

Date: July 27, 2016

From: NSF, ONR and the UNOLS Executive Secretary

To: Dr. Chris Measures, UNOLS Council Chair

*BLK* *RIS* *JCA*

Subj: 2017 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 UNOLS Council after having participated in numerous ship scheduling meetings and conducted a thorough review of the 2017 Letters of Intent for the U.S. Academic Research Fleet (ARF) Global, Ocean/Intermediate, Regional, and Coastal/Local class ships. Realizing that additional funding decisions from various funding agencies will be made over the coming weeks for the 2017-scheduling year, based on current projections the agencies present the following outlook for 2017. The Federal Agencies feel that an early review provides good analysis on where work is needed to fill out schedules, especially in the promotion of non-federal work, as well as an outlook on surge capability in the coming year. This year's findings are reviewed with the updated 2016 Federal Fleet Status Report in mind. This by no means is meant to convey a final forecast, but rather a baseline for continued discussions within UNOLS on the projections for CY 17 given that NSF considers "right-sizing" efforts have been successful in achieving desired Fleet utilization rates for supporting the research operations within the projected budgets (with only few exceptions).

The percentage variances from past June letters have been mainly a result of non-NSF work becoming known later in the scheduling process.<sup>1</sup> The current balance between the number of

1

| Agency  | ACOE | DOE | EPA | Inst/<br>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  |

ships in the Fleet and funding to support the infrastructure and science awards is viewed on the whole to be sustainable if the factors that comprise the ship's day rates stay at or about current levels and the same number of science awards are made. The NSF and ONR will continue their efforts on jointly right-sizing and modernizing the Fleet. Additionally, the Federal Agencies will continue work to bring uniformity in the application of costing principles across the ARF.

NSF anticipates ship days will be added to CY 17 schedules from the Spring 2016 OCE panels, resulting from OCE shifting funds from infrastructure to core science, in support of the National Research Council Decadal Survey of Ocean Sciences *Sea Change* Report recommendations.

Given the above, the NSF recommendation that proposals with ship time be only considered at the Fall panel has been modified to recommend 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. This shift in management has been publicly announced in an NSF Ocean Sciences newsletter.

There are presently 2114 funded days across all agencies for CY 17, as shown in Table 1. There are 970 pending days of which an estimated 30% (291) will likely be funded resulting in a total of 2405 days of proposed ship time. Figures 1-4 illustrate the Fleet utilization trends over the past ten years and the anticipated use in 2017, and Figure 3 in particular demonstrates the Global demand. It should be cautioned that raw utilization numbers alone do not adequately reflect the usage among classes of ships so it is important to distinguish the trends within ship

|  |    |    |   |     |    |    |     |     |      |    |     |      |
|--|----|----|---|-----|----|----|-----|-----|------|----|-----|------|
| 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 |
| Provisional 2016 days by agency                                  | 14 | 0  | 0 | 217 | 0  | 31 | 555 | 313 | 1567 | 2  | 343 | 3042 |
| Projected 2017 as of July 15, 2016: Total Funded and 30% Pending | 4  | 10 | 0 | 137 | 45 | 62 | 413 | 144 | 1484 | 1  | 107 | 2405 |

classes. Additionally, raw utilization numbers do not reflect the inport operational days that don't show up on schedules but nevertheless are days the ship is working. Typically these inport days loading/unloading days are distributed costs that are reflected in the ship's day rate.

NSF has requested that UNOLS/SSC and FIC continue work on defining a Full Optimal Year[s] (FOY) for each vessel to reflect actual targets each year. The FOY must be adjusted annually to take into account major scheduled downtimes such as mid-life refits. Additionally, NSF has called on UNOLS to better define the surge capacity in the FOY to adequately demonstrate the realities of operating a research vessel. The current FOY windows (which were adjusted per a request from NSF to provide a window verses one hard optimal number), needs further consideration for inclusion of all the activities that are not accurately reflected in the utilization numbers such as home port turn-arounds for loading/unloading, maintenance, inspections, home port outreach activities, for example. This effort will more clearly identify the 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 2017. As agreed to by the UNOLS Council, the referenced document, which guides the recommended process for making decisions regarding non-operational periods, calls for recommendations to be made by the Agencies. This letter provides those recommendations. The link to the reference document is:

[https://www.unols.org/sites/default/files/NonOp\\_Process\\_Recmd.pdf](https://www.unols.org/sites/default/files/NonOp_Process_Recmd.pdf). For CY 2017 there are no anticipated needs for non-operational periods.

### 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 when 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) NSF and ONR will not provide operators of agency-owned assets with lay-up funds or divert work from other UNOLS ships as an artificial mechanism by which 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 right-sizing and budgetary projections. 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 between 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 NSF with recommended actions to initiate a rebalancing between ocean sciences infrastructure and research/technology funding. In support of implementing the recommendations, NSF 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 NDSF, SSSE, OI and Early Career Cruises programs. NSF plans to continue this ship scheduling approach in the projected CY 17 flat budget environment.

5) 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 and requires continued evaluation. With regard to "right sizing" of the ARF, consideration will be given to geographic distribution of the ships and overall projected science utilization by class, as both are important factors in ensuring efficient operations.

7) NSF is currently reviewing options as outlined in NSF's Sea Change Reply for operations of R/V *Marcus G. Langseth*. NSF agrees that maintaining 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 support science needs using a regional planning approach.

8) Federal agencies encourage institutions that own and/or operate ARF vessels to fund ship days for institutional education and research. This commitment reduces the dependency on the Federal agencies, and lowers the day rate for all potential users. Multi-ship operators should avoid unintended consequences of shifting costs to other ships they operate. The use of institutional days must conform to requirements set forth in Charter Party and Cooperative Agreements.

.....



## Agency Decisions and Recommendations

- 1) NSF and ONR recommend the operators of all ships 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, reducing opportunities to schedule additional operational days in the current year.
- 2) NSF and ONR recommend the science community consider how to best integrate their research strategies with the enhanced capabilities yet smaller sizes of the R/Vs *Sikuliaq*, *Armstrong*, and *Ride*. The 12-month major overhaul of *Thompson*, which started this year, will provide an initial opportunity/necessity to utilize these vessels.
- 3) PIs preparing proposals for upcoming target dates are encouraged to stay in touch with NSF program managers. NSF has revised its recommendation for submission of proposals with ship time as follows: For research requesting Global- or Ocean-class UNOLS vessels the proposal should be submitted at least 18 months before the anticipated time of the first cruise. For Intermediate-, Regional-, and Local-class vessels, The proposal should be submitted with as much lead time as is practical, but we recommend doing so at least 12 months before the anticipated time of the first cruise. Details can be found on the Spring/Summer Making Waves Newsletter <http://www.nsf.gov/pubs/2016/nsf16085/nsf16085.pdf>.
- 4) University of Washington should continue with plans for a R/V *Clifford Barnes* replacement. NSF will support transferring the ship's title to UW at the appropriate time in UW's replacement efforts.

## Guidelines

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

- 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 16, 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 recommendation #2.

- 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 ship operations for 2016 are based on the submitted ship time requests, posted Letters of Intent (preliminary schedules) and cost estimates provided by the ship operators as of July 15th, 2016:

Table 1: Fleet Utilization by Agency (2011 - 2017)

| 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 & Pending Days*          | 14   | 0   | 0   | 217        | 0    | 31   | 555  | 313  | 1567 | 2    | 343   | 3042  |
| 2017 Funded Days**                   | 0    | 0   | 0   | 130        | 41   | 62   | 352  | 105  | 1348 | 0    | 76    | 2114  |
| 2017 Pending Days**                  | 12   | 33  | 0   | 22         | 13   | 0    | 202  | 131  | 452  | 2    | 103   | 970   |
| 2017 Funded & 30% of Pending Days*** | 4    | 10  | 0   | 137        | 45   | 62   | 413  | 144  | 1484 | 1    | 107   | 2405  |

Notes about the table:

The 2016 Funded and Pending days are based on posted ship schedules as of 7/15/2016. Operational days for Armstrong and Ride begin after UNOLS designation.

\* The 2017 Funded and Pending days are based on the latest LOIs and draft schedules posted as of 7/15/2016.

\*\* A 30% success factor rate has been applied to the pending days

- There were 2980 "chargeable days" on the 2015 final ARF published schedules. Based on the total of directly chargeable days, NSF accounted for ~ 50 % of total funding or 1477 days within the ARF. Additionally, NSF/OCE Ship Operations Budget supported 37.5 days on USCG *Healy*, 48 days RVIB *NB Palmer* and 16 days on *Ka'imikai-O-Kanaloa* (KOK). NSF/OOI supported 60 days on the *NB Palmer*. ONR funded 506 days in the ARF, with 128 on *Revelle*, and NOAA chartered 423 days.
- There are currently 3042 operating/charge days (funded and pending) on the 2016 published schedules as of July 15, 2016. NSF/OOI supported 62 days on the *NB Palmer*.

- The total funded number of operating days in 2016 for NSF is 1567 days. In 2015, of the total 2980 days, NSF funded 1477 days, or 50 %. In 2016, NSF will provide support for 52 % of the total days.
- For 2016, Globals/Ocean Class, (*Atlantis*, *Langseth*, *Revelle*, *Sikuliaq* and *Thompson*)/(Armstrong, *Ride* and *Kilo Moana*) have schedules with between 109 and 303 operating days (funded and all pending), accounting for 55% of total days (1650 days of the 2980). There are specific homeport maintenance periods planned. In CY 16, NSF funded 1048 on Globals/Ocean and ONR funded 385 days.
- In CY 16 *Atlantis* will operate 279 days with several cruises in/out of WHOI (therefore port days are not chargeable on the schedule.) The majority of work is for NSF (149 days), NSF-OO1 (40 days) with additional cruises for the Navy (45 days), NASA (31 days), and NTSB (14 days). This diversity in funding is important for all ships, but especially on the Globals. CY 17 *Atlantis* will be working at Full Optimal level, with work off Chile, the Eastern Pacific, and North and South Atlantic. The LOI currently has 250 funded days with 45 days pending. This includes time for NASA, NSF, and NSF-OOI.
- CY 16 *Revelle* has 303 days scheduled, with NSF at 150 days, ONR at 110 and NOAA at 41 (NSF/NOAA Barter days). Only two institutional days were added to their schedule. In CY 17, the current LOI shows 278 days, with some potential double booked cruises. ONR plans to support 138 days, including a transit from the Western Pacific back to homeport. NSF and NSF-OOI account for 99 days, NOAA 22 days, and potential ONC cruise for 19 days. Not reflected in their LOI are institutional days.
- *Langseth* plans to support 177 days in CY 16, with funding from NSF, European work (including NSF-NERC Barter Exchange). For CY 17 *Langseth* will need to identify the most cost effective way to handle work in the South Pacific for several funded projects, and sometime that year transit the ship across the Pacific.
- *Sikuliaq* straddled both MREFC and O&M funding, as sea trials and warranty dry-docking continue into the first half of CY 16. The schedule has 270 chargeable days from NSF, NSF-OOI, ONR, Ocean Networks Canada, and NOAA. *Sikuliaq's* scheduling is a challenge due to factors involved with Alaskan regional communities; therefore development of schedules needs to have some flexibility in order to accommodate potential Native Alaskan Community concerns. The *Sikuliaq* CY 17 schedule is awaiting some funding decisions however overall Letter of Intent is full. *Sikuliaq* should continue to work on options that include cruises that *Thompson* will not be able to handle until the Service Life Extension Program (SLEP) is concluded (June 2017).
- *Thompson* has a full schedule in CY 16 for their FOY period, which has been adjusted due to the SLEP, with many trips in/out of San Diego and Hawaii. *Thompson's* schedule includes support of NSF-OOI cruises, NOAA work (NSF/NOAA Barter days),



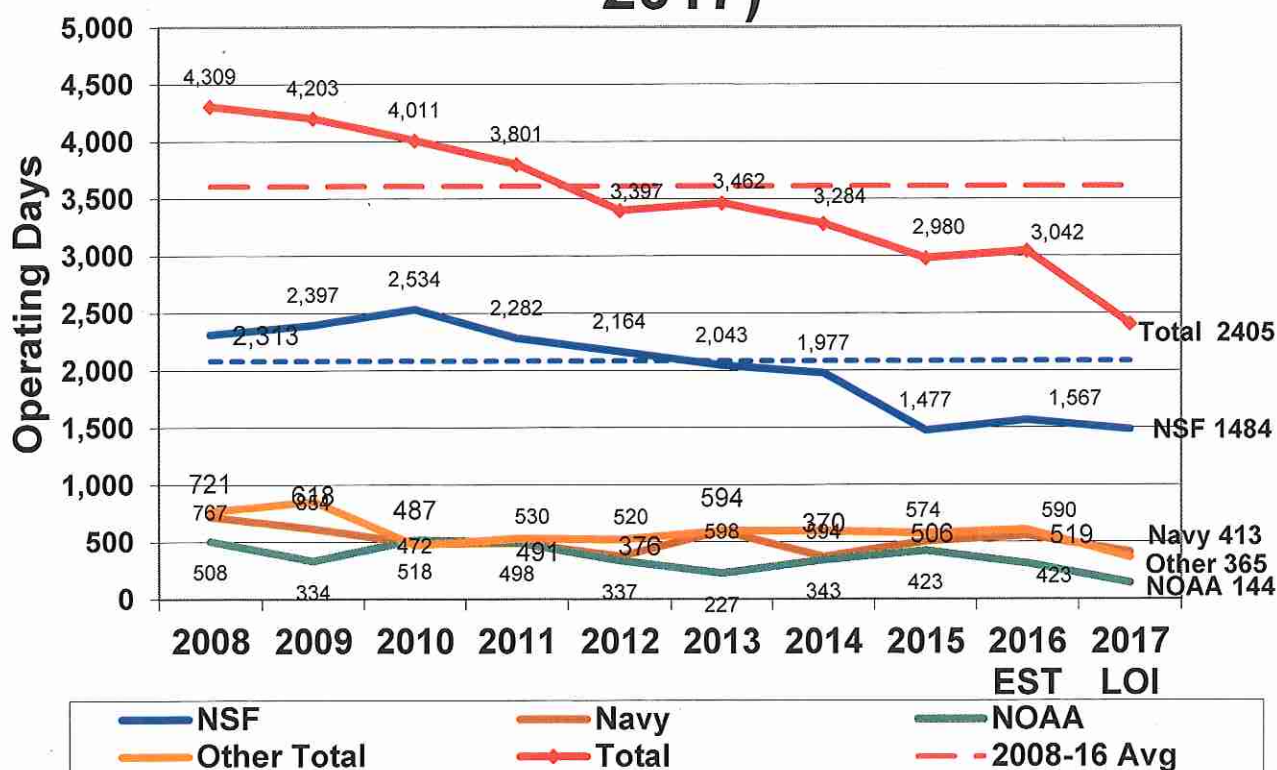
institutional days, as well as NSF days. For CY 17, *Thompson* will work the second half of the year after the SLEP is complete, with support for 188 days with funding from NSF, NASA and the Institution.

- *Kilo Moana's* CY 16 schedule includes 183 days, most of which were funded by NSF, the remaining a combination of international work and institutional days. As a result of a repair to upgrade the control system, some of the KM days have been shifted to *Ka'imikai-O-Kanaloa* (KOK). For CY 17, the *Kilo Moana* has 125 days funded by NSF with some pending work for the institution, the Navy and other groups.
- *Neil Armstrong* in CY 16 transitioned from construction into operations, with several Science Verification Cruises (SVC) and a three ship operations funded by ONR (48 days), 72 days for NSF-OOI and 46 days for NSF core. In CY 17 it is anticipated that *Armstrong* will surpass the FOY, with 275 days currently on their LOI, of which 232 are funded. One cruise has been left stranded due to the conflicts in time, and NSF is looking to support this cruise through the OFEG European Barter.
- *Sally Ride* spent most of CY 16 in construction, delivery, outfitting and SVC cruises (93 ONR days). They will carry out the fall NOAA CalCOFI cruise as their first science cruise (14 days). In CY 17, the LOI has 211 days, of which 61 are for NSF and NSF-OOI, 124 for ONR, and 26 NOAA. UC Institutional days will be considered.
- For the East Coast Intermediates, *Endeavor* has 197 days (funded) in CY 16, down 54 days from CY 15. For 2017, *Endeavor's* LOI has 181 funded days split between NOAA, ONR, Institution/State, Other, and NSF. In CY 16, *Atlantic Explorer's* schedule has 119 NSF days, along with 40 days for the Institution/State and Other. The CY 17 LOI shows 95 funded NSF days and 4 funded Institute days, with 26 pending NSF days.
- In CY 16 R/V *Pelican* in the Gulf of Mexico has a nearly fully subscribed schedule of 175 days but is down from CY 15 by 25 days. Historically *Pelican* has added days over the course of the operating year. The CY 17 LOI shows 131 funded days, 67 of which are NSF days, and 22 pending days.
- In CY 16 R/V *Hugh Sharp* has a schedule with 177 funded operating days. This is down from CY 15 by 8 days. For 2017, *Sharp's* LOI has 61 funded and 106 pending.
- In CY 16 R/V *Walton Smith* has a robust schedule, with 198 days, up from CY 15 by 86 days. The 2017 LOI has 50 days funded and 42 days pending.
- R/V *Savannah* has a full schedule at 219 days in CY 16, up from 177 days in CY 15. The 2017 LOI for R/V *Savannah* has 65 funded days and 70 pending.
- R/V *Blue Heron* has 56 operating days in CY16, up from 40 days in CY15. *Blue Heron's*

CY 17 LOI has 23 funded days, and 22 pending days, all for NSF.

- For the West Coast Intermediates, *Oceanus* has 181 funded days and 14 pending scheduled in 2016, down from 205 days in CY 15. *Oceanus'* CY 17 LOI has 76 funded and 32 pending days.
- 11. In CY 16 *Robert G. Sproul* is scheduled for 63 days down slightly from 69 days in CY 15. In 2017 there are 64 funded days and 30 pending days are shown on the Letter of Intent.
- *Barnes* CY 16 schedule has a mix of users comprising 86 days chargeable days including, 73 institutional days, 8 NSF days, and 5 "other" days. In CY 17 currently only has 10 days funded (UW). Typically UW is able to add days late in the year, and it is anticipated that CY 17 will add significant UW days.

## UNOLS Fleet Utilization (2008 - 2017)



## Ship Utilization by Class: 2008 - 2017

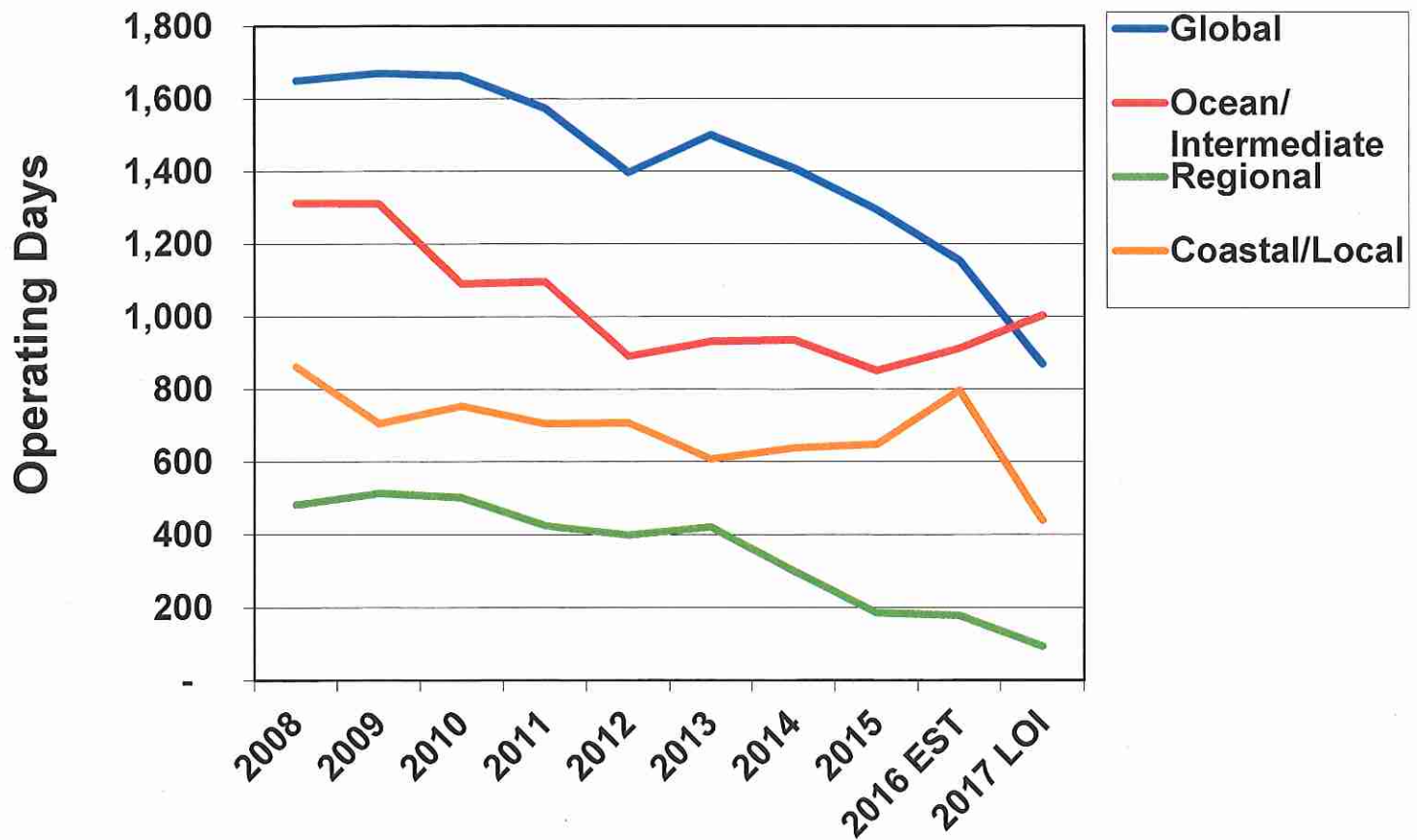


Figure 4

