**2018-2019 JPSS Proving Ground Risk Reduction Quarterly Reporting**

2019-2020 Project Information

**Principal Investigator:** Kimberly Hyde

**Team Members:** Colleen Mouw, Ryan Morse

**Organization:** Northeast Fisheries Science Center; University of Rhode Island

**Project Title**: Optimization of phytoplankton functional type algorithms for VIIRS ocean color data in the Northeast U.S. Continental Shelf Ecosystem

2019-2020 Project Summary

This project aims to optimize remote sensing phytoplankton functional type/size class (PFT/PSC) algorithms for the Northeast U.S. Continental Shelf (NES) for applications in fisheries management and ecosystem modeling. We will be collecting *in situ* optical and pigment data on six Ecosystem Monitoring cruises operated by the Northeast Fisheries Science Center. All available *in situ* data will then be used to validate the ocean color data (e.g. RRS and IOP products) from VIIRS and other sensors and evaluate several abundance and absorption based PFT/PSC algorithms.

2019-2020 Reporting Period

*Mark table, below, with an “x” corresponding to the quarter submitted*

|  |  |  |  |
| --- | --- | --- | --- |
| *CY2019 Q3: Period of Performance: 7/1/19 to 9/30/19*  *Due: October 11, 2019* | *CY 2019 Q4: 10/1/19 to 12/31/19*  *Due: January 10,2020* | *CY 2020 Q1: 1/1/20 to 3/31/20*  *Due: April 10,2020* | *CY 2020 Q2: 4/1/20 to 6/30/20*  *Due: July 10,2020* |
| Submitted 10/11/19 | Submitted 3/20/20 |  |  |

2019-2020 Quarterly Dashboard



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Green (Controlled) | Yellow(Caution) | Red(Critical) | Variance Summary *(Provide explanations as needed. More detail may be included in issues and risks sections as needed.)* |
| **Scope** |  |  |  |  |
| **Budget** |  |  |  | A portion of year 1 funds were not properly obligated in FY’18 (see below for more details). |
| **Schedule** |  |  |  | The February 2020 Ecosystem Monitoring cruise has been canceled (see below for more details). |

**Legend**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | *On Target* |  | *Deviation from plan which can be recovered* |  | *JPSS Program Science Attention needed.* |

|  |
| --- |
| 2019-2020 Quarterly Accomplishments |

**Accomplishments during this Reporting Period**

1. **Summary of Accomplishments** *(This is a high level summary of quarterly activities. This paragraph should be kept brief to half of one page or less.)*

We participated in our fourth field sampling cruise on the Gordon Gunter (NOAA) August 19 to 30, 2019 collecting absorption, backscattering, fluorescence, and pigment samples. Laboratory analysis of chlorophyll, colored dissolved organic matter (cdom), and particulate absorption being conducted at URI is on track. Chlorophyll (NEFSC), nutrient analyses (University of Maine) and HPLC (University of Maryland) are 100% complete for the first two cruise and on track for the latest two cruises. We continue to acquire and compile all available *in situ* data including CTD (NEFSC), radiometry (NESDIS), particulate absorption (NESDIS), and phytoplankton imagery (WHOI) to add to our project database. Satellite data from multiple sensors (SeaWiFS, MODIS-Aqua, VIIRS, NOAA-20, OCCCI and HERMES) are current and we have started the sat-ship match-up analysis with the *in situ* data. Kyle Turner, a URI student in Dr. Mouw’s laboratory, has reviewed several published PFT/PSC algorithms and has started to optimize the algorithms for the northeast shelf.

1. **Milestones Progress** *(Provide details of the progress of each activity or milestone for this quarter as relevant. Quarterly Reports should reflect only current quarter.)*

The majority of the time spent this quarter was on the collection (Aug 2019 cruise) and laboratory processing of the *in situ* validation data and prepping for the next cruise in mid-October. We completed all sample analyses for the November 2018 cruise and continue processing data from the May and Aug 2019 cruises. *In situ* data compilation and satellite data processing are on track and we have begun preliminary satellite-ship match-up analyses. We continue to work with WHOI on the phytoplankton imagery data and are prepared to analyze the data once available.

**Plans for the next Reporting Period:**

* Continue laboratory analyses
* Continue data compilation for available datasets and cruises
* If data is available from WHOI, begin the analysis of the phytoplankton imagery data
* Sat-ship match-up validation analyses
* Comparison of regional PFT/PSC algorithms

**Additional Information** *(This include the following, as relevant. If particular elements are not relevant to quarterly activities, write N/A/)*

1. **User engagement:** *(In addition to PGRR meetings, this includes collaboration and support for other stakeholders such as upper level management or other agencies such as FEMA. This may include a specific event like a large fire or hurricane or a field experiment, for example.)*
2. **Conference/workshop participation:** *(Conference Name, dates, materials presented)*

Two abstracts were submitted for presentations at the 2020 Ocean Sciences Meeting.

* Turner, K., K. Hyde, C. Mouw, R. Morse and A. Ciocheto. Regional Refinement of Phytoplankton Functional Type Algorithms for VIIRS Ocean Color Data on the Northeast U.S. Continental Shelf
* Hyde, K., A. Ciochetto, M. Forgarty, C. Mouw, R. Morse, V. Saba, and K. Turner. A 20-Year Analysis of Phytoplankton in the Northeast U.S. Continental Shelf Large Marine Ecosystem with Implications for Fisheries

1. **Project publicity:** *(news journals/articles etc.)*

Quarterly Pictures and Graphics

*JPSS Program Science requests pictures and graphics which reflect significant events or significant progress. Please include figure captions. This section should also include news worthy items. Please include pictures and graphics when experimental PGRR products benefit severe weather of environment forecasts or warnings or guidance. This section may exceed the 3 page count as needed.*

We have no new photos or graphics to show for this quarter as a majority of the time was spent collecting and processing the *in situ* samples.

2019-2020 Annual Milestones with Quarterly Status Updates

*2018-2019 plan, schedule and milestones should build upon project proposals and allocated budget. This plan serves as a project management tool allowing PI’s to track and meet goals. Tasks are activities that need to be accomplished within a defined period of time. Tasks are broken down into milestones with defined start and end dates. The level of granularity is defined by individual PI. This table should be used for future quarterly reports.*

|  |  |  |  |
| --- | --- | --- | --- |
| **Milestone** | **Planned Completion Date**  *(should be part of annual plan and should not change from quarter to quarter)* | **Actual Completion** | **Status** *(not started, on track, delayed, completed …)* |
| Task 1: Field Sampling & Sample Analyses | | | |
| Field Sampling 3 | June 2019 | 6/6/2019 | Completed |
| Field Sampling 4 | August 2019 | 8/31/2019 | Completed |
| Field Sampling 5 | November 2019 | 10/31/2019 | Early |
| Field Sampling 6 | February 2020 |  | At Risk |
| Task 2: Laboratory Analyses | | | |
| Field Data Analysis 2 (URI) | May 2019 | July 2019 | Completed |
| Field Data Analysis 3 (URI) | January 2020 |  | 70% Complete |
| Field Data Analysis 4 (URI) | March 2020 |  | Slight delay |
| Field Data Analysis 5 (URI) | June 2020 |  | On Track |
| Field Data Analysis 6 (URI) | October 2020 |  | At Risk |
|  |  |  |  |
| Task 3: Data Analysis | | | |
| In situ data compilation | October 2020 |  | On Track |
| Satellite data processing | Continuous |  | On Track |
| Preliminary data analysis | January 2020 |  | 50% Complete |
| Preliminary algorithm validation | January 2020 |  | 50% Complete |
| Algorithm optimization | October 2020 |  | On Track |
| Time series analysis | May 2021 |  | On Track |
| Modeling efforts | January 2021 |  | On Track |
| Publication writing | June 2021 |  | On Track |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

*Add rows as needed for all annual tasks and milestones. New milestones which may arise should be added at the end of the table as needed.*

|  |
| --- |
| Issues and Risks |

##### *This section should include no more than five or issues. Please separate risks from issues. Risks are the bad things that might happen. Dependencies on other projects and resources are considered risks. Issues have already occurred. High impact variances from Quarterly Dashboard can be addressed here as needed.*

##### Risk or Issue: *(State risk or issue and impact.)*

##### Issue - Due to communications issues between the program office and NEFSC, we were unaware that the year one funds received in June 2018 needed to be spent or obligated during FY’18. The result of this error was that we were not able to fund Dr. Morse for 3 months during year 1 of the project.

##### Risk - The staff from NESDIS who collect the in-water radiometry and particulate absorption samples are unable to participate in the May 2019 cruise due to other obligations.

##### Issue – The URI radiometry instrument failed during the last few days of the May 2019 cruise and we were unable to collect above and in-water radiometer profiles.

##### Risk - Changes in the availability of the NOAA ships and weather could cancel or reduce the sampling plan of the Ecosystem Monitoring cruises.

##### The February 2020 Ecosystem Monitoring cruise has been canceled due reduced available ship time.

##### Risk – Delays in receiving complementary historical and coincident data from project partners NESDIS and WHOI.

##### Mitigation Plan or Course Correction: *(This includes options and actions to reduce risks/threats to project objectives. For issues, this includes plans to address impacts.)*

##### Mitigation Plan – We have spoken with Arron Layns and the PGRR program office has agreed to give us additional funds in year 3 of the project to make up for the lost funds in year 1. Dr. Morse’s work was pushed back by approximately 6 months and he started on the project in July 2019.

1. Course correction – Dr. Mouw’s staff will collect in-water radiometry and the particle absorption samples, which will be sent to NESDIS to be analyzed.
   1. Dr, Mouw will send her instrument off for repair and we borrowed an instrument to use on the October cruise.

##### Course Correction – We are evaluating our project timeline to determine if we should try to piggyback on a [WHOI LTER](https://nes-lter.whoi.edu/) cruise to the Pioneer array in February or the May 2020 Ecosystem Monitoring cruise.

##### We postponed our 6th cruise until the May 2020 Ecosystem Monitoring cruise.

##### Mitigation Plan – We are in contact with both NESDIS and WHOI regarding the status of their data. NESDIS is currently updating their *in situ* database and hope to add historical EcoMon cruise related data this spring/summer. At WHOI, they have prioritized the August and November 2018 EcoMon cruises for quality control verification and geolocation. Historical verified IFCB data collected in the Northeast will be shared as it becomes available.

##### Status: *(If an issue or risk is closed, then it should not be reported in subsequent quarters.)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Issue/Risk** | **No Change/Open** | **Increasing** | **Decreasing** | **Closed** |
| **1** |  |  |  |  |
| **2** |  |  |  |  |
| **3** |  |  |  |  |
| **4** |  |  |  |  |
| **5** |  |  |  |  |

##### Comments: *(as needed)*