and other base operations. - Continue funding demonstration of New Strategies for Enhanced Monitored Natural Recovery at Navy Sediment Sites, NPDES Copper Effluent Control System with increase field work. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Funding for this budget item increased from $1.039M to $1.068M ($0.029M) due to increased field work for demonstration of New Strategies for enhanced monitored natural recovery at Navy sediment sites and Under Pier Sediment Pile Assessment Tools.					
Title: Cost-Effective Management of Environmental Regulatory Requirements	1.646	1.485	1.714	0.000	1.714
Articles:	-	-	-	-	-
FY 2019 Plans: FY 2019 Base Plans: - Complete the initiatives: Forward Looking Infrared Camera for Advanced Discharge Characterization, Smart Electronic Tools for Navy Environmental Compliance Monitoring and Reporting, Study of Waste Management and Minimization for AFFF Wastewater. - New program evaluate and demonstration/validation of Air Filtration for Indoor Air Quality, Stormwater Piping-Based Pollutant Best Management Practice, Improving Site Closure Decision-Making with Time-Integrated Groundwater Samples. ***FY 2020 Base Plans:*** FY 2020 Base Plans: - 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.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- Continue to evaluate the feasibility of Air Filtration for Indoor Air Quality, Stormwater Piping-Based Pollutant Best Management Practice, Improving Site Closure Decision-Making with Time-Integrated Groundwater Samples. - Continue the initiatives: Addressing Temporal Variability in Industrial Buildings during Vapor Intrusion Assessments, Demonstrating the Effectiveness of Novel Treatment Technologies for the Removal of Poly- and Perfluoroalkyl Substances from Groundwater, In-situ Automatic Stormwater Sampling Device for Use at Tidally Impacted Sampling Locations, Development and Demonstration of a Portable, Temporary Barrier to Aid in Cargo and Equipment Inspections to Prevent Brown Treesnake Dispersal. - Complete the initiatives: Utility Vault Water Treatment, Preventative Management of Contaminated Silt, Using Stable-Isotope Labeled Tracers to Validate Natural Attenuation of RDX in Groundwater, In Situ Treatment of 1,4-Dioxane using Enhanced Biodegradation, Demonstration of Improved Toxicity Methodology to Link Stormwater Discharges to Receiving Water Impacts, Sewer Gas Elimination Technology, Impact of Sediment Resuspension by Propeller Wash and Shore Sediment Dynamics on Remediation Options. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Funding for this budget item increased from $1.485M to $1.713M ($0.228M) due to increased field work for Addressing Temporal Variability in Industrial Buildings during Vapor Intrusion Assessments, In-situ Automatic Stormwater Sampling Device for use at Tidally Impacted Sampling Locations, Demonstrating the Effectiveness of Novel Treatment Technologies for the Removal of Poly- and Perfluoroalkyl Substances from Groundwater, and Temporary Barrier to Aid in Cargo and Equipment Inspections to Prevent Brown Treesnake Dispersal.					
Accomplishments/Planned Programs Subtotals	4.747	4.266	4.440	0.000	4.440

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-3, RDT&E Project Cost Analysis: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603721N / *Environmental Protection*	**Project (Number/Name)** 0817 / *Environmental Sustainability Development (NESDI)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
EEC 2	Various	EXWC : PT HUENEME, CA	6.325	0.500	Oct 2017	0.410	Oct 2018	0.400	Oct 2019	-		0.400	Continuing	Continuing	Continuing
EEC 2	Various	SSC : SAN DIEGO, CA	5.904	0.350	Dec 2017	0.325	Dec 2018	0.305	Dec 2019	-		0.305	Continuing	Continuing	Continuing
EEC 3	WR	NAWC : PATUXENT RIVER, MD	2.091	0.202	Mar 2018	0.135	Mar 2019	0.120	Mar 2020	-		0.120	Continuing	Continuing	Continuing
EEC 3	Various	NSWC : BETHESDA, MD	3.850	0.192	Nov 2017	0.175	Feb 2019	0.197	Feb 2020	-		0.197	Continuing	Continuing	Continuing
EEC 3b	Various	EXWC : PT HUENEME, CA	1.412	0.050	Mar 2018	0.077	Mar 2019	0.069	Mar 2020	-		0.069	Continuing	Continuing	Continuing
EEC 4	Various	EXWC : PT HUENEME, CA	8.380	0.540	Mar 2018	0.404	Mar 2019	0.390	Mar 2020	-		0.390	Continuing	Continuing	Continuing
EEC 4	Various	NSWC : BETHESDA, MD	4.388	0.307	Nov 2017	0.260	Nov 2018	0.255	Nov 2019	-		0.255	Continuing	Continuing	Continuing
EEC 4a	Various	SSC : SAN DIEGO, CA	3.565	0.340	Jan 2018	0.375	Apr 2019	0.423	Apr 2020	-		0.423	Continuing	Continuing	Continuing
EEC 5	Various	EXWC : PT HUENEME, CA	3.576	0.500	Nov 2017	0.433	Nov 2018	0.489	Nov 2019	-		0.489	Continuing	Continuing	Continuing
EEC 5	Various	SSC : SAN DIEGO, CA	1.810	0.395	Feb 2018	0.350	Feb 2019	0.494	Feb 2020	-		0.494	Continuing	Continuing	Continuing
EEC 5	Various	NAWC : PATUXENT RIVER, MD	1.327	0.050	Jun 2018	0.100	Jun 2019	0.095	Jun 2020	-		0.095	Continuing	Continuing	Continuing
EEC 5	Various	NSWC : BETHESDA, MD	2.290	0.504	Jan 2018	0.387	Jan 2019	0.385	Jan 2020	-		0.385	Continuing	Continuing	Continuing
EEC 5	WR	NAWCWD : CHINA LAKE, CA	1.360	0.122	Dec 2017	0.140	Dec 2018	0.150	Dec 2019	-		0.150	Continuing	Continuing	Continuing
EEC 5	WR	NAWC : LAKE HURST, NJ	0.831	0.075	Nov 2017	0.075	Nov 2018	0.100	Nov 2019	-		0.100	Continuing	Continuing	Continuing
EEC 3	WR	FRC - SE : JACKSONVILLE, FL	1.685	0.380	May 2018	0.380	May 2019	0.305	May 2020	-		0.305	Continuing	Continuing	Continuing
EEC 3	Various	NSWC : San Diego, CA	0.060	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603721N / *Environmental Protection*	**Project (Number/Name)** 0817 / *Environmental Sustainability Development (NESDI)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
EEC 3	WR	FRC - CE : Cherry Point, NC	0.380	0.075	Jun 2018	0.075	Jun 2019	0.085	Jan 2020	-		0.085	Continuing	Continuing	Continuing
EEC 3	Various	FRC-SW : San Diego, CA	0.718	0.165	Mar 2018	0.165	Mar 2019	0.178	Mar 2020	-		0.178	Continuing	Continuing	Continuing
		Subtotal	49.952	4.747		4.266		4.440		-		4.440	Continuing	Continuing	N/A

Remarks

Performing Activities: Naval Surface Warfare Center, Carderock Division (NSWC/CD); Engineering and Expeditionary Warfare Center (EXWC), Port Hueneme, CA; Naval Surface Warfare Center, Indian Head Division (NSWC/IH); Space and Warfare Systems Center, San Diego (SSC/SD); Naval Air Warfare Center Aircraft Division Patuxent River (NAWCAD/PAX); Naval Air Warfare Center (NAWCWD/China Lake); Naval Air Warfare Center Aircraft Division Lakehurst (NAWCAD/Lakehurst); Fleet Readiness Center Southeast, Jacksonville FL (FRC-SE); Fleet Readiness Center Southwest, San Diego (FRC-SW), Fleet Readiness Center East, Cherry Point (FRC-CE). Total Prior Years Cost: Subtotal does not include performing activities from prior years that are no longer performing activities. Award Dates: About 55% of the project is executed via contracts awarded by the performing activities. More rigorous contracting, funding and performer work induction processes are slightly increasing project management costs. Contracting and financial management offices across the performing organizations may be understaffed. Projects are derived from field level needs and awarded competitively to performing organizations, the portfolio mix of cost category/performing organization naturally changes from fiscal year to fiscal year. Due to this, some individual line items in the R-3 will increase at greater than a 2% escalation factor.

Explanation of increases greater than 2% between FY2019 and FY2020:
-EEC3 NSWC Bethesda MD increased from 0.175 to 0.197 due to increased project management costs and increase in field work for continuing projects.
-EEC4a SSC San Diego CA increased from 0.375 to 0.423 due to increased project management costs and increase in field work for continuing projects such as Demonstration of New Strategies for Enhanced Monitored Natural Recovery at Navy Sediment Sites.
-EEC5 EXWC PT Hueneme CA increased from 0.433 to 0.489 due to increase in project management costs and field work for continuing projects such as Addressing Temporal Variability in Industrial Buildings during Vapor Intrusion Assessments, Demonstrating the Effectiveness of Novel Treatment Technologies for the Removal of Poly- and Perfluoroalkyl Substances from Groundwater and Temporary Barrier to Aid in Cargo and Equipment Inspections to Prevent Brown Treesnake Dispersal.
-EEC5 SSC San Diego CA increased from 0.350 to 0.494 due to increase in project management costs and field work in continuing projects such as In-situ Automatic Stormwater Sampling Device for Use at Tidally Impacted Sampling Locations.
-EEC5 NAWCWD China Lake CA increased from 0.140 to 0.150 due to increased costs to support overall program management.
-EEC5 NAWC Lake Hurst NJ increased from 0.075 to 0.100 due to increased costs for program web site management.
-EEC3 FRC CE Cherry Point NC increased from 0.075 to 0.085 due to increase in field work for continuing projects such as Electromagnetic Interference Shielding Tape, Replacement of Cadmium in GSE Avionics Applications.
-EEC3 FRC SW San Diego CA increased from 0.165 to 0.177 due to increase in field work for continuing projects such as Electromagnetic Interference Shielding Tape, Replacement of Cadmium in GSE Avionics Applications.

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	49.952	4.747		4.266		4.440		-		4.440	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
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	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
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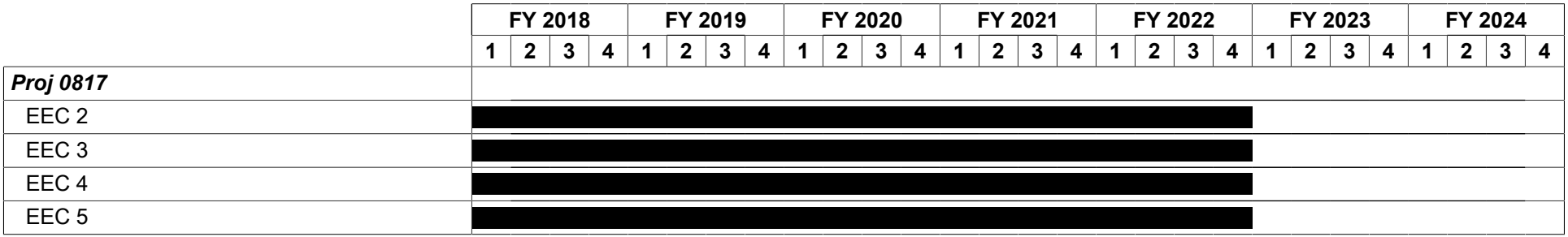

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603721N / *Environmental Protection*	**Project (Number/Name)** 0817 / *Environmental Sustainability Development (NESDI)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 0817				
EEC 2	1	2018	4	2022
EEC 3	1	2018	4	2022
EEC 4	1	2018	4	2022
EEC 5	1	2018	4	2022

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603721N / *Environmental Protection*				Project (Number/Name) 2015 / *Environmental Restoration RDT&E*			
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
2015: *Environmental Restoration RDT&E*	0.000	2.525	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	2.525
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Navy's Environmental Restoration minimizes risk to human health and the environment and restore contaminated sites to productive use. RDT&E improves identification, investigation, removal and remedial actions to address and clean up environmental contamination at Navy installations.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Per- and Poly- fluorinated alkyl Substances (PFAS)	2.525	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: N/A					
FY 2020 Base Plans: N/A					
FY 2020 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	2.525	0.000	0.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

RDTEN Contracts are Competitive Procurements.

E. Performance Metrics

Quarterly Program Reviews

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603721N / *Environmental Protection*	Project (Number/Name) 2015 / *Environmental Restoration RDT&E*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PFAS	Various	EXWC : Port Hueneme	0.000	2.525	Sep 2018	0.000		0.000		-		0.000	0.000	2.525	-
		Subtotal	0.000	2.525		0.000		0.000		-		0.000	0.000	2.525	N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	2.525		0.000		0.000		-		0.000	0.000	2.525	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603721N / *Environmental Protection*	**Project (Number/Name)** 2015 / *Environmental Restoration RDT&E*

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Proj 2015																												
Per- and Poly- fluorinated alkyl Substances (PFAS)					[redacted]																							

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603721N / *Environmental Protection*	**Project (Number/Name)** 2015 / *Environmental Restoration RDT&E*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 2015				
Per- and Poly- fluorinated alkyl Substances (PFAS)	4	2018	4	2019

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy											Date: March 2019	
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 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
9204: *Marine Mammal Research*	52.095	4.478	4.769	5.145	-	5.145	5.275	5.391	5.479	5.586	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 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**
Title: Marine Ecology and Population Dynamics	0.815	0.900	0.900	0.000	0.900
Articles:	-	-	-	-	-
FY 2019 Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Continue ongoing research on the topics of density estimation from passive acoustic monitoring, standards/ metrics development, and development of an automated sonar detector. Ongoing work on the topic of density estimation from passive acoustic monitoring are in the height of the fieldwork/data collection stage in FY2019. The ongoing work on the topic of standards/metrics development is now in the second half of the project and should be focused on refinements/testing of the passive acoustic monitoring metadata database system and standards development. The ongoing work to develop an automated sonar detector will be focused on comparing available detectors to determine which one is performing the best. None of the ongoing studies in these topic areas are scheduled to be completed in FY2019. One study is expected to be initiated in FY2019 in response to a need to collect data on potential impacts to coral from Navy activities. In addition, based on feedback from the Fleets and SYSCOMS, there is a need for continued investment in passive acoustic data analysis tools in FY2019.					
FY 2020 Base Plans: FY2020 Base Plans: Within the area of 'Marine Ecology and Population Dynamics', ongoing work covers topics such as standards/ metrics development and development of an automated sonar detector to standardize analysis of acoustic data. Two ongoing studies will continue into FY2021: -Acoustic Metadata Management for Navy Fleet Operations -Standardizing Methods and Nomenclature for Automated Detection of Navy Sonar In addition, at least two studies are expected to be initiated in FY2019 (would be ongoing in FY2020) in response to the following needs collected from Navy personnel: -data on potential impacts to coral from Navy activities in order to validate current required mitigation measures -improved passive acoustic data analysis tools Two studies are expected to be completed in FY2020: -Blue and fin whale density estimation in the US Pacific Fleet Southern California Offshore Range using PAM data -DECAF-TEA: Density Estimation for Cetaceans from Acoustic Fixed sensors in Testing and Evaluation Areas					
FY 2020 OCO Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
N/A					
Title: Criteria and Thresholds, Physiology and Behavior, and Effects of Sound	2.452	2.654	3.030	0.000	3.030
Articles:	-	-	-	-	-
FY 2019 Plans: Continue ongoing research on the topics of hearing (in birds, harbor porpoises and harbor seals), temporary threshold shift (in harbor porpoises and harbor seals), effects on fish from underwater explosions, behavioral response studies (beaked whales, fin whales, sperm whales), and in-situ explosive sound and propagation characterization. Most ongoing studies are in the middle of the data collection/fieldwork stage in FY2019, but two projects are the final data analysis and report writing stage. Two studies are expected to be completed in FY2019: -Frequency-dependent growth and recovery of temporary threshold shift in bottlenose dolphins, and -Temporary threshold shift in harbor porpoises due to naval sonar sounds and recovering of hearing. Funding in this topic area is particularly important because the results are needed by the end of 2020 to update the criteria and thresholds for the Phase IV acoustic effects modeling. If emergent needs are identified in FY2018, then they would need to be funded in late FY2018/early 2019 to meet the 2020 goal.					
FY 2020 Base Plans: FY2020 Base Plans: Within the area of 'Criteria and Thresholds, Physiology and Behavior, and Effects of Sound', ongoing work covers topics such as hearing, temporary threshold shift, behavioral response studies, and effects from underwater explosions. One ongoing study will continue into FY2021: -Multi-spaced measurement of underwater sound fields from explosive sources In addition, at least one study is expected to be initiated in FY2019 (would be ongoing in FY2020) in response to the following needs collected from Navy personnel: -data on sea turtle hearing/TTS -data on mysticete hearing Eight studies are expected to be completed by the end of FY2020:					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
-Hearing and estimated noise impacts in three species of Auk: Implications for the marbled murrelet -Hawaiian Monk seal auditory sensitivity study -Frequency-dependent growth and recovery of temporary threshold shift in bottlenose dolphins -TTS in harbor seals due to fatiguing noise of several frequencies -Temporary threshold shift in harbor porpoises due to naval sonar sounds and recovering of hearing -The effects of underwater explosions on fish -Cuvier's beaked whale and fin whale behavior during military sonar operations -3S3-Behavioral responses of sperm whales to naval sonar -Measuring the effect of range on the behavioral response of marine mammals through the use of Navy sonar and small source playbacks Funding within the area of 'Criteria and Thresholds, Physiology and Behavior, and Effects of Sound' is expected to increase for FY2020. Funding in this topic area is particularly important in FY2020 because the results are needed by the end of 2020 to update the criteria and thresholds for the Phase IV acoustic effects modeling. Therefore most of the projects will be in the final stages of trying to push to get final results in time to support this deadline. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Funding for this budget item increased from $2.654M to $3.036M ($0.382M). The additional funding requested would be used to support an emergent need for sea turtle Temporary Threshold Shift (TTS) data and to ensure that our eight studies scheduled to be completed in FY20 are completed on time. The sea turtle TTS project is a collaboration project with NOAA planned to begin in FY19 and is an opportunity to leverage additional funding from another federal organization. The eight studies schedule to be completed in FY20 (listed individually in R-2A) will be in the final stages of collecting remaining data, finalizing analysis, writing reports, and publishing results (hearing, behavioral response and TTS data) in peer-reviewed journals by the end of 2020. These results include needed to support updating the criteria and thresholds for the Phase IV acoustic effects modeling. These data are essential to ensuring that the Navy's take estimates are as accurate as possible for the Phase IV compliance documentation.					
Title: Mitigation Methodologies: Monitoring, New Technology, and Risk Assess	1.211	1.215	1.215	0.000	1.215
Articles:	-	-	-	-	-
FY 2019 Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Continue ongoing research on monitoring technology and development of the M3R (Marine Mammal Monitoring on Navy Ranges) system. None of the ongoing studies are scheduled to be completed in FY2019. After an analysis of the status of the passive acoustic monitoring technologies and tagging demonstrations are complete, it is anticipated that there will be a need to fund follow-on efforts in FY 2019. ***FY 2020 Base Plans:*** FY2020 Base Plans: Within the area of 'Mitigation Methodologies', ongoing work covers demonstration and validation of new technologies for monitoring and mitigation. One ongoing study will continue into FY2021: -M3R (Marine Mammal Monitoring on Navy Ranges) In addition, at least two studies are expected to be initiated in FY2019 (would be ongoing in FY2020) in response to the following need collected from Navy personnel: -demonstration and validation of passive acoustic sensors and platforms (UUVs, tags, fixed) for marine mammal monitoring None of the ongoing studies are scheduled to be completed in FY2020. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A					
Accomplishments/Planned Programs Subtotals	4.478	4.769	5.145	0.000	5.145

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603721N / *Environmental Protection*	**Project (Number/Name)** 9204 / *Marine Mammal Research*

D. Acquisition Strategy

RDTEN Contracts are Competitive Procurements.

E. Performance Metrics

Quarterly Program Reviews

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603721N / *Environmental Protection*	Project (Number/Name) 9204 / *Marine Mammal Research*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Mar Ecol & Pop Dynamics	Various	EXWC : Port Hueneme, CA	2.422	0.555	Nov 2017	0.745	Oct 2018	0.745	Oct 2019	-		0.745	Continuing	Continuing	Continuing
Criteria & Thresholds	SS/CPFF	NMMF : San Diego, CA	0.135	0.049	Nov 2017	0.000		0.000		-		0.000	0.000	0.184	-
Mitigation Methods	SS/CPFF	SDSU : San Diego, CA	0.216	0.358	Nov 2017	0.000		0.000		-		0.000	0.000	0.574	-
Criteria & Thresholds	SS/CPFF	SEAMARCO : Netherlands	0.276	0.040	Nov 2017	0.000		0.000		-		0.000	0.000	0.316	-
Mitigation Methods	WR	OASIS Technologies, Inc. : Lexington, MA	1.338	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Criteria & Thresholds	SS/CPFF	U Saint Andrews : United Kingdom	0.163	0.343	Nov 2017	0.400	Oct 2018	0.000		-		0.000	0.000	0.906	-
Mitigation Methods	SS/CPFF	Biowaves : San Diego, CA	0.139	0.000		0.000		0.000		-		0.000	0.000	0.139	-
Mitigation Methods	SS/CPFF	Syracuse U : Syracuse, NY	0.000	0.030	Nov 2017	0.000		0.000		-		0.000	0.000	0.030	-
Criteria & Thresholds	SS/CPFF	WHOI : Falmouth, MA	0.000	0.138	Nov 2017	0.200	Oct 2018	0.000		-		0.000	0.000	0.338	-
Mitigation Methods	WR	SPAWAR : San Diego, CA	0.988	0.085	Nov 2017	0.100	Oct 2018	0.200	Oct 2019	-		0.200	Continuing	Continuing	Continuing
Criteria & Thresholds	SS/CPFF	MARECOTEL : Seabeck, WA	0.000	0.560	Nov 2017	0.600	Oct 2018	0.600	Oct 2019	-		0.600	0.000	1.760	-
Mitigation Methods	SS/CPFF	Scripps Institute : San Diego, CA	0.751	0.297	Nov 2017	0.200	Oct 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Criteria & Thresholds	SS/CPFF	U Washington : Seattle, WA	0.000	0.403	Nov 2017	0.300	Oct 2018	0.000		-		0.000	0.000	0.703	-
Mitigation Methods	SS/CPFF	Oregon State Univ : OR & HI	0.754	0.055	Nov 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Criteria & Thresholds	Various	EXWC : Port Hueneme, CA	0.000	0.613	Jan 2018	0.651	Jan 2019	1.830	Jan 2020	-		1.830	0.000	3.094	-
Mar Ecol & Pop Dynamics	WR	NAVAIR : Lakehurst, NJ	0.377	0.130	Nov 2017	0.075	Oct 2018	0.075	Oct 2019	-		0.075	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603721N / *Environmental Protection*	Project (Number/Name) 9204 / *Marine Mammal Research*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Mitigan Methods	Various	EXWC : Port Hueneme, CA	0.000	0.183	Jan 2018	0.515	Jan 2019	0.715	Jan 2020	-		0.715	Continuing	Continuing	Continuing
Mar Ecol & Pop Dynamics	SS/CPFF	BMC Inc. : Chicago, IL	0.441	0.100	Nov 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Mitigation Methods	WR	NUWC : Newport, RI	10.657	0.194	Nov 2017	0.400	Oct 2018	0.300	Oct 2019	-		0.300	Continuing	Continuing	Continuing
Mar Ecol & Pop Dynamics	WR	NPGS : Monterey, CA	3.579	0.030	Nov 2017	0.030	Oct 2018	0.030	Oct 2019	-		0.030	Continuing	Continuing	Continuing
Mar Ecol & Pop Dynamics	MIPR	NOAA: Various : La Jolla, CA	3.511	0.000		0.050	Oct 2018	0.050	Oct 2019	-		0.050	Continuing	Continuing	Continuing
Mitigation Methods	SS/CPFF	Scripps Institute : La Jolla, CA	9.715	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Mitigation Methods	SS/CPFF	Oregon State Univ. : Corvallis, OR	2.066	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Criteria & Thresholds	WR	NUWC : Newport, RI	0.000	0.000		0.100	Oct 2018	0.300	Oct 2019	-		0.300	0.000	0.400	-
Criteria & Thresholds	SS/CPFF	SPAWAR : San Diego, CA	3.775	0.315	Nov 2017	0.403	Oct 2018	0.300	Oct 2019	-		0.300	Continuing	Continuing	Continuing
Criteria & Thresholds	SS/CPFF	Cascadia Research Collective : Olympia, WA	8.249	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Criteria & Thresholds	SS/CPFF	San Diego State Univ : San Diego, CA	2.543	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	52.095	4.478		4.769		5.145		-		5.145	Continuing	Continuing	N/A

Remarks

Individual projects are derived from field level needs and awarded competitively to performing organizations, the portfolio mix of cost category/performing organization naturally changes from fiscal year to fiscal year.

The following increases are above 2% from FY19 to FY20:
- Mitigation Methods: SPAWAR: San Diego, CA; Increase from $0.100 to $0.200. Increase due to added projects from FY18 that has increase efforts in FY20.
- Mitigation Methods: EXWC: Port Hueneme, CA; Increase from $0.515 to $0.715. Increase due to planned FY19/20 projects that will be awarded competitively by EXWC to performing organizations based on subject matter expertise required by Navy need.
- Criteria & Thresholds: NUWC: Newport, RI; Increase from $0.100 to $0.300. Increase due to increase on existing projects due to field year.(Clarity: Field Year means that the project will have a field effort (in this situation: Data Collection at Sea) in FY2020. This will increase cost.)
- Criteria & Thresholds: EXWC: Port Hueneme, CA; Increase from $0.651 to $1.590. Increase due to planned FY19/20 projects that will be awarded competitively by EXWC to performing organizations based on subject matter expertise required by Navy need.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603721N / *Environmental Protection*	Project (Number/Name) 9204 / *Marine Mammal Research*	

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	52.095	4.478		4.769		5.145		-		5.145	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603721N / *Environmental Protection*	**Project (Number/Name)** 9204 / *Marine Mammal Research*

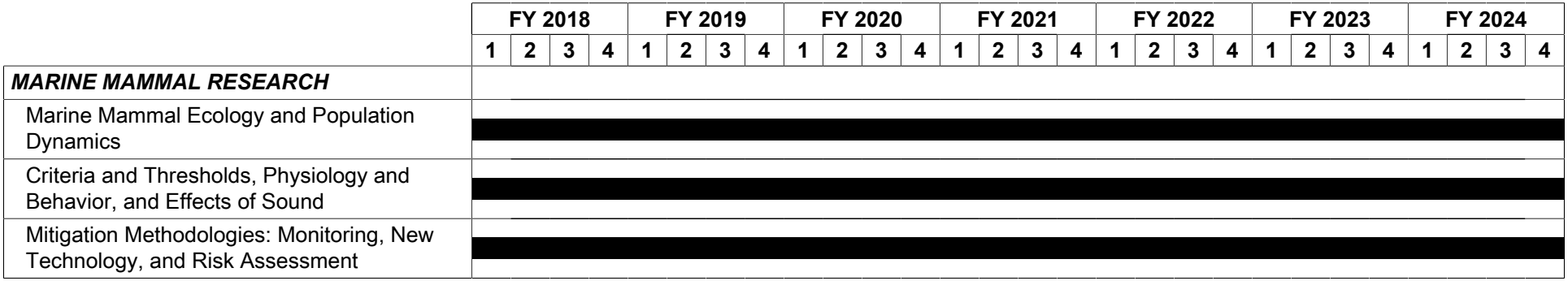

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603721N / *Environmental Protection*	**Project (Number/Name)** 9204 / *Marine Mammal Research*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
MARINE MAMMAL RESEARCH				
Marine Mammal Ecology and Population Dynamics	1	2018	4	2024
Criteria and Thresholds, Physiology and Behavior, and Effects of Sound	1	2018	4	2024
Mitigation Methodologies: Monitoring, New Technology, and Risk Assessment	1	2018	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
9205: *Marine Mammal Settlement*	0.000	3.000	3.000	3.000	-	3.000	0.000	0.000	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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: MARINE MAMMAL SETTLEMENT	3.000	3.000	3.000	0.000	3.000
Articles:	-	-	-	-	-
FY 2019 Plans: Work in FY2019 under topic area 1 will be focused on conducting soundscape monitoring and fieldwork within National Marine Sanctuaries on the East Coast, West Coast, and Hawaii. This will include deployment and maintenance of passive acoustic monitoring equipment, gliders, telemetry stations; organization and communication regarding analysis techniques; and potentially some initial analysis of data collected. Work under topic area 2 will be focused on holding a follow-up workshop and continuing to collaborate with the workgroup experts on priority research areas to advance density spatial modeling methods among federal agencies.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Work under topic area 3 will include planning for what experts will be included in the workgroup and for the elicitation process that will occur in FY2020. ***FY 2020 Base Plans:*** FY2020 Base Plans: Work under topic area 1 will be focused on continuing soundscape monitoring and fieldwork within National Marine Sanctuaries on the East Coast, West Coast, and Hawaii. This includes deployment and maintenance of passive acoustic monitoring equipment, gliders, and telemetry stations. In addition, analysis of data collected and final products will be completed. Work under topic area 2 will be focused on continued development of new modeling techniques to address key issues identified by the working group. A workshop will be held in FY2020 to bring the workgroup together to go over progress made and provide recommendations to support final products. Work under topic area 3 will focus on analysis of density data collected during FY2019. Per settlement requirements, funding under Project 9205 will remain stable at $3M per year (over FY18-20). FY2020 will be the last year of funding. ***FY 2020 OCO Plans:*** N/A					
Accomplishments/Planned Programs Subtotals	3.000	3.000	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

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603721N / *Environmental Protection*	Project (Number/Name) 9205 / *Marine Mammal Settlement*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SURTASS	MIPR	NOAA, HQ : Silver Spring, MD	0.000	2.500	Oct 2017	2.500	Oct 2018	1.800	Oct 2019	-		1.800	0.000	6.800	-
SURTASS	WR	EXWC : Port Hueneme, CA	0.000	0.500	Oct 2017	0.500	Oct 2018	1.200	Oct 2019	-		1.200	0.000	2.200	-
		Subtotal	0.000	3.000		3.000		3.000		-		3.000	0.000	9.000	N/A

Remarks

Annual funding in the amount of $3M are required to comply with the settlement. Funding will likely be disbursed as indicated below and all monies are required in the 1st Quarter of the Fiscal Year (Oct 1 2019).

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	3.000		3.000		3.000		-		3.000	0.000	9.000	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603721N / *Environmental Protection*	**Project (Number/Name)** 9205 / *Marine Mammal Settlement*

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Proj 9205																												
SURTASS Marine Mammal Settlement: SURTASS Marine Mammal Settlement	[redacted]																											

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603721N / *Environmental Protection*	**Project (Number/Name)** 9205 / *Marine Mammal Settlement*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 9205				
SURTASS Marine Mammal Settlement: SURTASS Marine Mammal Settlement	1	2018	4	2020

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603721N / *Environmental Protection*				Project (Number/Name) 9999 / *Congressional Adds*			
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
9999: *Congressional Adds*	0.000	0.598	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.598
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.

Environmental Enabling Capabilities-5 (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)	**FY 2018**	**FY 2019**
Congressional Add: Program Increase	0.598	0.000
FY 2018 Accomplishments: FY18 funds will be applied to: -Study of Waste Management and Minimization for Aqueous Film Forming Foam (AFFF) Wastewater, Demonstrating the Effectiveness of Novel Treatment Technologies for the Removal of Poly- and Perfluoroalkyl (PFOS/PFOA) Substances from Groundwater, Low-VOC and Low-HAP Wipe Solvent and Paint Thinner Demonstration/Validation, Preventative Management of Contaminated Silt, Impact of Sediment Resuspension by		

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019
Propeller Wash and Shore Sediment Dynamics on Remediation Options, Background analysis and tracer study to identify metal contaminant source contributions to stormwater runoff. ***FY 2019 Plans:*** N/A		
Congressional Adds Subtotals	0.598	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Quarterly Budget Reviews

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603721N / *Environmental Protection*	Project (Number/Name) 9999 / *Congressional Adds*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
EEC5	Various	EXWC : Port Hueneme, CA	0.000	0.278	Oct 2018	0.000		0.000		-		0.000	0.000	0.278	-
EEC5	WR	SSC : San Diego, CA	0.000	0.100	Oct 2018	0.000		0.000		-		0.000	0.000	0.100	-
EEC5	WR	NSWC : Bethesda, MD	0.000	0.075	Oct 2018	0.000		0.000		-		0.000	0.000	0.075	-
EEC5	Various	FRC SE : Jacksonville, FL	0.000	0.065	Oct 2018	0.000		0.000		-		0.000	0.000	0.065	-
EEC5	Various	NAWC : Patuxent River, MD	0.000	0.040	Oct 2018	0.000		0.000		-		0.000	0.000	0.040	-
EEC5	Various	NAWC : China Lake, CA	0.000	0.040	Oct 2018	0.000		0.000		-		0.000	0.000	0.040	-
		Subtotal	0.000	0.598		0.000		0.000		-		0.000	0.000	0.598	N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.598		0.000		0.000		-		0.000	0.000	0.598	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603721N / *Environmental Protection*	**Project (Number/Name)** 9999 / *Congressional Adds*

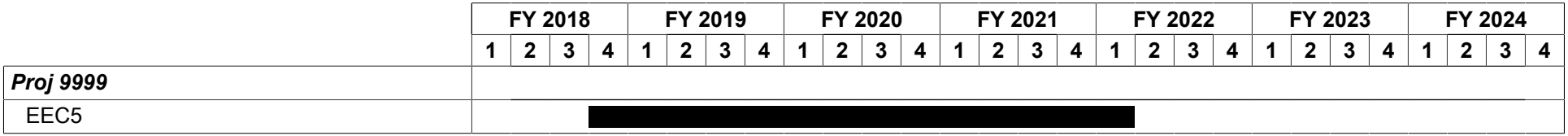

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603721N / *Environmental Protection*	**Project (Number/Name)** 9999 / *Congressional Adds*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 9999				
EEC5	4	2018	1	2022