



Geoff White, Director  
Atlantic Coastal Cooperative Statistics Program  
1050 N. Highland Street, Suite 200 A-N  
Arlington, VA 22204

August 16, 2021

Dear Mr. White,

The Massachusetts Division of Marine Fisheries and the Rhode Island Division of Marine Fisheries, through partnership with Harborlight software, are pleased to resubmit the proposal titled “*Integration of vessel monitoring systems and electronic reporting in SAFIS and SAFIS applications through API development and field testing of multiple hardware options: Phase 2*” for your review. We believe this proposal is the next important step toward integration of various vessel-based data streams into the SAFIS databases and applications and implementing tracked data collections programs by partner agencies.

Please address questions jointly to Rich Balouskus of the Rhode Island Division of Marine Fisheries and Anna Webb of the Massachusetts Division of Marine Fisheries.

Sincerely,  
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**Enclosures:**

ACCSP Proposal: “*Integration of vessel monitoring systems and electronic reporting in SAFIS and SAFIS applications through API development and field testing of multiple hardware options: Phase 2*”

Appendix A: Principal Investigators’ Curricula Vitae

Memo from ACCSP regarding proposed work within the SAFIS framework.

Letter containing replies to questions from proposal team reviewers

Proposal for Funding made to:  
Atlantic Coastal Cooperative Statistics Program  
Operations and Advisory Committees  
1050 N. Highland Street, Suite 200 A-N  
Arlington, VA 22204

**Integration of vessel monitoring systems and electronic reporting in SAFIS  
and SAFIS applications through API development and field testing of  
multiple hardware options: Phase 2**

**Submitted by:**

Anna Webb  
Massachusetts Division of Marine Fisheries  
30 Emerson Avenue  
Gloucester, MA 01930

Rich Balouskus  
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**Applicant Name:** Massachusetts Division of Marine Fisheries and Rhode Island  
Division of Marine Fisheries

**Project Title:** Integration of vessel monitoring systems and electronic reporting  
in SAFIS and SAFIS applications through API development and  
field testing of multiple hardware options: Phase 2

**Project Type:** New Project

**Principal Investigators:** Anna Webb (MADMF), Rich Balouskus (RIDMF)

**Requested Award Amount:** \$86,244.44

**Requested Award Period:** For one year, beginning after the receipt of funds

**Date Submitted:** August 16, 2021

### **Terminology:**

While project partners named this proposal “Phase 2” of the similarly titled FY19 proposal that initiated the integration of vessel tracking data with trip reporting, they consider this a new project. While the authors recognize the similarities to the Phase 1 pilot project, a significant change in scope is presented for Phase 2. The primary focus of this proposal is the development of an operable SAFIS backend for storage of tracking data and the creation of an administrative interface for viewing tracking data. The primary focus of “Phase 1” was determining if and how specific cellular devices could deliver tracking data to both eTrips and SAFIS. Phase 2 proposes to build upon the baseline created during Phase 1 producing enhanced products and scoping additional features. Thus, this proposal is not considered a request for maintenance funding for the existing platform.

It is probable that a production version of eTRIPS supporting VMS integration (as developed in Phase 1) will be available for distribution to the general public (i.e., available for download in the Apple and Google app stores) prior to the initiation of Phase 2. As a result, location data will be collected alongside catch and effort data in real fishing scenarios from those fishermen who are choosing to utilize the VMS connection (optional), or if mandated by any partner prior to the initiation of Phase 2. Enhancements to this version would be the goal of this project and, pending testing and review, provide expanded VMS options as well as more user-friendly tools.

### **Objective:**

To continue development of an API-based integration of geographical vessel-monitoring data with real-time electronically reported data for small scale inshore fisheries in the eTRIPS mobile application and through an ACCSP hosted web-based administrative application. Within the scope of the project, the following additional deliverables will be met:

- Evaluate functionality of additional VMS devices not tested in Phase 1 in order to complete technical analysis of all currently available cellular devices.
- Develop strawman requirements for future cellular and/or low-cost satellite VMS devices to meet ACCSP standards for integration into the program. This step will be carried out in collaboration with the ACCSP data team. Additionally, this will negate the need for future testing of cellular units as they become available on the market.
- Analyze approval procedures for federal VMS products in light of new inshore cellular options and pending lobster/Jonah crab fishery regulations. Compare approval procedures for federal VMS products to strawman ACCSP requirements developed for this project.
- Produce an updated comparative cost and technical specification analysis of available cellular VMS devices and data plans as well as all NOAA GARFO approved VMS devices.

- Investigate enhancements to current program capabilities for specific use cases of geofencing and track line post-hoc analysis, and document a process to add further use cases and/or additional enhancements after project completion.
- Enhance the existing administrative tool and scope requirements to develop a new tool to view tracks in real time and provide a platform for advanced post-hoc analysis.
- Conduct an informal survey of fishermen to solicit ideas for future improvements of program and end user needs.

**Need:**

Satellite-based vessel-monitoring-systems (VMS) have been deployed for years on federally permitted vessels and utilized by NOAA Fisheries and NOAA Office of Law Enforcement (OLE) successfully. These systems allow OLE to monitor and receive messages about vessels' positions, but also allow for the vessel captains to be notified when approaching defined boundaries. Most ACCSP state partners have not yet implemented this technology due to high costs and logistics. New cellular-based VMS technology has emerged that is less expensive to purchase and use and can be accessed via mobile devices providing opportunity for partners with limited resources. State managers and law enforcement are eager to explore the utility of this technology to allow for more flexible management programs in various fisheries accompanied with more robust accountability. Positional data generated from VMS devices linked with trip-level data is needed to accomplish the rigorous monitoring associated with these types of management programs especially where the current level of reported location data is insufficient. Furthermore, with the increasing presence of other ocean uses in recent years (e.g., renewable energy, aquaculture) in historically utilized commercial fishing areas, the ability to track spatiotemporal use with catch may be of interest to various commercial fishing stakeholders and management groups.

Per an August 4<sup>th</sup> press release from the Atlantic States Marine Fisheries Commission (ASMFC), "The ASMFC's American Lobster Management Board initiated Draft Addendum XXIX to Amendment 3 to the Interstate Fishery Management Plan for American Lobster. The Draft Addendum considers implementing electronic tracking requirements for federally-permitted vessels in the American lobster and Jonah crab fishery, with the goal of collecting high resolution spatial and temporal effort data. Draft Addendum XXIX will propose specifications for tracking devices to ensure the collected data meet both management and assessment needs. These specifications include data reporting rates, preferred technologies, and minimum standards for tracking devices." Phase 2 of this project proposes to directly collaborate with both ACCSP and ASMFC to support the successful development of Addendum XXIX.

In Phase 1 of this funding, the project team successfully enhanced eTRIPS mobile to obtain VMS data collected from several affordable cellular sourced devices and created an API (Application Programming Interface) capable of transmitting the collected VMS data into a

single standardized format in the Standard Atlantic Fisheries Information System (SAFIS). This VMS data is then ‘paired’ with eTRIPS trip report data creating a comprehensive history of spatially explicit fishing trips. This is distinct from the current federal use of satellite VMS which tracks vessels 24 hours a day/7 days a week, regardless of when fishing is occurring. A variety of cellular-based VMS systems were evaluated for compatibility with the API. After completion of Phase 1, several additional needs, which became the objectives of Phase 2, were identified to build upon this concept and to increase functionality of the program for both managers and harvesters.

NOAA Fisheries ‘approved’ VMS devices are required to meet stringent standards as set forth by OLE, and until recently, did not include non-satellite-based options. State managers do not typically have access to OLE stored data in real time, so Phase 1 of this project determined that data generated by cellular VMS systems would most appropriately work independently but parallel to existing databases and applications currently in place at NOAA Fisheries and should be stored and extracted by ACCSP. Additionally, the Phase 1 concept was developed as a data collection tool, and consequently, its scope differed in intent from the OLE VMS program. This identified a need for a standard process and repository for the combined positional and catch and effort trip-level data reported by vessels utilizing new cellular VMS technology. The proposed Phase 2 represents the next step necessary to begin developing an integrated database and programmatic system to fully take advantage of both new and existing VMS technologies.

### **Results and Benefits:**

The storage and display of VMS data by SAFIS and SAFIS applications further moves towards ACCSP being the sole repository for fisheries-dependent data collection, which makes multi-jurisdiction management more streamlined and data more easily available and accessible. This project ultimately addresses the ACCSP’s catch and effort priority by further integrating and advancing data collection methods to include location tracking, which will support emerging management issues and improve the quality of data used to make decisions. The addition of geographic/positional fisheries-dependent data streams is becoming a priority of ACCSP and its partners and integral to SAFIS and SAFIS applications keeping current with emerging technologies. During Phase 1, ACCSP acquired appropriate GIS licenses and dedicated staff time to advancing ACCSP’s spatial data storage and use. Additionally, in March 2021, the Commercial Technical Committee initiated a spatial coordination working group to assist and guide ACCSP in spatial development. ACCSP and its partners are increasingly being asked to provide spatial analyses at resolutions that currently are not collected, and this approach will help resolve those issues.

eTRIPS mobile, which facilitates the collection of real-time catch and effort data, has been in production since 2015 and been successfully implemented within the SAFIS framework across several fisheries for both the commercial and party/charter sectors. In Phase 1, the application

was integrated with VMS data from the five tested device platforms, creating a more complete accounting of the catch, effort, and location of a given fishing trip. This integrated dataset, submitted via the API to ACCSP and displayed in the enhanced administrative application proposed in Phase 2, shall provide a platform to query the data for these "alternative" VMS programs. A single repository for all vessel-generated VMS data is necessary to create the query platform for "real time" report generation. SAFIS is the ideal place for this type of data compilation as it encompasses both state and federal systems and thus is usable among all partners. Scoping the potential for development of a new administrative application to view and query non-trip VMS data and live data will provide important context and details for both application developers and managers moving forward. It is intended that such a tool would bolster management efforts by supporting the identification of fishing patterns and non-fishing activity as well as provide the potential for future law enforcement compatibility.

By collaborating with industry representatives, the project will be able to incorporate elements that make the reporting of location data more attractive to the end users. The utilization of a survey will not only improve the end user (fishermen) experience by soliciting feedback about what works best at sea and how they would like to view and use those data, but also promote buy-in from industry via involvement in the process. Ultimately the results of this project should foster more flexible management strategies that benefit fishing practices by allowing fishermen to operate more effectively and efficiently. Upon success, the results from this effort would make VMS programs more accessible to all partners and location tracking management programs possible. This type of management strategy is particularly valuable for stock assessments that are spatially refined, such as those used for menhaden, black sea bass, tautog, and proposed for striped bass. A spatiotemporally explicit catch reporting system will allow for easier adjustment of catch information into discrete spatial units, thus precluding the need for some of the assumptions currently being used for these more progressive assessments. Additionally, the availability of this type of spatially defined catch and effort information could allow for other population assessments to progress to more spatially refined structures, thus improving the stock assessment enterprise as a whole. Managers, harvesters, and various stakeholders may also find utility in aggregated tracking data in relationship to proposed ocean uses such as offshore renewable energy development and aquaculture. While Phase 2 of this project does not intend to make harvester's personal tracks available for use by the public, the value of these data is apparent.

The collaboration during Phase 1 between two state partners highlighted the varying data needs of each. By utilizing the new technology on the market and expanding an avenue of integrated reporting, this project will open new methods for real-time data collection and utilization by all state partners. This project emphasizes partner collaboration and developing a product that can be used by any single partner, particularly for inshore fisheries. This will include discussions with NOAA Fisheries and OLE and build upon any advances that occur prior to Phase 2. A cost

analysis of tested VMS hardware and the resulting applications will be updated with new devices for any partner interested in implementing a VMS program at the conclusion of the project to aid in regulatory decision-making processes.

Although this project does not include any objectives directly tied to law enforcement, refinement of the ACCSP administrative viewer could potentially be adapted for law enforcement needs. As an example, Rhode Island OLE is currently utilizing cellular VMS trackers to aid in the enforcement of a pilot program involving weekly landing limits. Any developments made expressly for law enforcement would require partnership with OLE. It is anticipated that a “Phase 3” would follow the completion of this project. A Phase 3 would be smaller in scope but would include development on the scoped interface from Phase 2 (see section titled *Development and Scoping of Administrative Application* below) and potentially involve collaboration with ACCSP to further enhance data processing and visualization for law enforcement needs.

#### **Data Delivery Plan:**

All data will be stored at ACCSP following the same protocols as Phase 1. Tracks from completed trips, along with real time locations, will be pulled via API into ACCSP tables. Authorization schemes at the application and database level ensure that administrators only have access to location data under their jurisdiction. Tables are accessed through applications in the SMS portal, and data will be available to export in multiple formats. Database connections would also be available to pull trip location data directly into partner systems.

#### **Approach:**

Phase 1 of this project highlighted the need to further develop several concepts to improve the end user experience, improve the manager/data consumer capabilities, and to better assimilate new devices or further enhancements. Additionally, clearly defining the relationship between federal VMS and the piloted devices and programs as well as providing detailed cost analyses will be critical to the launch of any state-managed VMS data collection program. Phase 2 of this project plans to deploy VMS devices on ten fishing vessels. In an effort to increase participation in the project, participating fishermen will be rewarded with a gift card and entry into a lottery to win a larger prize. The approach to each objective is outlined here:

#### *New Devices:*

This is a rapidly expanding market and new companies are launched often. To date, two additional devices have been identified and are proposed to add to the eTRIPS mobile tracking version in Phase 2: Particle and SkyMate. These devices will be tested in the field and the ability to merge VMS data from each with eTRIPS trip reporting determined. It should be noted that as part of this project a set of requirements for devices to meet ACCSP standards will be developed,



thus negating the necessity to test new devices as they are released in the future (see section *Requirements Document for New Devices* for more detail).

1. Particle, <https://www.particle.io/>

These devices have been initially tested in Maine and are currently being incorporated into the VESL application designed to act similarly to the Phase 1 eTRIPS mobile application.

*Hardware:* While Particle offers several available tracking devices, the Tracker One unit offers the most 'out-of-the-box' options for this program. These devices are an extremely low-cost option (~\$160).

*Service:* Based on a ping rate of one minute, each individual Tracker One device qualifies under Particle's 'free tier', meaning there is no monthly or annual fee for data usage.

*Connection Type:* Particle provides an open-source online platform that requires advanced programming but is capable of being designed to fit specific projects. Based on initial work conducted in Maine, connection between Particle's API and eTRIPS/SAFIS should be feasible.

2. SkyMate, <https://www.skymate.website/vms-index>

This is a satellite-based company but has launched a lower cost device that aligns with the cellular models previously tested.

*Hardware:* SkyMate is providing two hardware options. Both utilize satellite transmission and have Bluetooth built in. The first option is the m1600 ([details here](#)), and the current cost of this device is \$1,399. However, they will be launching a newer, low cost, coastal product due out in the Spring of 2022. This is slated to be half the price of the m1600, approximately \$700.

*Service:* The base fee is \$15 per month. There are no additional charges for data sent to eTRIPS mobile via Bluetooth to then be forwarded to the ACCSP. There is an additional \$0.50 charge per hour of data (1 minute recording frequency) for any data sent via satellite.

*Connection Type:* SkyMate is proposing to allow the transmission of trip data points via a Bluetooth connection to the eTRIPS mobile device that is connected to the SkyMate VMS unit. With this method, the captain would be able to later utilize the WiFi on their eTRIPS device to submit the trip and location data. Since there would be no data transmission via satellite, only the base fee of \$15 per month would apply. The proposal

includes costs for the satellite transmission for testing purposes and to clearly document the process for using this device.

#### *Requirements Document for New Devices and Comparison to Federal Requirements*

As this market is expanding rapidly, the requirements for cellular-based VMS devices to be added to the eTRIPS mobile platform and SAFIS data repository will need to be clearly documented. Phase 2 will concentrate on identifying those needs for transmission of data to the ACCSP and, in collaboration with the ACCSP data team, developing a standardized approval process for new devices or updates in the future without the need for further funding resources. Additionally, this effort is critical for the centralized administrative application (another objective of this proposal) to be successful. These requirements will ensure the accurate and timely ingestion of data from the VMS device to the SAFIS administrative application. This requirements document will be available through ACCSP for any interested companies moving forward.

This process will also be compared to the existing OLE VMS requirements documents, with a focus on the Greater Atlantic Region (GARFO), to determine how the cell-based devices and the requirements set forth for ACCSP compare to the existing satellite VMS requirements. Furthermore, there are ongoing discussions in the Northeast region regarding integration of cost-effective cell-based tracking into the federal lobster fishery. These discussions may result in a federal rule making process that advances this effort prior to the initiation of Phase 2. This project will build on any results from these discussions (contingent upon those discussions occurring) and expand upon the requirements needed to run a successful, integrated, federal, non-federal, or hybrid VMS data collection program. This comparison will be made available to any interested parties, but particularly to managers who are looking to implement a vessel tracking program. This type of analysis will be valuable to those considering all options and what is specifically required of each.

This proposal does not intend to address the potential issue of certain vessels being regulatorily required to have both a traditional satellite VMS device as well as a cellular VMS device, but will provide comparisons of federally approved VMS devices and cellular units. These comparisons will assist managers when evaluating the costs of adding a secondary VMS unit to a vessel. This is a discussion being held at both the ASMFC and at the federal level. Because proposed lobster tracking requirements (ping rate) exceed the current capabilities of satellite VMS units or are cost prohibitive, it is possible that multi-permitted vessels will require two separate VMS devices.

### *Satellite Versus Cellular Costs Summary*

Phase 2 proposes to update the evaluation of costs and technical specifications associated with a variety of options that was completed in Phase 1. All currently approved NOAA GARFO VMS devices will also be included in the cost/specification analysis to provide side-by-side detail for ACCSP, NOAA Fisheries, and managers. Lastly, this is a rapidly expanding market and new companies are launched often. To date, two additional devices have been identified to test in Phase 2: SkyMate and Particle and upon successful testing will be added to the summary. Devices tested in Phase 1 will have cost summaries updated based on any new pricing structures implemented since the completion of Phase 1.

### *Further Application Enhancements*

Partners electing to use these VMS systems will need to know the costs associated with and utility of the implementation of the various options for management programs, as well as understand the economic impact on individual fishing practices. These types of management programs can be quite diverse and often are tailored to meet a specific need. For example, in Rhode Island the VMS and trip data is desired to track trips associated with a weekly aggregate landing programming while in Massachusetts the VMS are desired for allowing fishing to take place in state managed environmentally sensitive habitats. During Phase 1, it was determined that geofencing, including the potential for interactive alerts with captains, would be feasible with further development and is critical to application success. Further development is necessary to determine functionality outside of cell range and in what capacity geofencing might be limited. Regardless of distance from shore limitations though, geofencing will have many inshore applications specifically involving identification of ports and the ability to reduce ping rates while docked or identifying sensitive habitat areas. A review of the existing capabilities, limitations of each platform, each device's requirements to implement such features, and testing of enhancements on each device will be conducted during Phase 2.

### *Development and Scoping of Administrative Application*

Initial development occurred on a viewer for post-hoc track analysis (e.g., multiple trip patterns, vessel speed, harvesting locations) during Phase 1. The current application does not display real-time vessel tracking information and has limited functionality for submitted VMS data. Phase 2 intends to enhance this existing application. At a minimum, the expanded existing viewer would be able to display all completed tracks from a given vessel over a specified time period, provide information pertaining to the vessel submitting those data, and provide basic metrics regarding specific trips (e.g., vessel speed) with the opportunity to download data for further analysis.

While the expanded track viewer will allow basic data queries and provide managers a starting point for post-hoc analysis, there is a need for a dedicated and robust real-time track viewer and post-hoc analysis tool. Development of an ACCSP web-hosted administrative application allowing for both real-time view of vessel location and post-hoc analysis is required for the

spatial analysis necessary to manage discreet fishing management areas. Furthermore, non-trip tracking data storage and viewing is essential for management. This may involve changes to the API which delivers track data to ACCSP, or to merge the API from the earlier MA-ME tracking project with the API from Phase 1 to acquire such data. The best available service needed to host such a platform will be scoped through discussions with the ACCSP Spatial Coordination sub-committee, ACCSP, Harborlight, and project partner agencies. ArcGIS Online (AGOL) will be explored as a host platform as well as within the SAFIS application itself. Baseline requirements will be defined as will a path forward for feature enhancements to produce output that can be used by partners for data analysis. Phase 2 proposes to scope what this application would look like and how it would functionally be developed and hosted. However, actual development of this advanced application would not occur under this Phase 2 funding.

This objective is perhaps the most time and work intensive piece of the project for ACCSP staff. This commitment is addressed in the accompanying memo from ACCSP.

#### *Industry Survey*

Lastly, industry members will be surveyed for input on various interface topics including but not limited to the utility of track data in their SAFIS account, ease of linking devices, installation of devices, and more. Participants will be identified by each partner for the survey and include those who participated in testing previously as well as others who have interest in the project. By including some funds for fishermen incentives in this project budget, we are also improving the success rate of obtaining volunteers and promoting participation in surveys conducted throughout this project.

#### **Geographic Location:**

Inshore waters surrounding Massachusetts and Rhode Island.

**Milestone Schedule:**

The milestone schedule is based on the starting month of the project as month “1.”

Task	Month												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Complete requirements gathering	X	X											
Acquire new device APIs	X	X											
Acquire new devices and plans		X											
Program new devices to eTRIPS mobile			X	X	X	X	X	X	X	X	X		
Test new devices and all enhancements				X	X	X	X	X	X	X	X	X	
Identify requirements for new devices				X	X	X	X	X	X	X	X		
Federal VMS comparison effort							X	X	X	X	X		
Geofencing enhancement	X	X	X	X	X	X	X	X	X	X	X	X	
Track Viewer scoping/development	X	X	X	X	X	X	X	X	X	X	X	X	
Industry survey	X	X	X										
Report writing						X	X					X	X

**Project Accomplishments Measurement:**

<b>Project Goal</b>	<b>Measure of Accomplishment</b>
Evaluate functionality of additional VMS devices not tested in Phase 1.	Report identifying functionality, benefits, and problems associated with each device.
Develop strawman requirements for future cellular and/or low-cost satellite VMS devices to meet ACCSP standards for integration into the program.	Publish a requirements document for new devices to be added to the eTRIPS mobile vessel tracker program.
Analyze approval procedures for federal VMS products in light of new inshore cellular options and pending lobster/Jonah crab fishery regulations. Compare approval procedures for federal VMS products to strawman ACCSP requirements developed for this project.	Include in the report a comparison to existing marketed federal VMS options and note how the new products would fair in the federal approval process.
Produce an updated comparative cost and technical specification analysis of available cellular VMS devices and data plans as well as all NOAA GARFO approved VMS devices.	Report identifying costs of all tested VMS products and federal counterparts.
Investigate enhancements to current program capabilities for specific use cases of geofencing and track line post-hoc analysis, and document process to add further use cases and/or additional enhancements after project completion.	Documented results for geofencing use cases such as port identification and closed area crossings as well as how to request feature enhancements moving forward.
Enhance the existing administrative tool and scope requirements to develop a tool to view tracks in real time and provide a platform for advanced post-hoc analysis.	Report comprehensive overview of technical requirements needed to support development of an enhanced administrative tool.
Conduct an informal survey of fishermen to solicit ideas for future improvements of program and end user needs.	Include in the report summarized, anonymous responses from survey highlighting repeated trends.

**Cost Summary:**

Description	Calculation	Funding Source				
		In-Kind		Requested from ACCSP		Admin Costs
		MADMF	RIDMF	MADMF	RIDMF	
<b>Personnel (a)</b>		<b>\$1,942.83</b>	<b>\$2,391.0</b>	<b>\$9,302.14</b>	<b>\$7,278.00</b>	<b>\$0.00</b>
Anna Webb (Env Analyst, MADMF)	5% of time @ 2 hrs/wk	\$1,942.83		\$1,942.83		
Nick Buchan (Env Analyst, MADMF)	10% of time @ 4 hrs/wk			\$7,359.31		
John Lake (Mar. Biologist, RIDMF)	3% of time @ 1 hr/wk		\$2,391.0			
Rich Balouskus (Mar. Biologist, RIDMF)	10% of time @ 3.5 hrs/wk				\$7,278.00	
<b>Fringe (b)</b>		<b>\$767.41</b>	<b>\$1,141.0</b>	<b>\$3,674.34</b>	<b>\$5,387.00</b>	<b>\$0.00</b>
37.53% MA Fringe rate	Applied to A. Webb's salary	\$729.14		\$729.14		
37.53% MA Fringe rate	Applied to N. Buchan's salary			\$2,761.95		
1.97% MA Payroll rate	Applied to A. Webb's salary	\$38.27		\$38.27		
1.97% MA Payroll rate	Applied to N. Buchan's salary			\$144.98		
RI Fringe rate	Applied to J. Lake's salary		\$1,141.0			
RI Fringe rate	Applied to R. Balouskus salary				\$5,387.00	
<b>Supplies (c)</b>		<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$5,186.96</b>
SkyMate units	3 Units @ \$700 per unit					\$2,100.00
Particle units	3 Units @ \$159.99 + Shipping @ \$6.99					\$486.96
Fishermen Incentives	Estimated 10 \$200 gift cards + 1 lottery incentive					\$2,500.00
Shipping costs	Estimated shipping to partners					\$100.00
<b>Contractual (d)</b>		<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$50,000.0</b>
Harborlight Software	Development 215 hours @\$170/hour = \$36,550 QA and Test 107.6 hours @\$50/hour = \$5,350 Project Management 54 hours @150/hour = \$8,100					\$50,000.0
<b>Other (all divided evenly amongst partners) (e)</b>		<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$640.00</b>
SkyMate data cost	3 devices at \$15/month for one year					\$540.00
SkyMate satellite cost	200 hours at \$0.50 per hour					\$100.00
Particle plan data cost	No data cost with this company; using free tier					\$0
<b>Total Direct Charges</b>		<b>\$2,710.24</b>	<b>\$3,532.0</b>	<b>\$12,976.48</b>	<b>\$12,665.0</b>	<b>\$55,826.96</b>

Description	Calculation	Funding Source				
		In-Kind		Requested from ACCSP		
		MADMF	RIDMF	MADMF	RIDMF	Admin Costs
<b>Total Direct Charges (repeated from previous page)</b>		<b>\$2,710.24</b>	<b>\$3,532.0</b>	<b>\$12,976.48</b>	<b>\$12,665.0</b>	<b>\$55,826.96</b>
<b>Indirect Charges (f)</b>		<b>\$481.63</b>	<b>\$689.00</b>	<b>\$2,306.00</b>	<b>\$2,470.00</b>	<b>\$0.00</b>
24.79% MA Indirect	Applied to A. Webb salary only	\$481.63		\$481.63		
24.79% MA Indirect	Applied to N. Buchan salary only			\$1,824.37		
19.5% RI Indirect	Applied to J. Lake's salary		\$689.00			
19.5% RI Indirect	Applied to R. Balouskus salary				\$2,470.00	
<b>Totals</b>		<b>\$3,191.87</b>	<b>\$4,221.0</b>	<b>\$15,282.48</b>	<b>\$15,135.0</b>	<b>\$55,826.96</b>
<b>Total Project Cost</b>		<b>\$93,657.31</b>				
<b>In-kind versus Direct Percent Contribution</b>		<b>7.91%</b>		<b>92.09%</b>		
<b>Requested Amount</b>		<b>\$86,244.44</b>				



**Cost Details:**

- a. Personnel (\$16,580.14 Requested; \$4,333.83 Match)** MA DMF will use a small portion of co-PI Anna Webb's salary as match for this application. Her CV is attached. J. Lake will provide in-kind support from RI. The remaining salary is requested from ACCSP.
- b. Fringe (\$9,061.34 Requested; \$1,908.41 Match)** MA DMF will provide matching funds to cover fringe and payroll expenses associated with A. Webb's match salary. MA DMF's fringe rate of 37.53% includes the costs for Group Insurance, Retirement, and Terminal Leave. MA DMF's payroll rate of 1.97% includes the costs of Unemployment Insurance, Employer Medical Assistance Contribution, Medicare Tax, and Paid Family Medical Leave. RI will provide matching funds to cover fringe for expenses associated with J. Lake's match salary. All remaining fringe costs are requested from ACCSP.
- c. Equipment/Supplies (\$5,186.96 Requested; \$0 Match)** All equipment/supplies costs for devices, fishermen incentives, and shipping is requested from ACCSP. Three of each device type is requested; one of each device will be used by MA, RI, and Harborlight for testing. For incentives, participation in the trials will be rewarded with gift cards and a lottery for a larger incentive will be used to encourage survey participation. **Devices will be moved among vessels during the testing phase to accommodate more participation.**
- d. Contractual (\$50,000.00 Requested; \$0 Match)** Software development costs for Harbor Light Software, Inc. will be \$50,000 **and includes project management, development, and QA/testing costs.** This covers enhancements to eTRIPS mobile to integrate with the Particle and Skymate VMS devices to retrieval of device-specific GPS data, and upload that data to SAFIS. It additionally covers enhancements to geofencing functionality and to eTRIPS based on extended user experience in the field. These costs are based on development experience with existing devices, with consideration that the two new devices present unique approaches to accessing location data that were not offered by Phase 1 devices.
- e. Other (\$640.00 Requested; \$0 Match)** The data plan/contract costs for the devices are requested from ACCSP. This includes the cost of transmitting the data at designated ping rates.
- f. Indirect Charges (\$4,776.00 Requested; \$1,170.63 Match)** MA DMF will provide matching funds to cover the indirect costs associated with A. Webb's match salary. MA DMF has a federally-negotiated indirect rate of 24.79%. RIDMF's indirect rate is 19.5% on salary plus fringe. All remaining indirect costs are requested from ACCSP.

## Summary of Proposal for Ranking Purposes

Proposal Type: *New Project*

### Primary Program Priority:

**Catch and Effort:** This proposal focuses on enhancements to the collection and integration of positional data with catch and effort data already collected through SAFIS applications.

**Data Delivery Plan:** See outline on page 6.

### Project Quality Factors:

#### **Multi-Partner/Regional impact including broad applications:**

This is a joint project between two Northeast partners. The results will be directly applicable to any partner interested in developing a location monitoring program in inshore waters, and the cost analysis in the final report will aid further management decisions both by the principal investigator's agencies and any interested partner.

#### **Contains funding transition plan/defined end-point:**

This is a one-year project with a defined end goal. The goal is to enhance the existing product to better serve both managers and fishermen, produce documentation regarding implementing a cell-based VMS data collection program, and to scope the requirements for a real-time VMS administrative tool.

**In-kind contribution:** Please see the costs table on page 14.

#### **Improvement in data quality/quantity/timeliness:**

Further integrating positional data into catch and effort reporting is another step towards implementation of a comprehensive spatiotemporal data collection program. Testing new VMS devices and the ability to integrate with eTRIPS mobile expands the options for such data collection.

#### **Potential secondary module as a by-product:**

**Social and Economic:** Integration of VMS and electronic reporting will help foster more progressive management strategies, which will help fishermen fish more efficiently while still making the programs enforceable. With the increasing presence of other ocean uses in recent years (e.g., renewable energy, aquaculture) in historically utilized commercial fishing areas, the ability to track spatiotemporal use with catch may be of interest to various commercial fishing stakeholders and management groups. The ability to geofence specific areas could allow fishermen access to areas that have competing uses, thus allowing them greater opportunities for their fishing businesses. Additionally, the comparative analysis across different VMS units will allow fishermen to make informed decisions on the type of unit that best meets their business needs and supports the management objective.

#### **Impact on stock assessment:**

Positional data at the trip level would be valuable for stock assessments, allowing the nuances of catch location to be observed and utilized in spatially refined models while introducing possibilities for more refined spatial analyses where current statistical reporting area demarcations are not sufficient to identify and monitor fishing activity within a given region.

## Appendix A: Curricula vitae for the principal investigators

### **Anna R. Webb**

30 Emerson Ave · Gloucester, MA 01930  
anna.webb@mass.gov · (978) 282-0308 x115

#### **EDUCATION:**

##### **Continuing Education:**

Intro to Computer Programming, University of Massachusetts, Lowell; Fall 2016  
Relational Database Concepts, University of Massachusetts, Lowell; Spring 2015  
SQL Programming, Hands-On Technology Transfer, Inc.; Fall 2014

##### **Graduate Education:**

Master's of Science Degree, Marine and Atmospheric Science, *Focus: Fisheries*, School of Marine and Atmospheric Sciences, Stony Brook University, August 2011  
Thesis title: *Understudied Species in Coastal U.S. Waters: Issues, Solutions, and Implications for Ecosystem-Based Fishery Management*

##### **Undergraduate Education:**

Bachelor of Science Degree, Marine Vertebrate Biology, Stony Brook University, May, 2007

#### **WORK EXPERIENCE:**

**Environmental Analyst**, Massachusetts Division of Marine Fisheries, Gloucester, MA  
November, 2015 - Present

##### **Ongoing Responsibilities:**

- Project leader for Division's Fisheries Statistics Project. Project is a six person team responsible for collecting, entering, and managing catch and effort data from commercial fishermen and landings data from seafood dealers in Massachusetts. Job duties also include managing ongoing federal grants as the principal investigator.
- Specifically oversee the harvester data collection, entry, quality control, and compliance for Massachusetts and provide outreach and technical support to harvesters submitting reports electronically through SAFIS or via paper.
- Provide support and oversight for dealer data collection, entry, quality control, and compliance, data requests from internal personnel, other partner agencies, and the public, and quota monitoring of various species.
- Lead point of contact for all swipe card technology and Atlantic Coastal Cooperative Statistics Program (ACCSP) related matters.
- Member of the Commercial Technical Committee, Past Chair of the Information Systems Committee, and Chair of the SAFIS Outreach Committee at the ACCSP.

**Program Coordinator**, Massachusetts Division of Marine Fisheries, Gloucester, MA  
April, 2014 – November, 2015

- Oversee the harvester data collection, entry, quality control, and compliance for Massachusetts
- Provide outreach and technical support to harvesters and dealers submitting reports electronically through SAFIS or via paper.
- Instituted the online video tutorial series for harvesters using SAFIS and a newsletter focusing on electronic reporting for dealers and harvesters.
- Participate in the swipe card dealer application project with ACCSP and Maine

Department of Marine Resources.

- Member of the Commercial Technical Committee, Vice Chair of the Information Systems Committee, and Chair of the SAFIS Outreach Committee at ACCSP.

**ACCSP Fishery Specialist (Coordinator)**, Rhode Island Division of Fish and Wildlife-Marine Fisheries Section, Jamestown, RI

April, 2012 – April, 2014

- Oversee SAFIS data entry and compliance by dealers, harvesters, and staff.
- Provide daily technical support to dealers and fishermen.
- Participate on the quota monitoring team to make decisions regarding seasonal closures and possession limit changes for summer flounder, black sea bass, tautog, bluefish, striped bass, scup, menhaden, and monkfish.
- Manage the research-set-aside program in Rhode Island.
- Write and submit progress and final reports for ACCSP grants.
- Provide data to staff and external users while monitoring confidentiality issues.
- Member of the Commercial Technical Committee, Vice Chair of the Information Systems Committee at ACCSP, Chair of the Data Warehouse Outreach Committee.

**Seasonal Field Technician**, New York State Department of Environmental Conservation, East Setauket, NY

June, 2011 – April, 2012

- Conduct seining surveys of juvenile striped bass in Western Long Island bays.
- Assisted with the monitoring of 35 fish pots in a Long Island Sound fishery-independent survey of tautog and a trawl survey of Peconic Bay, NY targeting juvenile finfish species.
- Participated in onboard sampling and measurement of recreational charter boat catch including local species such as summer flounder, black sea bass, and scup.
- Monitor and collect commercial striped bass fishery samples from local fish markets
- Press and age striped bass scales.
- Data entry: Cooperative Angler Program; Vessel trip reports into SAFIS.

**Research Technician**, Stony Brook University, Stony Brook, NY

March, 2007 – September, 2008

- Participated in hard clam restoration project in conjunction with The Nature Conservancy by analyzing gonad and general body condition of both sanctuary and native clams
- Collected and filtered seawater for chlorophyll and POC/PON content analysis
- Analyzed sediment cores for both POC/PON analysis and enumeration of benthic organisms
- Prepared all materials for both field sampling and laboratory testing

#### **SPECIAL SKILLS:**

- Relational database management including MS Access and Oracle based databases
- Data mining large datasets for repeating errors
- Proficient in SQL and Microsoft Office Suite, expert in Microsoft Excel
- Experience with R, GIS, HTML, Visual Basic

# Richard G. Balouskus

3 Fort Wetherill Rd · Jamestown, RI 02840  
Richard.Balouskus@dem.ri.gov · (401) 423-1924

## EDUCATION:

### Graduate Education:

Master's of Science Degree, Marine Biosciences, *College of Earth, Ocean, and Environment*,  
University of Delaware, 2011

Thesis: "*Macrofaunal utilization of intertidal fringing salt marsh and hardened shorelines*"

### Undergraduate Education:

Bachelor of Science Degree, Environmental Science, University of Vermont, 2005

## WORK EXPERIENCE:

**Principal Marine Biologist**, Rhode Island Division of Marine Fisheries, Jamestown, RI  
February, 2019 - Present

### *Ongoing Responsibilities:*

- Lead PI for the Rhode Island ventless fish pot survey. Collects monthly samples of structure oriented species in state waters. Performs data entry and analysis on collected biological samples; maintains project database. Conducts research with state partners.
- Lead PI for the Rhode Island winter flounder spawning stock survey. Conducts weekly fyke net surveys in RI coastal ponds in winter months. Maintains winter flounder tagging project conducted since 1999. Performs data entry and analysis on collected biological samples; maintains project database. Conducts research with state partners.
- Oversees the RI aggregate fluke and black sea bass pilot program. Performs extensive data analysis of fishing activity to determine efficacy of program. Works with harvesters to ensure compliance with VMS and reporting requirements.
- Member of the NEFMC Groundfish Planning Development Team
- Member of the ASMFC Winter Flounder Technical Committee

**Fisheries Biologist**, INSPIRE Environmental, Newport, RI

July, 2017 – February, 2019

- Developed protocol and secured funding for a hook and line survey to address concerns of federal and state agencies regarding locations of spawning cod aggregations on Cox Ledge with regards to offshore wind development.
- Served as chief scientist for research; responsible for procurement and maintenance of equipment, contracting and community engagement with vessels and anglers, dissection and assessment of collected cod, data analysis and reporting.
- Additional work includes assessment of sediment profile and plan view images to assess seafloor habitat characteristics.
- Preparation of proposals to private, federal, international, and NGO RFPs. Responsible for scoping and monitoring of project budgets through to completion and delivery of final products to clients.

**Project Manager**, Applied Science Associates (dbs RPS ASA), Wakefield, RI

April, 2011 – July, 2017

- Performed marine fisheries and coastal habitat research calculating injuries and reporting scientific findings for the DeepWater Horizon oil spill NRDA. Conducted analyses of large fisheries and environmental datasets.

- Developed novel methodologies for assessment of marine fish and invertebrate population dynamics.
- Project manager for development, application, and training of environmental risk assessment regarding oil and offshore wind development and operation in marine and coastal waters.
- Conducted risk assessments for coastal waters incorporating socioeconomic and ecological resources, including climate change planning.
- Preparation of proposals to private, federal, international, and NGO RFPs. Responsible for scoping and monitoring of project budgets through to completion and delivery of final products to clients.

**SPECIAL SKILLS:**

- Relational database management including MS Access
- Proficient in Microsoft Office Suite, R, and GIS
- Small boat handling including several safe boating courses



# Atlantic Coastal Cooperative Statistics Program

1050 N. Highland Street, Suite 200A-N | Arlington, VA 22201  
703.842.0780 | 703.842.0779 (fax) | [www.accsp.org](http://www.accsp.org)

**TO:** ACCSP Operations and Advisors Committee Members

**FROM:** Julie DeFilippi Simpson, ACCSP Deputy Director

**DATE:** June 10, 2021

**SUBJECT:** ACCSP Staff Workload for Proposed Project

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**Project Title:**

Integration of vessel monitoring systems and electronic reporting in SAFIS and SAFIS applications through API development and field testing of multiple hardware options: Phase 2

**Project Type:** New Project

**Principal Investigators:** Anna Webb (MADMF), Rich Balouskus (RIDMF)

**ACCSP Staff Workload Comments:** \*

One of the objectives of the project is to develop an enhanced administrative tool to view tracks in real time and provide a platform for advanced post-hoc analysis of spatial data. During the FY2020 project, ACCSP staff developed an APEX application for post-submission track viewing. The application provides tracks based on data points, with limited spatial analysis as attributes, and is integrated within the SAFIS management system. The data are available immediately after submission to the ACCSP unified API. SAFIS Administrators can select from dropdown lists of users, and trips submitted by those users along with a date range. Records representing unique pings are converted into Oracle geometries. Spatial analyses are then performed and connected with segments between each data point. Segments are then loaded into the map interface, and are color-coordinated according to custom speed bins. The application should not be considered a GIS, as users are not able to perform spatial analysis on their own, but will serve as the basis for achieving this objective during FY 2022.

The entirety of the technical work for achieving this objective will be done by ACCSP Data Team staff with spatial data skills. Partner agency staff have already proved to be willing and able to share ideas, codes, and approaches as possible to achieve efficiency through collaboration.

In order to develop an administrative tool that can support extensive spatial analyses, significant ACCSP staff time is required (500+ person-hours). This may involve ArcGIS Online integration with ACCSP's portal, or it may involve further development with the Google Map services. The staff workload for this proposal would be focused on a single member of the Data Team. The Data Team is structured in such a way as to be at least 2 people deep in almost all areas. As such, while the workload would be substantial, it could be spread over the entirety of the team through task sharing managed by the Data Team Lead. It is the opinion of the ACCSP leadership that this project is feasible.

\* Comments and opinions are based on evaluation of this project individually as opposed to all proposed projects as all projects have yet to be submitted.

*Our vision is to produce dependable and timely marine fishery statistics for Atlantic coast fisheries that are collected, processed, and disseminated according to common standards agreed upon by all program partners.*





Geoff White, Director  
Atlantic Coastal Cooperative Statistics Program  
1050 N. Highland Street, Suite 200 A-N  
Arlington, VA 22204

August 16, 2021

Dear Mr. White,

The Massachusetts Division of Marine Fisheries and the Rhode Island Division of Marine Fisheries, through partnership with Harborlight software, are pleased to resubmit the proposal titled “*Integration of vessel monitoring systems and electronic reporting in SAFIS and SAFIS applications through API development and field testing of multiple hardware options: Phase 2*” for your review. This letter documents the proposal PI’s responses to questions posed by the Operations Committee proposal review team. Where applicable this information has also been included in the text of the updated proposal document. The project team felt having direct responses to questions in one document may be helpful for further review.

**Question:** Proposal appears to be ‘maintenance’ as opposed to a ‘new’ project.

**Reply:** While the authors recognize the similarities to the Phase 1 pilot project, a significant change in scope of work is presented for Phase 2. The primary focus of this proposal is the development of an operable SAFIS backend for storage of tracking data and the creation of an administrative interface for viewing tracking data. The primary focus of “Phase 1” was determining if and how specific cellular devices could deliver tracking data to both eTrips and SAFIS. Phase 2 proposes` to build upon the baseline created during Phase 1 producing enhanced products and scoping additional features. Thus, this proposal is not considered a request for maintenance funding for the existing platform.

**Question:** Provide clarification whether vessels might be required to have two tracking devices (depending on fishing permits) running simultaneously on a single vessel.

**Reply:** This is a discussion being held at both the ASMFC and at the federal level. Because proposed lobster tracking requirements (ping rate) exceed the current capabilities of satellite VMS units and/or are cost prohibitive, it is possible that multi-permitted vessels will require two separate VMS devices under Addendum XXIX to Amendment 3. However, this proposal does



not intend to address this specific issue but will provide comparisons of federally approved VMS devices and cellular units. These comparisons will assist managers when evaluating the costs of adding a secondary VMS unit to a vessel.

**Question:** How would the regulatory requirement be handled beyond the state level?

**Reply:** This proposal does not intend to address specifics of how regulatory requirements would be implemented. The focus of this project is centered on data collection and uses by management. A multi-jurisdictional group discussion will be needed to address potential regulatory implementation of this project's tool. As an example, implementation of such a program in the federal lobster fishery will require data to be collected under ACFCMA, be transmitted to ACCSP for initial storage, then be transferred to NOAA OLE for enforcement purposes. Other regulatory impacts to such data collection should be determined through multi-jurisdictional discussions.

**Question:** How many vessels tested each platform in Phase 1? Across which species?

**Reply:** Significant difficulties in development and implementation of devices on commercial vessels were encountered during Phase 1 due to the COVID-19 pandemic. Five unique state vessels were used for testing across a range of environments including open ocean, nearshore bays, and inland coastal ponds. Implementation of devices on commercial vessels will proceed in the near future; species landed during test trips will be entirely dependent upon volunteers.

**Question:** Concerns were expressed regarding the cost to ACCSP to complete this project.

**Reply:** This project was designed in direct collaboration with ACCSP. Please see the provided memo (an attachment to this proposal) which highlights ACCSP's role and staffing abilities for this proposed work.

Sincerely,

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