

Biannual Progress Review of Implementation of NOAA Fisheries
Electronic Technologies Policy
November 2016
Southeast Region

- *The number of FMPs with defined fishery-dependent data collection monitoring goals.*

There are 16 fishery management plans (FMPs) in the Southeast Region and all have defined fishery-dependent data collection monitoring goals. The Caribbean Fishery Management Council (Caribbean Council) has four FMPs, including Queen Conch, Spiny Lobster, Reef Fish, and Corals and Reef Associated Plants and Invertebrates (Coral). The Caribbean Council is in the process of developing three island based FMPs; the earliest implementation date would be in 2018. The Gulf of Mexico Fishery Management Council (Gulf Council) has six FMPs Coral, Red Drum, Shrimp, Reef Fish, Spiny Lobster, and Coastal Migratory Pelagics [CMP], and two FMPs (Spiny Lobster and CMP) are joint between the Gulf Council and South Atlantic Fishery Management Council (South Atlantic Council). The South Atlantic Council has eight FMPs Sargassum, Coral, Golden Crab, Shrimp, Snapper-Grouper, Dolphin Wahoo, Spiny Lobster, and CMP, which includes the two FMPs shared with the Gulf Council.

- *The number of FMPs reviewed to identify fisheries where the adoption of additional electronic technologies would be appropriate for achieving data needs.*

All 16 FMPs in the Southeast Region have recently been reviewed to identify fisheries where the adoption of additional electronic technologies would be appropriate. This review can be found in the *National Marine Fisheries Service Southeast Region Electronic Monitoring and Reporting Regional Implementation Plan*

at http://sero.nmfs.noaa.gov/sustainable_fisheries/documents/pdfs/em_er_implementation_plan_southeast.pdf and is summarized below. Additional electronic technologies are not likely needed for five FMPs in the Southeast Region including Coral (Caribbean), Coral (Gulf of Mexico [Gulf]), Coral (South Atlantic), Sargassum (South Atlantic), and Red Drum (Gulf).

Caribbean Council

For the Caribbean Council, three FMPs (Queen Conch, Spiny Lobster, Reef Fish) are suitable for adoption of electronic reporting technologies. The fourth (Coral) is not very suitable because the only fishing taking place within the context of that FMP is aquarium trade harvest, which is very small scale and primarily an activity conducted in state waters. However, electronic data reporting certainly is possible, but not likely needed.

Gulf Council

Two fisheries managed by the Gulf Council (red drum and coral) prohibit all harvest; thus, no monitoring, electronic or otherwise, is needed. Although a FMP (joint with the South Atlantic) exists for spiny lobster, most management occurs via the Florida Fish and Wildlife Conservation Commission.

Shrimp:

The shrimp fishery is completely commercial in federal waters. A random sample of commercial vessels (ca. 1/3 of the fleet) is equipped with electronic positioning devices, which is used to document effort. The units record vessel location every 10 minutes and transmit the data using cellular technology when in range. Vessel speed can be calculated and time spent deploying, fishing, recovering, and traveling. Catch and bycatch data are collected via port agents, an observer program, and surveys. The observer program samples less than 1% of all shrimp effort; however, the observer program has been in place since 1992 (voluntary), and mandatory since 2007; thus, a long-standing database exists regarding catch and bycatch. Given the high volume of catch in this trawl fishery, and the multitude of species involved, it would not be practicable to implement electronic (or paper) catch/bycatch reporting by the vessel/crew.

A 2012 Biological Opinion recommended that the National Marine Fisheries Service (NMFS) better assess the impacts of incidental take in fisheries. The Biological Opinion also indicated that NMFS must have a plan to increase observer effort for the shrimp trawl fishery in South and Southwest Florida where sawfish interactions are most likely to occur using standard observer protocols and/or using electronic monitoring. There is some observer coverage in Southwest Florida; however, electronic monitoring could serve as an alternative to observers for documenting sea turtle and sawfish interactions in the shrimp trawl fishery. Pilot testing with contracted shrimp trawl vessels occurred in 2014 and 2015 (**Table 1** - EM shrimp fishery). The EM system performed well in capturing video for a total of 109 hauls over 62 days at sea. The hardware held up for the duration of the trips with no water ingress to the deck components and there was only one significant gap that may have been caused by a system component malfunction. While no sawfish interactions took place during the recorded trips, the EM system was installed and configured to allow the capture video imagery of sufficient quality to allow data reviewers to clearly see catch as it was brought on board and to identify other small sharks. Despite some positive preliminary results, there is a need to further test this system and expand coverage to areas outside southwest Florida in order for implementation to occur. Based on the current information, it could be predicted that any proposal to Fishery Management councils to require the use of EM would be resisted due to the limited information available.

Reef Fish:

Commercial dealers are required to report electronically in the Gulf (**Table 2** - Dealer ER Costs). For the reef fish fishery, all commercial vessels are required to have an operational vessel monitoring system (VMS) unit that transmit a signal (typically once per hour) identifying the exact latitude and longitude of the vessel. Vessels are required to submit a declaration (hail-out) prior to departing port to report their targeted species and gear being used. In addition, all vessels participating in the two Gulf Individual Fishing Quota (IFQ) programs are required to submit pre-landing notifications 3 to 24 hours prior to landing that indicates the landing location, landing date/time, dealer, and estimated pounds to be landed in each share category through the VMS, IFQ website, or phone. IFQ participants are required to report landings through the IFQ website on the day of offload or within 96 hours of the pre-landing notification, whichever occurs sooner. For non-IFQ reef fish vessels electronic landings are reported through the dealers. The Gulf Council is considering some proposed changes that would require all vessels harvesting reef fish to submit a pre-landing notification identifying the landing location and landing date/time when harvesting non-IFQ species.

All commercial vessels are required to submit paper logbooks as a condition of their permit. This paper logbook could be replaced by electronic reporting requirements on a voluntary basis as early as next spring. A pilot study to test at-sea vessel electronic logbooks has been recently completed by the Southeast Fisheries Science Center (SEFSC). Reporting requirements for commercial vessels have been ground-truthed through an observer program. In addition, the Gulf of Mexico Reef Fish Shareholders Alliance, through a partnership with Ocean Conservancy and Mote Marine Laboratory, has installed camera-based electronic monitoring systems on seven vessels to test their ability to collect information on reef fish catch and discards. At the October 2016 meeting, the Gulf Council initiated an amendment to investigate requiring electronic reporting for commercial vessels.

For the recreational sector of the reef fish fishery, electronic reporting is required of headboats participating in the Southeast Regional Headboat Survey (SRHS), and the Gulf Council is currently developing an action to require similar electronic reporting by all for-hire vessels. This action, if implemented, would require trip level electronic reporting by all for-hire vessels for catch of both reef fish and CMP species. Current Gulf Council preferred alternatives include a hail out, a hail-in with reporting prior to arriving at the dock, and submission of fishing records to NMFS via NMFS approved hardware/software with minimum archived

GPS capabilities that provides the vessel position. A pilot study in the headboat sector, which was completed in 2015, utilized VMS to report and monitor catch. All vessels in this study were required to submit a declaration prior to departing port and to submit a pre-landing notification 1 hour prior to landing indicating landing location, landing date/time, and estimated fish retained. There is no electronic reporting by the private recreational component of the fishery, although the private recreational component has identified this as a need. Such a voluntary self-reporting system would need to be ground-truthed and validated through alternative cross sampling. The Marine Recreational Information Program (MRIP) randomly selects 10% of state and federally licensed charter vessels to report fishing effort each week. This is done through a telephone survey and may also be done through their new mail survey.

Joint Gulf Council and South Atlantic Council CMP:

Commercial dealers purchasing federally managed species are required to report electronically in the Gulf of Mexico and South Atlantic (**Table 2** - Dealer ER Costs). There is no electronic monitoring/reporting by commercial vessels in the CMP fishery, and implementing such a requirement might not be feasible. There is a paper logbook submission requirement, and the catches are sampled by port agent intercepts. Although there are some full-time professional king mackerel fishermen, mostly residing on the east coast of Florida, who fish in the Gulf of Mexico during open seasons, for Gulf of Mexico-based fishermen, king mackerel is not a full time occupation, as the various zones are only open seasonally. Many of these fishermen also participate in the reef fish fishery in the Gulf of Mexico and the snapper-grouper fishery in the South Atlantic, and if they are part of the IFQ programs, they do have VMS onboard. Non-IFQ fishermen have been very negative to implementation of an electronic reporting requirement. The Gulf and South Atlantic Councils are interested in electronic logbooks for the CMP commercial sector. Spanish mackerel is primarily caught in state waters, and cobia is frequently taken while targeting other species; thus, electronic reporting may not be desirable for these components of the CMP fishery.

In the recreational sector, mackerels are not necessarily a target species, but will be taken incidentally or targeted as an alternative species during a fishing trip. Headboats participating in SRHS may take mackerels or cobia, and as noted for the reef fish and snapper-grouper fisheries, these boats report electronically. Similarly, the remaining for-hire vessels will make catch of CMP species part of an overall fishing trip; electronic monitoring and reporting requirements are being developed by the Gulf and South Atlantic Councils (for more information see Gulf reef fish and South Atlantic Snapper-Grouper sections). For private anglers, electronic reporting requirements exist but have primarily focused on reef fish. As noted for reef fish, such voluntary self-reporting would need some sort of ground-truthing and validation.

South Atlantic Council

All harvest is prohibited for one fishery managed by the South Atlantic Council (coral), and there is no harvest occurring for Sargassum. Thus, no monitoring, electronic or otherwise, is needed for these FMPs. Although a FMP (joint with the Gulf of Mexico) exists for spiny lobster, most management occurs via the State of Florida.

Snapper-Grouper:

With the exception of electronic reporting for dealers (**Table 2** - Dealer ER Costs) and SRHS headboats, electronic reporting is not currently being done in other aspects of the snapper-grouper fishery. The South Atlantic Council is currently developing an action to require electronic logbooks in the for-hire and commercial sectors of the Snapper-Grouper, dolphin-wahoo, and CMP fisheries to improve assessments and data timeliness. There is a need to modernize the small wreckfish individual transferable quota program, which currently relies on paper-based coupons. Electronic reporting improvements are the primary priority for snapper-grouper, dolphin-wahoo and CMP in the South Atlantic, and there is an ongoing pilot study to test at-sea vessel electronic logbooks. Improvements and development of ER include: pilot testing and

developing electronic logbooks for commercial snapper-grouper, dolphin-wahoo, and CMP to obtain more timely and finer spatial resolution data; development and implementation of an electronic reporting system for federally permitted charter vessels; and adding wreckfish in the Southeast Regional Office Web-based catch share reporting system.

Golden Crab:

There are only 11 permitted vessels that participate in the golden crab fishery. Golden crab vessels are required to maintain logbooks, but there are often significant lags in data reporting and data entry. Data timeliness could be greatly improved and data entry costs could be reduced through implementation of electronic logbooks. Additionally, the South Atlantic Council is interested in exploring the use of trap gear pingers to differentiate trap locations from vessel location, as traps are often deployed near habitat areas of particular concern or other closed areas. Currently, the South Atlantic Council is not taking action to address golden crab electronic reporting or monitoring.

Shrimp:

Unlike the Gulf of Mexico, the use of electronic logbooks is not required in the South Atlantic shrimp fishery. Like the Gulf of Mexico shrimp fishery, expanded use of electronic monitoring may be warranted for the South Atlantic shrimp fishery. There are approximately 100 federally permitted vessels with limited access South Atlantic rock shrimp permits, and another 100 federally permitted vessels with open access rock shrimp permits that can shrimp off North Carolina and South Carolina. Rock shrimp vessels have been required to carry a VMS since 2003. The South Atlantic Council is interested in expanding the use of electronic monitoring to link location-specific catch and bycatch data to VMS data to better evaluate the impacts and trade-offs of spatial-area closures on shrimp harvest and coral protection. Currently, the South Atlantic Council is not taking action to require additional shrimp electronic reporting or monitoring requirements.

Dolphin-Wahoo:

Commercial fishers are required to report paper-based logbooks for dolphin-wahoo, while commercial dealers and headboats are required to report purchases and catches of dolphin-wahoo electronically on a weekly basis. Similar to snapper-grouper and CMP species, it is a priority to pilot test and develop electronic logbooks for the commercial sector to obtain more timely and finer spatial resolution data and to develop and implement an electronic reporting system for federally permitted charter vessels, in accordance with recommendations made by the Gulf of Mexico and South Atlantic Council's Technical Subcommittee. The for-hire electronic logbook would require reporting of dolphin-wahoo for all federally permitted for-hire vessels.

- *For fisheries where additional electronic technologies are identified as appropriate, the number of FMPs with electronic technologies incorporated into fishery-dependent data collection programs.* Five FMPs (Gulf Shrimp, Reef Fish, Snapper-Grouper, Dolphin-Wahoo, and CMP) in the Southeast Region currently have electronic technologies incorporated into fishery-dependent data collection programs.
- *Address progress at the fisheries level, i.e. the appropriate unit within a FMP that better reflects the application of electronic technologies. This might be sector, cooperative, or other unit with a FMP, as appropriate. For example, the plan for electronic monitoring implementation in the New England Multispecies Fishery is two sectors out of 17.*

Commercial electronic logbook

A coastal logbook is shared by the commercial sector of the Gulf of Mexico Reef Fish, South Atlantic Snapper-Grouper, South Atlantic Dolphin-Wahoo, and Joint Gulf of Mexico and South Atlantic CMP

fisheries. The Gulf and South Atlantic Councils are developing amendments to put electronic reporting in place for for-hire vessels for these fisheries in the Gulf of Mexico and South Atlantic, although the requirements for reporting may differ between regions. Electronic reporting improvements are the primary priority for these fisheries in the Gulf of Mexico and South Atlantic. A commercial pilot study to test at-sea vessel electronic logbooks has recently been completed by the SEFSC and the Gulf and South Atlantic Councils intend to develop an amendment to require electronic logbook reporting for these fisheries. Additionally, a catch-share system with electronic reporting requirements and VMS has been tested for headboats in the Gulf of Mexico in 2014-2015 and a National Fish and Wildlife Foundation funded project to test VMS electronic logbooks on up to 275 charter vessels began in 2016. An additional National Fish and Wildlife Foundation funded project to test electronic logbooks on vessels within Louisiana will begin in 2017.

The SEFSC conducted a pilot project testing the feasibility of electronic logbooks for several federally managed fisheries in North Carolina to Texas and for the Atlantic fishery for highly migratory species. SEFSC provided platforms (portable computers or tablets) for reporting by cooperating captains. Several private companies and one regional fisheries partner (Atlantic Coastal Cooperative Statistics Program [ACCSP]) provided reporting software for those platforms. The project demonstrated the feasibility of electronic reporting for multiple coastal and pelagic fisheries and provided vendors and SEFSC information on the utility of and modifications needed for future reporting systems. This pilot project was conducted with funds from FY13 through FY15 (**Table 3** - ER-log FY13-FY15). The results of this study resulted in the Gulf Council beginning an amendment to look at electronic logbook reporting for commercial vessels.

SEFSC will continue preparing for commercial electronic reporting by modifying federal databases to receive and manage the more detailed information to be received through electronic reports and working with our regional partner ACCSP, which will assist with data receipt and transfer (**Table 4** - ER-log FY16).

Commercial dealer electronic reporting

The SEFSC initiated monitoring annual catch limits (ACLs) using voluntary electronic reporting by dealers in 2011. Electronic dealer reporting became mandatory in 2014. The resulting systems have allowed the SEFSC to increase the number of ACLs monitored species from about 15 to more than 70 in 2016. Additionally the fraction of ACLs with substantial overages has been greatly reduced. This progress has been due to the combined efforts of SEFSC, Northeast Fisheries Science Center, Southeast Regional Office and our regional fisheries partners ACCSP and GulfFIN (**Table 2** - Dealer ER Costs). The capabilities of this system will be improved in 2016/2017 by refining the forecasting with statistical approaches, which may improve accuracy and will provide uncertainty about the estimates.

Commercial dockside sampling electronic data collection

The SEFSC is developing a system for automating data collection of commercial dockside samples using tablets and electronic measuring boards. The pilot version of the tablet application has recently been completed and communications between the tablet and the measuring board is being tested (**Table 5** - TIP sample data electronic recording). Once successful, the SEFSC would seek to deploy tablets and boards to federal samplers of commercial fisheries from Texas to North Carolina assuming that funds to purchase equipment can be obtained. In the long term, the SEFSC hopes to expand the communication capabilities of the tablets to addition devices such as electronic scales and perhaps barcode readers.

Observer electronic data collection

Data Transfer Application for Longline Monitoring Observer Program Database:

The NMFS-SEFSC has three programs that monitor catch and bycatch in longline vessels in the western North Atlantic. To reduce the time and resources needed between data collection and data entry, development of applications that facilitate the exchange of observer data between a remote version of the

database contained on a computer and the central database is needed. This would allow an observer to enter and transmit data while at-sea from a vessel with email capability, using either an existing VMS or satellite transmission, which can reduce costs. Real-time quota monitoring is the end goal, but currently not available due to the lack of electronic reporting capabilities in the observer program. In 2012, the SEFSC Panama City Laboratory awarded a contract to Elemental Methods, LLC to develop a computer application (IOS and Android platforms) integrating GPS and photographs using a tablet to enter data at-sea by observers. Initial testing found the screens did not load rapidly when the observer toggled among them limiting the speed of data entry. In addition, testing for iridium network for data transfer at sea has indicated that data transfer rate is insufficient. To fully implement this application, further development is continuing in 2016 with the application expanded to cover the gamut of longline observer programs in the southeast. The project objectives include (1) evaluate software/hardware options to overcome issues identified in prior work; (2) identify common variables between Southeast longline observer data collection protocols, and evaluate feasibility of creating a single application solution vs multiple application variants; (3) create application(s) designed to efficiently record information at sea, especially the relevant variables needed to support real time management and (4) test systems both in laboratory and field settings for ease of use, reliability, accuracy of data collection, and speed of data transfer.

Headboat electronic reporting

In 2012, the Southeast Region Headboat Survey received funding from the MRIP Operations Team to develop and implement an electronic reporting system capable of collecting catch and effort information from the South Atlantic and Gulf of Mexico headboat sector; *Survey-Wide Implementation of Electronic Logbook Reporting on Headboats Operating in the U.S. South Atlantic and Gulf of Mexico* (**Table 6 - SRHeLog**). The software development contract included the development and implementation of a Web-based portal and mobile application. On January 1, 2013, the Southeast Region Headboat electronic logbook (SRHeLog) was tested and implemented on 78 vessels from the South Atlantic region and 70 vessels from the Gulf of Mexico. The SRHeLog has streamlined the logbook reporting process and enabled the SRHS to provide landings estimates every two months; whereas, paper logbooks historically limited landings estimates to an annual basis. In 2014, the SRHeLog provided the capability to monitor and support the successful testing and completion of the Gulf of Mexico Headboat Collaborative Program (**Table 7 – SRHeLog**). This project assessed the feasibility of a catch share program in the Gulf of Mexico headboat fishery. The project also tested the use of VMS for reporting both trip departure and pre-landing notices that aided in dockside validation and sampling.

In 2015, SERO received funding from the Fisheries Information System program to test VMS-based electronic logbooks on a small subset of headboat vessels in the Gulf of Mexico that participated in the Headboat Collaborative Program. SERO and SEFSC staff has been working with the VMS-vendor to develop VMS-based logbook software in 2016. Software development is nearing completion, after which on the water testing will be conducted to compare VMS reporting methods to SRHeLog reporting.

- *In addition to discussing which FMPs or fisheries are appropriate for the application of electronic technologies, include information on why other FMPs or fisheries are not being considered for the incorporation of electronic technologies.*

In the Caribbean, the Coral FMP is not very suitable for electronic technologies because the only fishing taking place within the context of that FMP is aquarium trade harvest, which is very small scale and primarily an activity conducted in state waters.

Two fisheries managed by the Gulf Council (red drum and coral) prohibit all harvest, thus no monitoring, electronic or otherwise, is needed. Although a FMP (joint with the South Atlantic) exists for spiny lobster, most management occurs via the State of Florida. All harvest is prohibited for one fishery managed by the

South Atlantic Council (coral), and there is no harvest occurring for Sargassum. Thus, no monitoring, electronic or otherwise, is needed for these FMPs.

Table 1 - EM Shrimp Fishery. Costs and cost share for shrimp trawl fishery.

EM shrimp-trawl protected species monitoring	Total Cost	% Government cost share?	% Industry cost share?	NMFS budget line (e.g., FRM, catch shares, NOP, etc.)
System Development & Maintenance				
Specifications setting				
Technical software system design QA/QC, metadata, integration				
System maintenance				
Commercial off- the shelf/3 rd party developer option: developers have borne costs				
Data storage / archiving				
Hardware and Infrastructure	\$42,793	100%	0%	CRP
CPU, GPS, etc.				
Telecommunications Satellite, cellular, (specify)				
Government IT infrastructure				
Field Support	\$70,679	100%	0%	CRP
Installation				
---labor				
---Wiring, backup power, connections, etc.				
Training (labor, materials, travel)				
Data validation				
Maintenance/Repair				
Help Desk				
Data Communications & Reporting				
At sea				
Shoreside				
Government IT infrastructure				
Data Retrieval	\$10,133	100%	0%	CRP
Data Validation				
Data Storage				

Table 2 - Dealer ER costs and cost share FY2012-15.

Dealer Electronic Reporting Program	Total Cost	% Government cost share?	% Industry cost share?	NMFS budget line (e.g., FRM, catch shares, NOP, etc.)
System Development & Maintenance				
Specifications setting	\$12,462	100		Fish Stats
Technical software system design QA/QC, metadata, integration	\$70,231	100		Fish Stats
System maintenance	\$128,000	100		Fish Stats Catch Shares
Commercial off- the shelf/3 rd party developer option: developers have borne costs	\$12,500	100		FIN
Data storage / archiving	\$1,731	100		FIN
Hardware and Infrastructure				
CPU, GPS, etc.	\$87,500		100	
Telecommunications Satellite, cellular, (specify)	\$21,000		100	
Government IT infrastructure	\$1,731	100		SEFSC facilities
Field Support				
Installation	\$7,692	100		
---labor	\$7,692	100		FIN
---Wiring, backup power, connections, etc.	0			
Training (labor, materials, travel)	\$1,442		100	
Data validation	\$577	100		FIN
Maintenance/Repair	\$10,000	50	50	FIN
Help Desk	\$5,000	100		FIN
Data Communications & Reporting				
At sea	0			
Shoreside	0			
Government IT infrastructure	\$288	100		SEFSC facilities
Data Retrieval	\$8,000	100		Catch Shares
Data Validation	\$3,462	100		FIN
Data Storage	\$9,231	100		FIN

Table 3 - ER-log 2013-15. Costs and cost share for the southeast electronic log book pilot project FY13-15¹

E-logbook Pilot Program	Total Cost	% Government cost share?	% Industry cost share?	NMFS budget line (e.g., FRM, catch shares, NOP, etc.)
System Development & Maintenance				
Specifications setting	\$12,500	100		Fish Stats
Technical software system design QA/QC, metadata, integration	\$30,159	100		FIS
System maintenance				
Commercial off- the shelf/3 rd party developer option: developers have borne costs	\$9,615		100	
Data storage / archiving	\$288	100		FIN
Hardware and Infrastructure				
CPU, GPS, etc.	\$7,500	100		FIS
Telecommunications Satellite, cellular, (specify)	\$20		100	Fish Stats
Government IT infrastructure	\$288	100		FIN
Field Support				
Installation	\$91,000	100		FIS
---labor	\$90,000	100		FIS Catch Shares Fish Stats
---Wiring, backup power, connections, etc.	\$1,000	100		FIS
Training (labor, materials, travel)	\$5,000	100		FIS
Data validation	\$2,644	100		Fish Stats
Maintenance/Repair	\$132	100		FIS
Help Desk	\$1,394	100		Fish Stats
Data Communications & Reporting				
At sea	0			
Shoreside	\$1,058	100		FIS
Government IT infrastructure	0			
Data Retrieval	\$529	100		FIS
Data Validation	0			
Data Storage	\$264	100		FIS

¹ Provide reference for the program, including brief description and a citation to the implementing rule

Table 4 - ER-log FY16 funds. Costs and cost share for the southeast electronic log book pilot project FY16

E-logbook Pilot Program	Total Cost	% Government cost share?	% Industry cost share?	NMFS budget line (e.g., FRM, catch shares, NOP, etc.)
System Development & Maintenance				
Specifications setting	\$13,000	100		Fish Stat
Technical software system design QA/QC, metadata, integration	\$135,963	100		FIS
System maintenance				
Commercial off- the shelf/3 rd party developer option: developers have borne costs				
Data storage / archiving				
Hardware and Infrastructure				
CPU, GPS, etc.				
Telecommunications Satellite, cellular, (specify)				
Government IT infrastructure				
Field Support				
Installation				
---labor				
---Wiring, backup power, connections, etc.				
Training (labor, materials, travel)				
Data validation				
Maintenance/Repair				
Help Desk				
Data Communications & Reporting				
At sea				
Shoreside				
Government IT infrastructure				
Data Retrieval				
Data Validation				
Data Storage				

Table 5 - ER TIP electronic data recording 2014-16. Costs and cost share electronic sample data recording

E-logbook Pilot Program	Total Cost	% Government cost share?	% Industry cost share?	NMFS budget line (e.g., FRM, catch shares, NOP, etc.)
System Development & Maintenance				
Specifications setting				
Technical software system design QA/QC, metadata, integration	\$222,357	100		Catch Shares Fish Stats SEFSC IRM
System maintenance				
Commercial off- the shelf/3 rd party developer option: developers have borne costs				
Data storage / archiving				
Hardware and Infrastructure				
CPU, GPS, etc.	\$13,700	100		Fish Stats FIS
Telecommunications Satellite, cellular, (specify)				
Government IT infrastructure				
Field Support				
Installation				
---labor				
---Wiring, backup power, connections, etc.				
Training (labor, materials, travel)				
Data validation				
Maintenance/Repair				
Help Desk				
Data Communications & Reporting				
At sea				
Shoreside				
Government IT infrastructure				
Data Retrieval				
Data Validation				
Data Storage				

Table 6 - SRHeLog. Southeast Region Headboat electronic logbook (SRHeLog) 2013-2014. Survey-Wide Implementation of Electronic Logbook Reporting on Headboats Operating in the U. S. South Atlantic and Gulf of Mexico.

SRHeLog Program	Total Cost	% Government cost share?	% Industry cost share?	NMFS budget line (e.g., FRM, catch shares, NOP, etc.)
System Development & Maintenance				
Logbook website	16,000	100	0	MRIP
Mobile applications	20,000	100	0	MRIP
Agents website	10,000	100	0	MRIP
System maintenance/ongoing support	19,000	100	0	MRIP
Outreach costs	1,000	100	0	MRIP

Table 7 - ER program costs Headboat Collaborative project FY2014-15.

Headboat Collaborative IFQ project	Total Cost	% Government cost share?	% Industry cost share?	NMFS budget line (e.g., FRM, catch shares, NOP, etc.)
System Development & Maintenance				
Specifications setting				
Technical software system design QA/QC, metadata, integration				
System maintenance				
Commercial off- the shelf/3 rd party developer option: developers have borne costs				
Data storage / archiving				
Hardware and Infrastructure				
CPU, GPS, etc.				
Telecommunications Satellite, cellular, (specify)				
Government IT infrastructure				
Field Support				
Installation				
---labor				
---Wiring, backup power, connections, etc.				
Training (labor, materials, travel)				
Data validation				
Maintenance/Repair				
Help Desk				
Data Communications & Reporting				
At sea				
Shoreside				
Government IT infrastructure				
Data Retrieval				
Data Validation	1,310,000	100		Catch shares
Data Storage				