Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Navy											Date: February 2020	
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 2019**	**FY 2020**	**FY 2021 Base**	**FY 2021 OCO**	**FY 2021 Total**	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**Cost To Complete**	**Total Cost**
Total Program Element	453.110	19.629	20.564	20.601	-	20.601	21.586	22.388	22.822	23.168	Continuing	Continuing
0401: *Shipboard Waste Mgmt*	340.315	7.746	7.979	9.398	-	9.398	10.012	10.607	10.807	10.914	Continuing	Continuing
0817: *Environmental Sustainability Development (NESDI)*	54.699	4.227	4.440	5.939	-	5.939	6.195	6.314	6.442	6.571	Continuing	Continuing
9204: *Marine Mammal Research*	55.096	4.656	5.145	5.264	-	5.264	5.379	5.467	5.573	5.683	Continuing	Continuing
9205: *Marine Mammal Settlement*	3.000	3.000	3.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	9.000

A. Mission Description and Budget Item Justification

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

Many environmental laws, regulations, and policies impose restrictions on Navy training and testing, vessels, aircraft, and facilities that interfere with operations and/or increase the cost of operations. The Navy must be able to conduct its national security mission in compliance with applicable environmental requirements in the U.S. and abroad without compromising performance, safety, or health, while simultaneously minimizing the cost of compliance. The projects for this Program Element (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 Manual 4715.06, "Regulations on Vessels Owned or Operated by the Department of Defense," Vol 1-4, (f) Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, (g) National Invasive Species Act of 1996, (h) Ballast Water Management for Control of Nonindigenous Species in Waters of the United States, (i) Clean Air Act, (j) Federal Insecticide, Fungicide, and Rodenticide Act, (k) Marine Mammal Protection Act, and (l) Endangered Species Act, (m) Comprehensive Environmental Response, Compensation, and Liability Act, and (n) Resource Conservation and Recovery Act. References (a) through (n) 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) Uniform National Discharge Standards (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.

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)

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Navy	Date: February 2020
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*

Expand the technology and methods available to the U.S. Navy marine species monitoring program (3) Preserve core Navy readiness capabilities. 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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	19.811	20.564	20.172	-	20.172
Current President's Budget	19.629	20.564	20.601	-	20.601
Total Adjustments	-0.182	0.000	0.429	-	0.429
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.182	0.000			
• Program Adjustments	0.000	0.000	0.401	-	0.401
• Rate/Misc Adjustments	0.000	0.000	0.028	-	0.028

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy			Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
0401: *Shipboard Waste Mgmt*	340.315	7.746	7.979	9.398	-	9.398	10.012	10.607	10.807	10.914	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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Technical Authority (TA)	1.470	1.450	1.624	0.000	1.624
Articles:	-	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Description: Funding in support of TA is utilized to develop waste stream handling equipment 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 2020 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. - Update the oil spill database by monitoring and documenting ship spills and other oil spill discharge violations. - 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. - Perform annual assessments of emergent air emission processes and technologies to enable effective compliance at minimal life cycle cost and risk to operations. ***FY 2021 Base Plans:*** - Update the Ship Oil Spill Database, analyze oil spill root causes and identify policy/training/hardware deficiencies to reduce oil discharges/violations. - Draft policy and implement training to reduce ship oil spill discharge violations. - Perform initial assessment and on-site evaluations of commercial waste management systems to determine future system feasibility. - 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. - 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. - Perform annual assessments of emergent air emission processes and technologies to enable effective compliance at minimal life cycle cost and risk to operations. ***FY 2021 OCO Plans:***					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Additional funds for technology identification and assessment for hull cleaning capture and filtration.					
Title: Liquid Wastes	2.275	2.321	2.321	0.000	2.321
Articles:	-	-	-	-	-
Description: This effort addresses liquid wastes in two (2) major areas: Oil Pollution Abatement and Non-oily Waste. ***FY 2020 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) - Complete development of military performance specification for centrifugal OWS - Conduct shipboard evaluations of revised automated procedures and cleaners for membrane regeneration - Initiate laboratory evaluation of Navy militarized centrifugal OWS with Navy oil content monitor (OCM) Non-Oily Waste (NOW): - Continue long-term assessment of sewage and graywater piping development, prevention and cleaning. - Conduct laboratory evaluation of sewage and graywater sludge treatment technology - Initiate shipboard evaluation of Vacuum Instrumentation Isolation - Develop testing strategy for laboratory evaluation of alternative vacuum pumps. ***FY 2021 Base Plans:*** - Continue 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) - Complete laboratory evaluation of new Tank Level Indicator technology - Complete laboratory testing of a modified commercial militarized centrifugal OWS.					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Non-Oily Waste (NOW): - Continue long-term monitoring and assessment of sewage and graywater piping scale prevention and pipe degradation. - Draft requirements for detergents/cleaners for NOW treatment systems - Complete shipboard evaluation of Vacuum Instrumentation Isolation - Continue laboratory evaluation of alternative vacuum pumps. ***FY 2021 OCO Plans:*** N/A					
Title: Hazardous Material Control and Management	1.015	0.937	1.100	0.000	1.100
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. Hazardous Material Control and Management (HMC&M) addresses environmental, safety and health risks to ship construction workers, Ship's Force (S/F), and shipyard workers. ***FY 2020 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. ***FY 2021 Base Plans:*** - Continue 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. - Assess less hazardous or non-hazardous substitutes for high-risk hazardous materials. ***FY 2021 OCO Plans:*** N/A					
FY 2020 to FY 2021 Increase/Decrease Statement:					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
FY20 to FY21 increase of $163K is required to support shipboard evaluation of medical waste handling system.					
Title: Ballast Water Management	1.836	2.021	2.122	0.000	2.122
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. ***FY 2020 Plans:*** - Continue assessments of emergent commercial off the shelf Ballast Water Treatment System (BWTS) that would enable effective compliance at minimal life cycle cost and risk to operations. - Identify systems for detailed acquisition and evaluation. - Complete full-scale evaluation of two commercial electrochlorination (EC) based BWTSs to assess system performance, reliability, operability and maintainability, and suitability as a Navy shipboard system. - Begin development of modified commercial Ultraviolet (UV) based commercial. - Refine Navy ship installation guidance for meeting ballast water discharge standards considering damage control and stability requirements. - Continue to assess feasibility of a rapid BWTS. ***FY 2021 Base Plans:*** - Continue assessments of emergent commercial off the shelf EC and UV based BWTS that would enable effective compliance at minimal life cycle cost and risk to operations. - Based on the designs developed in FY20, fabricate and begin evaluation of a modified commercial UV BWTS. - Procure and perform initial evaluation of rapid BWTS(s). ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** FY20 to FY21 increase of $79K is required to support procurement and fabrication of the modified commercial ballast water system.					
Title: Solid Waste Management	1.050	1.150	2.021	0.000	2.021
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 2021 Navy		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
FY 2020 Plans: - Perform assessments of emergent commercial off the shelf solid waste management processes and technologies that will enable effective compliance at minimal life cycle cost and risk to operations. - Refine Navy ship acquisition requirements for APPS compliant solid waste processing systems and management processes - Complete laboratory testing and Navy environmental testing (shock, vibration, electromagnetic interference) of waste processing equipment for special solid waste (Feminine Hygiene Products, Pilot Urine bags, etc.) - Prepare for shipboard evaluation of waste processing equipment for special solid waste (Feminine Hygiene Products, Pilot Urine bags, etc.). - Conduct Navy environmental testing (shock, vibration, electromagnetic interference) of technology to display equipment documentation to operators and maintainers. ***FY 2021 Base Plans:*** - Continue assessments of solid waste management processes and technologies with emphasis on small ships that would enable effective compliance at minimal life cycle cost and risk to operations. - Evaluate solid waste systems for surface ships and submarines. - Conduct shipboard evaluation and Navy ship environmental testing of innovative solid waste equipment. - Issue Navy ship acquisition requirements for APPS compliant solid waste processing systems. - Perform shipboard evaluation of Medical waste processing equipment for special solid waste. (Feminine Hygiene Products, Pilot Urine bags, etc.) ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** FY20 to FY21 increase of $871K is required to support shipboard testing of innovative solid waste handling equipment.					
Title: Non-Copper Antifouling	0.100	0.100	0.210	0.000	0.210
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.					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
FY20 to FY21 increase of $110K is required to support shipboard testing of advanced commercial antifouling coatings. ***FY 2020 Plans:*** - Prepare and submit final report on Qualified Products List (QPL) testing of the 11 coatings. Results from historical qualification tests, ship patch testing will be included in the evaluation. - Assess installation and coating removal issues with advanced antifoul coating systems. - 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 2021 Base Plans:*** - Perform test installations of promising new antifouling coatings on Fleet assets. - Evaluate performance of advanced coating systems. - Assess emergent commercial antifouling coatings. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** FY20 to FY21 increase of $110K is required to support shipboard testing of advanced commercial antifouling coatings.					
Accomplishments/Planned Programs Subtotals	7.746	7.979	9.398	0.000	9.398

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

RDT&E Contracts are Competitive Procurements.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy			Date: February 2020
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 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 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 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 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 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	NSWCCD, Bethesda, MD : Bethesda, MD	220.916	6.770	Nov 2018	6.950	Nov 2019	8.089	Nov 2020	-		8.089	Continuing	Continuing	Continuing
Developmental Test & Evaluation	WR	NRL,Wash,DC : Wash,DC	33.524	0.500	Nov 2018	0.050	Nov 2019	0.050	Nov 2020	-		0.050	Continuing	Continuing	Continuing
Developmental Test & Evaluation	WR	NSWCPD, Philadelphia, PA : Philadelphia, PA	0.913	0.301	Nov 2018	0.279	Nov 2019	0.479	Nov 2020	-		0.479	Continuing	Continuing	Continuing
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	23.475	0.175	Nov 2018	0.050	Nov 2019	0.080	May 2021	-		0.080	0.000	23.780	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy		Date: February 2020
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 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	C/CPFF	Misc. Contracts : TBD	13.103	0.000		0.650	Jul 2020	0.700	May 2021	-		0.700	0.000	14.453	-
		Subtotal	304.239	7.746		7.979		9.398		-		9.398	Continuing	Continuing	N/A

Remarks

Increased funding to NSWCCD for Ballast Water Management (BWM) tasking related to testing of both commercial and modified commercial BWTSs; for identification and testing of Capture and Clean Hull Cleaning Technology; and to investigate and spearhead design, integration and testing of innovative solid waste equipment. FY20 and 21 Miscellaneous Contract funding for BWM and Hull Cleaning Technology to be identified in FY20.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 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

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	340.315	7.746		7.979		9.398		-		9.398	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603721N / *Environmental Protection*	**Project (Number/Name)** 0401 / *Shipboard Waste Mgmt*

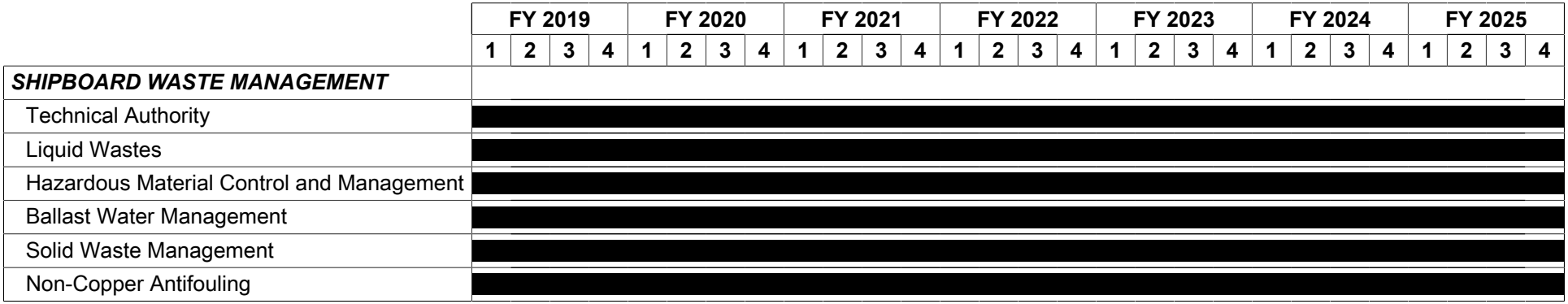

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603721N / *Environmental Protection*	**Project (Number/Name)** 0401 / *Shipboard Waste Mgmt*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
SHIPBOARD WASTE MANAGEMENT				
Technical Authority	1	2019	4	2025
Liquid Wastes	1	2019	4	2025
Hazardous Material Control and Management	1	2019	4	2025
Ballast Water Management	1	2019	4	2025
Solid Waste Management	1	2019	4	2025
Non-Copper Antifouling	1	2019	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy											Date: February 2020	
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 2019**	**FY 2020**	**FY 2021 Base**	**FY 2021 OCO**	**FY 2021 Total**	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**Cost To Complete**	**Total Cost**
0817: *Environmental Sustainability Development (NESDI)*	54.699	4.227	4.440	5.939	-	5.939	6.195	6.314	6.442	6.571	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The vision outlined in "A Design for Maintaining Maritime Superiority, Version 2.0" (December 2017) and "2018 National Defense Strategy of the United States of America" is for our Navy to become more lethal, resilient and a rapidly innovating joint force. We must maintain a fleet that is trained ready to operate and fight decisively. 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 the National Defense Strategy, the Navy must anticipate and address potential environmental constraints which 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 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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Maximize Training & Testing Requirements Within Environmental Constraints	0.696	0.705	0.587	0.000	0.587
Articles:	-	-	-	-	-
FY 2020 Plans: FY 2020 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 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 2021 Base Plans: FY 2021 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.					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
-Continue to evaluate the feasibility of Cost Effective Main Charge Remediation of Insensitive Munitions for Range Clearance. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease by 0.118 due to completion of analysis of the long-Term Fate of Munitions constituent of terrestrial sites					
Title: Platform Maintenance and Repair With Minimal Environmental Footprint	1.007	0.953	1.401	0.000	1.401
Articles:	-	-	-	-	-
FY 2020 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 (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 2021 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 (VOC) hazardous air pollutants (HAP) and other hazardous compounds at Naval Aviation Systems Command Fleet Readiness Centers and the Navy's shipyards.					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
-Continue the initiatives: Replacement of Cadmium in Ground Support Equipment Avionics Applications, Elimination of Hexavalent Chromium from Magnesium Conversion Coating Processes at Fleet Readiness Centers, Low VOC Primers for Ground Support Equipment Application. -Continue to evaluate the feasibility of Assessment of Cadmium Alternatives for Connector Applications, Development and Implementation of Methods to Reduce Sealant Waste in Fleet/Depot Level Operations. -Complete the initiatives: Electromagnetic Interference Shielding Tape. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase by 0.448 due to increased project management costs and increase in field work for continuing projects such as Replacement of Cadmium in Ground Support Equipment Avionics Applications, Elimination of Hexavalent Chromium from Magnesium Conversion Coating Processes at Fleet Readiness Centers, Development, Implementation of Methods to Reduce Sealant Waste in Fleet/Depot Level Operations and Low VOC Primers for Ground Support Equipment Application.					
Title: Support Shore Readiness within Environmental Constraints	1.039	1.068	1.510	0.000	1.510
Articles:	-	-	-	-	-
FY 2020 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 2021 Base Plans:*** FY 2021 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 demonstration of New Strategies for Enhanced Monitored Natural Recovery at Navy Sediment Sites. -Continue to evaluate the feasibility of Developing Lines of Evidence to Support Nutrient Compliance at Navy shipyards, Flexible Under Pier Sediment Assessment					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
-Complete the initiative NPDES Copper Effluent Control System. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase of 0.442 due to increased project management costs and increase in field work for continuing projects addressing contaminated sediment management and treatment, evaluate the feasibility of Developing Lines of Evidence to Support Nutrient Compliance at Navy shipyards and Flexible Under Pier Sediment Assessment.					
Title: Cost-Effective Management of Environmental Regulatory Requirements	1.485	1.714	2.441	0.000	2.441
Articles:	-	-	-	-	-
FY 2020 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. - 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 2021 Base Plans:*** FY 2021 Base Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
-Continue providing validated knowledge, models, processes and systems to improve environmental monitoring and reporting, and reduce the cost of compliance with regulations and management of coastal contamination and contaminated sediments. -Continue the initiatives: Air Filtration for Indoor Air Quality, Improving Site Closure Decision-Making with Time-Integrated Groundwater Samples, Addressing Temporal Variability in Industrial Buildings during Vapor Intrusion Assessments, Development and Demonstration of a Portable, Temporary Barrier to Aid in Cargo and Equipment Inspections to Prevent Brown Treesnake Dispersal. -Continue to evaluate the feasibility of In-situ Biodegradation of 1,4-Dioxane and Chlorinated Solvent Mixtures in Dilute Plumes, Mesocosm Field Testing of In situ PFAs Treatment Trains, Demonstrating the Use of a Novel, Hybrid Polyelectrolyte/Hydrophilic Polymer for In situ PFAS Treatment Applications, Sensor interface and infrastructure for monitoring (SIIM), Contaminant Monitoring and Mapping for Informing Stormwater Best Management Practices, In-well headspace samplers for long-term groundwater chlorinated hydrocarbon monitoring, Innovative Activated Carbon Filters to Address Vapor Intrusion within Commercial/Industrial Buildings, Field Demonstration of Colloidal Activated Carbon for In Situ Sequestration of Per- and Polyfluoroalkyl Substances. Complete the initiatives: Stormwater Piping-Based Pollutant Best Management Practice, 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 ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase of 0.727 due to increased project management costs and increase in field work for continuing projects such as Demonstrating the Use of a Novel, Hybrid Polyelectrolyte/Hydrophilic Polymer for In situ PFAS Treatment Applications, Field Demonstration of Colloidal Activated Carbon for In Situ Sequestration of Per- and Polyfluoroalkyl Substances, Sensor interface and infrastructure for monitoring (SIIM), Mesocosm Field Testing of In situ PFAs Treatment Trains, Contaminant Monitoring and Mapping for Informing Stormwater Best Management Practices and increased costs for program web site management.					
Accomplishments/Planned Programs Subtotals	4.227	4.440	5.939	0.000	5.939

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603721N / *Environmental Protection*	**Project (Number/Name)** 0817 / *Environmental Sustainability Development (NESDI)*

C. Other Program Funding Summary ($ in Millions)

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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy		Date: February 2020
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 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
EEC 2	Various	EXWC : PT HUENEME, CA	6.825	0.410	Oct 2018	0.400	Oct 2019	0.283	Oct 2020	-		0.283	Continuing	Continuing	Continuing
EEC 2	Various	SSC : SAN DIEGO, CA	6.254	0.325	Dec 2018	0.305	Dec 2019	0.300	Dec 2020	-		0.300	Continuing	Continuing	Continuing
EEC 3	WR	NAWC : PATUXENT RIVER, MD	2.293	0.135	Mar 2019	0.120	Mar 2020	0.150	Mar 2021	-		0.150	Continuing	Continuing	Continuing
EEC 3	Various	NSWC : BETHESDA, MD	4.042	0.175	Feb 2019	0.197	Feb 2020	0.200	Feb 2021	-		0.200	Continuing	Continuing	Continuing
EEC 3b	Various	EXWC : PT HUENEME, CA	1.462	0.077	Mar 2019	0.069	Mar 2020	0.160	Mar 2021	-		0.160	Continuing	Continuing	Continuing
EEC 4	Various	EXWC : PT HUENEME, CA	8.920	0.404	Mar 2019	0.390	Mar 2020	0.630	Mar 2021	-		0.630	Continuing	Continuing	Continuing
EEC 4	Various	NSWC : BETHESDA, MD	4.695	0.260	Nov 2018	0.255	Nov 2019	0.300	Nov 2020	-		0.300	Continuing	Continuing	Continuing
EEC 4a	Various	SSC : SAN DIEGO, CA	3.905	0.375	Apr 2019	0.423	Apr 2020	0.580	Apr 2021	-		0.580	Continuing	Continuing	Continuing
EEC 5	Various	EXWC : PT HUENEME, CA	4.076	0.394	Nov 2018	0.489	Nov 2019	0.870	Nov 2020	-		0.870	Continuing	Continuing	Continuing
EEC 5	Various	SSC : SAN DIEGO, CA	2.205	0.350	Feb 2019	0.494	Feb 2020	0.791	Feb 2021	-		0.791	Continuing	Continuing	Continuing
EEC 5	Various	NAWC : PATUXENT RIVER, MD	1.377	0.100	Jun 2019	0.095	Jun 2020	0.130	Jun 2021	-		0.130	Continuing	Continuing	Continuing
EEC 5	Various	NSWC : BETHESDA, MD	2.794	0.387	Jan 2019	0.385	Jan 2020	0.300	Jan 2021	-		0.300	Continuing	Continuing	Continuing
EEC 5	WR	NAWCWD : CHINA LAKE, CA	1.482	0.140	Dec 2018	0.150	Dec 2019	0.210	Dec 2020	-		0.210	Continuing	Continuing	Continuing
EEC 5	WR	NAWC : LAKE HURST, NJ	0.906	0.075	Nov 2018	0.100	Nov 2019	0.140	Nov 2020	-		0.140	Continuing	Continuing	Continuing
EEC 3	WR	FRC - SE : JACKSONVILLE, FL	2.065	0.380	May 2019	0.305	May 2020	0.600	May 2021	-		0.600	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 2021 Navy		Date: February 2020
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 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
EEC 3	WR	FRC - CE : Cherry Point, NC	0.455	0.075	Jun 2019	0.085	Jan 2020	0.100	Jan 2021	-		0.100	Continuing	Continuing	Continuing
EEC 3	Various	FRC-SW : San Diego, CA	0.883	0.165	Mar 2019	0.178	Mar 2020	0.195	Mar 2021	-		0.195	Continuing	Continuing	Continuing
		Subtotal	54.699	4.227		4.440		5.939		-		5.939	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 FY2020 and FY2021:
-EEC2 EXWC PT Hueneme CA decrease from 0.400 to 0.283 due to completion of Analysis of the Long-Term Fate of Munitions Constituents on Terrestrial Sites.
-EEC3 NAWC Patuxent River MD increased from 0.120 to 0.150 due to increase in field work for continuing projects such as Replacement of Cadmium in Ground Support Equipment Avionics Applications.
-EEC3b EXWC PT Hueneme CA increased from 0.069 to 0.160 due to increased field work for support to continuing projects.
-EEC4 EXWC PT Hueneme CA increased from 0.390 to 0.630 due to increase in field work for continuing projects addressing contaminated sediment management and treatment.
-EEC4 NSWC Bethesda MD increased from 0.255 to 0.300 due to increased project management costs and increase in field work for continuing projects.
-EEC4a SSC San Diego CA increased from 0.423 to 0.580 due to increase in field work for continuing projects such as evaluate the feasibility of Developing Lines of Evidence to Support Nutrient Compliance at Navy shipyards and Flexible Under Pier Sediment Assessment.
-EEC5 EXWC PT Hueneme CA increased from 0.489 to 0.870 due to increase in field work for continuing projects such as Demonstrating the Use of a Novel, Hybrid Polyelectrolyte/Hydrophilic Polymer for In situ PFAS Treatment Applications and Field Demonstration of Colloidal Activated Carbon for In Situ Sequestration of Per- and Polyfluoroalkyl Substances.
-EEC5 SSC San Diego CA increased from 0.494 to 0.940 due to increase in field work for continuing projects such as Sensor interface and infrastructure for monitoring (SIIM), Mesocosm Field Testing of In situ PFAs Treatment Trains, and Contaminant Monitoring and Mapping for Informing Stormwater Best Management Practices.
-EEC5 NAWC Patuxent River MD increased from 0.095 to 0.130 due to increased project management costs and increase in field work for continuing projects.
-EEC5 NSWC Bethesda MD decreased from 0.385 to 0.300 due to completion of field work.
-EEC5 NAWCWD China Lake CA increased from 0.150 to 0.210 due to increased costs to support overall program management.
-EEC5 NAWC Lakehurst NJ increased from 0.100 to 0.140 due to increased costs for program web site management.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy		Date: February 2020
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 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
-EEC3 FRC SE Jacksonville FL increased from 0.305 to 0.600 due to increase in field work for continuing projects such as Replacement of Cadmium in Ground Support Equipment Avionics Applications, Elimination of Hexavalent Chromium from Magnesium Conversion Coating Processes at Fleet Readiness Centers, and Development and Implementation of Methods to Reduce Sealant Waste in Fleet/Depot Level Operations. -EEC3 FRC CE Cherry Point NC increased from 0.085 to 0.100 due to increased project management costs and increase in field work for continuing projects. -EEC3 FRC SW San Diego CA increased from 0.178 to 0.195 due to increased field work for support to continuing projects such as Low VOC Primers for Ground Support Equipment Application.														

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	54.699	4.227		4.440		5.939		-		5.939	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603721N / *Environmental Protection*	**Project (Number/Name)** 0817 / *Environmental Sustainability Development (NESDI)*

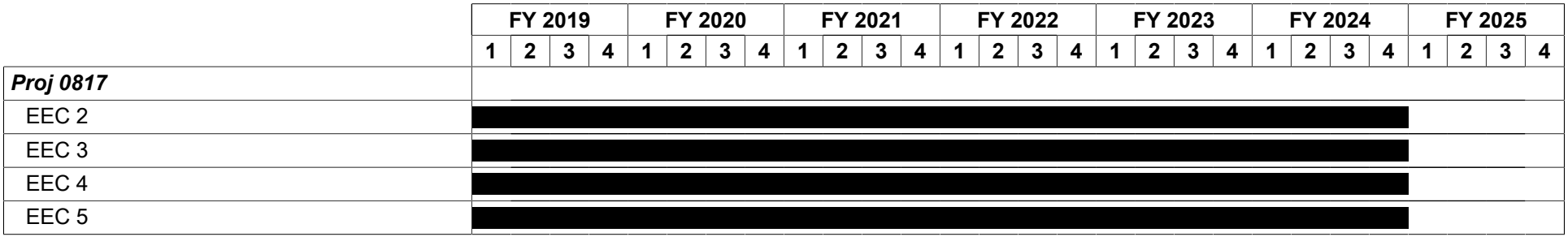

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603721N / *Environmental Protection*	**Project (Number/Name)** 0817 / *Environmental Sustainability Development (NESDI)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 0817				
EEC 2	1	2019	4	2024
EEC 3	1	2019	4	2024
EEC 4	1	2019	4	2024
EEC 5	1	2019	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy										Date: February 2020		
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 2019**	**FY 2020**	**FY 2021 Base**	**FY 2021 OCO**	**FY 2021 Total**	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**Cost To Complete**	**Total Cost**
9204: *Marine Mammal Research*	55.096	4.656	5.145	5.264	-	5.264	5.379	5.467	5.573	5.683	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 2019**	**FY 2020**	**FY 2021 Base**	**FY 2021 OCO**	**FY 2021 Total**
Title: Marine Ecology and Population Dynamics	0.900	0.900	1.019	0.000	1.019
Articles:	-	-	-	-	-
FY 2020 Plans:					
FY2020 Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Within the area of 'Marine Ecology and Population Dynamics', ongoing work covers topics such as density estimation from passive acoustic data, standards/metrics development and development of an automated sonar detector to standardize analysis of acoustic data. Ongoing studies that will continue into FY2021: -Acoustic Metadata Management for Navy Fleet Operations -Standardizing Methods and Nomenclature for Automated Detection of Navy Sonar -Analytical methods to support the development of noise exposure criteria for behavioral response Ongoing studies that are expected to be completed by the end of 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 Studies that will begin in FY20 (initiated in late FY2019): -ACCURATE: ACoustic CUe RATEs for passive acoustic density estimation -MSM4PCoD: Marine Species Monitoring for the Population Consequences of Disturbance -Demonstration and validation of passive acoustic density estimation for right whales Funding within the area of 'Marine Ecology and Population Dynamics' is expected to remain stable from FY19 to FY20.					
FY 2021 Base Plans: Within the area of 'Marine Ecology and Population Dynamics', ongoing work covers topics such as density estimation from passive acoustic data, standards/metrics development and development of an automated sonar detector to standardize analysis of acoustic data. Ongoing studies that will continue into FY2022: -Standardizing Methods and Nomenclature for Automated Detection of Navy Sonar -Analytical methods to support the development of noise exposure criteria for behavioral response -ACCURATE: ACoustic CUe RATEs for passive acoustic density estimation -MSM4PCoD: Marine Species Monitoring for the Population Consequences of Disturbance -Demonstration and validation of passive acoustic density estimation for right whales Ongoing studies that are expected to be completed by the end of FY2021:					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
-Acoustic Metadata Management for Navy Fleet Operations In addition, studies are expected to be initiated in FY2021 in response to needs collected from Navy personnel in FY20. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Funding required in FY21 is expected to increase by 0.119 compared to FY20, with a number of ongoing projects hitting the height of their effort (data collection and data analysis) along with some new projects that are expected to begin.					
Title: Criteria and Thresholds, Physiology and Behavior, and Effects of Sound	2.541	3.030	3.030	0.000	3.030
Articles:	-	-	-	-	-
FY 2020 Plans: FY2020 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. Ongoing studies that will continue into FY2021: -Multi-spaced measurement of underwater sound fields from explosive sources -Hearing and estimated noise impacts in three species of Auk: Implications for the marbled murrelet -Cuvier's beaked whale and fin whale behavior during military sonar operations -Measuring the effect of range on the behavioral response of marine mammals through the use of Navy sonar and small source playbacks -The effects of underwater explosions on fish Ongoing studies that are expected to be completed by the end of FY2020: -Hawaiian Monk seal auditory sensitivity study -Frequency-dependent growth and recovery of temporary threshold shift in bottlenose dolphins -Temporary threshold shift 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 -3S3-Behavioral responses of sperm whales to naval sonar					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Studies that will begin in FY20 (initiated in late FY19): -Collection of auditory evoked potential hearing thresholds in minke whales (Balaenoptera acutorostrata) -Towards a mysticete audiogram using humpback whales' behavioral response thresholds -Use of "Chirp" Stimuli for non-invasive, low-frequency measurement of marine mammal auditory evoked potentials -Temporary threshold shifts in underwater hearing sensitivity in aquatic turtles Funding within the area of 'Criteria and Thresholds, Physiology and Behavior, and Effects of Sound' is expected to increase for FY20. Funding in this topic area is particularly important in FY20 because the results are needed by the end of 2022 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 2021 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. Ongoing studies that will continue into FY2022: -Collection of auditory evoked potential hearing thresholds in minke whales (Balaenoptera acutorostrata)data on sea turtle hearing/TTS -Towards a mysticete audiogram using humpback whales' behavioral response thresholdsdata on mysticete hearing -Use of "Chirp" Stimuli for non-invasive, low-frequency measurement of marine mammal auditory evoked potentials -Temporary threshold shifts in underwater hearing sensitivity in aquatic turtles Ongoing studies that are expected to be completed by the end of FY2021: -Multi-spaced measurement of underwater sound fields from explosive sources -Hearing and estimated noise impacts in three species of Auk: Implications for the marbled murrelet -Cuvier's beaked whale and fin whale behavior during military sonar operations -Measuring the effect of range on the behavioral response of marine mammals through the use of Navy sonar and small source playbacks -The effects of underwater explosions on fish					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
In addition, studies are expected to be initiated in FY2021 in response to needs collected from Navy personnel in FY20. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Funding in FY21 is expected to remain similar to FY20, due to some projects coming to an end and some projects beginning.					
Title: Mitigation Methodologies: Monitoring, New Technology, and Risk Assess	1.215	1.215	1.215	0.000	1.215
Articles:	-	-	-	-	-
FY 2020 Plans: FY2020 Plans: Within the area of 'Mitigation Methodologies', ongoing work covers demonstration and validation of new technologies for monitoring and mitigation. Ongoing studies that will continue into FY2021: -M3R (Marine Mammal Monitoring on Navy Ranges) Ongoing studies that are scheduled to be completed in FY20: -Extended duration acoustic tagging of right whales -High fidelity acoustic and fine-scale movement tags to enable behavioral response research on deep diving whales Studies that will begin in FY20 (initiated in late FY19): -Improved Tag Attachment System for Remotely-Deployed Medium-Term Cetacean Tags Funding within this area is expected to remain stable from FY19 to FY20. ***FY 2021 Base Plans:*** Within the area of 'Mitigation Methodologies', ongoing work covers demonstration and validation of new technologies for monitoring and mitigation. Ongoing studies that will continue into FY22:					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
-M3R (Marine Mammal Monitoring on Navy Ranges) -Improved Tag Attachment System for Remotely-Deployed Medium-Term Cetacean Tags No studies are scheduled to be completed by the end of FY21. However, studies are expected to be initiated in FY21 in response to needs collected from Navy personnel in FY20. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Funding required in FY21 is expected to remain similar to FY20. Although no projects will be completed in FY21, some of the ongoing projects will have less effort in FY21, which balances out required funding.					
Accomplishments/Planned Programs Subtotals	4.656	5.145	5.264	0.000	5.264

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

RDTEN Contracts are Competitive Procurements.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy			Date: February 2020
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 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Mar Ecol & Pop Dynamics	Various	EXWC : Port Hueneme, CA	2.977	0.745	Oct 2018	0.745	Oct 2019	0.871	Oct 2020	-		0.871	Continuing	Continuing	Continuing
Criteria & Thresholds	SS/CPFF	NMMF : San Diego, CA	0.184	0.000		0.000		0.000		-		0.000	0.000	0.184	-
Mitigation Methods	SS/CPFF	SDSU : San Diego, CA	0.574	0.000		0.000		0.000		-		0.000	0.000	0.574	-
Criteria & Thresholds	SS/CPFF	SEAMARCO : Netherlands	0.316	0.000		0.000		0.000		-		0.000	0.000	0.316	-
Criteria & Thresholds	SS/CPFF	U Saint Andrews : United Kingdom	0.506	0.400	Oct 2018	0.000		0.000		-		0.000	0.000	0.906	-
Mitigation Methods	SS/CPFF	Syracuse U : Syracuse, NY	0.030	0.000		0.000		0.000		-		0.000	0.000	0.030	-
Criteria & Thresholds	SS/CPFF	WHOI : Falmouth, MA	0.138	0.200	Oct 2018	0.000		0.000		-		0.000	0.000	0.338	-
Mitigation Methods	WR	SPAWAR : San Diego, CA	1.073	0.100	Oct 2018	0.200	Oct 2019	0.200	Oct 2020	-		0.200	Continuing	Continuing	Continuing
Criteria & Thresholds	SS/CPFF	MARECOTEL : Seabeck, WA	0.560	0.600	Oct 2018	0.600	Oct 2019	0.600	Oct 2020	-		0.600	0.000	2.360	-
Mitigation Methods	SS/CPFF	Scripps Institute : San Diego, CA	1.048	0.200	Oct 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Criteria & Thresholds	SS/CPFF	U Washington : Seattle, WA	0.403	0.300	Oct 2018	0.000		0.000		-		0.000	0.000	0.703	-
Mitigation Methods	SS/CPFF	Oregon State Univ : OR & HI	0.809	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Criteria & Thresholds	Various	EXWC : Port Hueneme, CA	0.613	0.538	Jan 2019	1.830	Jan 2020	1.823	Jan 2021	-		1.823	0.000	4.804	-
Mar Ecol & Pop Dynamics	WR	NAVAIR : Lakehurst, NJ	0.507	0.075	Oct 2018	0.075	Oct 2019	0.075	Oct 2020	-		0.075	Continuing	Continuing	Continuing
Mitigan Methods	Various	EXWC : Port Hueneme, CA	0.183	0.515	Jan 2019	0.715	Jan 2020	0.715	Oct 2020	-		0.715	Continuing	Continuing	Continuing
Mar Ecol & Pop Dynamics	SS/CPFF	BMC Inc. : Chicago, IL	0.541	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Mitigation Methods	WR	NUWC : Newport, RI	10.851	0.400	Oct 2018	0.300	Oct 2019	0.300	Oct 2020	-		0.300	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy			Date: February 2020
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Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Mar Ecol & Pop Dynamics	WR	NPGS : Monterey, CA	3.609	0.030	Oct 2018	0.030	Oct 2019	0.030	Oct 2020	-		0.030	Continuing	Continuing	Continuing
Mar Ecol & Pop Dynamics	MIPR	NOAA: Various : La Jolla, CA	3.511	0.050	Oct 2018	0.050	Oct 2019	0.050	Oct 2020	-		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	0.100	Oct 2018	0.300	Oct 2019	0.300	Oct 2020	-		0.300	0.000	0.700	-
Criteria & Thresholds	SS/CPFF	SPAWAR : San Diego, CA	4.090	0.403	Oct 2018	0.300	Oct 2019	0.300	Oct 2020	-		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	55.096	4.656		5.145		5.264		-		5.264	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.

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	55.096	4.656		5.145		5.264		-		5.264	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy			Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603721N / *Environmental Protection*	**Project (Number/Name)** 9204 / *Marine Mammal Research*

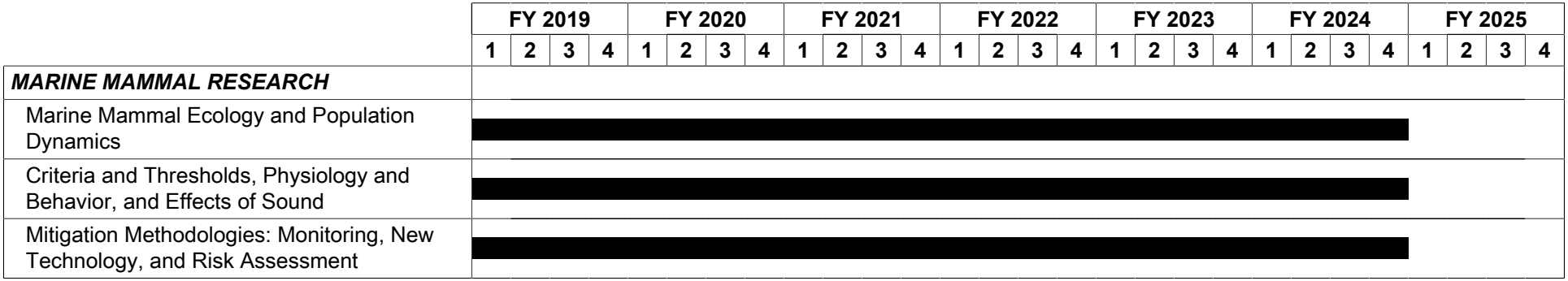

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603721N / *Environmental Protection*	**Project (Number/Name)** 9204 / *Marine Mammal Research*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
MARINE MAMMAL RESEARCH				
Marine Mammal Ecology and Population Dynamics	1	2019	4	2024
Criteria and Thresholds, Physiology and Behavior, and Effects of Sound	1	2019	4	2024
Mitigation Methodologies: Monitoring, New Technology, and Risk Assessment	1	2019	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy			Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
9205: *Marine Mammal Settlement*	3.000	3.000	3.000	0.000	-	0.000	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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: MARINE MAMMAL SETTLEMENT	3.000	3.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2020 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.					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
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 2021 Base Plans:*** N/A ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease by 3.0 due to settlement requirements, funding under Project 9205 will remain stable at $3M per year (over FY18-20). FY2020 will be the last year of funding.					
Accomplishments/Planned Programs Subtotals	3.000	3.000	0.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

RDTEN Contracts are Competitive Procurements.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy			Date: February 2020
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 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SURTASS	MIPR	NOAA, HQ : Silver Spring, MD	2.500	2.500	Oct 2018	1.800	Oct 2019	0.000		-		0.000	0.000	6.800	-
SURTASS	WR	EXWC : Port Hueneme, CA	0.500	0.500	Oct 2018	1.200	Oct 2019	0.000		-		0.000	0.000	2.200	-
		Subtotal	3.000	3.000		3.000		0.000		-		0.000	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 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	3.000	3.000		3.000		0.000		-		0.000	0.000	9.000	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603721N / *Environmental Protection*	**Project (Number/Name)** 9205 / *Marine Mammal Settlement*

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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 2021 Navy		Date: February 2020
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	2019	4	2020