



**Modification 002
to
Task Agreement P11AC90896 (formerly P11AT40625)
Cooperative Agreement Number P09AC00212 (formerly H4503090700)
between
United States Department of the Interior
National Park Service, Northeast Region
and
Stony Brook University**

PROJECT TITLE: Impact of Hurricane Sandy on the Fire Island National Seashore (FIIS) Water Quality and Seagrass Resources

CFDA Number: 15.945 - Cooperative Research and Training Programs – Resources of the National Park System

GENERAL: The purpose of this modification is to:

- a) Administratively change the Task Agreement number to reflect the new number of the Task Agreement as reflected in the NPS Financial and Business Management System (FBMS).
- b) Revise provisions under award and payment for the inclusion of use of the Automated Standard Application for Payments (ASAP) System.
- c) Add funds in FY2013 in accordance with the budget proposal in Attachment E.

MODIFICATION:

ARTICLE III – Term of Agreement

This Modification will extend the existing task agreement through September 30, 2016. The purpose of this extension is to assure completion of all products and deliverables associated with this agreement within a reasonable time frame. Data reduction, QA/QC, and report preparation and review require additional time beyond the original Task Agreement end date of September 2013.

ARTICLE IV – Key Officials/Key Personnel

The NPS Agreements Technical Representative (ATR) is changed to Charles Roman and the NPS Project Technical Contact will be Sara Stevens. All other Key Officials remain the same.

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ARTICLE V – Award and Payment is modified as follows;

NPS will provide funding to Stony Brook University in an amount not to exceed \$171,988 for work described in Attachment A. This Task Agreement may be modified to provide additional deliverables and funding in FY2014 and FY2015.

The chargeable appropriation for this Task Agreement is:

FY 2013 Appropriation Data: \$171,988.
WBS: PX.P0199992A.00.4
FA: PLCLISD5S.CN0000
CC: PPNENERO00

Task Agreement P11AT40625

FY 2011 \$34,571

Mod 001-FY2012 \$35, 437

Total Federal Funds awarded to date under this Task Agreement: \$241,996.

This task agreement may be modified to provide additional funding in additional fiscal years subject to the availability of funds and upon NPS approval of annual work plans and budgets.

Stony Brook University shall request payment in accordance with the following:

1. **Method of Payment.** Payment will be made by advance and/or reimbursement through the Department of Treasury's ASAP system.
2. **Requesting Advances.** Requests for advances must be made submitted via the ASAP system. Requests may be submitted as frequently as required to meet the needs of the Cooperator/Recipient to disburse funds for the Federal share of project costs. If feasible, each request should be timed so that payment is

received on the same day that the funds are dispersed for direct project costs and/or the proportionate share of any allowable indirect costs. If same-day transfers are not feasible, advance payments must be as close to actual disbursements as administratively feasible.

3. **Requesting Reimbursement.** Requests for reimbursements must be submitted via the ASAP system. Requests for reimbursement should coincide with normal billing patterns. Each request must be limited to the amount of disbursements made for the Federal share of direct project costs and the proportionate share of allowable indirect costs incurred during that billing period.
4. **Adjusting payment requests for available cash.** Funds that are available from repayments to, and interest earned on, a revolving fund, program income, rebates, refunds, contract settlements, audit recoveries, credits, discounts, and interest earned on any of those funds must be disbursed before requesting additional cash payments.
5. **Bank Accounts.** All payments are made through electronic funds transfer to the bank account identified in the U.S Treasury ASAP system by the Cooperator/Recipient.
6. **Supporting Documents and Agency Approval of Payments.** Additional supporting documentation and prior Agency (NPS) approval of payments may be required when/if a Cooperator/Recipient is determined to be “high risk” or has performance issues. If prior Agency payment approval is in effect for an award, the ASAP system will notify the Cooperator/Recipient when they submit a request for payment. The Cooperator/Recipient must then notify the NPS Awarding Officer identified on the Assistance Agreement that a payment request has been submitted. The NPS Awarding Officer may request additional information from the Cooperator/Recipient to support the payment request prior to approving the release of funds, as deemed necessary. The Cooperator/Recipient is required to comply with these requests. Supporting documents may include invoices, copies of contracts, vendor quotes, and other expenditure explanations that justify the reimbursement requests.

ARTICLE VI – REPORTS, RECORDS AND DELIVERABLES:

B: What and When to Submit – The recipient will submit to the NPS the following reports at the specified times:

1. Annual Progress Report due February 3, 2014 - The progress report will include:
 - (a) Summary analysis of all of the Fire Island National Seashore spatial and continuous water quality monitoring data, the seagrass condition monitoring data collected and the rapid spatial seagrass assessment;
 - (b) All data sheets and associated metadata for data collected summer 2013;
 - (c) A summary of overall progress on the work plan;
 - (d) Any problems or favorable or unfavorable developments;
 - (e) Other information pertinent to this Agreement and associated water quality and seagrass monitoring.

2. Draft Final Report due February 2, 2015-The draft final report will include:
 - (a) Trend analysis of all collected monitoring data and summary statistics combined, including a trend analysis for the water quality metrics from the spatial surveys, the high resolution seagrass monitoring site and for the rapid seagrass spatial survey for all years segregated in a pre-post breach comparison. The final report will also include a discussion on the possible effects of Hurricane Sandy and the subsequent breach on water quality and seagrass resources in Great South Bay and FIIS;
 - (b) Data sheets and associated metadata for data collected during the summer of 2014;
3. Final Report due April 1, 2015 following peer review and revision based on comments
4. Final Data, Data Sheets and Metadata due April 1, 2015 based on the following:
 - (a) The cooperator will be responsible for all data reduction and data quality assurance and control for both the continual and spatial water quality and seagrass data collected. All data reduction will follow the appropriate SOPs outlined in “Monitoring Protocols for the National Park Service Northeast Region Coastal Parks: Estuarine Nutrient Enrichment.” In addition, all data, after reduction and quality assurance, will be archived electronically and delivered to the NPS in a MicroSoft® Access™ -based template, called NPSTORET. The database will be delivered to the NPS with the final report.
 - (b) In addition to the electronic data files, metadata for all spatial and non-spatial data describing the history of where, when and why the data were collected, who collected the data and the methods used to collect and process the data will be provided with the final report

ARTICLE VII – Attachments

The following documents are attached and made a part of this Task Agreement:

- E. The Stony Brook University proposal entitled “Impact of Hurricane Sandy on the Fire Island National Seashore (FIIS) Water Quality and Seagrass Resources”

All other terms and conditions remain unchanged.

ARTICLE VIII – Signatures

IN WITNESS WHEREOF, the parties hereto have executed this Task Agreement on the date(s) set forth below.

FOR STONY BROOK UNIVERSITY

Director, Office of Sponsored Programs

Date

FOR THE NATIONAL PARK SERVICE

Agreements Officer

Date

ATTACHMENT E – Stony Brook University Study Proposal/Scope of Work

Impact of Hurricane Sandy on the Fire Island National Seashore (FIIS) Water Quality and Seagrass Resources

Bradley James Peterson

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2013-14 Scope of Work

This proposal is submitted to conduct the (1) spatial water quality monitoring for Fire Island National Seashore (FIIS), (2) to deploy, maintain and retrieve the continuous water quality sonde during the water quality index period, (3) to conduct the seagrass condition monitoring at permanent monitoring transects and (4) to conduct the rapid spatial seagrass assessment. These activities will be performed to quantify the impact that the breach through Fire Island is having on submerged aquatic vegetation within the boundaries of the FIIS.

Monitoring responses to changes in estuarine nutrient enrichment incorporates several spatial sampling designs to address questions at a hierarchy of scales. Vital signs related to estuarine water quality and sediments are sampled using a probability design throughout the boundaries of the Fire Island National Seashore submerged resources. For water quality vital signs, spatial sampling is coupled with continuous monitoring at a representative site. The seagrass vital signs will be assessed with both a large scale survey and an intensive monitoring of seagrass condition. The seagrass survey will be sampled using a probability design within the submerged park boundaries of Fire Island National Seashore. By combining small scale, coarse measurements of entire estuaries with large scale, high resolution measurements of selected areas, this mixture of sampling approaches and intensities enhances the likelihood of detecting changes in response to the breach through Fire Island.

1. Water Chemistry, Water Quality and Water Clarity at Fire Island National Seashore

We will conduct all field sampling and processing of water samples according to the standard operating procedures outlined in “Monitoring protocols for the National Park Service North Atlantic Coastal Parks: Estuarine Nutrient Enrichment.” Spatial sampling of estuarine water chemistry, water quality and water clarity will use a probability-based systematic survey design. The sampling framework for FIIS is a grid of tessellated hexagons that encompasses the entire submerged boundary of the park. This boundary contains 30 hexagons, and vital sign sampling will occur at a random location within each hexagon (Figure 1). The number of hexagons was determined based on the known spatial variability of vital sign measurements and the desired degree of change detection. The systematic survey of water column measurements will occur weekly during a four-week summer index period (July 2013 and 2014). Because the survey is probability based, it allows inferences to be drawn regarding the status of entire park submerged resources. In addition to this spatial survey, one station will be established for continuous

monitoring of water chemistry, water quality, and water clarity measures throughout the index period. This station will not be part of the probability design. The continuous monitoring station will be selected to be representative of the overall estuary. Continuous monitoring data will not be used

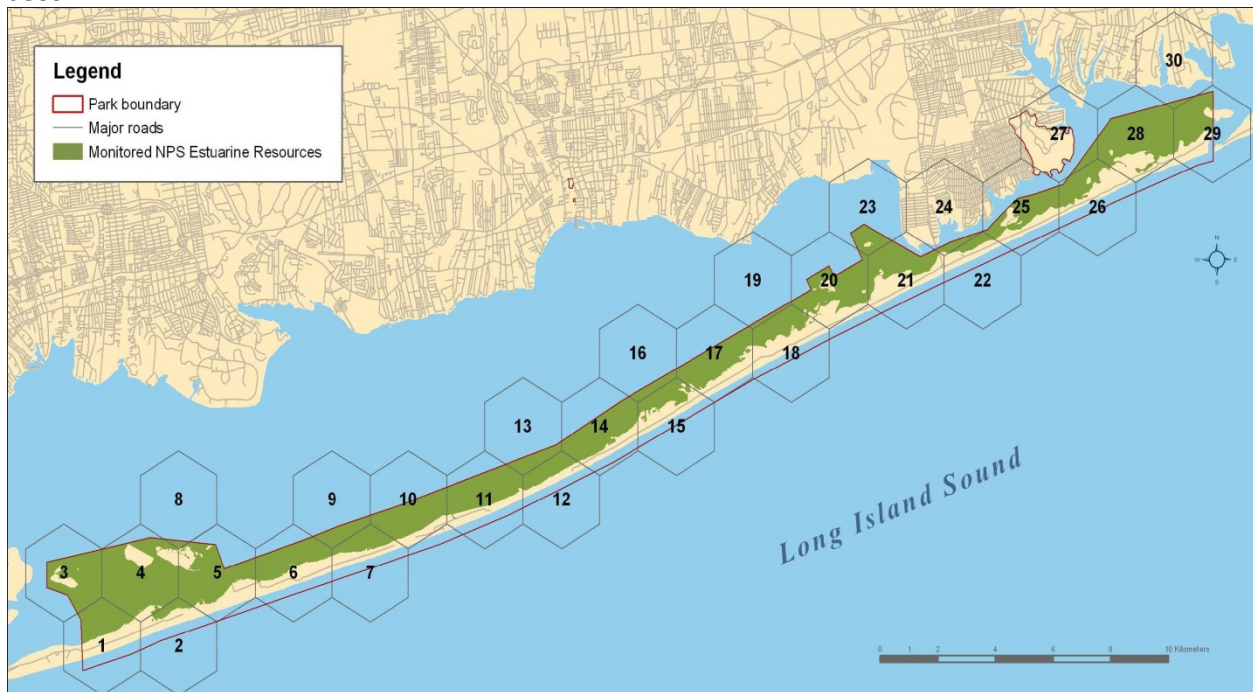


Figure 1. Water quality monitoring hexagons for FIIS

used to make inferences to other locations beyond the sampling stations. However, estuarine vital signs are known to exhibit a high degree of temporal variability, with important events occurring more frequently than weekly sampling may detect. Thus the continuous data are valuable in interpreting the patterns observed through systematic sampling. In addition, the previous records of continuous data from the index location will be compared to that of 2013 and 2014 to see if the recent breach has significantly impacted the water quality metrics at this site.

Estuarine water chemistry, estuarine water quality, and estuarine water clarity measurements will be made using the YSI 6600 multi-parameter water quality monitor (sonde) for spatial surveys and the complementary YSI 6600 EDS (extended deployment system) for continuous monitoring of dissolved oxygen, turbidity, chlorophyll a, salinity, and temperature. Attenuation of Photosynthetically Available Radiation (PAR) will similarly be monitored discretely and continuously using LiCor PAR sensors. Continuous monitoring of chlorophyll will be achieved using the YSI optical chlorophyll sensor. Data from this continuous record will be post calibrated against discrete water samples that are collected periodically throughout the monitoring period adjacent to the YSI sonde. These discrete samples will be filtered through glass fiber filters and analyzed for chlorophyll a by extractive methods. For spatial surveys, chlorophyll a is determined directly from near-surface water samples that are filtered and analyzed by extractive methods.

2. High Resolution Monitoring of Seagrass Condition at Fire Island National Seashore

High resolution seagrass monitoring will be incorporated in the Vital Signs protocol at the Fire Island National Seashore through the use of permanent-quadrat observations along three 50-m long transects that are stratified by depth. Sampling methods will be consistent with the global seagrass monitoring program SeagrassNet and include percent cover, shoot density, and canopy height within permanent quadrats, and plant biomass from small ($.0035\text{m}^2$) samples taken nearby. Quadrat sampling yields unbiased estimates of seagrass characteristics along each transect, and repeated measurements will be used to detect changes in seagrass characteristics over time at each transect depth. Differences in the rate of change between shallow and deeper transects may signal declining water quality. Various nondestructive methods of estimating seagrass biomass have been developed, including calibration of visual biomass estimates and predictions of biomass from percent cover measured directly or from photographs using image analysis. In areas with substantial depth gradients, eelgrass shoot morphology and bed structure varies considerably with depth, from dense, short (ca. 20-40 cm) shoots in shallow water to long (ca. 80-120 cm), relatively sparser shoots in deeper areas. We will supplement the SeagrassNet monitoring with more extensive biomass sampling coupled with measures of percent cover. This will be accomplished by measuring percent cover and then harvesting 30 - 0.0625m^2 quadrats for biomass measurement. Samples will be collected from a randomly selected location adjacent to permanent quadrats, so they will be distributed across the depth range of eelgrass in this system. During sample processing, we will measure the same characteristics of three large terminal shoots as were collected during the baywide survey: maximum leaf length, number of leaves, shoot widths, and canopy height. We will then use these data to generate predictive relationships between eelgrass biomass and explanatory variables.

Within-bed measures of seagrass condition, including percent cover, shoot density, canopy height, and areal biomass, will be sampled using a cluster sampling design stratified by depth zone. Seagrass responses to nutrient enrichment are typically detected first at the deepest locations of existing beds. Therefore, the sampling objective of seagrass condition monitoring will be to compare trends in seagrass characteristics between shallow and deep locations of existing habitat. This requires a much smaller sampling investment than would be required to describe an entire seagrass bed. One 50-m transect will be located within each of three depth zones (shallow, mid-depth, and deep) in a seagrass bed that is representative of Fire Island National Seashore seagrass habitat. Twelve sampling locations will then be randomly positioned along each transect. Sampling will occur within and adjacent to 0.25-m^2 plots, and plots in July 2013 and 2014. The location of the high resolution vital signs monitoring site is in close proximity to the breach. This offers an excellent opportunity to evaluate the impact of changing water quality (cooler water temperatures and higher light availability) as a result of the breach on submerged aquatic vegetation resources within the park.

3. Rapid Assessment of Large Scale Seagrass Abundance and Density

Great South Bay experienced a severe brown tide from May 2008 through Nov 2008. Due to the 40% loss of seagrass in the late 1980's resulting from a brown tide bloom, there has been considerable concern over the effect that this bloom may have had on seagrass resources in the bay. As a rapid spatial seagrass assessment was conducted for Fire Island National Seashore in 2007 and 2009, the park is able to assess the potential impact of the breach on submerged vegetation resources by conducting this rapid assessment in 2013 and 2014. Sampling will be conducted in July and August of both years near the time of maximum eelgrass leaf biomass in the region. A grid of smaller tessellated hexagons (200) will be used as the basis for selecting

seagrass sampling locations (Figure 2). The submerged boundary of the Fire Island National Seashore will be partitioned into these tessellated hexagons and a random sampling station selected in each hexagon. This approach combines the benefits of systematic and random

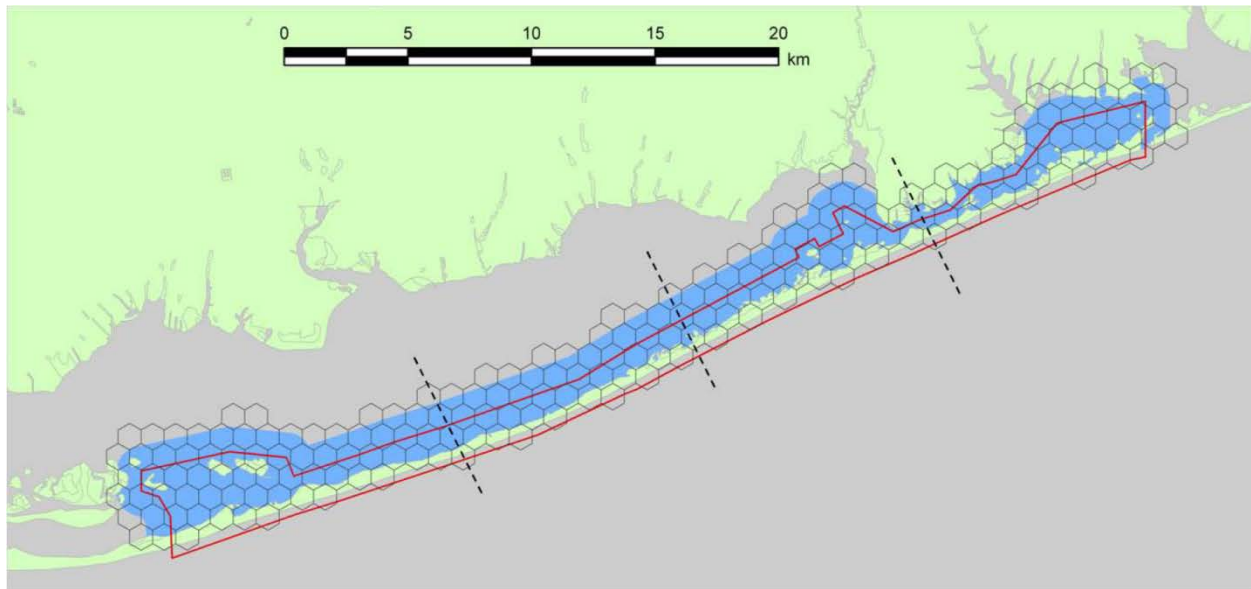


Figure 2. Hexagon sampling grid for the rapid seagrass survey at FIIS

sampling, so that sampling locations are distributed evenly across the area of interest, but all points in the bay still have equal probability of being sampled.

Surveying the entire study area demands rapid methods of data collection at individual sample sites. The time needed for seagrass sampling depends greatly on whether *in situ* observations and plant harvesting are required; sampling time is vastly reduced by avoiding both the need for observations by SCUBA or snorkel and for processing large quantities of plant material. We therefore selected monitoring variables with known relationships to seagrass ecosystem integrity that could be measured exclusively from a boat. Pre-selected random sampling stations will be located by GPS. Four sub-sampling points will then be selected at each station. The first sample will be taken at the GPS location. Subsequent points will be located every four meters along a 12-m transect running directly downwind of the station coordinates. At each sample point, we will measure eelgrass percent cover within a .25m² quadrat. Cover measurements will be made either by viewing the substrate through the water, using a viewscope, or using an underwater video camera mounted to a quadrat frame, depending on water depth. In addition, we will collect three large terminal eelgrass shoots at each sampling point using a rake on a telescoping handle or a throw rake. We will record the maximum leaf length, number of leaves, and width of each shoot, and the canopy height of the sample (height of 80% of the leaf material, ignoring the tallest 20% of the leaves). We will also record water depth at each point.

Deliverables

An annual report will be submitted (Feb 1, 2014) incorporating all of the Fire Island National Seashore spatial and continuous water quality monitoring data, the seagrass condition monitoring data collected and the rapid spatial seagrass assessment. In the second annual report (Feb 1,

2015), the same data will be provided as in year one. However, this annual report will include a Trend Report for the water quality metrics from the spatial surveys, the high resolution seagrass monitoring site and for the rapid seagrass spatial survey for all years segregated in a pre-post breach comparison. The second annual report (Feb 1 2015) will include a discussion on the possible effects of Hurricane Sandy and the subsequent breach on water quality and seagrass resources in Great South Bay and FIIS.

Peterson will be responsible for all data reduction and data quality assurance and control for both the continual and spatial water quality and seagrass data collected. All data reduction will follow the appropriate SOPs outlined in *“Monitoring Protocols for the National Park Service Northeast Region Coastal Parks: Estuarine Nutrient Enrichment.”* In addition, all data, after reduction and quality assurance, will be archived electronically and delivered to the NPS in a MicroSoft® Access™ -based template, called NPSTORET, which is patterned after the Natural Resource Data Template. The database will be delivered to the NPS with the annual reports. In addition to the electronic data files, metadata for all spatial and non-spatial data describing the history of where, when and why the data were collected, who collected the data and the methods used to collect and process the data will be provided with the final report. Prior to the submission of the final reports (2014 and 2015), an oral presentation will be made to park staff or other designees of the National Park Service and a draft final report will be circulated. Below is a timeline of project tasks including the anticipated dates of all deliverables.

D. PROJECT TIMELINE

[illegible]

Proposed Budget

A. Salaries and Wages		2013	2014
	Peterson	\$12,396	\$12,768
	Graduate student (FIIS water quality)	\$6,250	\$6,250
	Graduate student (FIIS seagrass spatial survey)	\$6,250	\$6,250
	Undergraduate assistant (water quality and spatial survey)	\$4,800	\$4,800
	Total	\$29,696	\$30,068
B. Fringe Benefits			
	Summer Fringe Benefits (17%)	\$2,107	\$2,171
	Grad Student Benefits (14.5%)	\$1,813	\$1,875
	Undergraduate Benefits (5%)	\$240	\$240
	Total	\$4,160	\$4,286
C. Equipment			
	6600V2 with DO, Chla, Turbidity, Temp, Salinity	\$22,000	
	PAR sensors with wipers for continuous sonde	\$11,000	
	Total	\$33,000	\$0
D. Travel			
	FIIS water quality monitoring	\$1,056	\$1,056
	FIIS seagrass spatial survey	\$1,568	\$1,568
	Total	\$2,624	\$2,624
E. Supplies and Expendable Equipment			
	FIIS water quality monitoring	\$7,110	\$2,500
	FIIS seagrass spatial survey	\$3,000	\$3,000
	Total	\$10,110	\$5,500
F. Other			
	FIIS water quality monitoring and SeagrassNet sites	\$5,560	\$5,560
	FIIS seagrass spatial survey	\$9,050	\$9,050
		\$14,610	\$14,610
	Total Direct Costs	\$94,200	\$57,087
	Total Indirect Costs (17.5%)	\$10,710	\$9,990
	Total Proposal Costs	\$104,910	\$67,078

Budget Justification (Total budget = \$171,988)

Salary and Wages (\$59,764)

The three elements of this project will require intensive field and lab work as well as data quality control and analysis. Therefore, the equivalent of 1.25 months of summer salary is requested for Peterson (\$12,396 Yr 1 and \$12,768 Yr 2) for his effort in this project. Salary has also been requested for 3 months of summer support for two graduate students (\$12,500) and one undergraduate research assistant project (\$4,800) each year. Peterson will have overall responsibility for the conduct of the project at Stony Brook University, for the supervision of project personnel and will have primary responsibilities for report preparation and documentation of results.

Fringe Benefits (\$8,446)

Fringe associated with this request is calculated at 17% for Peterson's summer salary support, 14.5% for the graduate student assistant in Yr1 and 15% in Yr 2 and 5% for the undergraduate research assistant in both years.

Equipment (\$33,000)

Funds are requested to purchase one YSI 6600v2 with copper-encased sensors for Turbidity, Chl a, pH and C/T, and a depth sensor rated to 61m. It also includes a copper sensor guard, copper tape, copper C/T sensor screen and C-Spray. In addition, funds are requested for two PAR sensors mounted with automatic wipers for the continuous sonde (\$11,000).

Travel (\$5,248)***FIIS Water Quality Monitoring*** (\$1,056 each year)

Funds are request to travel to and from the FIIS maintenance facility and the Southampton-Stony Brook campus. Ten (10) field days are scheduled to accomplish the water quality spatial survey and two (2) field days to conduct the sampling of the SeagrassNET site (Twelve round trips - 960 miles @ \$0.80/mi = \$768). In addition, travel funds are requested for two (2) trips to trailer a university boat to the FIIS maintenance facility and set-up the installation mechanism for the continuous water quality sonde and to dismantle the mechanism and return the boat to Stony Brook Southampton (160 miles @ \$1.80/mi = \$288).

FIIS seagrass spatial survey (\$1,568 each year)

Funds are request to travel to and from the Southampton-Stony Brook campus and the FIIS maintenance facility. Twenty (20) field days are scheduled to accomplish the seagrass spatial survey at the 200 sites within FIIS (20 round trips from Southampton, NY- 1600 miles @ \$0.80/mi = \$1,280). In addition, travel funds are requested for two (2) trips to trailer a university boat to the FIIS maintenance facility and return the boat to Stony Brook Southampton (160 miles @ \$1.80/mi = \$288).

Supplies and Expendable Equipment (\$15,610)***FIIS water quality monitoring*** (\$7,110 in Yr 1 and \$2,500 in Yr 2)

These funds will be used to purchase a Li-Cor 1400 data logger (\$1,750), Li-192 underwater quantum sensor (\$700), Li-190 quantum sensor (\$400), a 10m underwater cable (\$420) and a Millipore vacuum pump (\$840) as well as expendable supplies for the instrument calibration, instrument maintenance and field sampling such as chlorophyll and turbidity standards, antifouling paint, copper screen and tape for the sensors and materials needed to construct the housing for the permanent sonde in the field. In addition, funds are requested to purchase GF/F

filters, syringes, coolers, 1L polycarbonate bottles for the collection and filtration of Chl *a* from the spatial water quality monitoring. Finally, these funds will be used to purchase rope, floats, transect tapes, SCUBA tank fills, sample storage containers for the fixed SeagrassNET monitoring site in FIIS.

FIIS seagrass spatial survey (\$3,000 both years)

These funds will be used to purchase expendable supplies for the sample collection such as gear boxes, whirlpaks, batteries, digital camera, GPS, coolers, ice, float buckets, quadrats, telescoping rods, sorting trays, measuring sticks, expendable dive gear (snorkels, mask, fins, booties), foul weather gear, SCUBA tank fills.

Other (\$29,220)

FIIS Water Quality Monitoring (\$5,560 each year)

These funds will be used to pay for university vessel use (12 field days @ \$350/day = \$4,200) and to purchase fuel and oil (\$85/day * 12 days = \$1,020). In addition, funds are requested to cover hazardous shipping costs for the Chl *a* samples collected as part of the water quality protocol. These validation samples must be shipped overnight on dry ice (2 shipments @ \$120 = \$240). The remaining funds are requested for data storage material and office supplies used in the performance of this project (\$100).

FIIS seagrass spatial survey (\$9,050 each year)

These funds will be used to pay for university vessel use (20 field days @ \$350/day = \$7000) and to purchase fuel and oil (\$85/day * 20 days = \$1700). Funds are requested for data storage material and office supplies used in the performance of this project (\$350).

Indirect Costs (\$20,700)

The Indirect Costs rate is 17.5%