

Date: 14 July 2017 *BAA* *RTS* JCA
From: NSF, ONR and the UNOLS Executive Secretary
To: Dr. Deborah Steinberg, UNOLS Council Chair

Subj: 2018 U.S. Academic Research Fleet Operations Support Findings and
Recommendations

Ref: UNOLS Non-Operators Subcommittee Procedures for Recommending Non-
Operational Periods of Ships in the UNOLS Fleet (revised 8 June 2015)

Introduction

The National Science Foundation (NSF), the Office of Naval Research (ONR), and the UNOLS Executive Secretary provide the following letter to the UNOLS Council after having participated in initial 2018 ship scheduling meetings, and having conducted a review of the 2018 Letters of Intent for the U.S. Academic Research Fleet's (ARF) Global, Ocean/Intermediate, Regional, and Coastal/Local class ships. We recognize additional science funding decisions will be made by all funding agencies in the coming weeks for the 2018-scheduling year, but based on current projections the NSF and ONR present the following outlook for 2018 with supporting charts and data from the UNOLS Office. We feel this early review and these findings enable a focus on weak or limited ship schedules, encourage the promotion of non-federal work, and provide an outlook on surge capability for the approaching operating year. This annual letter is not meant to convey the final forecast for 2018, but rather provides a baseline for continued discussions within UNOLS on the projections for the ARF's operating year. The agencies consider past efforts and ongoing strategies achieved desired Fleet utilization rates within current and projected agency budgets with only a few exceptions.

The percentage variances from past June/July letters have been mainly a result of non-NSF work becoming known later in the scheduling process (see Table 1). The current balance between the number of ships in the ARF and available agencies' funding to support the infrastructure and science awards is projected to be sustainable, if day rates stay at or about current levels and about the same number of science awards are made. The NSF and ONR will continue their efforts on modernizing the ARF. The agencies will continue efforts to bring uniformity in the application of costing principles across the ARF.

Table 1: Comparison of Projected Utilization vs. Actual Utilization

Agency	ACOE	DOE	EPA	Inst/State	BOEM	NASA	NAVY	NOAA	NSF	USGS	Other	Total
Projected 2013 as of June 1, 2012: Total Funded and Pending	0	0	0	128	0	32	151	154	1682	20	239	2406
Actual/Final 2013 days by agency	8	0	0	200	4	14	594	227	1989	23	403	3462
Projected 2014 as of June 17, 2013: Total Funded and Pending	0	0	0	121	20	17	334	152	1700	40	175	2559
Actual/Final 2014 days by agency	0	7	6	227	18	20	370	343	1977	33	283	3284
Projected 2015 as of June 11, 2014: Total Funded and Pending	10	0	0	77	8	0	308	119	1291	57	90	1960
Actual/Final 2015 days by agency	13	24	6	195	12	26	506	423	1477	40	258	2980
Projected 2016 as of June 9, 2015: Total Funded and Pending	0	0	0	71	3	26	206	162	1281	29	259	2037
Actual/Final 2016 days by agency	14	0	0	168	0	31	534	284	1465	2	340	2838
Projected 2017 as of July 15, 2016: Total Funded and Pending	4	10	0	137	45	62	413	144	1484	1	105	2405
Provisional 2017 days by agency	12	26	5	271	9	70	598	242	1663	2	301	3199
Projected 2018 as of June 20, 2017: Total Funded and 30% Pending	0	3	0	61	3	64	326	141	1597	2	86	2282

NSF anticipates some ship days will be added to CY 18 schedules from the Spring 2017 OCE panels, resulting from shifts within the OCE infrastructure budget and moved to core science. This continues support of the National Research Council *Decadal Survey of Ocean Sciences Sea Change* Report recommendations. Please see Agency Position #4 below.

Given the above, the NSF recommends proposals with ship time be considered at both panels, but with the caveat that Global/Ocean Class ship requests be considered for 18 months or more from time of submission. The following link provides the 19

May 2017 announcement:

https://www.nsf.gov/news/news_summ.jsp?cntn_id=191729&org=OCE.

As of 20 June, there are 2007 funded ARF ship days across all agencies for CY 18, as shown in Table 2¹. There are 917 pending days of which an estimated 30% (275) will likely be funded resulting in an approximate total of 2282 days of ship time. Figures 1 through 4 illustrate the Fleet utilization trends over the past ten years and the anticipated use in 2018, and Figures 2 and 3 in particular, demonstrate the changing demand of each ship class. Raw utilization numbers alone do not adequately reflect the usage among classes of ships, so it is important to distinguish the causes of trends within ship classes. Also, the utilization numbers depicted in the graphic do not account for the homeport operational days during which the ship, crew and science team are working pre- and post-cruise. Typically these days in homeport for loading and unloading are distributed costs, and are reflected in the ship's day rate. Discussion should continue among the operators to determine whether it is in their best interest to charge for homeport loading and unloading days (given these are operational days) and reflect standard industry practice. While this would not change the operating costs, changes in homeport loading/unloading charges may result in a more equitable cost practice that assigns these costs to the users versus distributing the costs to all users.

NSF has requested that UNOLS/Ship Scheduling Committee (SSC) and FIC finalize a methodology for defining a Full Optimal Year (FOY) for each vessel to reflect annual targets. Additionally, NSF has requested UNOLS better define the available surge capacity in the FOY, to adequately demonstrate the realities of operating a research vessel. The current FOY "window" for each vessel, which includes all the activities not represented in the utilization numbers, (e.g. home port turn-arounds for loading/unloading, maintenance, inspections, home port outreach activities) should to be reviewed to clearly identify the available surge capacity for the ARF.

Based on the early findings outlined below, some ships in the ARF may have a lower than optimal schedule in 2018. As agreed to by the UNOLS Council, the Non-Op Process provides guidance for making decisions regarding non-operational periods, and calls for recommendations to be made by the agencies. This letter provides those recommendations. The link to the reference document is:

¹ These funding totals do not include NSF/OCE ship support outside the ARF. In 2018, NSF/OCE will use R/Vs *Nathaniel B. Palmer*, *Lawrence Gould*, and *Alliance*.

https://www.unols.org/sites/default/files/NonOp_Process_Recmd.pdf .

Agency Positions

1) Vessel owners have sole discretion on whether or not to retain their vessel(s) in service. Agencies have final say on where their respective federal work will be carried-out. UNOLS can withdraw ships from the ARF, if utilization declines over a period of time and owner-operators continue to retain their ship in service, as outlined in the UNOLS Guidelines for Requesting/Becoming a UNOLS Vessel, Chapter 6. (dated 9/30/2004).

2) The NSF and ONR will not normally provide operators of agency-owned assets with lay-up funds, and will not divert work from other UNOLS ships as an artificial means to reduce day rates. Lay-up funds for a specific ship will be carefully reviewed on a case-by-case basis, and will be considered within the context of the overall ARF usage and budgetary projections. The NSF and ONR believe this is in compliance with the UNOLS Charter (ANNEX I, Ship Scheduling Committee).

3) Federal agencies prioritize decisions based on schedule efficiency, scientific effectiveness, and budget comparisons among ship options, to maximize science support while making every effort to reduce overall costs. This may require a long-term view beyond a 12-month forecast. It may be the case that consolidation of underutilized schedules adds transit days but reduces overall costs, and is in line with Agency Position 2 above.

4) The National Research Council/National Academy of Sciences (NRC/NAS) Report "Sea Change: A Decadal Survey of Ocean Sciences, 2015 - 2025" provided the NSF with recommended actions to initiate a rebalancing between ocean sciences infrastructure and research/technology funding. In support of implementing the recommendations, NSF Ocean Sciences Division (OCE) has taken a holistic approach to funding the entire portfolio, which includes continued coordination with other Divisions within the NSF Directorate for Geosciences, which fund facilities. Efficiencies were realized during CYs 15 and 16 by optimizing available assets across the Directorate and reducing costs for ship operations. The resultant funding was made available for reinvestment in core research/technology programs, as well as within the ARF through enhancements to the National Deep Submergence Facility (NDSF), Shipboard Scientific Support Equipment (SSSE), Ocean Instrumentation (OI) and Early Career Cruises programs. The NSF plans to continue this ship scheduling approach in

the projected CY 18 budget environment.

5) The NSF and ONR agree an appropriate level of surge capacity is needed; in particular for rapid response-type cruises, and to allow for potential future increases in science utilization.

6) Given the current and projected Federal funding limitations and the need to modernize the ARF, it has become apparent ARF size is an important factor in overall planning and budgeting resources for maximum attainment of science objectives, and requires continued evaluation. With regard to "right sizing" of the ARF, consideration will be given to geographic distribution of the ships, mission capabilities, and overall projected science utilization by Class, as all are important factors in ensuring efficient and effective investments in science operations at sea.

7) The NSF is currently reviewing options as outlined in NSF's *Sea Change* Reply for operations of R/V *Marcus G. Langseth*. The NSF agrees that having access to specialized seismic capabilities is important, and how to best achieve these capabilities is an on-going discussion with multiple stakeholders. The NSF/OCE Marine Geology and Geophysics Program plans to continue to support science needs using a regional planning approach.

8) Federal agencies encourage institutions that own and/or operate ARF vessels to employ their assets for institutional education and research. This initiative shares the burden with the Federal agencies, and lowers the day rate for all potential users. The use of institutional days must conform to requirements set forth in Charter Party and Cooperative Agreements.

Agency Decisions and Recommendations

1) The NSF and ONR recommend the operators of all ships continue to identify ways to reduce costs, and seek appropriate opportunities to support research and education programs from other funding sources, including institutional funds. The Federal agencies encourage leveraging activities in order to maximize scheduling opportunities. It is important operators not over-estimate yearly costs, which tend to result in large residual carry-forward funds, and the resulting consequence of reducing opportunities to schedule additional operational days in the current year.

2) The NSF and ONR recommend the science community consider how to best integrate their research strategies with the enhanced capabilities, yet smaller berthing capacities of the R/Vs *Sikuliaq*, *Armstrong*, and *Ride*. While the major overhaul of R/V *Thompson* ends later this year, R/V *Revelle* will begin her overhaul period in 2019.

3) The University of Washington (UW) continues to pursue a replacement plan for the R/V *Clifford Barnes*, and expects to bring an existing vessel online as an institution-owned vessel late this year or early next year. The NSF will transfer the *Barnes*' title to UW to facilitate divestment of the vessel, which aligns with previous divestment procedures.

Guidelines

The guidelines and principals used by ONR and the NSF to develop the recommendations noted above, as well as budgetary investments in ship operations, are outlined below:

- 1) Budgetary constraints across the Federal agencies, escalating ship day rates and ship repairs, require that operators strive to maintain operating costs within inflation. An institution's ability to maintain reasonable day rates will be considered when negotiating annual awards. In CY 17, Global and Ocean Class ships accounted for approximately 75% percent of the NSF budget for ship operations and technical support, and the impact to the Fleet should be especially considered, as stated in the Agency Decisions and Recommendations #2. In CY 17 the NSF/OCE funded 43% (723 days) of the total ship time (1691 days) for the ARF's Global and Ocean Class vessels, NSF-OOI funded 12% (209 days), and ONR funded 19% (324 days). The remaining 26% was from NOAA, NASA, Institutional, and non-Federal funding.
- 2) Federal agencies will continue to evaluate weak schedules of institution-owned ships, and the additional impact to an agency's costs. Recognizing that shore-side support is one area where costs are distributed across the ships, these costs will continue to be reviewed on an annual basis. Base costs should be used in evaluating comparisons.
- 3) When possible, scheduled maintenance periods should be carried out in a vessel's homeport, both as a cost saving measure as well as an opportunity to

conduct substantive preventative maintenance. Unless an exemption is granted, U.S. shipyards must be used for regulatory dry-docking.

- 4) Ship schedules should be developed to meet the science program requirements while adhering to budgetary constraints.
- 5) Science program requirements should match the oceanographic outfitting capabilities of the ship on which the program is scheduled.
- 6) The size/class of vessel should be considered when selecting ships appropriate for the science mission.
- 7) The Funding Agency Program Manager and the Principal Investigator (PI) will be consulted when information beyond that listed on the UNOLS Ship Time Request Form is required. PIs and operators should avoid changing the scope and purpose of the funded project unless approved by the Federal agency.
- 8) Programs may be scheduled as a two-ship operation instead of a single Global Class ship, if it will be more efficient and cost effective.
- 9) Every effort should be made to schedule each year's funded programs within the budgetary constraints of each Federal agency. Deferrals will be considered if a particular cruise cannot be accommodated effectively and efficiently. All cruises requiring significant transit costs will be specifically reviewed and evaluated to determine if it can be accommodated within the available funding.
- 10) Cruises requiring Federal assets, such as NDSF ROVs, need special consideration when scheduling. It may necessitate substitution of assets, which requires approval by the funding agencies to either give flexibility for scheduling the cruises or for cost savings.

Supporting Information and Findings

The following findings regarding ARF vessel operations for 2018 are based on the submitted ship time requests, posted Letters of Intent (LOI) or a preliminary schedule, and cost estimates provided by the vessel operators as of June 20, 2017, but does not reflect the recent announcement by the NSF to discontinue support for the OOI Southern Ocean Sites at Argentine Basin and 55 South.

The operational days for each ARF vessel for CY 18 are a “snap shot” of the 2018 LOIs that are posted as of 20 June 2017. The LOIs still have double and triple bookings which will be discussed and resolved among funding agencies and UNOLS ship schedulers during the scheduling process.

These notes will help to explain the cruises that are double and triple booked, and to which ship schedule the days are accounted for in the “Fleet Utilization By Agency”, Table 2 for 2018.

Meg Tivey- NSF/OCE/MGG- 1657794- Requested *Atlantis*. This is a funded *Jason* program, and is double-booked with *Atlantis* and *Kilo Moana*. The 14 days for the cruise are accounted for on the *Kilo Moana* LOI. It would require 9 days of transit for *Kilo Moana* and 22 days of transit for *Atlantis*.

Monica Orellana- NSF/OCE/CO- 1634009- Requested *Thomas Thompson*. This is a funded program, and is double booked with *Sally Ride* and *Kilo Moana*. The program would bring *Kilo Moana* back to Honolulu. The 19 days for the cruise are accounted for on the *Kilo Moana* LOI.

Deb Kelley- NSF/OCE/MGG 1634169- Requested *Thomas Thompson*. This is a funded *Jason/Sentry* program, and is double booked with *Atlantis* and *Sally Ride*. The number of science bunks available with the *Jason* and *Sentry* teams aboard would be an issue if the cruise is on *Sally Ride*. The 18 days are accounted for on the *Sally Ride* LOI.

Silke Severmann- NSF/OCE/CO & NSF/OCE/MGG- Requested *Oceanus*. This is a funded program, and is triple booked with *Sikuliaq*, *Oceanus*, and *Sally Ride*. The 21 days for the cruise are accounted for on the *Sikuliaq* LOI.

Bess Ward- NSF/OCE/CO 1657663- Requested *Roger Revelle*. The STR stated *Sally Ride* would be acceptable. This is a funded program, and is triple booked with *Sikuliaq*, *Roger Revelle* and *Sally Ride*. The 37 days are accounted for on the *Roger Revelle* LOI.

Michael Beman-NSF/OCE/CO- 1555375- Requested *Ocean/Intermediate*. This is a funded program, and is double booked with *Oceanus* and *Sally Ride*. The 20 days for the cruise are accounted for on the *Oceanus* LOI.

Table 2: Fleet Utilization by Agency (2011 – 2018)

Agency	ACOE	DOE	EPA	Inst/State	BOEM	NASA	NAVY	NOAA	NSF	USGS	Other	Total
2011 Funded Days	0	0	1	198	35	2	491	498	2282	62	232	3801
2012 Funded Days	0	0	0	170	21	37	376	337	2164	11	281	3397
2013 Funded Days	8	0	0	146	4	14	594	227	2043	23	403	3462
2014 Funded Days	0	7	6	227	18	20	370	343	1977	33	283	3284
2015 Funded Days	13	24	6	195	12	26	506	423	1477	40	258	2980
2016 Funded Days	14	0	0	168	0	31	534	284	1465	2	340	2838
2017 Funded & Pending Days*	12	26	5	271	9	70	598	242	1663	2	301	3199
2018 Funded Days**	0	0	0	44	0	33	312	103	1465	0	50	2007
2018 Pending Days**	0	10	0	57	10	102	46	126	440	6	120	917
2018 Funded & 30% of Pending Days***	0	3	0	61	3	64	326	141	1597	2	86	2282

Notes about the table:

- * The 2017 Funded and Pending days are based on posted ship schedules as of 6/22/2017.
- ** The 2018 Funded and Pending days are based on the latest LOIs and draft schedules posted as of 6/20/2017.
- *** A 30% success factor rate has been applied to the pending days

- There were 2838 “chargeable days” on the 2016 final ARF published schedules. Based on the total of directly chargeable days, the NSF accounted for ~ 52 % of total funding or 1465 days within the ARF; and in addition NSF/OCE support of 52 days on *Ka`imikai-O-Kanaloa (KOK)*, and the NSF/OOI support of 52 days on *Nathaniel B. Palmer*. ONR & NRL funded 534 days in the ARF and 43 days on USCG *Healy*, and NOAA chartered 284 days. Due to major changes in schedule and platform availability over the course of CY2016, there was a net reduction of 78 NSF-funded days on *Kilo Moana*, and a net increase of 52 NSF-funded days sailed on *KOK*.
- There are currently 3199 operating/charge days (funded and pending) on the 2017 published schedules as of June 20, 2017. The NSF will provide support for 1663 or 52 % of the total days, and ONR/NRL will support 598 or 19%. The NSF/OCE is supporting 79 days on *KOK*, and 93 days on *NB Palmer*. ONR is supporting 58 days on the USCG *Healy*, while NOAA is chartering 242 days on ARF vessels and 24 days on *Healy*.

- For CY 17, Globals/Ocean Class vessels *Atlantis*, *Langseth*, *Revelle*, *Sikuliaq*, and *Thompson/Armstrong*, *Ride* and *Kilo Moana* have schedules with between 54 and 298 operating days (funded and all pending), accounting for 53% of total days (1691 days of the 3199). There are specific homeport maintenance periods planned.
- In CY 17 *Atlantis* will operate 298 days with a transit from the Pacific to WHOI and with cruises in/out of homeport (therefore port days are not chargeable on the schedule.) The majority of work is for NSF (229 days), NSF-OOI (35 days) with additional cruises for the NASA (33 days).

During CY 18 *Atlantis* will be supporting NSF work for the entire year except for 28 NASA days. The LOI currently has 226 funded days with 27 days pending.

- In CY 17 *Roger Revelle* has 278 days scheduled, with the NSF at 84 funded days plus 35 pending NSF-OOI days, ONR at 96, NASA at 37, and NOAA at 23. Three institutional days are included in their schedule. Due to a large two-ship program, conflicts on Pacific Global ship scheduling has resulted in a NSF cruise that requires *Jason* and *Sentry* to be potentially deferred into 2019. Consideration by the agencies is needed to find compromises that avoid this scenario especially in light of the overall lower utilization projections.

During CY 18, the current LOI for *Roger Revelle* shows 275 days, with 106 days pending. Early year work will be carried out in the Eastern Pacific, with late year work in the Central Pacific, before transiting home for the beginning of the Mid-Life Refit. NSF and NSF-OOI account for 167 funded days plus 42 days pending, 2 Navy funded days, a pending NASA cruise of 50 days, and 14 pending other days.

- In CY 17 *Marcus Langseth* plans to support 152 days, with funding from NSF, and 18 days funded by the Simons Foundation.

During CY 18 *Marcus Langseth* will operate in the South Pacific in support of three funded projects, totaling 79 days, including one NERC barter (paid for by NSF, and adds to a future offset on an OFEG ship).

- In CY 17 the *Sikuliaq* schedule has 271 chargeable days from NSF, NSF-OOI, ONR, and the State of Alaska. Development of *Sikuliaq's* schedules will require continued flexibility in order to accommodate coordination with Native Alaskan Communities.

During CY18 the *Sikuliaq* schedule includes 152 funded days of work and 51 pending days including 6 days of funding by the State of Alaska. NSF/OCE and NSF/PLR

account for 130 days. *Sikuliaq* will join USCG *Healy* in a dual-ship project funded by ONR.

- *Thomas Thompson* entered its mid-life refit shipyard in June 2016, and major work continues through most of CY 17. Completion of the overhaul has been extended until late Fall CY 17 due to additional, required repairs on various ship systems. Upon completion of the shipyard, testing and outfitting, *Thompson* will sail West and take *Roger Revelle's* place in the Western Pacific and Indian Ocean supporting Agency programs throughout 2018. The current CY18 LOI indicates 232 funded days, with an additional 44 days pending Agency funding decisions.
- In CY 17 *Kilo Moana's* schedule includes 201 days, 113 funded by NSF, the remaining a combination of NOAA, ONR, 2 cruises of non-federally funded work, and institutional days. Due to a delay in completing the CY 17 regulatory shipyard, *KM's* cruises have been shifted to *Ka'imikai-O-Kanaloa* (KOK) including 79 days of NSF support for five HOT cruises (4 days each), one OBS deployment cruise (5 days), one open water SCUBA project (9 days), and a major 45-day submersible support effort into the Papahānaumokuākea Marine Monument.

During CY 18, *Kilo Moana* has 131 days funded by the NSF with 72 days of pending work for NOAA, NSF and non-federal groups.

- *Neil Armstrong* began CY 17 in a Post-Shakedown Availability shipyard, completing a number of warranty repair projects and mission capability improvements. Beginning its operating year in March, *Neil Armstrong* has 234 funded days for CY 17, supporting ONR, NSF and NSF-OOI programs. During CY18 *Neil Armstrong* is scheduled for 284 days of science, primarily in the North Atlantic, with 6 days pending. The NSF/OCE and NSF/OOI will support 244 days, ONR 21 days, WHOI will support 10 institutional days, and 9 days will be supported by other sources.
- In CY 17 *Sally Ride* continues Post Delivery activities with the first half of the year conducting additional Science Verification cruises, and then 85 days in a Post-Shakedown Availability shipyard, mid-April through early July. CY 17 operational days total 203, with 23 NSF-OOI days pending. 34 UCSD Institutional days are included in the CY 17 schedule. Most cruises will stage from homeport in San Diego.

During CY 18 *Sally Ride's* LOI indicates 257 total days, with 72 funded days and 185 days (50 NASA, 26 NOAA, 109 NSF and NSF-OOI) pending scheduling and agency funding decisions.

- For the East Coast Intermediate *Endeavor* in CY 17, the schedule has 173 funded days and 73 pending days. For CY 18, *Endeavor's* LOI has 152 funded days split between NOAA, ONR, NSF, and other. There are also 91 pending days (NSF and other).
- In CY 17 *Atlantic Explorer's* schedule has 118 NSF days, along with 4 days institutionally funded. The CY 18 LOI shows 168 funded NSF days and 4 funded institutional days. There are also 36 pending NSF days.
- In CY 17 R/V *Pelican* in the Gulf of Mexico has a near fully subscribed schedule of 175 days (21 of these are pending days). Historically, *Pelican* has added days over the course of the operating year. The CY18 LOI shows 82 funded days, 45 of which are NSF days, and 58 pending days.
- In CY 17 R/V *Hugh Sharp* has a schedule with 179 funded operating days. For 2018, *Sharp's* LOI has 20 funded and 78 pending.
- In CY 17 R/V *Walton Smith* has a robust schedule, with 123 days. The 2018 LOI currently has 62 days funded and 21 days pending.
- In CY 17 R/V *Savannah* has 154 days. The 2018 LOI for R/V *Savannah* has 60 funded days and 31 pending.
- R/V *Blue Heron* has 59 funded days in CY 17, with 12 days still pending. *Blue Heron's* CY18 LOI has 8 funded days, and 51 pending days.
- For the West Coast Intermediate, *Oceanus* has 217 funded days and 12 pending scheduled in CY 17. *Oceanus'* CY 18 LOI has 98 funded and 2 pending days.
- In CY 17 *Robert G. Sproul* is scheduled for 111 days. In CY18 there are 8 funded days, and 32 pending days shown on the Letter of Intent.
- In CY 17 *Clifford A. Barnes'* schedule has a mix of users comprising 92 chargeable days and 5 pending days, including 69 institutional days, 21 NSF days, and 7 Navy/ONR days. In CY18 *Clifford A. Barnes* has 9 days funded and 10 pending.

Figure 1: UNOLS Fleet Utilization (2009 - 2018)

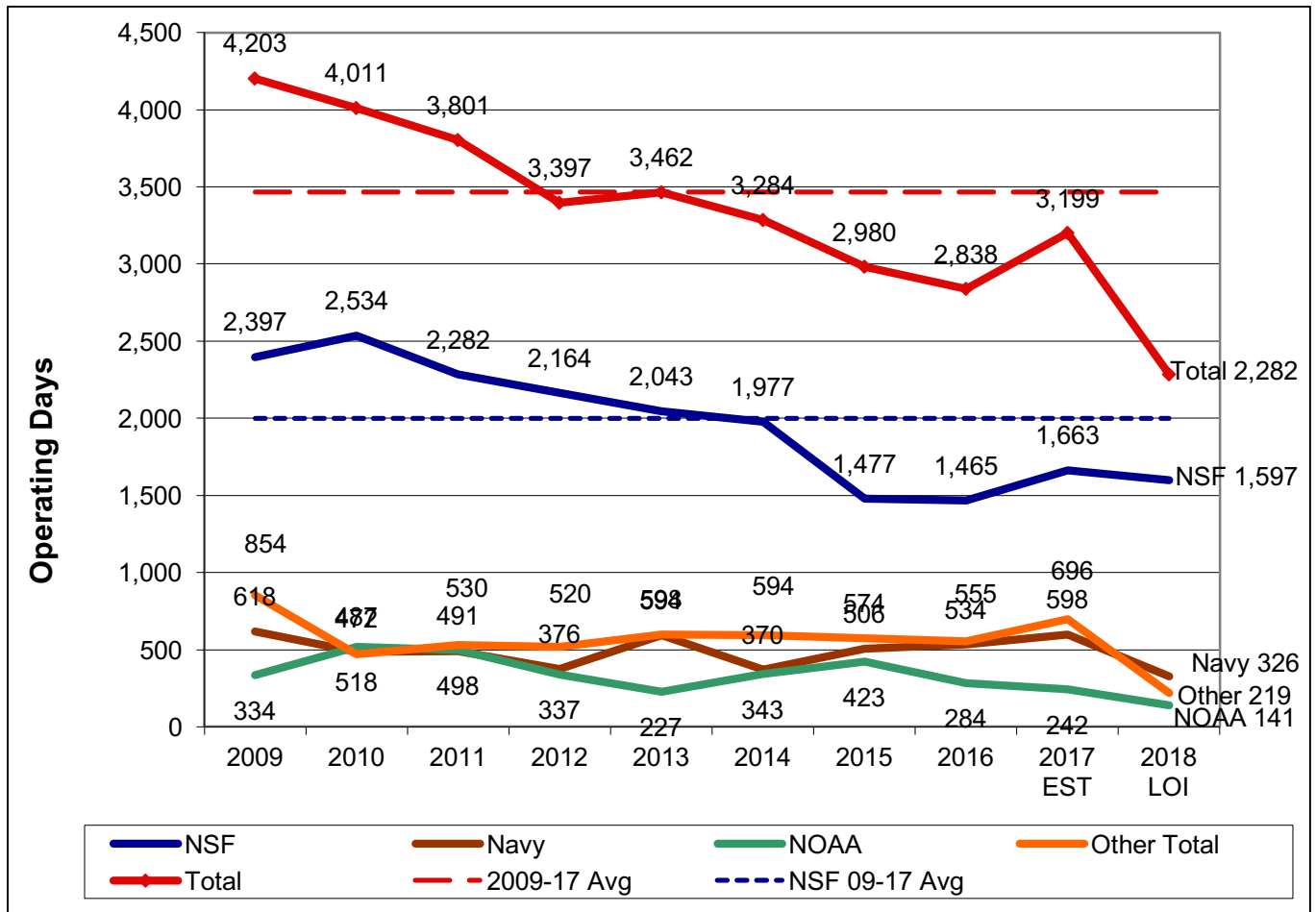


Figure 2: Ship Utilization by Class: 2009 – 2018: Global and Ocean Intermediate Class

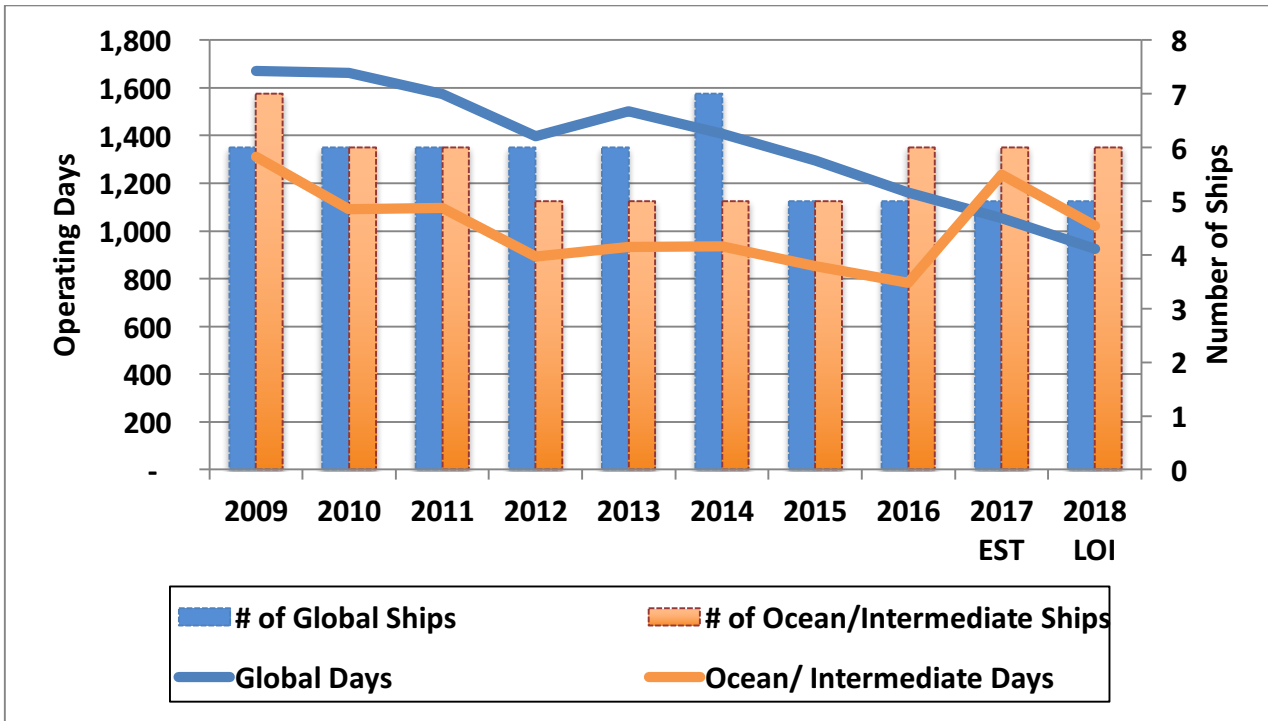


Figure 3: Ship Utilization by Class: 2009 – 2018: Regional and Coastal/Local Class

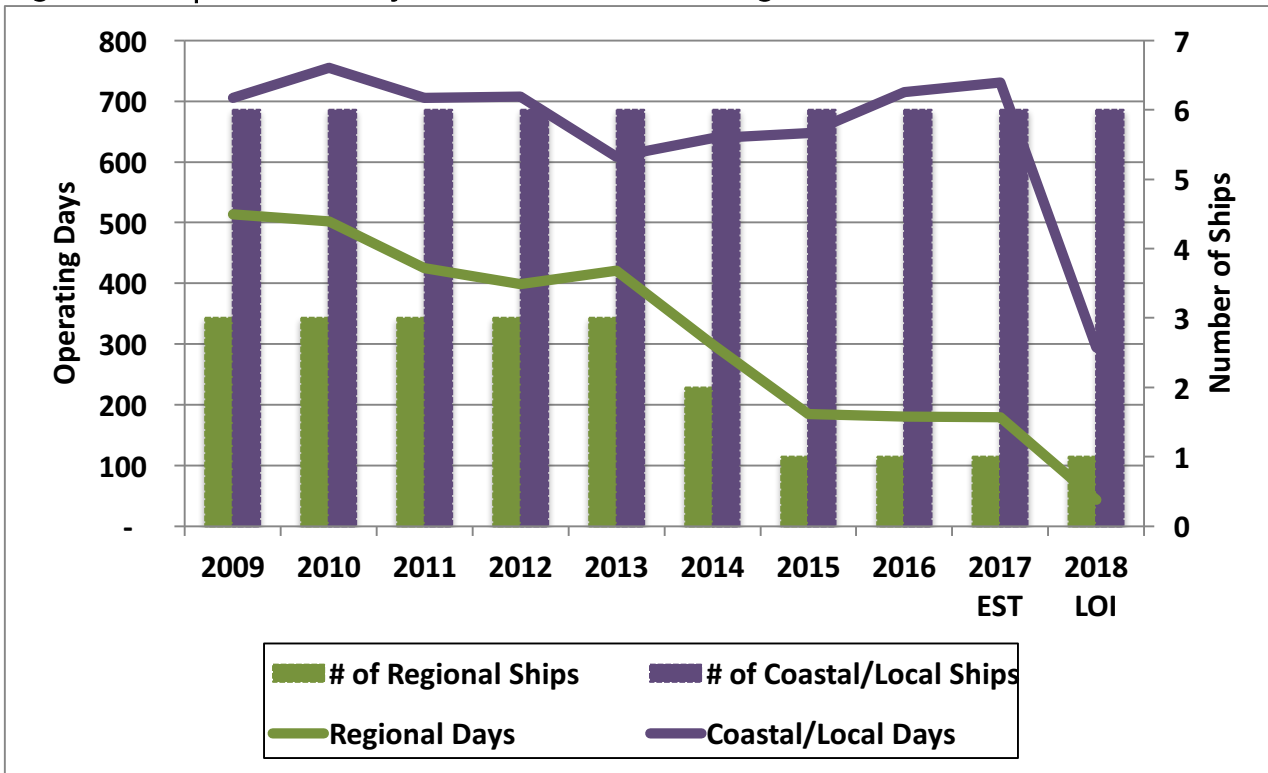


Figure 4: Ship Time Request Demand

