REGIONAL CLASS RESEARCH VESSELS (RCRV) $0

Appropriated and Requested MREFC Funds for the Regional Class Research Vessel Project
(Dollars in Millions)

	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024 Request	FY 2025 Request	Total Project
Previous Authorized Total Project Cost	$121.88	$105.00	$127.09	-	-	-	-	-	-	$353.97
American Rescue Plan	-	-	-	-	14.05	-	-	-	-	14.05
COVID-19 Impact	-	-	-	-	-	5.00	1.98	-	-	6.98
Hurricane Ida Construction Impacts[1]	-	-	-	-	-	25.00	-	-	-	25.00
Revised Total Project Cost	**$121.88**	**$105.00**	**$127.09**	**-**	**$14.05**	**$30.00**	**$1.98**	**-**	**-**	**$400.00**

[1] P.L. 117-43, the "Extending Government Funding and Delivering Emergency Assistance Act", included $25.0 million in one-time funding for necessary expenses related to RCRV construction impacted by Hurricane Ida.

Brief Description

The RCRV project is NSF's contribution to right-sizing and modernizing the U.S. Academic Research Fleet (ARF). It is expected that an ARF that includes three RCRVs will have sufficient research usage to support efficient operations while meeting regional demands. The first RCRV, R/V *Taani,* will be operated on the West Coast by Oregon State University (OSU). The second RCRV, R/V *Narragansett Dawn*, will be operated on the East Coast by the East Coast Oceanographic Consortium led by the University of Rhode Island. The third RCRV, R/V *Gilbert R. Mason,* will be operated in the Gulf of Mexico and nearby waters by the Gulf-Caribbean Oceanographic Consortium, led jointly by the University of Southern Mississippi and the Louisiana University Marine Consortium. The FY 2024 and FY 2025 Budgets do not request any further funds for RCRV; this narrative provides an update on the status of the project.

Baseline History

The RCRV project is a major component in the plan for modernizing the ARF,[1] an effort that began over two decades ago. In 2001, a report from the Federal Oceanographic Facilities Committee documented the need for Regional Class vessels. In response, NSF and the Naval Sea Systems Command (NAVSEA) entered into an interagency agreement in 2004 that resulted in two candidate designs for Regional Class ships. In 2007, the Federal Oceanographic Fleet Status Report endorsed the need for NSF-built Regional Class vessels to meet future science demand and in 2009, the National Academies report *Science at Sea* described the desirable characteristics of a modern Regional Class vessel. These characteristics and other science community factors were considered by a review panel when the preferred NAVSEA design was selected. In 2012, NSF issued a solicitation for the refreshed design and potential construction of three RCRVs. OSU was selected to manage the project and received the award in 2013. Input from external review panels, the University-National Oceanographic Laboratory System, and the *Sea Change*[2] report was received during the period 2013 to 2015 and

[1] National Ocean Council. Federal Oceanographic Fleet Status Report, 2013. https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/NSTC/federal_fleet_status_report_final.pdf

[2] Sea Change: 2015-2025 Decadal Survey of Ocean Sciences https://nap.nationalacademies.org/catalog/21655/sea-change-2015-2025-decadal-survey-of-ocean-sciences

informed the final decision to pursue construction. The *Sea Change* report recommended constructing only two of the three RCRVs originally planned, but Congress ultimately appropriated funding to build all three.

OSU awarded a contract for construction of the first vessel to Gulf Island Shipyards (now Bollinger Houma Shipyards [BHS]; see below) based in Houma, LA with options for two more vessels. When construction is complete, NSF plans to fund RCRV operations as part of ARF, partially leveraging savings from the retirement of older, less capable vessels.

Prior to the COVID-19 pandemic, the RCRV project had been planned within an authorized Total Project Cost (TPC) of $365.0 million. In FY 2017, $121.88 million was appropriated to facilitate the construction of three vessels, followed by $105.0 million in FY 2018 and $127.09 million in FY 2019. In December 2020, the NSF Director increased the TPC to $375.0 million to account for COVID-19 impacts that reduced the efficiency of the construction effort and increased the time to completion. In FY 2021, NSF approved the use of $14.05 million in American Rescue Plan funds to address COVID-19 impacts on the RCRV project. The FY 2022 Request of $5.0 million, in conjunction with the FY 2023 Request of $1.98 million to address continuing pandemic impacts, increased the total appropriated RCRV funds to the revised TPC of $375.0 million. In FY 2022, $25.0 million was appropriated to cover necessary expenses related to impacts of Hurricane Ida, which heavily damaged the area around the shipyard. The impact of Hurricane Ida to the RCRV project is estimated to be an increase of $23.45 million and six months of delay. In August 2022, the TPC was increased to $400.0 million.

Project Status

OSU is managing the construction of the RCRVs and transition to operations through a cooperative agreement with NSF, which encompasses the entire project, including tests and trials. The project is divided into four distinct phases, each funded through a separate cooperative support agreement, with award of each phase contingent upon successful completion of the prior one. These phases are:

Phase I: Project Refresh - **Complete**
Phase II: Shipyard Selection - **Complete**
Phase III: Construction - **In progress**
Phase IV: Transition to Operations - **Estimated Late 2025**

The project completed Phase II in CY 2017, during which bids for construction of RCRV were solicited from U.S. shipyards and evaluated. The project is now in Phase III, construction. Keel-laying for the R/V *Taani* was completed in November 2018; for the R/V *Narragansett Dawn*, in May 2019; and for the R/V *Gilbert R. Mason*, in March 2020.

The RCRV project includes up to one year of final outfitting, sea trials and science equipment testing/trials for each vessel, after delivery from the shipyard, to ensure readiness to conduct science operations safely and efficiently before entry into the ARF. This will mark the beginning of Phase IV Transition to Operations. The estimated beginning timeframe for Phase IV has been updated to late Summer 2024 due to delays precipitated by craft labor shortages stemming from the COVID-19 pandemic and exacerbated by the impact of Hurricane Ida, and some inefficiencies in shipyard management (mitigated by NSF-approved changes in key personnel at the shipyard). R/V *Taani* is currently scheduled to be delivered in late 2024 and will likely begin full operations in late 2025. The

project is planning a four- to six-month stagger between vessel deliveries, with the R/V *Narragansett Dawn* entering the ARF in early 2026 and R/V *Gilbert R. Mason* entering in late 2026.

Summary of Hurricane Ida Impacts

In April 2021, Gulf Island Shipyards, was acquired by BHS. The contract was novated under the existing terms and conditions and assigned to BHS. Construction progress improved as a result of the additional resources available at the larger shipyard, and BHS and OSU began to replan the project's schedule to account for more efficient processes as well as COVID-19 impacts. However, on August 29, 2021, Hurricane Ida made a direct hit on the city of Houma and on the shipyard. The Category 4 hurricane caused extensive damage to the shipyard and surrounding community. Many residents were evacuated for several weeks because electricity, water, and access to medical facilities were unavailable. In addition, RCRV equipment was damaged when the hurricane's winds destroyed two storage facilities at the shipyard. However, the main fabrication building remained intact, preventing damage to the hulls of R/V *Taani* and R/V *Narragansett Dawn* that were under construction. The evaluation of Hurricane Ida impacts, completed in May 2022, identified an additional cost of $23.45 million and an additional six months of schedule delay. In FY 2022, $25.0 million was appropriated for necessary expenses related to RCRV construction impacted by Hurricane Ida.

Summary of COVID-19 Impacts

In October 2020, OSU estimated likely COVID-19-specific impacts through 2021 for the entire three-ship build of $14.05 million and nine months of delay. In addition, $5.0 million was provided in FY 2022 and $1.98 million was appropriated in FY 2023 for NSF-held management reserve to address potential continuing, but unforeseen, pandemic impacts that could not be covered by budget contingency, per NSF policy.

Governance Structure and Partnerships

NSF Governance Structure

The RCRV project is overseen by the Division of Ocean Sciences (OCE) as part of the Ship Acquisition and Upgrade Program. RCRV project oversight is managed by a dedicated Program Officer with support from two other Program Officers who oversee operations of the ARF. Cross-Foundation coordination is provided by an Integrated Project Team (IPT) that includes staff from BFA's Research Infrastructure Office (RIO), Division of Acquisition and Cooperative Support/Infrastructure Support Branch, and Division of Institution and Award Support, the Office of the General Counsel, the Office of the Assistant Director for Geosciences, and the Office of Legislative and Public Affairs. Strategic oversight is also provided by NSF's Chief Officer for Research Facilities.

External Governance Structure

The RCRV project is funded through a series of agreements with OSU to manage the design refresh (conceptual, preliminary, and final designs), construction, testing and trials, and eventual operation of the first RCRV for the scientific community. The Principal Investigator for the award is the project manager (PM), who reports to the OSU Dean of the College of Earth, Ocean, and Atmospheric Sciences. The PM interacts directly with the NSF Program Officer and manages the RCRV administrative staff. The project scientist is a co-principal investigator for the award. The PM manages the RCRV project team including the risk manager, earned value management and schedule specialists, contracting officer, and OSU Shipyard Representative (SR). The SR in turn manages the naval architect and engineering contract and oversees the OSU shipyard staff and marine science technical advisors. The

RCRV Science Oversight Committee (SOC), with regional representation, multidisciplinary expertise, and independent science representatives conducting research in mission areas supported by federal stakeholders (NSF, Office of Naval Research [ONR], and National Oceanic and Atmospheric Administration [NOAA]), will be active through all project phases. The SOC provides guidance to the OSU RCRV project team through the PM and/or the NSF Program Officer.

Partnerships and Other Funding Sources

NSF is the sole sponsor of RCRV construction, providing three ships for inclusion in the ARF. ARF vessels support the needs of all federal stakeholders who conduct oceanographic research, particularly NSF, NOAA, and ONR. Other users are granted access to ARF ships for research purposes, and all users pay the same daily rates. NSF expects to support approximately 70 percent of RCRV utilization. NSF intends to make separate awards for operations to each RCRV-operating institution.

Cost and Schedule

Total Funding Requirements for RCRV

(Dollars in Millions)

	Prior Years	FY 2023	FY 2024 Request	FY 2025 Request	ESTIMATES[1] FY 2026	FY 2027	FY 2028	FY 2029	FY 2030
R&RA:									
Development & Design	$10.47	-	-	-	-	-	-	-	-
Operations & Maintenance		-	1.23	9.67	15.90	16.54	17.20	17.88	18.60
Subtotal, R&RA	$10.47	-	$1.23	$9.67	$15.90	$16.54	$17.20	$17.88	$18.60
MREFC:									
Implementation[2,3]	398.02	1.98	-	-	-	-	-	-	-
Subtotal, MREFC	$398.02	$1.98	-	-	-	-	-	-	-
TOTAL REQUIREMENTS	**$408.49**	**$1.98**	**$1.23**	**$9.67**	**$15.90**	**$16.54**	**$17.20**	**$17.88**	**$18.60**

[1] Outyear estimates are for planning purposes only and will be included as part of the total O&M for the Academic Research Fleet (ARF).

[2] Prior Years implementation includes $14.05 million of ARP funding provided to RCRV. It also includes $25.0 million provided under P.L. 117-43, the "Extending Government Funding and Delivering Emergency Assistance Act" for necessary expenses related to RCRV construction impacted by Hurricane Ida. NSF awarded $23.45 million of the $25.0 million appropriated for Hurricane Ida in late FY 2022; the remaining funds are carried forward.

[3] $6.98 million of NSF's MREFC funding appropriated for the RCRV project is estimated to be carried forward into FY 2024.

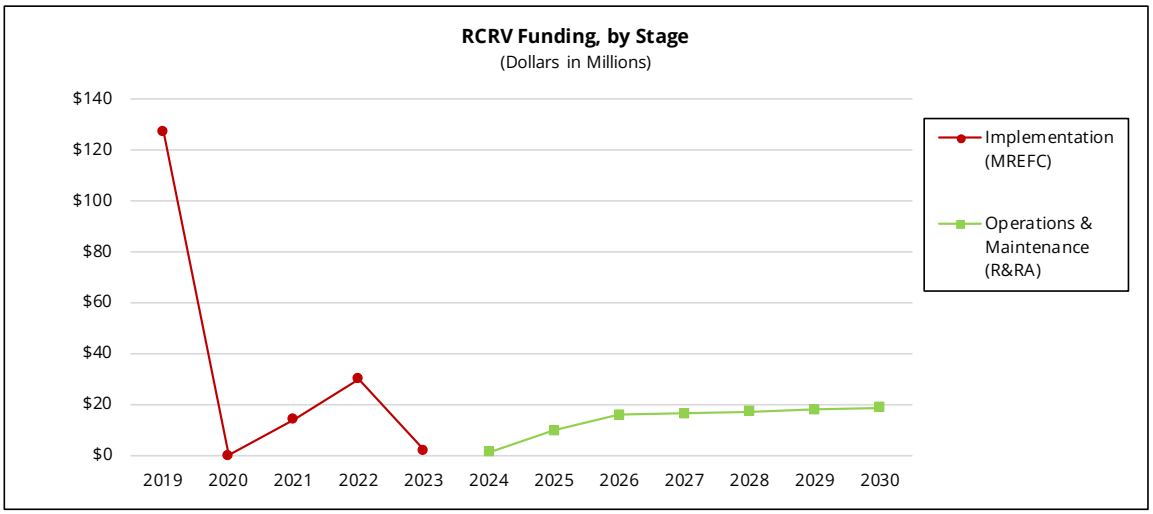
Total R&RA funding from FY 2017 to FY 2019 for RCRV design was $10.47 million. Of the total $400.0 million of MREFC funding provided, current obligations to support construction are $391.47 million, including $14.05 million in FY 2021 (American Rescue Plan/MREFC funding that was allocated to RCRV for COVID-19 impacts) and $23.45 million of the $25.0 million in one-time funding appropriated in FY 2022 for necessary expenses related to RCRV construction impacts from Hurricane Ida. No additional funds were requested to address Hurricane Ida impacts in FY 2023.

Future Operations Costs

Annual ship operations costs are well understood after several decades of experience with vessels of all classes in the ARF. OSU developed an estimate for the first year of operations assuming a robust but reasonable operating schedule of 200 days per year. OSU estimates that each RCRV will cost approximately $7.0 million to operate in its first full year, resulting in a rate of approximately $35,000 per day. This is comparable to the operating cost of current vessels after applying the appropriate multipliers for size and complexity. NSF's share of the total estimate for the first (nearly) full year of

operations of all three ships in 2026 is $15.90 million, with other user agencies contributing the balance. The ultimate annual cost for operating three RCRVs will be partially offset by cost savings from vessel retirements elsewhere in the ARF.

Each RCRV is expected to have a 35–40-year operational lifetime, most likely with a refit of major equipment at the mid-life point. At the end of each vessel's service life, it will be disposed of by an appropriate method, which may be by competitive bid for scrap value, or by public auction or transfer, as a still-operational vessel, to another organization. The anticipated cost for disposition is estimated at less than $1 million per vessel in current year dollars.



Reviews

- Proposal Review: In 2012, NSF issued Solicitation 12-558, Construction of Regional Class Research Vessels, which resulted in the selection of OSU as the lead institution for construction and for operation of the first vessel.
- Design Reviews: RCRV proceeded through the standard NSF process that included a Conceptual Design Review (December 2013), Preliminary Design Review (August 2014) and Final Design Review (FDR) (December 2016). The FDR ensured that anticipated project costs remained realistic and that no unforeseen events had arisen prior to the start of construction in FY 2017. The FDR Panel recommended that the project advance to the Construction Stage.
- Quarterly Management Reviews are conducted by OSU at the shipyard with NSF staff in attendance. The reviews provide all stakeholders, including the SOC and project Change Control Board, a detailed examination of the progress made by the shipyard and its vendors. Additionally, following each review, OSU, NSF, and the operating institutions assess the remaining risks and opportunities, updating the Risk Register as appropriate.
- Annual Progress Reviews: Construction progress reviews have been conducted annually by an external panel of experts since 2018. The review panels consistently expressed confidence that the OSU team was well qualified, had extensive relevant experience in ship acquisition, and had established a positive, professional working relationship with the shipyard. The most recent Annual Progress Review, held in March 2023, focused on the impacts of COVID-19, Hurricane Ida, and the change of ownership of the shipyard, and stated that OSU had done "an appropriate and effective job in responding to the challenges within its control in a professional and equitable

manner and has effectively managed the necessary adjustments to the Project cost and schedule with support from NSF." The review panels consistently found that the OSU Project Team remains capable of delivering three RCRVs to the ARF despite the remaining challenges (See Risks below).

Risks

The following principal risks have been identified in OSU's project risk register.

- Hull Delivery Delay: BHS replanned the construction schedule to accommodate a nine-month delay to the delivery of each hull beyond the contractual date due to the COVID-19 pandemic. An additional delay of six months was also added due to Hurricane Ida impacts. Additional delays due to known risks remain likely.
- Transition to Operations: Experience with commissioning new research vessels demonstrates the likelihood of unplanned events that could result in the need for additional port calls during sea trials and/or construction support if equipment fails. This risk will remain until all three of the vessels are put to sea.
- Requirements Changes: All stakeholders, including the construction team, operating institutions, SOC, and NSF can recommend requirements changes if improvements to operations or science support justify such changes. The ability to accommodate these recommendations is related to the availability of resources and an evaluation of the necessity for them. The likelihood of realizing requirements changes is reduced as construction progresses.
- Inadequate Shipyard Performance: Shipyard's performance, including its subcontractors', will remain a risk throughout construction. Realization of this risk resulted in a pause in construction from January to August 2020, and the use of approximately $18 million in contingency, which also mitigated future likelihood of occurrence. Additionally, construction progress is improving under the new, larger shipyard owner, BHS. The February 2022 Annual Progress Review panel remarked that BHS adds resources not previously available to the project, such as fabrication of the RCRV aluminum superstructure at another BHS facility.
- Unanticipated Personnel Costs: Personnel costs or required support may be greater than anticipated for operating institutions during construction and commissioning. This risk includes higher-than-anticipated crew costs, including training for RCRV's level of tonnage, or necessary additional personnel. This risk does not include additional time that could be required for transition to operations.

Approximately $38.70 million in budget contingency has been allocated to date as a result of realizing known risks. A science-prioritized and time-phased scope management plan is in place to minimize impacts to science capabilities in case contingency funds are insufficient to cover future realized risks. Scope reductions are not currently being considered given the expected sufficiency of remaining budget contingency. Although statistical estimates of downtime due to weather could be included in the risk model, a direct hit from a hurricane is a risk that cannot be estimated probabilistically by the project team, and thus is a risk held by NSF.