Agenda
Data Collection Committee

Gulf of Mexico Fishery Management Council

Grand Hotel Marriott
Azalea Ballroom
Point Clear, Alabama
Monday, January 26, 2015
10:30 a.m. – 12:00 p.m.

I. Adoption of Agenda **(Tab E, No. 1)** – Pearce

II. Approval of Minutes **(Tab E, No. 2)** – Pearce

III. Action Guide and Next Steps **(Tab E, No. 3)**

IV. Discussion of Technical Subcommittee for Electronic Charter Boat Reporting Recommendations **(Tab E, No. 4)** – Froeschke

V. EM/ER Implementation Plan **(Tab E, No. 5)** – Strelcheck

VI. MRIP Calibration Update **(Tab E, No. 6a & b)** – Strelcheck

VII. Review and Discussion of MRIP Red Snapper Workshop – Froeschke

VII. Other Business – Pearce

Members:
Harlon Pearce, Chair
John Greene, V. Chair
Doug Boyd
Roy Crabtree/Steve Branstetter
Dave Donaldson
Randy Pausina/Myron Fischer
Greg Stunz
David Walker

Staff: John Froeschke

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GULF OF MEXICO FISHERY MANAGEMENT COUNCIL

DATA COLLECTION COMMITTEE

Battle House Renaissance Mobile — Mobile, Alabama

October 20, 2014

VOTING MEMBERS

Harlon Pearce ..... Louisiana
Kevin Anson (designee for Chris Blankenship) ..... Alabama
Martha Bademan (designee for Nick Wiley) ..... Florida
Myron Fischer (designee for Randy Pausina) ..... Louisiana
John Greene ..... Alabama
Campo Matens ..... Louisiana
Robin Riechers ..... Texas
John Sanchez ..... Florida

NON-VOTING MEMBERS

Leann Bosarge ..... Mississippi
Doug Boyd ..... Texas
Jason Brand ..... USCG
Pamela Dana ..... Florida
Dale Diaz (designee for Jamie Miller) ..... Mississippi
Dave Donaldson ..... GSMFC
Corky Perret ..... Mississippi
Phil Steele (designee for Roy Crabtree) ..... NMFS
Greg Stunz ..... Texas
David Walker ..... Alabama
Roy Williams ..... Florida

STAFF

Stephen Atran ..... Population Dynamics Statistician
John Froeschke ..... Fishery Biologist
Doug Gregory ..... Executive Director
Beth Hager ..... Financial Assistant/IT Coordinator
Mara Levy ..... NOAA General Counsel
Charlene Ponce ..... Public Information Officer
Ryan Rindone ..... Fishery Biologist/SEDAR Liaison
Charlotte Schiaffo ..... Research & Human Resource Librarian
Carrie Simmons ..... Deputy Executive Director

OTHER PARTICIPANTS

Luiz Barbieri ..... GMFMC SSC
Jeff Barger ..... Ocean Conservancy, Austin, TX
Randy Boggs ..... Orange Beach, AL
Steve Branstetter ..... NMFS

Gregg Bray ..... GSMFC
Gib Brogan ..... Oceana
JP Brooker ..... Ocean Conservancy
Michael Drexler ..... Ocean Conservancy
Cynthia Fenyk ..... NOAA
Benny Gallaway ..... LGL Ecological, TX
Sue Gerhart ..... NMFS
Chad Hanson ..... PEW
Ben Hartig ..... SAFMC
Margaret Henderson ..... Gulf Seafood Institute
Mike Jennings ..... Freeport, TX
Robert Jones ..... EDF
Kristen McConnell ..... EDF
Herb Murphy .....
Laurie Picariello ..... Audubon Nature Institute
Bonnie Ponwith ..... SEFSC
Katie Semon ..... LDWF
Steve VanderKooy ..... GSMFC

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The Data Collection Committee of the Gulf of Mexico Fishery Management Council convened at the Battle House Renaissance Mobile, Mobile, Alabama, Monday afternoon, October 20, 2014, and was called to order at 3:15 p.m. by Chairman Harlon Pearce.

ADOPTION OF AGENDA
APPROVAL OF MINUTES
ACTION GUIDE AND NEXT STEPS

CHAIRMAN HARLON PEARCE: I am calling the Data Collection Committee to order. Please take your seats. We've got a lot to do. I am going to call the Data Collection Committee to order. We have Kevin Anson is here and Johnny Greene is here and Camp is here, but I like Camp's replacement sitting next to me better, and Myron is here and Robin is here and John Sanchez is here and Martha is here from Florida. Is there any changes or additions to the agenda? Yes, John.

DR. JOHN FROESCHKE: Andy Strelcheck is going to give the Calibration Summary Presentation and he's not here. His flight is delayed and so that's either going to have to go later in the committee, somewhere tomorrow, or in full council.

CHAIRMAN PEARCE: I was going to get to that, too. Andy Strelcheck is not here and so Tab E, Number 3, the Calibration Workshop, we will have to take up tomorrow, maybe before Reef Fish or in Reef Fish. That won't happen and so that is a change

to the agenda. I don't know if we need a motion for that, but he's just not here. Any other changes or additions to the agenda? Hearing none, we will keep going.

Minutes, has everyone read the minutes and are there any changes or additions to the minutes? If not, I would like to hear a motion to approve the minutes.

MR. KEVIN ANSON: So moved.

CHAIRMAN PEARCE: We have a motion and do we have a second? We have a motion and a second and any opposition to the approval of the minutes? Hearing or seeing none, the minutes are approved. The Calibration Workshop will be tomorrow and next on deck is our South Atlantic Council member with the Discussion of South Atlantic Council Recommendations for Electronic Charter Boat Reporting. Have you got it?

DISCUSSION OF SOUTH ATLANTIC COUNCIL RECOMMENDATIONS FOR ELECTRONIC CHARTER BOAT REPORTING

MR. BEN HARTIG: Well, no. I don't have that and I am very sorry to say that I did not look for that on this agenda and I am not ready to give that presentation, but if you allow me to do that at full council, I will do that.

CHAIRMAN PEARCE: That means we get out of here sooner tonight and that's fine with me. All right and so we're going to have to have that during full council. You had an email of Tab E-4 that you should have gotten, but we're not going to go into that.

Next, we're going into Discussion of Species Reporting Requirements for the Joint Electronic Dealer Reporting Amendment and (a) is Modifications to Federally-Permitted Seafood Dealer Reporting Requirements and, Kevin, this has got your name next to it and is that correct?

MR. ANSON: It appears to have my name next to it, yes, sir.

CHAIRMAN PEARCE: So are you ready?

DISCUSSION OF SPECIES REPORTING REQUIREMENTS UNDER THE JOINT ELECTRONIC DEALER REPORTING REQUIREMENT MODIFICATIONS TO FEDERALLY-PERMITTED SEAFOOD DEALER REPORTING REQUIREMENTS

MR. ANSON: Yes, I am ready. Thank you, Mr. Chair. You should

have in front of you Tab E, Number 5(a) and that is Modifications to Federally-Permitted Seafood Dealer Reporting Requirements and we had dealt with this not too long ago, this issue, and we came up with some codified text for a framework action to change some of the way that the dealers were to report, those dealers that had federal permits, consolidate the reporting, if you will, and some of those things that were in there were more timely reporting elements, requirements for use of electronic data reporting methods, and those types of things.

One other thing that was also included in there was some mention of the species that were to be included in regards to the reports and so the codified text went through. I will give you some background.

The text went through and so National Marine Fisheries Service went ahead and implemented the reporting requirements for the dealers and had some outreach and such and so they went ahead and were working with the states, the trip ticket folks within each of the states that had trip ticket programs that were functioning, and tried to work with the various states to have as streamlined a process for those dealers that had to report those federal landings, as was required under the new language.

During the process of those talks, to try to streamline that process, it became apparent that the Service was going down a path that the state folks didn't think they should be going in regards to what species should be reported to the Service and on what time basis.

It comes back to the language in the text, whereby those dealers that had the federal permits had to report -- I am condensing this down at this point in time and certainly Dr. Ponwith was involved with these discussions, or her staff were, and she can jump in at any time, but, essentially, it was the types of fish that were to be reported and those timelines and such.

We have some in Alabama that had some particular umbrage with what NMFS was requiring of those dealers and, again, trying to funnel this all through the trip ticket system to make it as efficient a process as possible and smooth of a transition for those dealers to report their landings.

NMFS wanted to get all of the data essentially that those dealers -- The transactions of the dealers and so that includes federally-managed species as well as fish that are not considered to be federally-managed under an FMP. For instance, that would be spotted seatrout for one state or another and

oysters and those types of things.

We tried to, through various conference calls and such and meetings through the commission and the FIN Committee meeting there, tried to work this out and come to some understanding relative to the timing of when the reports were due to NMFS and trying to parse out those species, again, that the states felt were not included. Although they were handled by that federally-permitted dealer, they weren't necessarily federally-managed species.

It didn't work out and essentially the Service believed that if anything needed to be changed or if that was the intent of the council that it needed to be more specifically worded that those species were not to be included in the reporting requirements for the federal dealers and it's kind of the reporting requirements, but also the timeliness of the data for those species and so it has to be specific to say all species under the FMP need to be reported on a timely basis and that type of thing.

That's the majority of it, the problem, if you will. It does precipitate -- I think, programmatically, there are some other issues there that might need to be worked out still with the Service and the states in regards to the actual information and how it's stored and how it's accessible and how it's available back to the dealer to access if they want to make a change, whether or not these tickets remain open, is what they're called.

The states would like to have more control, if you will, as to when the tickets are closed and no longer available for editing by the seafood dealer, because that helps them in trying to process the information and do some QA/QC on that, as they have been doing for years.

Those are some more technical issues that I don't think the council necessarily needs to address, but certainly I think what the council needs to address, and has been put on the agenda for discussion, is going back and looking at the framework action, the codified text that was issued the last time, and then, if the council so chooses, to go ahead and modify that so it's much clearer as to what species are to be required to be reported by the federal dealers.

As I understand it, that's in the document, Modifications to the Federally-Permitted Seafood Dealer Reporting Requirements, and, again, that's Tab E, Number 5(a) and -- Actually, that's what

was provided and so, Carrie, if you wouldn't mind, did you do this one?

DR. JOHN FROESCHKE: I did.

MR. ANSON: John, if you could kind of help us through. I mean these two documents are -- This is what was already presented, correct, and so this is just background, further background, information for us for a discussion as to how go about discussing the problem that we're having, correct?

DR. FROESCHKE: Yes, that's correct and so the discussion was asked to put the codified text in the document in the briefing book and so we've done that and the idea is that if there is specific language that you want to review or suggest that we modify through a framework action or something that we could begin this process.

CHAIRMAN PEARCE: Bonnie, do you want to make a comment at this time?

DR. BONNIE PONWITH: Yes, that would be helpful, Mr. Chairman, and so thank you for recognizing me. Obviously I'm not a member of the committee and I think Kevin did a really good job of outlining the situation.

There are many different angles to this issue and I think two of the really important ones are the legal read of the regulation as it stands right now and what does the regulation say we must do to be in compliance and then second piece is the council's intent and what was the council's intent in the way that regulation was written in the first place?

I am not really going to talk about either of those, because my interest in this, of course, is the science. I will be approaching this exclusively from the science perspective and our stake in the discussion is the quality and the timeliness of the information that we are using to generate the projections of when we think a commercial fishery needs to be closed.

The thumbnail sketch, again, of how that's done, using this electronic reporting -- First of all, let me step back and congratulate the council for what I think is a really exceptional advance in our ability to monitor those commercial ACLs.

This electronic dealer reporting is phenomenal in that it gets that information to the commercial landings system on a weekly

basis and our expectation is we see one of two things. We either see a report of all fish that were landed for federally-permitted commercial dealers or we get the other alternative, which is a no-purchase report.

By getting one of those two things, it's our assurance that we have got the whole enchilada there and then when we use that to determine what data are missing and then once we're aware of what data are missing, we have about six or seven algorithms that can be used to generate values for those missing data and those algorithms poach information from past years and from past weeks for those dealers that we don't have reports. It basically builds a picture of what could be on those tickets that are missing and uses that in the estimate to project the future. Based on these burn rates, when do we think that fishery is going to be closed?

I think we could all agree, right down to the dealers and the commercial fishers themselves and certainly the council in fulfilling its mandate, the closer we can come to projecting when the fishery truly needs to be closed, the better economically and just in terms of disruptions the system is running.

Our concern is, from the science perspective, is if we put into the hands of the commercial dealers judgment calls that it creates the potential for errors to be made, an accidental miscoding of a species as being state versus federal. It could result in us getting report for some of those species and not realize that we're missing some of the others.

That then runs the risk that we would be not projecting based on the fullest suite of information available and put us in jeopardy of underestimating what actually has been landed. Our interest in having all of the data is we think that that gives us the best chance of doing really, good sound projections and nailing those closure dates as close as can be possible.

Now, I recognize that that causes some challenges for the states and I have heard both from the Gulf states as well as now from the South Atlantic states that they are concerned about reporting these state-managed species in these federal reports, but I just wanted to make it clear, again, why we think that that strengthens the system and in our mind may be worth some of the challenges that we would have to work through from the states' perspective to make that possible.

The other thing is I don't -- Our goal is not to put an undue

burden on the dealers as well and if we did trim down the species that were reported, the obvious ones that are state managed to drop out of the system could be things like oysters and crabs, because there is probably a less probability of something like that being miscoded and being in completely category, taxonomic category, than some of the finfish.

It's just that those finfish lists, they can be dynamic. Almost every other meeting we're talking about changing the designation of a stock as to whether it's federally managed or not and we just feel like that takes some of the uncertainty out of the system and so I will stop at that.

CHAIRMAN PEARCE: Bonnie, one quick question. What do you do with speckled trout landings when you get them? Do you just discard it?

DR. PONWITH: We do not use those and so our intent is we would not be using them, but it would be a way for us just to increase the probability that we're getting all of the species that we are supposed to get and help us to be able to troubleshoot when we think we see a miscoding.

CHAIRMAN PEARCE: Mara and then I want to hear from our South Atlantic friend about how they feel about it.

MS. MARA LEVY: I was just going to say, to sort of help you focus in on the issue, if you look at Tab E-5(b), which is the actual rule, and you go to page 20, under (c) it has the requirements for dealers that hold the Gulf and South Atlantic dealer permit and it's the first sentence that says: A person issued a Gulf and South Atlantic dealer permit must submit a detailed electronic report of all fish first received for a commercial purpose within the time specified in this paragraph.

That's the language that you're looking at and the "all fish first received for a commercial purpose" is what's driving the requirement that dealers submit all of the information, regardless of whether it's federally managed or state managed. I just thought that might help you focus on the issue.

CHAIRMAN PEARCE: How is the South Atlantic handling this?

MR. HARTIG: Harlon, I believe that we're going to do exactly what the lawyers said. We want to have all fish reported so we can get a handle on everything that comes into the dealer so that we don't have these loopholes that arise that are possible that things that have been done like that in the past.

CHAIRMAN PEARCE: Thank you. Kevin.

MR. ANSON: A couple of things I want to address regarding Dr. Ponwith's comments. During our discussions, we had talked about, again, some of the technical things that could be done for the individual, the permitted dealer, to still comply with the reporting requirements and yet not get into a situation, again, where the states were interpreting the dealer reporting requirements to report everything and so we were trying to come to some middle of the road.

Technically, the dealer can be set up to submit the reports within the seven-day period, the end of the week, and they can push a button and all of those species that have been identified as being federally managed that are stored in their side of the database or on their computer, when they press a button and say "submit", all those species can go through, at least in the Gulf case, in my understanding, through the Commission. You all have immediate access to the data, the Commission's computers, or it gets packaged up and sent to the Science Center.

That's an immediate fix. Again, there's already been discussion with counsel from Louisiana and Alabama and NOAA's counsel regarding what is in the codified text and the codified text, in NOAA's interpretation, is that they need to report all the species.

Again, the issue comes back to, and I understand what Bonnie just said about the miscoding issue, but she just answered, Harlon, your question about what they do with the data if it comes in all spotted seatrout and they just put it aside. There's nothing that they do that we've understood, through a check and a balance -- That's what the states do, is they do their QA/QC work to make sure the species are being recorded accurately.

There is no new process that they can identify that that spotted seatrout is really a red snapper and so, again, there's more technical issues to this, because it kind of snowballs once all the data is transferred, but I think some of the confusion comes in in the intent, and that's what we're here to have some discussion about, what the intent of the council is relative to the federal dealer reporting requirements as it's now interpreted in the codified text that was sent up to the Secretary.

I guess where we have some problems and the misunderstanding

comes is on page 2 of the codified text and it says: This final rule modifies the permitting and reporting requirements for seafood dealers who first receive species managed by the councils through the previously mentioned FMPs. These revisions create a single dealer permit for dealers who first receive fish managed by the councils, require both purchase and non-purchase reports to be submitted online on a weekly basis, prohibit dealers from first receiving fish from federally-permitted vessels if they are delinquent in submitting reports, and change the sale and purchase provisions based on the new dealer permitting requirements.

Again, it's first-received species managed by the councils through the FMPs that are identified and that's where this goes and so there is some changes in what Mara had pointed out on page 20, but it's my understanding, when I communicated with our staff folks and I think in Louisiana there was similar communications, was the way that NMFS wants the data, all of the data for all of the species, was not the intent, because it does create some problems for us in trying to process the data and make sure that we have some controls in the data the way that the discussions further went out. Thank you.

CHAIRMAN PEARCE: All right and is there discussion? I would like to hear from the other states.

MS. LEVY: I don't have any issue with if you all decide as a policy matter -- Bonnie has the science reasons and you all decide as a council what you want to do with the reporting requirement.

I will say though that there is a difference between when the federal permit is required, which is for those federally-managed species that are identified in the FMP, and what's then required once you have the permit, which is that you report all species first received.

To me, that is not inconsistent with what's in the codified text. There's the idea that you need a permit and you only need this permit if you want to first receive those identified federally-managed species, but once you have the permit, the reporting requirement says that you have to report all species and so, again, it's the council's prerogative if you want to go back and modify those regulations, but I don't necessarily think that there's an inconsistency between what's identified on the board and then what's actually required for reporting.

DR. PONWITH: Here's a question and it's something that hadn't

come to me in some of our earlier conversations and that is if a dealer prepares their report and the report includes all species and when they push that "send" button, those data go through a splitter and the splitter is electronic code that the fed and the state data people work out, and it takes the state species and shunts them to you and we never see them and it takes the federal species and shunts them to us, that would be another way of doing it.

It doesn't preclude there being errors on the state side and, in other words, a species was identified as state, but it does take away that sort of black-box mystery of was there the potential of a federal species that got into the wrong bin. It's another thing to think about as we contemplate what the council's intent was in that original language.

MR. DAVE DONALDSON: I am not your committee and, Bonnie, that is exactly the process that we talked with our contractor with that does the electronic reporting tool, is that it would simply be that, that there would be a list of species that would go to the state and a list of species that would go to the feds.

The dealers wouldn't be filling out two separate forms, but they would just fill out the electronic trip ticket form and it would send the appropriate information to you all and the appropriate information to the states.

MR. ANSON: I agree and I think I touched upon that in the prior discussions here today and I thought that had been discussed in previous meetings and maybe not with you on a phone call, Bonnie, but with members of your staff and the state's trip ticket staff as an option.

That was not talked about for very long and that's certainly been offered at that level of discussion and I think it has been offered as a potential fix, if you will, for this particular issue.

CHAIRMAN PEARCE: So where does that leave us? Kevin, are you satisfied with that type of a fix?

MR. ROBIN RIECHERS: Bonnie, when you all get the data and you keep talking about them being characterized in the wrong bucket, if you will, or characterized wrongly, I mean that can always happen and that can be a coding error.

We obviously have QA/QC procedures that hopefully catch that before it would get to you, but, really, even if you identify

there's a problem, you're going to have to come back to us anyhow, because we're going to be the ones who are going to have the residential raw data that might be able to go back in time enough to look at and determine what was miscoded, possibly, and obviously at some point, when all you have is a digital record, you may not even have enough information to figure that out, other than maybe looking at size of fish and some quantities and poundage and so forth that might give you some inkling.

I mean I guess I'm just stuck in a process of even if you get it and you can tell that something is amiss, I mean that's at, the very best, all you're going to be able to tell.

CHAIRMAN PEARCE: Okay and where are we, guys? Any other comments on this any actions on this?

MR. PHIL STEELE: There's a lot of discussion here of what the council's intent was and there might have been some misunderstanding all the way around, but look at it, folks. It took us almost three years to develop what I consider one of the best data collection programs on the Earth.

It's helping us monitor our ACLs and stay within our limits and, personally, I think we ought to just leave it the way it is and go on down the road. To go back and change it now I think would add even more confusion to the system. It's a good system and it works and it's not adding that much more workload on the states and to go back and change it now I think would add more confusion and I suggest we just leave it the way it is.

MR. ANSON: Going back to Dr. Ponwith's question or your question, I guess, as to whether or not this could work, certainly we would want to try to go the path of least resistance, if you will, and try to come to some agreement and I guess if we have an understanding that that's the intent of the Science Center to go ahead and accept that form of splitting and we can get the contractor to do it and you're happy with that and if you want those spotted seatrout landings, you can get them at the end of the month.

That's where my next issue comes in, is it's the timing. Again, with what the states -- We're all trying to make this as efficient as possible and that was the original goal when we had this discussion, was that we were going to try to work together, utilizing the states' existing trip ticket programs, to make it as least burdensome on the seafood dealers to comply.

It does come back to the issue, the one other issue that's

outstanding, and that's maybe something that we could discuss or be able to come to some agreement as well, is the issue of the weekly reporting and then the states have on their books the thirty days.

The federal reporting might supersede the states' timeliness or that thirty-day -- By the 10th of the month for the preceding month is essentially how the states have it written for their timeliness.

Maybe if that could be resolved, in that they just press that button at the end of the week and it kind of gets stored each week off to the side and then they submit it by the 10th for that week or something. I mean that might be something that we just -- Because they are sending in all the information, essentially, they're not going to be holding back or withholding the state landings and they're just going to press the "submit" and then it will go to the Commission and then, from there, it gets parsed out and you all get the federally-identified species that stays and the rest is retained within the Commission and then it's just a de facto -- It's not a problem anymore and they just comply with the federal and then, by doing that, pressing that button, they also send the state landings in as well and by the end of the month, they get it submitted because they have the seven-week or the weekly reporting requirement for the federal species.

I guess it's not an issue, but it just might be, again, something that we have to be aware of on the programming side, or the contractor side, with how that data is stored once the dealer does hit "submit".

CHAIRMAN PEARCE: Okay, Kevin. You're satisfied a little bit right now?

MR. ANSON: Yes and I think we've got some pretty good indication from Dr. Ponwith that that's a reasonable or a way out of this and so I think that's -- That's doable technically and it's been communicated or the contractor has been asked that question and he says it's a simple fix.

CHAIRMAN PEARCE: I just want to make sure Alabama is happy and that's all.

DR. PONWITH: What I would like to do then is circle back with my folks, because I was unaware that that the notion of a splitter, let's call it that for code, to keep it short, has already been discussed and so I will circle back with them and

find out what their concerns with that approach was, but, to me, I think one of the obvious ones is that if doing so creates a situation where we're looking at the data on a weekly basis and the other is pooling up and not being looked at until the end of the month, we still run into the potential then that we end up using the data that we have in hand to generate projections and then find out, after the fact, that we were missing a boatload because of entry error or something like that. I will touch bases with them and get some more clarity on that.

DISCUSSION OF STRATEGIES TO IMPROVE PRIVATE RECREATIONAL DATA COLLECTION AND MANAGEMENT

CHAIRMAN PEARCE: Okay and so we're ready to move on. I think we finished most of the agenda and we have one more item on the agenda. Kevin, you're finished with that? Okay. Next is Discussion of Strategies to Improve Private Recreational Data Collection and Management. I will lead this.

I guess I'm just following up on some of the discussions we had at the last council meeting. I asked them to pull up an Ad Hoc Private Recreational Data Collection Panel meeting we had in February of 2013 and I think that was all sent to your emails and it's just for discussion, to bring up ideas, so we can try to think.

Even if we do regional management, we have to have ideas to manage the private fishery in the Gulf and so I wanted to just kind of start some discussions and see where we go. We had almost thirty people at this ad hoc committee meeting and we came up with some ideas and came up with some pretty good rationales for them.

One of the motions that we passed was, first off, to implement a private recreational boat permit to improve the data collection and one of the other ones that we passed was to require daily permits for the daily bag limit for the private recreational boat owner to be issued for red snapper to be filled out with the necessary information as required by the Gulf Council in order to receive more permits that are unlimited in nature until the quota is caught.

Some of the rationale for that is that we would get real-time data, data from private docks, data can be species-specific, enable panel surveys, better define sample frame, improve discard data, reduce recall error, and the mechanism could be in place for a species-by-species program down the road, electronic internet-based sales points, create personal angler logs, data

can be used for multiple purposes like creating historical records and so on, create buy-in for the system for every angler, confidence in data, and may provide another source of angler contact data for MRIP.

I just want to kind of open it up to the committee to see if there's any other ideas or just follow up, because I know we'll be talking about management and I think that private recreational fishermen, we need to consider how to help them. It's our job to do that and I just want to open it up for discussion.

Any other ideas or discussion from this committee? Gregg, I know you're not on my committee, I don't think yet, but you've got the iSnapper program and that would fit easily into one of these type of thought processes we're talking about as well and so feel free to come up with anything you could think about. I don't see a whole lot of discussion.

DR. GREGG STUNZ: Not being on the committee, I will be happy to comment after I let the committee members go, but I have a few comments.

DR. FROESCHKE: I wonder if we could break this down into two, because there are two fundamental issues here. One is the improving the data, which we all support and we understand that's a process, but, two, I think what I hear so much, and you all as well, is the management side and what's the primary goal.

If the primary goal is to figure out some way to extend the recreational season, then perhaps we could think about what tools are available in that context and if some data collection system, in addition to maybe improving the data, would ultimately have a role in slowing the harvest such that the season could be extended. I guess we could either talk about it separately or figure out if the management is really the priority and how to go about that.

CHAIRMAN PEARCE: If we start with the first one, improving data, one of the things we could improve is our in-season quota monitoring. I think that's very important.

We have sort of been under a lawsuit that says we have to keep all of our fisheries within their allocation and so I think improving data is a big thing and, of course, extending seasons is definitely one of the things that we would like to do, is to make it a better fishery.

One of the things that's very obvious to me is that if we have three-million recreational fishermen in the Gulf, if 25 percent of them catch one eight-pound snapper, the quota is caught and so we've got to figure out a way to make sure that everyone gets their access, but not go over the allocation.

MR. JOHNNY GREENE: If you remember the last public testimony session we had that went until 10:30 or 11:00 at night, one of the guys that stayed toward the end was a gentleman, Gary Smith, from Mississippi, which we were in Biloxi, as you recall.

He was pretty adamant about the fact that all of these people had went and made all these recommendations and put time and effort in it and nothing had been done since and I think the following day we tried to pass a motion to start something to do that and I believe it failed.

Whether it fails again or not, I think this is a path that we're going to have to go down and do something somewhere. It's not going to be easy and it's not going to be popular and it's going to be fun, but we've got to do something somewhere.

We've got a lot of hope and faith in a couple of amendments right now, but there is no guarantees that any of them will pass at the rate we've been going and so I think that this is something that we've got to address and look at. I think they've got several good ideas.

The one thing that does jump out at me is that this was an AP of all recreational fishermen, every one of them. I don't see a charter boat guy on there and I don't see a commercial guy. This was a group of just recreational guys locked in a room and it looks like they came out with some really, good, viable, well-thought-out ideas and I think that we should expand on this.

Now, how we go from there, I don't know. I understand that Dr. Froeschke wanted to break it into two pieces and I don't know that I'm really ready to get my head around that at just this point, but I think that that's the direction that we need to go and so if you want to try to break it down into the items that Mr. Froeschke had mentioned and perhaps we should have them look at that and maybe give him more direction in how to do that.

CHAIRMAN PEARCE: I understand and you know it's not the recreational anglers' job. It's our job to help them manage their fishery and it's our job to come up with some ideas and all I'm trying to do is stimulate some interest here that even

if we go to regional management could follow under regional management, but I think that we can't just let it lie and so I just brought this up for discussion and if we don't have any other discussion, we can always think about it and bring it back up in full council, but other than that, I am just trying to stimulate interest in the development of some sort of a fishery management plan or some sort of a fishery management program for the private recreational. Gregg, did you have anything else you wanted to add?

DR. STUNZ: Yes, sure. I will be happy to comment here and maybe take my council hat off for a minute and put on my researcher hat. MRIP has funded us for a significant electronic data collection program and I want to say pilot, but that's not the right word. We are well beyond that, obviously. We are very big supporters of electronic data collection in my research program and some successes that we've had with the for-hire guys.

We've taken that to the next level and it will be Gulf-wide. It's iPhone-based apps, although this time it will run on 99 percent of the platforms of Smartphones. We've been though that creation process and we're just about done and at the end of the month here, I think we'll be ready to go and pilot this in state waters starting as early as the first of the year, around that realm, but then obviously be ready for what's going on with the next season and, of course, what happens there will influence some of the data collection likely, but we think that that shows some real promise.

It's going to go along a panel-type approach of anglers that we identify as part of these panels that will enter the data as well as anyone that wants to enter it Gulf-wide and we have been working closely with teams of statisticians to make sure this is developed appropriately so the data will be usable.

Working with Robin and of course being out in Texas, a lot of this will happen through his shop and his crew and partnering with those guys to do a lot of validation work, through creels and a variety of techniques like that. We are confident that we're going to see some real promise in this starting as early as next year.

Let me look at my notes here and see if I forgot anything else I wanted to hit. Anyway, if you guys had any questions kind of on where we are or what the plans -- Probably by the January meeting, I will even have examples of it for you guys to see and so, anyway, that's where we are, Harlon.

CHAIRMAN PEARCE: Got you. Well, either we're getting long in the day or we just don't have a whole lot of comments about this today.

MR. GREENE: I would like to ask a question of Dr. Stunz, if I may. Gregg, one of the things when I talk to recreational fishermen is that they want to go fishing whenever they can go and I think that's the lure of a lot of what the charter boat guys want to do, is when they can sell a trip.

I don't think that the charter and the recreational guys are that different in that respect, but when you look at a charter guy, he's willing to buy a VMS and put it on his boat. It's something that's tamper-proof and it's something that works all the time.

Has there been any development, thoughts or strategies, on what you guys have done that would make a tamper-proof deal? In other words, oh, man, I forgot to turn my phone on today and they didn't catch me and so I didn't go fishing type of a prevention mode. Have you looked at anything like that?

DR. STUNZ: Could you ask me that again? The sound cut out right at the last minute there and I couldn't quite get the last part.

MR. GREENE: The biggest concern that I think a lot of people would have is that when you're dealing with the Smartphone type of deal, if it's not turned on, then it can't create a signal or a GPS coordinate or whatever. Is there anything that you all have looked at that would prevent that from happening, similar to a VMS that's on basically all the time? Maybe I need to talk to you more about it later in private, but it was just something that's been brought to my attention several times and without some type of a failsafe, that's where it seemed to stop.

DR. STUNZ: First, what we're most interested with iSnapper is the actual catch data and not necessarily like in the for-hire, where they had a hail-in and hail-out function and know when they're actually out fishing and it was also georeferenced to know where they are.

That technology is there and it's actually built into this new version and it likely won't be turned on for the private angler, because of some concerns that they have. They will have a hail-in and a hail-out function, but even if they don't do that, the advantage of electronic data collection, some of the points that

you were just talking about behind me there, was reducing error and having instant feedback. You don't have to go home and log into a webpage and so you can still do that even when your phone is off.

I mean obviously you have to turn it on to do it, but that georeferencing wasn't as important as just entering the data. Now, should they forget or get home, we still have web portals and working with Robin and his group and doing something similar along those lines, where anybody at any time can get onto a computer and enter that data is fully available.

What we have found is that most anglers on the recreational side don't want to do that at all and it's recreational fishing and so the easier we make it for them, the better. Having it on or off in this next version won't be that critical, because we're not that interested in where they are.

Having talked with the groups at NMFS in terms of their data collection, there will be some resolution, but very wide grids of let's say drop a pen where you fished today and there's a bunch of ins and outs and I would be happy to talk with you privately on how we're dealing with that, but that's how we're getting around what we saw the need from the original pilots were, the most efficient, streamlined, least cumbersome way to enter the data as efficiently as possible, and that's what this next version will look like.

CHAIRMAN PEARCE: Okay. Any other discussion?

DR. PONWITH: I am sure a big fan of innovation and I think we've spent a lot of time talking about how to improve things on the private angler side and I think one of the biggest challenges is building some empathy for how big the challenge is and I think that barrier is that if you look from the individual standpoint, it feels like a no-brainer.

If people are willing to donate information about what they caught and how they caught it, what's not to love? That does all the things that's on that list. It builds a sense of ownership over those numbers and it provides real-time information.

The flip side of that is, instead of thinking of them as individual anglers and thinking of them as the population and that is if you have a population of three-million, how do you figure out what they did?

That's where the challenge comes in, is getting this thinking about it from a population standpoint and thinking about it from an individual standpoint to meet in the middle and, to me, that's the place that's interesting and, to me, that's where the problem is actually going to get solved, when we can get to that meeting in the middle piece. It includes things like the ability of understanding volunteered data, data that are provided on a voluntary basis, and mathematically understanding how they relate to what otherwise would have been a statistically established sampling frame or something like that.

I am convinced mathematically there is a way to build those relationships. It's just it's one of the challenges of that meeting in the middle and then, secondarily, as we've already heard about, the issue of validating those data to make sure the self-reported data are reflecting sort of the cross-section of the population out there, but these are interesting conversations and, to me, that's the dynamic piece.

DR. STUNZ: Bonnie, I think you make some very, very key points and I think this next round of iSnapper is really going to address some of that. We've been working very, very closely with the MRIP statisticians that are on retainer for consulting and they understand fisheries and validation and user-entered data and a whole variety of things very, very well and they are very confident we can deal with this in this kind of format.

Now, is this going to be the end-all? Certainly not, but I think the benefits will far outweigh the costs and so I will be happy to talk to you even more if you want, but I think we will have some very good, concrete validation.

They are not at all worried about if you say you have three-million anglers and not all are reporting -- In the way we're designing this, which is essentially like a large mark and recapture study for fish, you will know what that non-reporting rate is like, based upon catch rates of others. You will know what that should be and you can extrapolate that back out just like you would do anything.

Now, we will see how it goes and that kind of thing, but the statisticians are very confident that the robustness of this next design will be able to handle some of those concerns.

CHAIRMAN PEARCE: Thank you. We are working on a reporting system for the for-hire sector and I guess the last frontier is the private recreational and so I think we really need to take some serious consideration of how we do this and all I wanted

was to try to stimulate some conversation here today and see how we move forward with that process. If I don't see any other hands and no other discussion, Mr. Chairman, I think I am done.

MR. HARTIG: Wait, Harlon. I can give you a little bit of information. We're early in the process. I did look at our summary minutes from the Data Collection Committee and there were two items that pertained to the charter boat logbook reporting in those items.

Number one was to direct staff to continue working on the charter boat logbook technical subcommittee to complete the report for the December 2014 meeting. A final report will be presented at the December meeting.

Number two was direct staff to begin working on a joint charter boat logbook amendment with the Gulf Council and so we are early in the process. It's early and if you would like me to give you an outline of what's in the subcommittee report so far, I can do that at full council.

CHAIRMAN PEARCE: That would be great. I see John is waving at me back there.

DR. FROESCHKE: Just to add to that, the subcommittee report, we presented that to you at the August meeting, I think, and so that's the draft we're working on and we are on schedule to have the final report completed by December and so we're on track.

CHAIRMAN PEARCE: Thank you, John. With that, Mr. Chairman, I think I'm done. I am not finished, but I'm done.

(Whereupon, the meeting adjourned at 3:40 p.m., October 20, 2014.)

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Tab E, No. 3

Data Collection Committee: Action Schedule for Tab E

Discussion: Discussion of Technical Subcommittee for Electronic Charter Boat Reporting Recommendations

Council Input and Next Steps:

- Advise staff on preferred course of action.

Discussion: Discussion of EM/ER Implementation Plan

Council Input and Next Steps:

- Advise staff on preferred course of action.

Discussion: Review and Discussion of MRIP Red Snapper Workshop

Council Input and Next Steps:

- Provide feedback to MRIP

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11/26/2014

Technical Subcommittee Report to the South Atlantic and Gulf of Mexico Fishery Management Councils: Recommendations for Electronic Logbook Reporting

November 2014

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Abbreviations used in this Document

ACCSP	Atlantic Coastal Cooperative Statistics Program
EEZ	Exclusive Economic Zone
FHS	For-hire-survey
FWC	Florida Fish and Wildlife Conservation Commission
FIN	Fisheries Information Network
GulfFin	Gulf of Mexico Fisheries Information Network
GMFMC	Gulf of Mexico Fishery Management Council
GSMFC	Gulf States Marine Fisheries Commission
GPS	Global Positioning System
HMS	Highly Migratory Species
MRIP	Marine Recreational Information Program
NOAA	National Oceanic and Atmospheric Administration
NCDENR	North Carolina Department of Environment and Natural Resources
NRC	National Research Council
PPS	Proportional Probability Sampling
SAFMC	South Atlantic Fisheries Management Council
SCDNR	South Carolina Department of Natural Resources
SERO	Southeast Regional Office
SRHS	Southeast Region Headboat Survey
SEFSC	Southeast Fisheries Science Center
TPWD	Texas Parks and Wildlife Department
VMS	Vessel Monitoring System

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EXECUTIVE SUMMARY

Catch from recreational anglers comprises a substantial proportion of total catch for many species in the regions managed by the Gulf of Mexico and South Atlantic Fishery Management Councils. For-hire charter vessels are an important component of the recreational fishery both in terms of fishing effort and harvest. There is a need to improve data collection practices for charter vessels to address evolving needs of science and management and to capitilze on the improvements of emerging electronic reporting technologies. The Gulf of Mexico and South Atlantic Fishery Mangement Councils are considering changes in management for these purposes and formed a technical subcommittee to provide recomendations to implement electronic logbook reporting for charter vessels in the Gulf of Mexico and South Altantic Fishery Management Councils respective jurisdictions.

Currently, for-hire data collection programs gather information on fishing effort and catch by marine recreational anglers fishing on professionally licensed for-hire vessels (including charter, guide, and large party boats). NOAA Fisheries, in coordination with the states, ACCSP, and FINS, support regional programs to collect these statistics, with the ultimate goal of building a system of data collection programs that are responsive to regional needs and are coordinated at the national level to provide standard data elements for both regional and national assessments of fish stocks and associated fisheries management.

The technical subcommittee was formed from state and federal biologists and resource managers that have the requisite experience to develop best practices for an improved for-hire data collection program. The technical subcommitte was instructed to provide these recommendations by December 1, 2014 and this report reflects these recommendations. The group met May 27-28, 2014 and drafted initial reccommendations for the Gulf of Mexico and South Atlantic Fishery Management Councils' review. This guidance has been integrated into the report to the extent practibable yet, the recommendations remain those of the technical subcommittee.

The subcommittee recommends a census style, electronic reporting system that builds upon the Gulf of Mexico electronic logbook pilot program, the electronic reporting program for headboats, and the recently implemented electronic dealer reporting program. A brief overview of the recommendations is below:

- Complete census of all participants;
- Mandatory, trip level reporting with weekly electronic submission. Give flexibility to require submission more frequently than weekly if necessary. Give flexibility to declare periods of inactivity in advance;
- Development of compliance tracking procedures that balance timeliness with available staff and funding resources;
- Implementation of accountability measures to ensure compliance;

- Use validation methods developed in the Gulf of Mexico logbook pilot study as a basis to ensure that the actual logbook report is validated and standardized validation methodologies are employed among regions;
- Minimize reporting burden to anglers by reducing (or preferably eliminating) paper reporting and eliminating duplicate reporting;
- Maintain capability for paper-based reporting during catastrophic conditions;
- Require and maintain a comprehensive permit/email database of participants;
- Develop and implement the program in close coordination with MRIP, SERO, SEFSC, HMS, state agencies, ACCSP, and GulfFIN;
- Include procedures for expanding estimates for non-reporting; and,
- Allow multiple authorized applications or devices to report data as long as they meet required data and transferability standards.

The technical subcommittee has provided these recommendations within the framework of finite fiscal and personnel resources with consideration of reporting burden and technology requirements for charter vessel operators. The recommended program should be flexible enough to accomodate changes in technology or funding availability without compromising the integrity of the long-term data series. The technical subcommittee also realizes that advances in data collection technologies will continue and the program will require evaluation, and likely subsequent improvement to meet the evolving needs of science and management.

SECTION 1. BACKGROUND

Catch from recreational anglers comprises a substantial proportion of total catch for many species in the regions managed by the Gulf of Mexico and South Atlantic Fishery Management Councils (GMFMC, SAFMC). For-hire data collection programs gather information on fishing effort and catch by marine recreational anglers fishing on professionally licensed for-hire vessels (including charter, guide, and large party boats). NOAA Fisheries, in coordination with the states, ACCSP, and FINs, supports regional programs to collect these statistics, with the ultimate goal of building a system of data collection programs that are responsive to regional needs and are coordinated at the national level to provide standard data elements for both regional and national assessments of fish stocks and associated fisheries management.

Recreational harvest from for-hire vessels in the Southeast Region are monitored through a combination of effort and dockside intercept surveys. The Marine Recreational Information Program's (MRIP) for-hire survey (FHS) and the Southeast Region Headboat Survey. The FHS estimates charter vessel catches of state and federally managed species off the U.S. Atlantic and Gulf coast states, with the exception of Texas and more recently Louisiana. The Texas Parks and Wildlife Department conducts their own creel survey to estimate private and charter landings. Since 1993, South Carolina has administered a paper-based logbook reporting program for every licensed six-pack charter operator. These data are primarily used for state management and quota monitoring for federally managed species occurs as part of the MRIP for-hire survey. North Carolina is also developing an electronic logbook system for their own use with the goal of supplanting the MRIP for-hire survey once fully operational and compatible with MRIP. In recent years, interest by constituents and the Councils has been growing to implement electronic reporting requirements in the for-hire sector. There is general distrust of MRIP landings estimates for the for-hire survey and managers and fishermen have expressed a need for more timely and accurate data to support fishery monitoring, science, and management. Additionally, the National Research Council's (NRC) review of recreational survey methods concluded that in most cases charter boats should be required to maintain logbooks of fish landed and kept. These factors led to an electronic logbook pilot study of Texas and Florida charter vessels in 2010-11 and new electronic reporting regulations for headboats in 2014. Four additional projects have also been funded by MRIP or the National Fish and Wildlife Foundation in 2014 to test new approaches for monitoring charter vessel catch and effort. The GMFMC and SAFMC have also passed motions at recent meetings expressing their interest in electronic reporting by charter vessels and they formed this technical subcommittee to develop recommendations for the Councils' consideration by December 1, 2014, on how to best achieve an electronic reporting system for charter vessels. The technical subcommittee met May 27-28, 2014 to develop recommendations to the Councils. The technical subcommittee reached consensus of several aspects on a proposed program and identified a framework for implementation.

SECTION 2. OBJECTIVES

The Councils appointed this technical subcommittee (membership list below) to develop recommendations to implement an improved data collection program to support the needs of science, fisheries management, and address stakeholder concerns about data quality and redundancy in reporting. Specifically, the technical subcommittee was charged with developing recommendations to implement electronic reporting for charter vessels in the Gulf of Mexico and US South Atlantic in support of the following objectives:

- Increasing the timeliness of catch estimates for in-season monitoring;
- Increasing the temporal (and/or spatial) precision of catch estimates for monitoring;
- Providing vessel-specific catch histories for management;
- Reducing biases associated with collection of catch statistics; and,
- Increasing stakeholder trust and buy-in associated with data collection.

SECTION 3. TECHNICAL SUBCOMMITTEE MEMBERS

3.1 Membership

- Gregg Bray – GSMFC
- Ken Brennan – SEFSC
- Mike Cahall – ACCSP
- Mike Errigo – SAFMC
- Mark Fisher - TPWD
- John Froeschke – GMFMC
- Eric Hiltz – SCDNR
- Doug Mumford – NCDENR
- Ron Salz – MRIP
- Beverly Sauls – FWC
- George Silva – HMS
- Andy Strelcheck – SERO

3.2 Timeline

- May 2014 – Technical subcommittee meeting in Tampa, Florida
- June 2014 - Provide meeting summary to Councils for review and guidance;
- July 2014 - Technical subcommittee conference call to discuss Councils' review and guidance;
- September 2014 - Technical subcommittee webinar to discuss items needed to complete the report;
- November 2014 - Draft report sent to subcommittee for review;
- December 1, 2014 - Provide report to Gulf and South Atlantic Councils.

SECTION 4. RECOMMENDATIONS

The technical subcommittee discussed trade offs and limitations of potential modifications to fisheries reporting in for-hire fisheries. The subcommittee agreed (by consensus) on preferred approaches for several aspects and discussed barriers to implementation of a new program. The subcommittee solicited and received preliminary input from both Councils following the May 27-28 meeting. This guidance has been integrated into the report to the extent practibable yet, the recommendations remain those of the technical subcommittee.

The subcommittee emphasized that the program should ***not*** be designed around a single species, and should be flexible enough to accommodate different reporting requirements for different segments of the for-hire fleet. For example, if federally permitted vessels were required to report more frequently during the recreational red snapper season, other vessels that do not participate in this fishery should be able to continue reporting at their normal frequency. Similarly, an electronic reporting system should be able to accommodate vessels already required to carry VMS units for participation in commercial fisheries without necessarily requiring all for-hire vessels to report through VMS. Although not currently required, the Gulf Council expressed interest in using VMS and hail-out, hail-in protocols to improve effort estimates. This practice certainly could improve the quality of effort estimation in the for-hire fleet, although, implemenation would not be without challenges. The cost of a VMS program both in terms of vessel equipment and agency staff/infrastructure would require additional, long-term funding (see section about costs). This may be beyond current resource availability. Rather than recommend fleet-wide implementation of VMS and hail-out, hail-in requirements, the subcommittee recommends structuring the charter fishery monitoring program such that it is scaleable and expandable as management needs, technology, and funding availability change. This recommendation would allow improved data collection in the near term building on the recently implemented electronic reporting system for southeast region headboats (i.e., weekly, electronic reporting) and the MRIP charter vessel pilot program, yet would not require full implemention of VMS to move beyond the current process.

The current survey methodology was deemed inadequate to meet the objectives posed to the group (although not necessarily the original intent of the charter vessel survey). Specifically, timeliness, bias reduction, and stakeholder buy-in could be improved with an electronic reporting system without the inherant expense and time for implementation of VMS technology in the charter fleet (of course, the introduction of new biases is possible). These improvements are necessary given the requirement to establish annual catch limits for federally managed species and close the fishery when the target harvest level has been caught each year. This requirement for in-season quota monitoring is far beyond the management needs when the original charter vessel survey was designed and implemented and the guidance herein attempts to match the data collection effort to the needs of the current and future fisheries management.

4.1 Mandatory or voluntary participation

The technical subcommittee discussed participation in any new charter vessel monitoring program. Specifically, the subcommittee considered if participation in the program by charter vessel owner/operators could be voluntary or if mandatory participation is necessary. Voluntary

reporting programs can be advantageous in that reporting burden is reduced (or absent) from participants that do not wish to participate. This would also reduce the number of reports that require processing for catch and effort estimation. However, in absence of a complete sample, estimation procedures are necessary. Estimation procedures can be accurate and robust in a well-designed survey, however, likely at the expense of reduced timeliness. Developing estimates of total catch from a volunteer program is problematic as the proportion of participants may be highly variable through time or across the survey area and volunteer participants may not be representative of all possible participants in this survey. This pattern has been demonstrated previously (e.g., angler avidity) in other studies of volunteer programs and will bias estimates when expanded to the total sector. Voluntary programs would also require careful consideration of the characteristics of the participants and those who choose not to participate as it is impossible to compare catch patterns with participants and non-participants; and an assumption that they are identical is necessary but likely inaccurate. The subcommittee agreed that the potential for bias is too great to recommend any voluntary reporting program and suggested that any program (i.e., census or survey) require reporting from participants be mandatory if selected (e.g., Southeast Region Headboat Survey (SRHS)).

The subcommittee agreed that the potential for bias is too great to recommend any voluntary reporting program and mandatory participation is necessary for vessel/owneroperators selected. This is recommended to best achieve the overarching objectives of the proposed program.

4.2 Survey or census

Both census and statistical surveys can (and are) used to estimate catch and effort in marine fisheries. Surveys are beneficial in that a representative sample of anglers (as opposed to the entire "population" of anglers in the fishery) and their catch is used to estimate the total catch. However, management often requires these estimates over relatively small areas, short-time scales, or for rare event species. In these situations, survey estimates sometimes lack the precision necessary or desired for management decisions.The common remedy is to increase sample effort (i.e., sample size) to achieve desired precision levels, however, the necessary sample size may exceed program resources. An additional challenge of surveys is that the strata (e.g., area, time-period) require complete coverage before making an estimate. In practice, this means that surveys generally have a longer lag between the time fishing occurs and when the resulting data are available for use.

A census provides a sum of the total effort and catch by tabulating these metrics from all participants in the fishery. In theory, reporting and subsequent use of these data in management can be rapid as no additional estimation procedures are necessary and the report submission frequency can be established (e.g., weekly) to balance management needs with reporting burden on fishery participants. In practice, estimating catch and effort from a census can be challenging if some participants do not report their catch and effort data within the specified reporting periods. In this event, the census is incomplete and requires an expansion factor to calculate the total catch and effort. As with any survey design, this estimation routine requires additional time, resources, and reduces precision of the estimate. In extreme cases, expanding an incomplete census to a total estimate can be difficult or impossible if the proportion of non-compliant

participants is large or if the non-compliant participants are markedly different than those that are reporting as required. Nonetheless, this capability is essential in a real-world census and is important to consider when developing reporting requirements (frequencies and accountability measures) and minimum acceptable lag-time for use in fisheries management.

The technical subcommittee recommends the development and implementation of a electronic logbook *census* program to estimate catch and effort for southeast region charter vessels, including procedures for expanding for non-reporting. This recommendation was based in part on the inability of the current survey to meet the needs of science and management applications and the requirement of timeliness beyond which is readily achievable through a survey approach.

4.3 Reporting frequency

The subcommittee discussed how often reports need to be submitted to provide timely data for science and management. Frequent reporting has at least two benefits. Reporting as frequently as practicable reduces recall error/bias when producing catch reports. Frequent reporting also can make these data available for use sooner. Currently, the GMFMC and SAFMC require electronic reporting on a weekly basis for commercial seafood dealers and federally permitted headboat operators. Similarly, the subcommittee recommends mandatory weekly reporting, or at shorter intervals if necessary (e.g., The Gulf Council may want to require daily logbook submission during the recreational red snapper season) for a new charter vessel program. A second recommendation was that reports be due from the prior fishing week as soon as practicable. Commercial seafood dealer reports must be submitted by the Tuesday following the previous fishing week (Monday through Sunday). This was considered preferable over the headboat reporting requirements where trip reports are due one week after the end of the fishing week. The reduced lag addresses both advantages identified above.

The technical subcommittee recommends trip level reporting with weekly submission due the Tuesday following each fishing week. This would include no activity reports that could be submitted in advance if periods of inactivity are known. The technical subcommittee discussed that a daily reporting requirement may not be feasible or enforceable, however, reporting systems and user interfaces should be designed to encourage "real-time" at-sea reporting of catch and catch related data elements (e.g. fishing location, fishing method, target species).

4.4 Data collection

A variety of software applications are available for data collection and submission including web, smart phone, and tablet based technology. Web-based software provide the capability to report fisheries data after completing the trip. Smart phone or tablet technology could be used for at-sea or real time reporting of catch and effort. This approach may limit the complexity of reporting options but could provide enhanced validation methods because catch and effort data could be submitted before returning to port allowing enhanced dockside validation. Smart phone and tablet technology can also allow for data input without a current

network connection and are also capable of recording vessel positions during a trip via global positioning system (gps) (a far cheaper technology than VMS, but not in real-time).

The subcommittee recommends a multi-faceted approach where a number of reporting platforms can be used so long as the minimum data standards and security protocols are met. Data standards would need to be developed and the subcommittee agreed that NOAA Fisheries, the GulfFIN, and ACCSP could work collaboratively to develop appropriate standards.

These recommendations encompass two overarching objectives of the monitoring program: 1) Flexibility for specific regions, species, or time periods; 2) A flexible framework to allow incorportion of improved technologies as they become available. Electronic monitoring and reporting capabilities are rapidly evolving and the options available in the near-future may far exceed the current suite of tools. It is necessary to allow (and encourage) this developement such that in can be leveraged effectively to meet the needs of fisheries management.

4.5 Data storage and management

The subcommittee discussed data storage and management that would be necessarily expanded from the status quo in a census based monitoring program. The ACCSP and GulfFIN expressed willingness to handle these raw data and indicated this could be accomplished with extant resources.

The subcommittee recommends this process:

1. Logbook data collected via authorized platform, ex. web, tablet, phone, or VMS application
2. Data submitted to ACCSP or GulfFIN;
3. Data integrated by ACCSP or GulfFIN into single composite data set;
4. Composite data set distributed to appropriate agencies for analyses and use.

This process could eliminate duplicate reporting for some participants so long as appropriate data standards are in place and the respective agencies agree to confidentiality standards, which would allow sharing and accepting one another's data for use. Elimination of duplicate reporting (e.g., separate state and federal reports) would be a substantial benefit to participants in this survey program and could mitigate any additional reporting requirements for comparison to the current MRIP survey program.

4.6 Validation and estimation

A successful electronic for-hire program will require adequate validation of catch and effort data and will require collaboration among state, federal, and fishery information network (FIN) programs. A census is likely to be incomplete and estimation procedures for adjusting catch estimates will need to be developed in cooperation with MRIP. The time lag necessary to expand an incomplete census to an estimate (of harvest or effort) should be built into the

timeliness need for science and management applications. The Gulf MRIP pilot program tested new validation procedures and provided guidance on improvements necessary before full implementation. The pilot program was successful in that electronic reporting was used (almost exclusively) and supported many of the goals (e.g., more timely, simplified reporting process) yet, many participants failed to submit reports within the required time frame complicating the use of these data for management. The rates of compliance increased over the length of the pilot study period and similar result would be expected with full implementation highlighting the need for validation and an estimation procedure to calculate total catch and effort.

The technical subcommittee recommends building upon the validation methodology developed in the Gulf MRIP pilot study. An overview of the proposed methodolgy is below.

Dockside Validation of Logbook Trip Reports (Catch and Effort)

Validation procedures are critical to assessing the accuracy and completeness of submitted logbook reports. Critical components of validation include the creation and review of a site and vessel registry, and methods to validate catch and effort of self-reported data. There is currently a MRIP funded project; *Pilot Project; Validation Methods for Headboat Logbooks,* which is testing dockside sampling methods that could be used to validate headboat logbooks. Results from this project will be available in the spring of 2015.

Site and Vessel Registry

A registry of all vessels required to report via logbooks should include detailed docking location information for each vessel. The port city and mailing address for owners of all federally permitted vessels (both active and non-active) is available from the permit frame maintained by NMFS SERO, and may be used as a starting point for indentifying where vessels are located. A regularly updated list of all active charter vessels (both federal and state permitted) with docking site information is also maintained in states where the MRIP FHS is administered. From the vessel registry, a list of all known docking locations should be generated and each site should be given a unique identification code. Information contained in the site list should also include site location descriptions, site telephone numbers, contact person at the site, GPS location coordinates, and the total number of vessels located at the site. The site registry should be used to randomly select sites for dockside validation assignments (described below).

Validation of Catch

Dockside assignments for validating harvest should be randomly selected from the site registry and stratified by region (e.g. state or sub-region within large states) using probability proportional to size (PPS) sampling with replacement, with the size measure being the number of vessels at each site. This method is used in statistical sampling designs where sample clusters (e.g. sites where charter vessels dock) differ widely with respect the number of sample units (charter vessels) contained within. PPS sampling selects sites with a higher number of vessels more frequently and prevents potential sample bias by insuring that vessels at low pressure sites do not have a higher probability for selection. Sample days should be distributed across weeks and across weekend/weekday strata, and more weight should be given towards high fishing activity periods (summer and weekends). It is recommended that the site selection program be run monthly by a regional coordinating entity, such as GSMFC, who provides draw files to local

coordinators (states or other entities). Local coordinators should report tallies for the number of completed assignments and successful interviews to the regional entity weekly.

During an assignment, field samplers should arrive at the assigned site at least one hour before half-day charter fishing trips are expected to return. For sites where overnight fishing trips take place, field staff should call or visit the site the day before the assignment to determine if overnight trips are returning and arrive on site early if necessary to intercept those vessels. Upon arrival, samplers should survey the site and attempt to locate each vessel listed on the vessel register for that site. Each vessel at the site should be recorded on an Assignment Summary Form and coded as one of the following:

1 = vessel in
2 = vessel out, charter fishing (this must be verified)
3 = unable to validate (vessel sold, moved to unknown location, etc.)
4 = vessel out, NOT charter fishing (this must be verified)
5 = vessel out, fishing status unknown (use when unable to verify the fishing status)

For vessels coded as 2 (out charter fishing), the field sampler should attempt to verify the expected return time and record this time on the Assignment Summary Form. As each vessel returns from fishing, the sampler should record on a separate Dockside Intercept Survey Form the vessel name, vessel ID number, and the return date and time. Samplers should first approach the vessel operator for permission to weigh and measure all harvested fish, and the sampler should then observe the harvested catch and record the total number of fish for each species, as well as length at the mid-line (mm) and weight (kg) of whole fish that can be measured. After the catch is inspected, the field sampler should then conduct an interview in person with a crew member (captain and/or mate). It is important to conduct interviews directly with vessel operators, rather than with charter vessel clients, since the purpose of the dockside validation is to measure recall error and bias in trip data recorded by vessel operators on logbook trip reports. During the in-person interview, the following information should be recorded:

- Departure date
- Departure and return time
- Number of passengers (fishing and non-fishing, not including crew)
- Number of anglers (total number of passengers that fished at any time during the trip)
- Number of crew, including captain
- Target species
- Primary area fished (crew should be asked to identify the statistical area where the majority of fishing took place during the trip using statistical maps provided)
- The minimum and maximum depths (in feet) fished for the trip
- The percent of fishing time spent fishing in federal waters, state waters, and inland waters
- Primary fishing methods (bottom fishing, drifting, trolling, spear fishing)

- Hours fished (number of hours spent with gear in the water)
- For each species released or could otherwise not be observed by the field sampler, the total number released for each disposition:

  1 – Thrown back alive

  3 – Eaten/plan to eat

  4 – Used for bait/plan to use for bait

  5 – Sold/plan to sell

  6 – Thrown back dead/plan to throw away

  7 – Other purpose

Samplers should remain on site until the last vessel known to be out fishing has returned (with the exception of overnight trips).

Validation of Vessel Activity and Inactivity (Effort)

Validation of vessel activity (or inactivity) is critical to determining compliance with logbook reporting requirements. Information on whether or not a vessel is in or out of port on a particular day can be matched with logbook records or hail out/hail in requirements to determine if vessel activity was accurately reported. To validate vessel activity and inactivity before reporting in the logbook reporting system, sites should be clustered into groups of sufficient size that all sites within the selected region may be visited within a 6 to 8 hour time period, including driving time. Site clusters should be selected each week within a month using simple random sampling, without replacement. For small states where all sites may be visited in a single day, sites may all be included in a single cluster that is validated each week.

During a scheduled vessel activity validation assignment, the field sampler should visit all sites within a selected vessel activity validation region and attempt to verify the fishing status for all vessels at each site within that region. The sampler should record the fishing status and time for each vessel on a Vessel Status Validation Form using the following codes:

1 – Vessel in

2 – Vessel out, charter fishing (must be verified)

3 – Unable to validate

4 – Vessel out, not charter fishing (must be verified)

5 – Vessel out, status unknown

If possible, the sampler should verify the fishing status with someone at the dock or in the booking booth. If unable to verify the fishing status of a vessel, the sampler should use code 5.

Dockside validation will also serve the secondary, and essential, function of collecting biological samples from the for-hire fishery. These samples are necessary to characterize the

catch for use in stock assessments and to monitor the health of the stocks. If practicable, the subcommittee recommends using observers on six-pack charter vessels. Additionally, VMS in conjunction with hail-out, hail-in to improve validation could be considered to improve validation and data quality, although at the expense of additional cost and reporting burden.

The subcommittee recommends use of an MRIP certified methodology for validation with the following elements: Gulf MRIP pilot study methodologies, including dockside validation of catch and vessel activity, and maintenance of site and vessel registries.

The following additional elements should also be considered:

- At-sea observer coverage; and,
- Fine-scale discard data, depths of capture, area fished, release mortality.

If VMS and hail in/hail out requirements are implemented, methods for validation could be modified as VMS technicians could validate when trips occur through vessel position coordinates.

4.7 Accountability measures

Procedures to ensure timely and accurate reporting of data are essential to the success of any program. Late or missing reports can reduce accuracy (recall bias), increase uncertainty (e.g., requires procedure to estimate catch from missing reports), and can prevent timely use of these data for science and management. The Councils recently began requiring electronic submission of reports from commercial seafood dealers. Dealer reports and the associated problems with late or missing reports were discussed at length by the Councils. The Councils now require timely submission (weekly, with reports submitted by the Tuesday following the previous fishing week) and that seafood dealers are *only* authorized to purchase seafood if they are up to date on previous reports. A similar procedure should be developed for charter vessels requiring submission of previous reports to maintain a valid charter vessel permit and take passengers on for-hire trips. The subcommittee recognizes that accountability will be challenging and costly to implement due to the mobility, turnover and sheer number of charter vessels.

The principle objective is to encourage compliance without issuing fines and/or penalties. However, the full range of potential accountability measures should be enumerated in consultation with NOAA General Counsel through development of management regulations and penalty schedules. Similar (or identical) reporting requirements should be established between the South Atlantic and Gulf of Mexico management regions that will ease reporting burden and aid in compliance. Extensive outreach, training (as necessary), positive messaging, and industry participation in the design of the data collection system should aid in reporting compliance and meeting the goals of the program.

The subcommittee recommends accountability measures and reporting requirements similar to those implemented for commercial seafood dealers in the southeast

region (i.e., weekly submission of trip level reports, including periods of no activity due Tuesday following each week). A charter vessel owner/operator would only be authorized to harvest or possess federally managed species if previous reports have been submitted by the charter vessel owner/operator and received by NMFS (NMFS) in a timely manner. Any delinquent reports would need to be submitted and received by NMFS before a charter vessel owner/operator could harvest or possess federally managed species from the EEZ or adjacent state waters.

4.8 Calibration with existing survey

Transitioning into the proposed program will require an upstart period of at least one year to conduct outreach and ensure a high level of compliance. **The subcommittee recommends dual survey methods (existing and new) for no less than three years.** This overlap in survey periods will provide a basis to calibrate the new census results to the historical catch and effort data from the existing charter vessel survey. Historical catch data are critical inputs for science (e.g., stock assessments) and management (e.g., season length) and implementation of a new system without calibration would compromise the value of the historical catch information. Additionally, implementation of the new program is likely to have start-up difficulties that require modification, as such, the *existing survey would not be expected to provide the best scientific information available (at least for the first year)* until the new program is deemed operational.

Data from the new program would not be expected to provide management advice during the first year of operation. Moreover, this would allow the possibility of an initial phase-in or limited implementation to identify and solve significant problems prior to implementation for all participants.

4.9 Should state permitted for-hire vessels be required to participate?

The subcommittee discussed the objectives of the proposed program (i.e., improved estimates of catch both in terms of timeliness and accuracy), as well as the importance of mandating participation from state permitted for-hire vessels. The possibility of state vessels landing federally managed species in state waters does exist but the magnitude of those landings is unknown at this time, but expected to be relatively small for most federally managed species. The difficulties in establishing rules to mandate state vessel participation may be too great and should not be a barrier to developing a reporting program for federally permitted vessels. However, incorporation of state vessels into the program should be a long-term objective that would aid in timeliness and accuracy of data from the entire for-hire fleet and could simplify validation protocols that would not require distinguishing between state and federally permitted vessels.

The subcommittee recommends that the Councils move forward with development of a reporting system that includes federally permitted for-hire vessels while also exploring ways to determine the impact of state permitted vessels on landings estimates of federally

managed species. Long term, the subcommittee recommends that both state and federally permitted charter vessels participate in this census to include the entire fleet of charter vessels harvesting federally managed species.

4.10 Program coordination

The subcommittee discussed that the success of the program requires a smooth and well-coordinated program throughout the region. This is to meet timeliness needs, improve accuracy (and precision), and minimize duplication of effort.

To this end, the subcommittee recommends that GulfFIN and ACCSP committees work jointly with end users (i.e., MRIP, SERO, SEFSC, HMS, and state agencies) to coordinate this new reporting program. Both quality control and quality assurance units in the program to ensure data meets required standards. A timeline for program implementation must be developed with the Councils, states, and other agencies.

4.11 Budgetary implications

The vision of the subcommittee is that the proposed census program may be funded through MRIP and incorporate MRIP certified validation and estimation procedures but operation would be decentralized from MRIP to regional and state entities through their FINs**. It is expected that the census approach recommended by this subcommittee would result in additional costs for monitoring compliance and validating trip activity. Additional infrastructure and personnel may be necessary to maintain and process these data.**

Electronic Logbook Costs

Cost estimates are an important component to the development of any new reporting program, and provide resource managers and scientists with a sense of how much funding is needed to support both implementation and maintenance of a program. Costs for electronic reporting may include: software development, reporting and/or monitoring hardware, monthly service fees, and personnel for data management, validation, and estimation. Costs are incurred both by the government, as well as fishermen who report these data. The following provides a summary of estimated costs for the electronic reporting program developed by the Technical Subcommittee. Cost estimates from existing programs and pilot studies, such as MRIP, the Southeast Headboat Survey, the commercial coastal logbook program, and the MRIP electronic logbook pilot study, are also provided for comparative purposes. Implementation of a new reporting program would require side-by-side comparative testing for calibration purposes, and those costs are not considered herein. Costs for observer coverage are also not included. Rather, costs are focused on the initial implementation, ongoing administration, data management, and statistical estimation of an electronic reporting program in the Gulf of Mexico and South Atlantic.

<u>Current and Pilot Study Program Costs</u>
The Marine Recreational Information Program (MRIP) is the primary source of charter for-hire data in the Southeast Region. MRIP collects catch and effort data from both state-licensed and

federally-permitted charter vessels from North Carolina through Mississippi. Charter vessel catch and effort data are also collected by the Louisiana Department of Fish and Wildlife and Texas Parks and Wildlife Department through creel surveys, and side-by-side comparison testing is planned for Louisiana in 2015. Annually, MRIP spends approximately $4.3 million dollars to conduct dockside sampling and validation in the Southeast Region (North Carolina to Louisiana) for both private and charter vessels. Costs for specifically conducting charter sampling were not estimated, as those costs are difficult to estimate due to a combination of factors (survey procedures, contractual pricing, fixed costs and staffing/administrative considerations), but obviously would be less than the overall costs indicated above. An additional $600 thousand dollars is spent conducting the for-hire telephone survey annually. A total of 3,920 charter vessels are currently included in the MRIP for-hire survey frame.

Headboat catch for 145 vessels is monitored through electronic logbooks by the SEFSC. A total of 13 federal, state, and contract personnel are involved in administering the program and monitoring fishing activity from North Carolina to Texas, including biological sampling and validation of reports of landings and effort. Costs for the program include salaries and benefits, vehicles, travel, supplies, and software development and maintenance. Total funding for the Southeast Headboat Survey is approximately $888 thousand dollars, which equates to $6,124 per vessel annually.

The SEFSC coastal logbook program for commercial fisheries is a paper-based logbook program, which obtains data from about 3,000 permit holders (vessels). Annually, the SEFSC spends $775 thousand dollars for data entry, personnel, printing, storage, software maintenance, and overhead for this program. These costs do not include Trip Interview Program sampling, which is used for validation and biological sampling of commercial landings. The costs also do not include compliance enforcement.

Lastly, MRIP conducted an electronic logbook pilot study in 2011. The study included 410 vessels from the Florida Panhandle and Port Aransas, Texas. Costs for the pilot program included $213.5 thousand dollars for start-up expenses, including a stakeholder workshop, software development, certified letters, outreach meetings, and working group meetings. Project expenses for logbook reporting and validation for one-year totaled $385.6 thousand dollars. These expenses included salaries and overhead for a full-time coordinator, a database manager, and four field staff. Expenses were also included for travel and training expenses, equipment, printing costs, at-sea observer passenger fares, and GSMFC administrative costs. The average cost per vessel was $1,340 for Texas vessels and $658 for Florida vessels. Many more vessels were concentrated in a small geographic area in the Florida Panhandle, resulting in lower costs relative to Texas. In-kind contributions from NMFS and state employees were not included for many staff who served on the project team for the pilot study and conducted analyses, customer service, and database management. Therefore costs presented in the final report are less than the true costs of the project. On average, the cost per vessel as reported in the pilot study was $911 after excluding observer passenger fares and paper-based logbook printing.

Table 1. Estimated Costs for an Electronic Logbook Program. Estimates are based on 2,555 federally permitted charter vessels. Headboat vessels are excluded from cost estimates, as well as vessels already possessing a commercial reef fish permit and VMS unit.

Activity	Cost Type	Estimated Expenses	Comments/Source
Software Development	Start-up (gov't)	$100,000	Costs for Web site/app development. These costs could be reduced if existing software applications (SE Headboat Survey or iSnapper) are used instead of any new software developed. However, modifications of data fields, data storage and data export procedures would be required to accommodate the increased number of vessels.
Hardware/database infrastructure	Start-up (gov't)	$25,000	Purchase of a server to store data.
Hardware/database maintenance	Reoccurring (gov't)	$20,000	There would be reoccurring costs for hardware/software and database maintenance.
Database manager(s) and administration	Reoccurring (gov't)	$150,000	Salaries and administrative costs for database management.
Certified Letters	Start-up, with period reoccurring compliance letters (gov't)	$15,858	2,643 vessels @ $6 per letter
Stakeholder Outreach Workshops	Start-up (gov't)	$30,000	15 meetings @ $2,000 per meeting
Field Samplers – Salaries, Benefits, and Overhead	Reoccurring (gov't)	$3,392,000	53 port agents @ 50 vessels per port agent. $64,000 for salary, benefits, and overhead per port agent – source SE Headboat Survey. If costs per vessel ($658-$1,340) from MRIP pilot study are used, then total costs range from $1.74 to $3.54 million.
Data Analyst(s) – Salary and Benefits	Reoccurring (gov't)	$215,000	1 Gulf and 1 South Atlantic analyst @ GS-13 salary + benefits
Training, Travel, and Equipment for Field Samplers	Reoccurring (gov't)	$158,700	~$60 per vessel – source MRIP pilot study; costs are higher for more remote areas vs. ports with large concentrations of vessels.
Enforcement and Compliance Monitoring – Enforcement officer salaries, benefits, and overhead.	Reoccurring (gov't)	$800,000	Data timeliness is critical for a logbook program. Additional compliance monitoring and enforcement for misreporting and non-compliance with reporting will be required. To properly conduct compliance an increase of 5 Enforcement Officers and 1 Supervisory Enforcement Officer are estimated to be needed.

VMS units (if required)	Start-up (gov't or industry)	$5,750,000 (low estimate) $7,750,000 (high estimate) (Reimbursement to fishermen for the purchase of VMS units may be available from NOAA Fisheries' Electronic Monitoring Grant Fund, but this money is currently not in hand and OLE would need to request funds through the budgetary process)	Currently 107 charter for-hire vessels have a commercial reef fish permit and VMS unit and another 145 vessels participate in the SE Headboat Survey. Approximately 2,500 charter for-hire vessels would need to obtain a VMS, if required. Costs for VMS units range from $2,300 to $3,800. Up to $3,100 is currently authorized for reimbursement.
VMS installation	Start-up (industry)	$500,000 (low estimate) $1,500,000 (high estimate)	2,500 vessels x $600 for marine technician to install VMS unit. Installation costs range from $200 to $600 depending upon proximity of vessel to marine electrician.
VMS personnel	Reoccurring (gov't)	$530,000	Salary and benefits for five VMS technical staff (monitor 500+ vessels each) and one OLE Helpdesk person.
VMS annual service charges	Reoccurring (industry)	$1,800,000	$60 per month per vessel; $720 annually per vessel x 2,500 vessels
VMS unit software	Reoccurring (gov't)	$50,000	If VMS units will report any unique information, units will need to have initial and periodically updated software installed at a cost up to $50,000.
Total Costs (w/o VMS)		$170,858 (Start-up) $4,735,700 (Reoccurring) $4,906,558 (Start-up + reoccurring)	
Total Costs (w/ VMS)		$6,420,858 (Start-up – low est.) $9,420,858 (Start-up – high est.) $7,115,700 (Re-occurring) $13,536,558 (Total – low est.) $16,536,558 (Total – high est.)	If VMS is required, some expenses for port sampling validation of fishing effort and enforcement compliance may be reduced.

SECTION 5. CHALLENGES

5.1 Calibration with existing survey

The subcommittee recommends the use of dual survey methods (existing and new) for no less than three years. This overlap in survey periods will provide a basis to calibrate the new census results to the historical catch and effort data from the existing charter vessel survey. Historical catch data are critical inputs for science (e.g., stock assessments) and management (e.g., season length) and implementation of a new system without calibration would compromise the value of the historical catch information. Additionally, implementation of the new program is likely to have start-up difficulties that require modification, as such, the *proposed census would not be expected to provide the best scientific information available (at least for the first year)* until the new program was deemed operational.

5.2 Reporting burden

Although frequent reporting with as short as practicable lags between end of fishing period and report submission is desirable, the burden of reporting on vessel operators is an important concern. Wherever feasible, the reporting burden should be minimized. Implementation of this new program would require additional reporting burden over the status quo. To mitigate this requirement, the subcommittee recommends reducing duplicate reporting (submission of reports to multiple agencies, possibly in different formats) to ease reporting requirements. For example, charter vessels selected for the current For-Hire telephone survey should be able to submit their data electronically satisfying the submission requirements for both programs.

5.3 Compliance

Ensuring compliance is likely the biggest barrier to achieving the objectives for this program; more timely data with improved accuracy and stakeholder confidence. The MRIP Gulf logbook pilot project was negatively affected by late or missing reports from participants. In a census program, this is detrimental to both timeliness and accuracy as complete catch estimates cannot be generated with missing reports. Late reporting also affects accuracy because of recall bias (i.e., difficult to remember what was caught several weeks earlier). In addition, an incomplete census will require an estimation procedure to account for un-reported landings that requires time and adds uncertainty to the final catch and effort estimates.

Adequate accountability measures are essential to achieving high compliance rates (i.e., 100% timely reporting). The subcommittee recommended an approach similar to the accountability measures recently developed for commercial seafood dealers and headboats. Briefly, commercial seafood dealers are only authorized (i.e., possess valid permit) to purchase seafood if their weekly purchase reports have been submitted. As is the case with headboat reporting, charter boats would not be allow to harvest or possess federally managed species from the EEZ or adjacent state waters untilprevious trip (including no activity) reports have been submitted. The effectiveness of this accountability measure is dependent of the capability of law

enforcement to enforce reporting requirements. **The subcommittee recommends consultation with the Office of Law Enforcement and NOAA General Counsel to explore the selection of appropriate and enforceable accountability measures.**

5.4 Collaboration with states

Individual States would be tasked with data collection and validation within their collective states. State requirements vary regarding reporting of fishery data with some states (e.g., South Carolina) requiring the submission of paper-based reporting. Other states (e.g., North Carolina) are progressing rapidly toward electronic logbooks with the other states within this range. **Long term**, **the subcommittee recommends that both state and federally permitted charter vessels participate in this census to include the entire fleet of charter vessels harvesting federally managed species.** In the near-term, implementation of electronic logbook reporting for the federally permitted for-hire fleet would substantially improve the data collection program but not depend on delays and uncertainties associated with requiring similar regulations for state-permitted vessels at this time. Consideration of only federally permitted vessels would ease the implementation of this process with the caveat that a large proportion of charter vessels would not be included in the census and their catch (and effort) would have to be estimated via other means that would reduce effectiveness of the census program. However, for state-permitted vessels, requiring electronic reporting without duplicate paper reporting may require legislative changes in some states (e.g., South Carolina) and there is uncertainty if or when this could be accomplished.

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National Marine Fisheries Service Southeast Region Electronic Monitoring and Reporting Regional Implementation Plan

January 8, 2015

NOAA FISHERIES

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Abbreviations Used in this Document

ACCSP	Atlantic Coastal Cooperative Statistics Program
CFMC	Caribbean Fishery Management Council
CMP	coastal migratory pelagic
ELB	electronic logbook
EM	electronic monitoring
ER	electronic reporting
FMC	fishery management council
FMP	fishery management plan
GMFMC	Gulf of Mexico Fishery Management Council
GSMFC	Gulf States Marine Fisheries Commission
IBQ	individual bycatch quota
IFQ	individual fishing quota
ITQ	individual transferable quota
NMFS	National Marine Fisheries Service
SAFIS	Standard Atlantic Fisheries Information System
SAFMC	South Atlantic Fishery Management Council
SEFSC	NMFS Southeast Fisheries Science Center
SERO	NMFS Southeast Regional Office
VMS	vessel monitoring system

List of Terms

Electronic monitoring (EM) – The use of technologies – such as vessel monitoring systems or video cameras – to passively monitor fishing operations through observing or tracking. Video monitoring is often referred to as EM.

Electronic reporting (ER) – The use of technologies - such as phones, tablets, or computers - to record, transmit, receive, and store fishery data.

Electronic technology (ET) – Any electronic tool used to support catch monitoring efforts both on shore and at sea, including electronic reporting (e.g., e-logbooks, tablets, apps) and electronic monitoring (VMS, video cameras, and sensors).

Vessel Monitoring System (VMS) – Electronic monitoring technology that allows the tracking of fishing vessels, including their position, time at position, course, and speed.

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Background

There is a growing need for more timely and accurate data for fisheries management and science. Recognizing these growing demands for data collection, the National Marine Fisheries Service (NMFS) published policy guidance in May 2013 on the use of electronic technology for fishery-dependent data collection (NOAA 2013a). The policy included guidance on the use of both electronic monitoring (EM) and electronic reporting (ER). Later that year NMFS also published a discussion draft summarizing EM/ER guidance and best management practices for federally-managed species (NOAA 2013b), and in January 2014 a national EM workshop was held (Lowman et al. 2014). The May 2013 policy guidance gave specific directive for NMFS to develop regional EM/ER plans.

In the Southeast, there has been growing interest and use of EM/ER. Over the past 15 years, numerous pilot studies have been completed examining the use of EM and ER in federally managed fisheries (see **Table 1**). The Gulf of Mexico and South Atlantic Fishery Management Councils (FMCs) have both required the use of ER and/or vessel monitoring systems (VMS) for shrimp, commercial reef fish, headboats, and federally-permitted dealers, and there is growing interest to expand the use of electronic reporting in the charter for-hire, private, and commercial sectors. Requirements to monitor annual catch limits (ACLs) have also increased the need for more timely data to ensure catch limits are not exceeded and accountability measures are triggered.

Initial input on the plan was solicited from the Gulf of Mexico, South Atlantic, and Caribbean FMCs. An EM/ER Implementation Plan Committee, comprised of Council/NMFS representatives, reviewed a draft plan in November and each Council reviewed (or will review) a revised plan at Council meetings in December 2014 and January 2015. Additional input will be obtained from stakeholders and constituents in January 2015, with the goal of completing the plan by early 2015. Once finalized, the plan will serve as a roadmap for EM/ER development and implementation throughout the Southeast Region.

Table 1. Timeline of electronic reporting and electronic monitoring implementation and testing in the Southeast Region, 2000-present.

2000

- Bluefin Data LLC develops electronic reporting system for Louisiana commercial seafood dealers to report their purchases. Electronic reporting via trip tickets later expanded to other Gulf of Mexico states.

2003

- Vessel monitoring systems required for South Atlantic rock shrimp (SAFMC 2003)

2004

- Phase I testing of shrimp ELBs begins (Cole et al. 2005)
- Electronic reporting via trip tickets expanded to North Carolina

2006

- Vessel monitoring systems required for Gulf of Mexico commercial reef fish vessels (GMFMC 2005a)

2007

- Commercial red snapper IFQ program implemented; IFQ dealers required to report electronically via Web-based system; IFQ allocation transfers completed electronically (GMFMC 2006)
- Gulf of Mexico shrimp vessels selected by NMFS to report are required to participate in the ELB program to collect shrimp effort data (GMFMC 2005b).

2008

- Electronic monitoring pilot study conducted onboard Gulf of Mexico longline vessels (Pria et al. 2008)

2009

- Southeast Region Headboat Survey begins testing a PC-based ER system for headboats.

2010

- Commercial grouper-tilefish IFQ program implemented; IFQ dealers required to report electronically via Web-based system; IFQ share and allocation transfers completed electronically (GMFMC 2009)

2011

- iSnapper pilot study begins testing recreational ER via a iPhone/iPad application (Stunz et al. 2014)

2012

- Tablet and phone-based ELB pilot testing begins for headboats participating in the Southeast Region Headboat Survey.
- Electronic monitoring pilot study conducted onboard commercial snapper-grouper bandit reel vessels (Baker 2012).
- Gulf of Mexico Shareholder's Alliance begins testing EM on Gulf of Mexico Fishing Vessels (Tate 2012)
- Electronic reporting via trip tickets expanded to South Carolina and Georgia

2013

- Pilot testing of phone-based ELBs begins in the U.S. Caribbean (Steinback 2014).
- Mote Marine Laboratory receives NFWF funding to establish an electronic monitoring center to advance regional capacity transition to EM

2014

- A new cost-sharing program for Gulf of Mexico shrimp ELBs is implemented to collect fishing effort data. Shrimp vessels must participate if selected to report by NMFS (GMFMC 2013a).
- South Atlantic and Gulf of Mexico headboats required to report logbooks electronically (SAFMC/GMFMC 2013).
- South Atlantic and Gulf of Mexico federally permitted commercial dealers required to report purchases electronically (GMFMC/SAFMC 2013)
- Pilot testing begins to evaluate the use of ELBs for commercial vessels in the Gulf of Mexico and South Atlantic (see GMFMC August 2014 briefing book accessible at: www.gulfcouncil.org).
- Southeast Regional Office begins development of the Bluefin Tuna Individual Bycatch Program, which will track landings and bycatch of bluefin tuna in the Atlantic and Gulf of Mexico.

Goals and Objectives

The goal of this plan is to provide an operational strategy for implementing and expanding the use of EM/ER for federally managed commercial and recreational fisheries in the Southeast Region. Numerous data collection challenges currently exist in the Southeast Region. Some of the primary challenges that EM/ER may address include reducing time lags in reporting which can prevent or reduce ACL/quota overages, improving the precision of recreational catch estimates, increasing the amount of data available for estimating regulatory discards, providing catch records histories for commercial and for-hire vessels, increasing sampling efficiency, and reducing redundancies in data collection. Addressing these many challenges can help fishermen, scientists, and managers by prevent overfishing and harvest overages, improving stock assessments and scientific research, and providing greater flexibility through use of innovative management strategies.

In the Southeast, the primary focus is on expanding the use of ER to improve the quality and timeliness of fisheries data for use by managers and scientists. Greater, more immediate benefits are expected to be realized through expanded use of ER, especially if reporting accuracy and precision are improved and more timely data can be validated to reduce data collection biases. Although the Southeast Regional Office (SERO) and Southeast Fisheries Science Center (SEFSC) view EM as important to improving science and management, development and implementation of EM, especially use of video camera systems, is considered a longer-term implementation goal than ER for most fisheries. There are already many fisheries in the Southeast using VMS for EM and SERO and the SEFSC see great utility in this technology for habitat protection and enforcement of fishery regulations.

The primary objectives of this plan are to:

1. Define regional objectives for the use of EM/ER;
2. Establish a framework for EM/ER development and implementation in the Southeast;
3. Identify challenges impeding the use of EM/ER in the region and potential solutions for overcoming those challenges;
4. Develop a prioritized list of fisheries suitable for EM/ER implementation;
5. Identify and quantify (where possible) costs and infrastructure needed for expansion of EM/ER use; and,
6. Develop a process for reviewing progress made toward EM/ER implementation.

Additionally, this plan generically discusses timelines for implementing EM/ER in various fisheries and sectors, but it is recognized that in many situations implementation and use of EM/ER will be contingent on the feasibility of the technology and input, recommendations, and regulatory actions made by the regional FMCs. Therefore, the plan is not overly prescriptive as to when EM/ER may be implemented.

The primary goal for increasing the use of ER in the Southeast Region is to improve data timeliness, accuracy, and precision for use in management and science. This goal was also identified by each of the three regional FMCs when submitting input on this plan. More timely data are needed to aid management with monitoring catch and bycatch, setting season lengths, evaluating catch limits, and incorporating the most recent data into scientific studies and management.

In addition to expanding the use of ER, the SERO and the SEFSC are interested in exploring the use of EM. The primary goal for increasing the use of video monitoring in the Southeast Region is to improve documentation and monitoring of catch and bycatch in federally managed fisheries, and interactions with protected species. Benefits of such technology must be weighed against costs, potential stakeholder opposition, and the size and characteristics of vessels operating in each fishery.

SERO and the SEFSC are also interested in expanding the use of VMS. VMS are already used in many fisheries to aid enforcement and enhance monitoring. The primary goal for requiring and expanding the use of VMS technology in the Southeast Region is to improve quota monitoring and tracking, especially for catch share managed fisheries, and to ensure compliance with spatial management regulations. VMS are also useful for estimating effort and catch, which is currently done in the Gulf of Mexico shrimp fishery. Similar to video camera systems, the required use of VMS must be balanced against the costs of use and stakeholder support.

In addition to the goals described above, other regional goals for EM/ER include, but are not limited to: 1) improving perceptions and stakeholder buy-in regarding the data collection process through implementation of robust, validated data collection programs; 2) increasing data accessibility for managers, scientists, fishermen, and other constituents; and 3) developing standardized reporting practices and systems that reduce reporting burden and enhance quality control/quality assurance of submitted data.

Framework for EM/ER Implementation

The need for EM/ER is driven by clearly identified problems. Application of EM/ER can in some cases have significant costs and solutions to known problems must be clearly identified that articulate the need for EM/ER before it is pursued. Successful implementation of EM/ER requires a well-defined process. The process should outline steps for assessing EM/ER needs, development, implementation, and evaluation, with particular emphasis on whether EM/ER could augment or replace existing systems (NOAA 2013b). As proposed in NOAA's draft guidance and best practices for EM/ER (NOAA 2013b), the SERO and SEFSC, in coordination with its partners, intends to use a six phase process for EM/ER consideration and development (**Figure 1**). Each of these phases, and how they will be applied, is further discussed below.

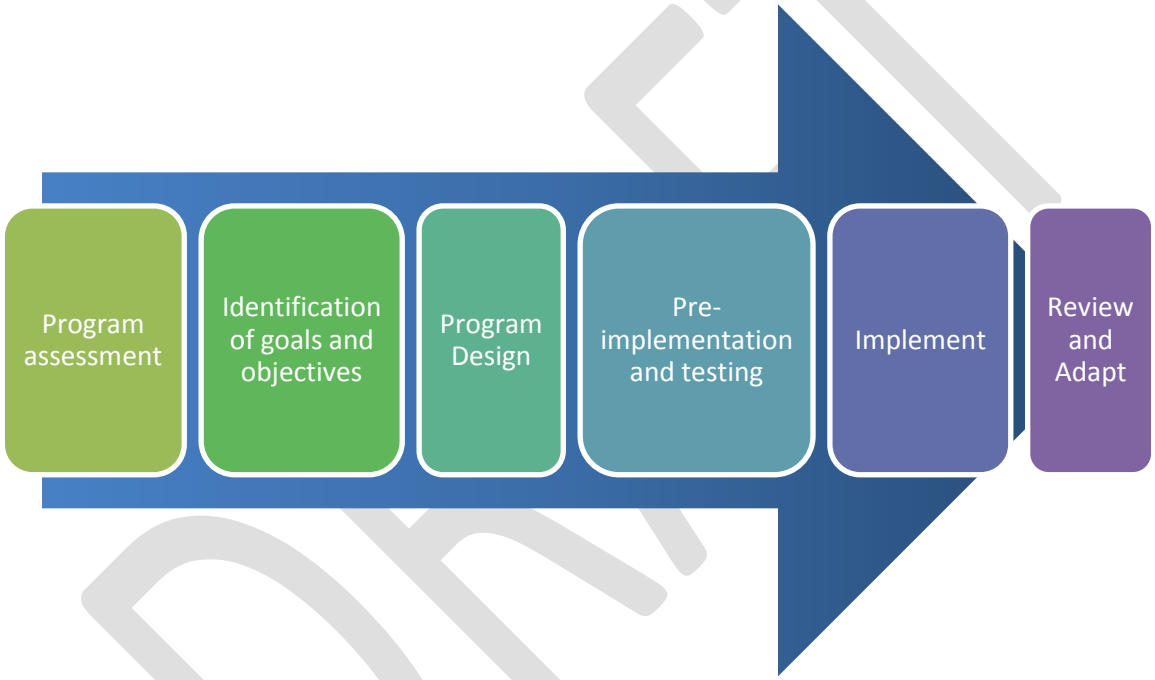

Figure 1. Phases of electronic monitoring and electronic reporting consideration and development.

Phase I – Assessment

Each fishery and sectors within a fishery have unique characteristics and EM/ER needs may greatly vary from fishery to fishery and one sector to another. There are a variety of different tools for monitoring and reporting, but each has strengths and weaknesses (NOAA 2013b). For each fishery or sector identified as a priority for EM or ER, the SERO and SEFSC, in coordination with its partners, will conduct an initial assessment of monitoring tools that may be appropriate for that particular fishery. Capabilities and limitations of EM/ER will be clearly identified within the context of the current monitoring system. Existing infrastructure, funding sources, critical

data gaps, stakeholder support/opposition, and management objectives will all be considered during the assessment phase and challenges impeding implementation will be identified.

It is critical that EM/ER objectives align with fishery management objectives and are not counter to scientific objectives. Stakeholders depend on accurate data for managing and assessing fish stocks, and it is important that stakeholders have confidence in the data (NOAA 2013b). The willingness of industry, state agencies, data collectors, and other stakeholders to use EM/ER will first be assessed before proceeding with further development. Stakeholder engagement in the Southeast will occur in many different ways and include: discussions at regional FMC meetings, state commission meetings, scientific panels, and stakeholder public hearings. Ultimately, costs must be realistic and affordable to the agency and stakeholders before proceeding. Consistent with the NOAA Electronic Technologies Policy (NOAA 2013a), no fishery-dependent ET program will be approved by NMFS if it creates an unfunded or unsustainable cost of implementation or operation contrary to applicable law or regulation. NMFS will work with the Councils and industry where cost sharing of monitoring costs is deemed appropriate, and develop where applicable transition plans from present to future funding arrangements.

Phase II – Identification of Monitoring Program Goals and Objectives

Clearly defined objectives are essential to successful development of catch monitoring systems. Too often, constituents and managers focus on tools for collecting data electronically before focusing on what information is needed to enhance management of the fishery. Additionally, objectives can vary greatly depending on whom you ask, making it complicated for those designing EM/ER data collection systems and tools to have a clear understanding of what is being accomplished.

Goals and objectives for EM/ER will be developed in coordination with the regional FMCs, state partners and commissions (e.g., ACCSP, GSMFC), enforcement, stakeholders, data analysts, and scientists. Data needs will be identified based on management plan objectives, scientific needs, and fleet/fishery characteristics. Each FMP's management objectives should be reviewed with ER/EM in mind, and new or modified objectives should be created to support increased use of EM/ER.

Phase III – Program Design

Based on the goals and objectives identified during Phase II, comparative analyses will then be conducted to assess the tradeoffs of different EM/ER systems. Costs, data timeliness and quality, ease of use, enforceability, and industry support, as well as many other factors, will be evaluated to assess the most appropriate options for EM/ER. Once an EM/ER system has been selected for development, a plan for testing and evaluating the EM/ER applications and overall program will also be developed. The pilot test plan will estimate costs and potential challenges, as well as define end-points for testing and steps to achieve full implementation if pilot testing is successful.

The SERO and SEFSC will work with the regional FMCs at this stage in the process and identify any needed regulatory changes for EM/ER programs. We also intend to work with industry members, other stakeholders, and EM/ER vendors to build buy-in, establish trust, identify infrastructure needs, develop regulations, and ensure quality data are collected (Lowman et al. 2014). Prior to implementation, regulatory changes will be made, as needed. Long-term archival storage of the data and how it will be handled for future use will also be considered by information technology staff, managers, and data users. A preferred EM/ER tool will then be selected based on cost considerations, input received, and the strengths and weaknesses of each tool in relation to the goals and objectives defined during Phase II.

The program design selected will need to be scientifically sound and statistically valid as the National Marine Fisheries Service (NMFS) is required to use the best scientific information available for collecting data per National Standard 2 of the Magnuson-Stevens Fishery Conservation Act. EM/ER data collection approaches must be unbiased and there is a need for information to be consistent with historical time series for use in determining the status of stocks. Any fishery-dependent survey or sampling approach developed should be statistically and scientifically certified for use, and a plan for calibrating new data collection methods to old methods should be determined prior to implementation, as needed. Alternative methods for reporting should also be identified in the event of technological problems or catastrophic events.

Phase IV – Pre-implementation

Once an EM/ER tool and program design has been selected, hardware/software and other information technology equipment will need to be purchased. Costs for program development and implementation will need to be determined during Phase III, including available infrastructure that can support new programs and who will pay for the costs of EM/ER. Funding will be needed for infrastructure and to hire agency personnel and/or contractors to support implementation of the EM/ER program. Presuming adequate funding is available, installation of EM/ER equipment will then commence with necessary testing of equipment. Data management, quality control/quality assurance procedures, and handling practices will also be defined and contingencies will be established for EM/ER equipment failure (NOAA 2013b). Costs will also be further refined during this phase and any necessary adjustments to long-term funding needs will be identified.

Pre-implementation should also involve pilot testing. Pilot studies allow for EM/ER equipment and technologies to be tested, and provide an opportunity for modifications and changes prior to full-scale implementation. It is important to involve stakeholders in this stage of the process to gather feedback based on their experience in the pilot and recommendations they think will improve the final product. Pilot studies also can be used to assess if management goals and scientific needs are met, before mandating EM/ER use. For instance, the Gulf Headboat Collaborative is currently testing an allocation-based catch share system that uses VMS and ER technology to track fishing activity and catches. The program is conducted as a pilot, with

approximately $^{1}/_{5}$ of the headboat fleet participating. ACCSP is also funding development and reporting of logbooks via handheld tablets. ACCSP is partnering with the Rhode Island Department of Fish and Wildlife and Rhode Island Party Charter Boat Asssociation on the project. Results from these and other pilots will help inform the Councils, NMFS, and stakeholders as to the utility of EM/ER for use in for-hire fisheries and allocation-based management systems. If successful, these and other pilot studies will serve as a useful basis for longer-term management strategies considered by regional FMCs.

Phase V – Implementation

During the implementation phase, final regulatory changes will be made. Customer service contacts will also be identified to help EM/ER users troubleshoot problems and resolve questions. Personnel (contractors, agency employees) will be properly trained to assist fishermen and dealers with reporting and monitoring requirements. Staff will collect feedback from industry members and vendors to resolve any unforeseen issues and make any needed refinements to the system. Infrastructure will also be expanded based on available funding to support data collected. Initial input, feedback, and results received post-implementation will also be conveyed to the regional FMCs, stakeholders, and other user groups.

Phase VI – Review and Adaption

In the final phase, performance of the EM/ER program will be evaluated. Performance will be evaluated based on identified goals and metrics specified for evaluation. Initially, reviews will happen more frequently, especially for new EM/ER programs, in order to provide more frequent updates and feedback to the regional FMCs, their Advisory Panels and Scientific and Statistical Committees, and stakeholders regarding program performance. Thereafter, periodic reviews of EM/ER programs will be conducted to ensure goals are still being met, funding is adequate, and stakeholder satisfaction remains high.

Technological Capabilities

Numerous electronic technologies are already used in the Southeast Region for reporting and monitoring. Below is a brief description of existing technological capabilities, as well as other technologies that are currently being tested throughout the Southeast Region. Additional information on implementation and testing of various EM/ER technologies in the Southeast Region is contained in **Table 1**.

Electronic Reporting Systems

There are a variety of ways electronic reports are collected from fisheries in the Southeast. These include personal computer based software programs, Web-based software, and applications available on tablets and smart phones. Beginning in early 2014, headboats in the Gulf of Mexico and South Atlantic were required to submit trip-level logbooks electronically. Electronic logbook reports are required on a weekly basis and may be submitted via the Web or smart phone/tablet applications. In August 2014, dealers purchasing federally managed species were required to submit electronic trip tickets using software developed by Bluefin Data LLC or through Standard Atlantic Fisheries Information System (SAFIS) software developed and maintained by the Atlantic Coastal Cooperative Statistics Program (ACCSP). Additionally, a Web-based system is used to report commercial dealer landings and conduct share and allocation transfers for the Gulf of Mexico Red Snapper and Grouper-Tilefish Individual Fishing Quota (IFQ) programs.

Electronic logbooks are also required in the Gulf of Mexico shrimp fishery to collect fishing effort and location information. Gulf shrimp permit holders are required to participate in the program if selected. Shrimp vessels selected to report have data recording devices with global position system (GPS) units that record a vessel's location every 10 minutes. Data are automatically transmitted to NMFS via a cellular phone connection. Vessel speeds are estimated between data points to determine the vessels fishing activity, which can then be used to calculate shrimp fishing effort and bycatch. Costs of the program are shared with shrimp vessel owners. One-time costs to the government for shrimp electronic logbooks (ELBs) were approximately $2 million dollars and reoccurring costs are approximately $313,000 annually (GMFMC 2013c). One-time installation costs for ELB installation were paid for by the government. Reoccurring costs to the shrimp fishermen for data transmission service fees are approximately $120,000 annually.

In addition to the mandatory ER programs discussed above there are also several pilot studies underway or recently completed to test the use of logbooks and other ER systems in commercial and recreational fisheries. These include, but are not limited to a Web-based logbook pilot study of Gulf of Mexico for-hire vessels funded by the Marine Recreational Information Program (MRIP) in 2010-11 (Donaldson et al. 2013), a smart phone/tablet application (iSnapper) funded by the Marine Fisheries Initiative (MARFIN) grant program to test ER in for-hire and private fisheries (Stunz et al. 2014), and a phone-based reporting system

(Digital Deck) to test ER in U.S. Caribbean fisheries (Steinback 2014). In 2013 and 2014, several Gulf of Mexico states implemented or began testing new voluntary or mandatory ER systems for collecting red snapper recreational catch data, and Florida intends to begin a new collection program for recreationally caught reef fish in 2015 (see August 2014 GMFMC briefing book available at: www.gulfcouncil.org). North Carolina will also implement a for-hire electronic logbook program beginning in 2015.

Video Camera Systems

Electronic video monitoring systems consist of a control box, sensors (e.g., GPS, hydraulic pressure transducer, and a winch rotation sensor), and cameras. The control box continuously records sensor data, as well as provides feedback on system operations (Pria et al. 2008). Video images are captured with cameras typically during fishing operations, and may be triggered to go on or off when winches rotate or hydraulic pressure changes. After video imagery is captured, it is viewed to enumerate and identify landed and discarded catch.

Video camera systems are currently not required in any federally managed fishery in the Southeast Region. Two pilot studies were conducted on commercial vessels in the Gulf of Mexico and South Atlantic. Pria et al. (2008) conducted an EM pilot study onboard Gulf of Mexico longline vessels. The study compared catch identification between observer and EM methods. Comparisons showed good agreement (>80%) between observer and EM methods, but identification discrepancies were observed for some species. EM was not able to reliably determine catch discarding due to inconsistent catch handling and limited camera views. Overall, study results indicated EM was useful for collecting fishing activity, spatial-temporal data, and assessing catch composition, but further work was needed to reliably determine catch disposition data.

In the South Atlantic, Baker (2012) examined the use of video cameras onboard commercial snapper-grouper bandit reel vessels. Results of the study were similar to those of Pria et al. (2008). Observer count data matched well with EM video count data, but species identification was less accurate. Many species important to the snapper-grouper fishery were difficult for the EM video reviewers to identify. The results indicated that EM monitoring could augment existing data collection programs provided steps were taken to improve catch counts and species identification.

A third study conducted by Tate (2012) and Batty et al. (2014) is still ongoing. The study is evaluating the use of EM in the Gulf of Mexico bandit reel and longline fishery and preliminary results are similar to those of the studies discussed above. This project demonstrated that EM could be used to reliably document fishing effort and retained catch, but that major changes to camera installation would be required to accurately record discarded fish.

A related National Fish and Wildlife Foundation project by Mote Marine Laboratory (Sarasota, Florida) is also underway with the intent of establishing an EM center for the commercial reef fish fishery. Another project also recently began in 2014 that is piloting the use of camera

systems onboard five Southwest Florida shrimp vessels to accurately account for sawfish and other large marine bycatch in shrimp trawl fisheries (J. Carlson, SEFSC, pers. comm.)

Vessel Monitoring Systems

VMS are satellite-based systems installed on fishing vessels to monitor vessel movement and activity. VMS systems consists of a mobile transceiver unit placed on the vessel, a communications service provider that supplies the wireless link between the vessel's unit and the NMFS Office of Law Enforcement (OLE), and a secure OLE facility where staff can monitor compliance. The data are kept secure and confidential and are only accessible by staff with clearance to access confidential VMS data. The system is programmed to send a signal once an hour 24-hours a day and 7 days a week, but can be turned off under certain circumstances if the vessel owner applies for a power down exemption.

In the Southeast, VMS are required on Gulf reef fish vessels, South Atlantic rock shrimp vessels, and various Highly Migratory Species vessels. There are currently five type-approved VMS units for use by fishermen. Units range in price from $2,300 to $3,800. Additional costs include installation and monthly service charges which average $45 to more than $60 depending on the service provider. Currently, NMFS has a reimbursement program for fishermen purchasing VMS units to comply with fishery management regulations.

In the Southeast, VMS are used by federal fishery managers and law enforcement to monitor fishing activity and enforce spatial-area closures and gear-restricted areas. Additionally, they can be used by enforcement and the Coast Guard to locate vessels in the event of emergencies. VMS data have also been used in some instances to assess the impacts of proposed regulations, such as spatial area closures. VMS provides detailed location information, but fishing activity must often be predicted using vessel speeds or a combination of other trip/area specific variables. Data collected currently through VMS include hail out notifications (e.g., gear, type of fishing) when a vessel leaves port and hail in notifications (e.g., time of landing, landing amounts, dealer, vessel identification) when a vessel returns to port. VMS units are also capable of collecting data similar to an electronic logbook. The Gulf of Mexico IFQ programs and Headboat Collaborative pilot program allow vessels to electronically submit hail in notifications prior to landing via VMS. The hail-in notifications include vessel name, landing location, to which dealer they will be selling fish, time of landing, and pounds landed by species or share category. At their June 2014 meeting, the Gulf of Mexico FMC expressed interest in using VMS for EM/ER in the for-hire fleet.

Fisheries Suitable for EM/ER in the SE Region

The Gulf of Mexico, South Atlantic, and Caribbean FMCs manage hundreds of species in 19 FMPs. These species are harvested by both commercial and recreational fishermen. Some species managed by FMPs are suitable for EM/ER, while EM/ER is not needed for others (e.g., federal harvest for red drum and corals, except octocoral, is prohibited). Additionally, EM and/or ER is already extensively used in some fisheries (e.g., Gulf of Mexico shrimp) and modes (Gulf of Mexico and South Atlantic headboats), reducing the need for further development or implementation. **Tables 2-3** summarize current monitoring and reporting requirements by FMP, region, and sector (commercial, recreational). They also identify fisheries potentially suitable for EM or ER. A more detailed description of Southeast Region fisheries potentially suitable for EM/ER is provided below and summarized in **Figure 2**. This list was developed with input from each of the regional FMCs. Region-wide priorities for EM/ER are also discussed. Prioritization of the list will be reviewed and discussed annually with the regional FMCs.

Gulf of Mexico

Reef Fish and Coastal Migratory Pelagics (CMPs) – The Reef Fish and Coastal Migratory Pelagics (CMPs) FMPs contain more than 30 species of snappers, groupers, jacks, hogfish, triggerfish, cobia, and mackerels. Reef fish and CMPs account for a majority of the ACL's monitored in the Gulf of Mexico and many reef fish managed under the commercial IFQ programs. Additionally, many of these species co-occur and are caught and discarded as bycatch while fishing for other target species. Electronic reporting is already required of dealers purchasing reef fish and CMPs, and headboats are required to report trip-level logbooks of landings and discards. Commercial logbooks are currently submitted via paper, but there is an ongoing pilot study to test at-sea vessel electronic logbooks (ELBs; Pierce 2014). There is also growing interest in the monitoring of recreational catches in the for-hire sector using ELBs. Because many reef fish species co-occur, there is also a need to monitor the abundance and species composition of fish that are not retained by commercial and recreational fishermen. The Gulf of Mexico and South Atlantic FMCs have established a technical subcommittee, which provided recommendations on an electronic reporting system for for-hire vessels by the end of 2014 (GMFMC/SAFMC 2014). Additionally, efforts are underway to improve recreational catch estimation of red snapper, with many states conducting pilot studies in 2014 (see August 2014 GMFMC briefing book available at: www.gulfcouncil.org). Electronic reporting improvements are the primary priority for reef fish and CMPs. Improvements and development of ER include:

1. Pilot testing and developing ELBs for commercial reef fish and CMPs to obtain more timely and finer spatial resolution data,
2. Development and implementation of an electronic reporting system for federally permitted charter vessels, including the potential use of VMS (as supported by the Gulf of Mexico FMC); and,
3. Continued pilot testing and development of various state based electronic reporting systems for monitoring red snapper and other reef fish catches of private anglers.

Table 2. Summary of the existing monitoring tools currently implemented in *commercial fisheries* of the Southeast Region. Green cells indicate fisheries where electronic technologies have already been implemented and regulated programs are in place. Fisheries where additional Electronic Reporting (ER) and Electronic Monitoring (EM) could potentially be suitable are noted, and yellow cells indicate those fisheries that have been identified as the highest priority for implementation.

Region	Fishery	Current Requirements						Additional ER Potentially Suitable?	VMS or EM Potentially Suitable?
		Dealer Electronic Reporting	Paper logbooks/reports	Electronic Logbooks/reports	VMS	Video	Observers		
Carribbean	Reef Fish	N	Y	N	N	N	N	elogbook - pilot testing began in 2014	
	Queen Conch	N	Y	N	N	N	N		
	Spiny Lobster	N	Y	N	N	N	N		
	Corals and Reef Associated Plants and Invertebrates	Harvest and possession prohibited except with Federal permit for scientific research, exempted fishing, or exempted educational activity							
Gulf of Mexico	Reef Fish	Y	Y	N	Y	N	Y	elogbook - pilot testing in 2015	EM for protected resource interactions; reef fish bycatch
	Shrimp	N	N	Y	N	N	Y		
	Aquaculture	Y	N	Y	N	N	N	Proposed regulations	
	Red Drum	Y	N	N	N	N	N		
	Corals	N	Y	N	N	N	N		
Gulf of Mexico and South Atlantic	Coastal Migratory Pelagics	Y	Y	N	N	N	Y	elogbook - pilot testing in 2015	
	Spiny Lobster	Y	N	N	N	N	N		
South Atlantic	Snapper-Grouper	Y	Y	N	N	N	N	elogbook - pilot testing in 2015; wreckfish ITQ online system	Pingers or VMS in black sea bass pot fishery; EM for snapper-grouper bycatch
	Shrimp	Y - Rock Shrimp Only	N	N	Y - Rock Shrimp Only	N	N		EM for rock shrimp to link location specific catch/bycatch to VMS data
	Dolphin-Wahoo	Y	Y	N	N	N	N	elogbook - pilot testing in 2015	
	Golden Crab	Y	Y	N	N	N	N	elogbook	Pingers for crab traps
	Sargassum	N	N	N	N	N	Y		
	Corals	N	Y	N	N	N	N		

Table 3. Summary of the existing monitoring tools currently implemented in *recreational fisheries* of the Southeast Region. Green cells indicate fisheries where electronic technologies have already been implemented and regulated programs are in place. Fisheries where additional Electronic Reporting (ER) and Electronic Monitoring (EM) could potentially be suitable are noted, and yellow cells indicate those fisheries that have been identified as the highest priority for implementation.

Region	Fishery	Current Requirements					Additional ER Potentially Suitable?	EM Potentially Suitable?
		Paper logbooks/reports	Electronic Logbooks	VMS	Video	Observers		
Carribbean	Reef Fish	N	N	N	N	N		
	Queen Conch	N	N	N	N	N		
	Spiny Lobster	N	N	N	N	N		
	Corals and Reef Associated Plants and Invertebrates	Harvest and possession of corals is prohibited except with Federal permit for scientific research, exempted fishing, or exempted educational activity; harvest of aquarium trade species allowed.						
Gulf of Mexico	Reef Fish	Y - Headboat only	Y - Headboat only	N	N	N	eLogbooks for charter; pilot testing electronic apps for private sector	VMS, if used in conjunction with electronic reporting or catch share program; pilot testing VMS in Headboat Collaborative
	Shrimp	Shrimp are not recreationally harvested in the Gulf of Mexico EEZ						
	Aquaculture	Proposed for commercial purposes only.						
	Red Drum	N	N	N	N	N		
	Corals	Live rock harvested for commercial purposes. Harvest and possession of corals prohibited except with Federal permit for scientific research, exempted fishing, or exempted educational activity.						
Gulf of Mexico and South Atlantic	Coastal Migratory Pelagics	Y - Headboat only	Y - Headboat only	N	N	N	eLogbooks for charter	
	Spiny Lobster	N	N	N	N	N		
South Atlantic	Snapper-Grouper	Y - Headboat only	Y - Headboat only	N	N	N	eLogbooks for charter	
	Shrimp	Shrimp are not recreationally harvested in the South Atlantic EEZ						
	Dolphin-Wahoo	Y - Headboat only	Y - Headboat only	N	N	N	eLogbooks for charter	
	Golden Crab	Golden crabs are not recreationally harvested in the South Atlantic EEZ						
	Sargassum	Sargassum is not recreationally harvested in the South Atlantic EEZ						
	Corals	Live rock harvested for commercial purposes. Harvest and possession of corals prohibited except with Federal permit for scientific research, exempted fishing, or exempted educational activity.						

Given the video monitoring challenges discussed earlier in this plan, particularly with identification of species and enumeration of bycatch, EM is not foreseen to be a viable option for replacing onboard observers. However, EM use in the reef fish and CMP fisheries may aid catch accounting and identification of interactions with marine mammals and sea turtles.

Shrimp - The Gulf of Mexico shrimp fishery is one of the nation's most economically valuable fisheries (GMFMC 2013a). Shrimp vessels are required to carry ELBs, if selected by NMFS. Fishing effort data collected from ELBs is critical to assessment of shrimp stocks and a key component for estimating juvenile red snapper bycatch mortality attributable to the shrimp fishery. Recently, a cost-sharing program for shrimp vessel ELBs was implemented in the Gulf of Mexico (GMFMC 2013a). No additional needs for shrimp ELBs are foreseen at this time.

However, expanded use of EM may be warranted. A 2012 Biological Opinion recommended NMFS better assess the impacts of incidental take in fisheries (NMFS 2012). 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 EM. There is some observer coverage in southwest Florida; however, EM could serve as an alternative to observers for documenting sea turtle and sawfish interactions in the shrimp trawl fishery. Pilot testing is currently underway to test the use of camera systems for accurately accounting for smalltooth sawfish interactions onboard Southwest Florida shrimp vessels (J. Carlson, SEFSC, pers. comm.)

South Atlantic

Snapper-Grouper and Coastal Migratory Pelagics – The South Atlantic FMC manages more than 50 species of snappers, groupers, mackerels, and other reef fish. Similar to the Gulf of Mexico, these species account for a majority of the ACLs monitored in the South Atlantic. Many of these species co-occur and are caught and discarded as bycatch while fishing for other target species. In the past several years, the South Atlantic FMC has approved new regulations to improve data timeliness in the South Atlantic, including ER by dealers and headboats. These regulations are intended to assist NMFS in monitoring ACLs and prevent, to the extent practicable, overages from occurring. With the exception of dealers and headboats, ER is not currently being done in other aspects of the snapper-grouper and CMP fisheries. Regulations require that the owner or operator of a vessel for which a commercial permit for South Atlantic snapper-grouper has been issued, who is selected to report by the Science and Research Director (SRD) must participate in the NMFS-sponsored ELB and/or video monitoring reporting program as directed by the SRD.

The South Atlantic FMC is also interested in implementing ELBs in the charter and commercial sectors of the Snapper-Grouper and CMP fisheries to improve assessments and data timeliness, and there is a need to modernize the wreckfish individual transferable quota (ITQ) program, which currently relies on paper-based coupons. Electronic reporting improvements are the primary priority for snapper-grouper and CMPs in the South Atlantic. Improvements and development of ER include:

1. Pilot testing and developing ELBs for commercial snapper-grouper and CMPs to obtain more timely and finer spatial resolution data;
2. Development and implementation of an ER system for federally permitted charter vessels;
3. Including wreckfish in the SERO Web-based catch share reporting system; and,
4. Pilot testing and development of various state-based electronic reporting systems for monitoring red snapper and other reef fish catches of private anglers.

Bycatch is also a major component to many snapper-grouper and CMP stock assessments, and better documentation of bycatch is needed. Bycatch reporting is a component of ER systems for headboats and could be included in ELBs and other ER systems developed for snapper-grouper and CMP fisheries. NMFS and the Gulf and South Atlantic Fisheries Foundation conduct a limited amount of observer coverage in the South Atlantic, so bycatch estimation in the commercial snapper-grouper and CMP fisheries relies primarily on self-reported discard logbooks. Better documentation of discards and discard mortality, potentially through the use of video EM, would improve the information used in stock assessments. However, as discussed previously, EM must overcome the challenges of species identification and enumeration of bycatch to be useful for science and management.

Lastly, there is potential for EM to better inform site selection and monitoring of spatial-area closure actions. For example, the South Atlantic FMC is interested in exploring the using of EM to monitor black sea bass pots and fishing activity. Pingers on pots, tablets with GPS, or VMS could potentially be used. Use of EM could aid the South Atlantic FMC and NMFS in monitoring where fishing activity occurs in relation to spatial-area closures. Any such use of EM would be contingent on the regulations proposed by the South Atlantic FMC, and FMP objectives.

Golden Crab – There are only 11 permitted vessels that participate in the golden crab fishery. The fishery is managed with permit, gear, and area restrictions, as well as a 2 million pound ACL. In recent years, less than 50% of the ACL has been harvested. Golden crab vessels are also 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 ELBs in the golden crab fishery. Additionally, the South Atlantic FMC 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 (HAPC) or other closed areas.

Shrimp – Unlike the Gulf of Mexico, the use of ELBs is not required in the South Atlantic shrimp Fishery. Regulations require that the owner or operator of a vessel that fishes for shrimp in the South Atlantic exclusive economic zone or in adjoining state waters, or that lands shrimp in an adjoining state, must provide information for any fishing trip, as requested by the SRD, including, but not limited to, vessel identification, gear, effort, amount of shrimp caught by species, shrimp condition (heads on/heads off), fishing areas and depths, and person to whom sold.

Like the Gulf of Mexico shrimp fishery, expanded use of EM may be warranted for the South Atlantic shrimp fishery. A 2012 Biological Opinion recommended NMFS better assess the impacts of incidental take of sea turtles in shrimp fisheries (NMFS 2012). 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 EM. Electronic monitoring could serve as an alternative to observers for documenting sea turtle and sawfish interactions in the shrimp trawl fishery.

Rock Shrimp – 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 and South Carolina. Vessels have been required to carry a VMS since 2003. Vessel monitoring systems were required to enhance enforcement and protect critical habitat, such as the Oculina HAPC. The South Atlantic FMC is interested in expanding the use of EM to link location-specific catch and bycatch data to VMS data. This will aid the South Atlantic FMC and shrimp industry in better evaluating the impacts and trade-offs of spatial-area closures on shrimp harvest and coral protection.

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. Recreational charter and private landings are collected by MRIP, which surveys anglers and captains using a combination of dockside intercepts and phone calls to estimate catch and fishing effort. Similar to snapper-grouper and CMP species, it is a priority to pilot test and develop ELBs for commercial fisheries to obtain more timely and finer spatial resolution data and to develop and implement an ER system for federally permitted charter vessels, in accordance with recommendations made by the Gulf of Mexico and South Atlantic FMC's Technical Subcommittee.

U.S. Caribbean

Commercial Fisheries – Commercial landings are reported by fishermen via catch record logbooks. In the U.S. Virgin Islands, catch records are recorded on a monthly basis and are submitted weeks to months after fishing has occurred. In many instances, catch records are not submitted until the time of permit renewal (July of each year), resulting in less reliable data. Commercial logbook reporting in the Gulf of Mexico and South Atlantic has also experienced similar problems with lags in logbook reporting.

Commercial landings from Puerto Rico come from self-reported fisher logbooks. Commercial landings from Puerto Rico have been incompletely reported and expansion factors are required to estimate unreported landings (SEDAR 2009). Often, expansion factors are large and result in commercial landings being expanded by 50% or more (SEDAR 2009). Late reporting and lags in data entry also result in commercial landings being made available six months to years after the fishing year has ended, making ACLs difficult to monitor. For example, only Puerto Rico

landings through 2012 were available to project 2014 season lengths and determine if ACLs had been exceeded (SERO 2014).

Steinback (2014) has been evaluating the use of smart phone-based ER for submitting catch record data by U.S. Caribbean commercial fishers. The Digital Deck ER platform is being tested by fishers in Puerto Rico and the U.S. Virgin Islands and the software allows agencies to access, review, and approve catch records submitted. Given the delays in reporting discussed above, ER use in the U.S. Caribbean commercial fisheries could provide more timely data for ACL monitoring. In particular, the Puerto Rico deepwater snapper unit 2 complex could greatly benefit from more timely and accurate reporting. Puerto Rico has already established a limited entry program for deepwater snapper fishermen. In recent years, the ACL for deepwater snapper unit 2 has been exceeded by a significant amount, requiring the season to be shortened. In-season, near real-time ER would aid fishers and managers in monitoring the ACL for this complex and could allow NMFS and the Caribbean FMC to use new management strategies (e.g., in-season fishery management and accountability measures) to decrease management and scientific uncertainty and increasing stakeholder support.

Recreational Sector – Currently, there is no program to collect recreational landings in the U.S. Virgin Islands and for-hire and private vessel landings and effort in Puerto Rico are estimated by MRIP through a combination of dockside intercept and phone surveys. The Caribbean FMC is interested in exploring the use of EM/ER in the recreational sector. At this time, ER in Caribbean FMC managed recreational fisheries are viewed as a low priority compared to enhancements in commercial reporting and development of a recreational data collection program for the U.S. Virgin Islands.

Electronic Monitoring – There are limited applications for use of EM in the U.S. Caribbean. EM is often used to monitor bycatch, but there are few size limits for federally managed U.S. Caribbean species. Also, many vessels are too small and too exposed to carry either VMS or video EM equipment. Use of EM is considered a very low priority for U.S. Caribbean fisheries.

Region-Wide

In addition to specific regional fisheries where EM/ER may be suitable, there are also many needs that are not fishery specific for enhancing and improving efficiency during sampling and data processing. Electronic technology can be used to increase sampling efficiency, eliminate redundancies in reporting through data standardization, and increase quality control and quality assurance through automated error checking.

Dockside Sampling/Observers – Improvements in both sampling efficiency and integration of data are needed when conducting observer and dockside data collection in the Southeast. For instance, electronic measuring boards are currently used to collect headboat data. Trip and sample information are stored and later downloaded to a database for use, saving port agents time entering data. Electronic measuring boards have been tested for commercial uses and the SEFSC is beginning to explore use of handheld computers or tablets to link electronic measuring

boards to other devices, such as scales, cameras, and bar code readers. A tablet application has already been developed for the shark observer program but work is still needed to make it more practical for field use. There is interest in expanding the use of handheld electronic devices for commercial and recreational data entry to improve data timeliness and accuracy.

Recreational Data Collection – Recreational fishermen account for a majority of the harvest for many key species (Coleman et al. 2004). In the Southeast, recreational catches are monitored with a variety of surveys, including MRIP, the Southeast Headboat Survey, and creel surveys conducted by Texas and Louisiana. There are also numerous pilot projects either underway or that have been recently completed (Baker and Oeschger 2011; Donaldson et al. 2013; see August 2014 Gulf of Mexico FMC briefing book available at: www.gulfcouncil.org) looking at the use of ER for collecting catch and effort data in private and for-hire fisheries. As discussed above, the Gulf of Mexico and South Atlantic FMCs are interested in pursuing use of ER and potentially VMS (at least for Gulf of Mexico vessels and headboats involved in catch share programs) to monitor fishing activity and catches. The SERO and SEFSC will continue to support the FMC's and their Technical Subcommittee as they move forward with recommendations for ER in the for-hire sector.

There is a need to improve data timeliness of recreational data, especially for headboats. Headboats are now required to report on a weekly basis and reports may be submitted via the Web or smart phone/tablet applications. Currently, in-season headboat landing estimates of major federally-managed species are available based on periodic data requests. NMFS is interested in expanding the availability of in-season landings data to all species managed with ACLs. Processes for QA/QC of in-season data and enhancements to data estimation and deliver procedures are needed to provide in-season landing estimates more real-time (within 1-2 months of reporting).

Improving private recreational data collection in the Southeast Region is also a high priority. Over the past several years, NMFS and Gulf of Mexico states have met to discuss, review, and develop pilot studies and new sampling programs designed to collect catch and effort data for red snapper and/or other managed fish species. Pilot studies are underway to evaluate the use of self-reported catch data via smartphone and tablet applications. NMFS will continue to support these data collection efforts and will coordinate with the Office of Science and Technology and MRIP consultants the review of new sampling approaches. Any new survey design should be reviewed by expert consultants prior to implementation and ideally should be pilot tested alongside existing data collection surveys for purposes of calibration.

Data Standardization/Redundancies – NMFS, in collaboration with its partners, is also interested in better standardizing data, and eliminating reporting redundancies, where applicable. For instance, bottlenecks exist for integrating and standardizing age/growth data collected and housed across multiple databases. Standardization and better integration of electronic data will increase efficiency and reduce staff processing time to reconcile datasets.

Another area ripe for improvement is integration of data collected during biological sampling. Trip level information is collected along with biological data during dockside and observer sampling. Often considerable time is spent linking biological samples to trip level data collections. Electronic technologies, such as bar code scanners, represent a technological solution for automatically linking information for a trip, saving staff time and resulting in enhanced standardization and integration of data collections.

Finally, another area in need of improvement is the reporting redundancies that currently exist in the Southeast Region. Reporting redundancies exist primarily in commercial fisheries where dealers and fishermen are required to report via logbooks, trip tickets, and catch share programs. These redundancies place a greater burden on industry when reporting and are often challenging to reconcile across multiple data sets. Last year, the Greater Atlantic Region initiated a fishery-dependent data visioning project. It is a collaborative effort among government, industry, private institutions, and academia to better understand the needs of the fishing industry and other stakeholders. The process is providing a holistic review of fishery dependent data collection methods and systems throughout the region with the goal of cataloguing current data needs and uses, data system strengths and weaknesses, and future data system needs. The Southeast Region would benefit from a similar process that brings together industry, state partners and commissions (e.g., ACCSP, GSMFC), and other interested stakeholders.

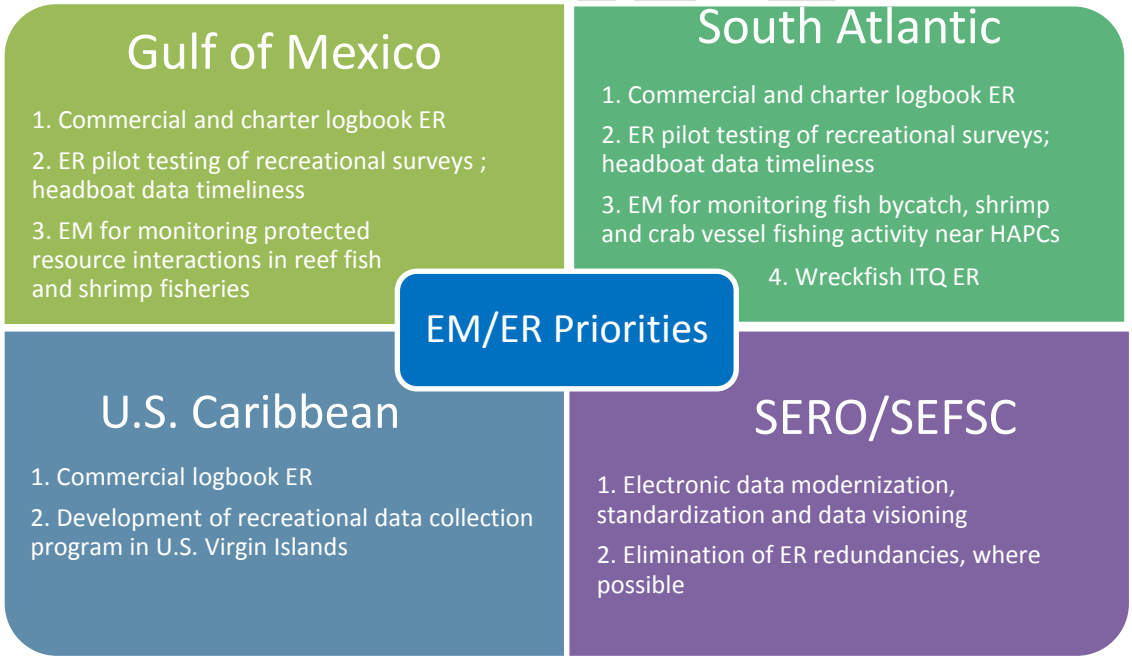

Figure 2. Southeast Region EM/ER Priorities for the Gulf of Mexico, South Atlantic, U.S. Caribbean and Southeast Regional Office/Southeast Fisheries Science Center.

Challenges Impeding EM/ER Implementation

The use of electronic technologies in the Southeast Region has increased greatly in recent years, but several challenges still remain that impede broader use of EM/ER. These challenges fall into six primary categories: 1) costs/infrastructure, 2) lack of regulatory authority, 3) size and extent of fleets, 4) communication and collaboration among multiple data collection partners, 5) calibration with old data collection methods, and 6) stakeholder support or opposition (**Figure 3**).

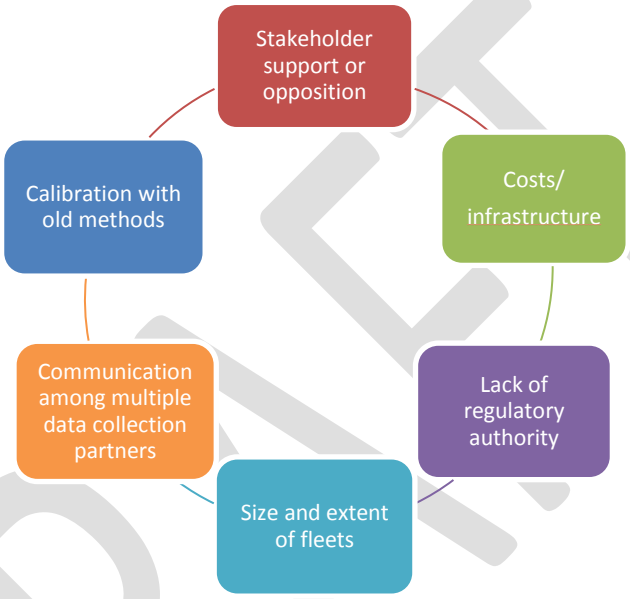

Figure 3. Challenges impeding EM/ER use in the Southeast Region.

Costs can be incurred by the agency, state and local governments, as well as fishermen. Although applications and Web sites for reporting catch are generally free or inexpensive, and are readily available for use on computers and smartphones, there are many other costs that apply to electronic data collections. Costs to fishermen may include initial purchase of EM/ER equipment, EM/ER equipment maintenance, and monthly service fees. Costs to the agency for various sampling methods and survey designs can vary greatly depending on the level of dockside validation for catch, effort validation, and required infrastructure. Infrastructure needed for managers and scientists to store and process data includes: data storage and processing, quality control and quality assurance conducted once data are submitted, and the electronic tools selected to report. Additionally, there are often increased costs associated with enforcement, especially if regulatory requirements are placed on when and how data are to be provided.

Regulations also constrain use of EM/ER in the Southeast Region. Often there is a lack of regulatory authority to either implement or enforce EM/ER. Many regulations currently refer to paper-based reporting requirements, may not contain standardized reporting requirements

(where applicable), and may be insufficient for ensuring accurate and timely data (e.g., regulations needed for reporting delinquency, reporting frequency and timeliness).

Technical and scientific challenges also exist. The size and geographic extent of fishing fleets in the Southeast is very large, especially for the recreational sector. There are also multiple data collection partners (GulfFIN, ACCSP, states, and NMFS) and current data collection efforts in many instances rely heavily on state partners to collect commercial and recreational data. Better coordination and communication among partners is critical to improving data collection programs and fostering an environment of cooperation rather than competition. Such collaboration will also eliminate inefficiencies, redundancies, and delays when developing EM/ER products. Given the multiple partners, it is critical to have buy-in from all data collection partners and ensure that ownership and oversight of any new EM/ER reporting system is clearly defined. There are also challenges with calibrating old methods of data collection with new EM/ER methods. Calibration of data is critical to ensure data can be incorporated into time series used for assessments, which requires running surveys at the same time, resulting in additional costs.

Lastly, there is often mixed industry support for EM/ER and willingness to participate may vary greatly across constituencies. Buy-in often varies by region, organization, and the level of reporting burden that may be placed on the industry.

Infrastructure and Costs

Costs and infrastructure present a major challenge when modifying, developing, and implementing EM/ER systems. This section discusses existing infrastructure in the Southeast Region, as well as at the GSMFC and ACCSP. Based on NOAA EM/ER guidance and best practices (NOAA 2013b), infrastructure needs extend beyond EM/ER hardware and also encompass needed personnel for developing and maintaining EM/ER. Given there is likely to be no large influx of government funds to support EM/ER on a continuing basis (NOAA 2013b), other options for funding EM/ER are also be discussed, including redirection of existing government funds and cost-sharing with industry.

NMFS recognizes that infrastructure expansion and development should not fall solely on the agency. Where applicable, development of standards for collecting necessary data should be developed. This will allow NMFS to utilize the expertise of third-party vendors with expertise in software development and data collection design. It will also allow NMFS to utilize existing infrastructure and services that potentially can be expanded through existing partners, such as ACCSP and the GSMFC.

Current Infrastructure

Southeast Fisheries Science Center – The SEFSC collects and aggregates landings, bycatch, and catch-effort data from fisheries managed by the Gulf of Mexico, South Atlantic, and Caribbean FMCs and coastal and oceanic species managed by the Highly Migratory Species Division of NOAA Fisheries. Commercial landings of federally managed species are collected electronically in cooperation with state partners and the regional Fisheries Information Networks (GSMFC, ACCSP). The SEFSC collects commercial vessel reports on catch and fishing effort and deploys observers on vessel in some fisheries for use in bycatch estimation and catch rate monitoring. The SEFSC collects electronic catch and effort information from the headboat fishery from North Carolina through Texas and integrates those data with information on recreational fisheries collected by the Texas Parks and Wildlife Department and the NOAA Fisheries MRIP program. The SEFSC uses the recreational and commercial information to conduct research and to support fisheries management.

Southeast Regional Office - The SERO collects and aggregates landings data and quota share transactions for the Gulf of Mexico red snapper and grouper-tilefish IFQ programs, and the South Atlantic wreckfish ITQ program. SERO also is responsible for monitoring and tracking quota for the Gulf Headboat Collaborative exempted fishing permit, which is currently being pilot tested through December 2015. In addition, SERO processes and issues permits and is currently developing an online Web-based system for permit renewal. SERO information technology programmers are responsible for maintaining the existing catch share Web-based systems, building new catch share electronic data collection systems, developing mobile applications, and for designing and developing a Web-based system for permit renewal. SERO also has a team of customer service staff responsible for the day-to-day administration and oversight of the Gulf of Mexico and South Atlantic catch share programs, including data auditing of landing transactions. Funding support for administration, enforcement, and

monitoring of Gulf of Mexico catch share programs is provided through collection of cost recovery fees from IFQ fishermen.

Office of Law Enforcement – OLE oversees NOAA Fisheries' VMS program. At the SERO, a VMS program manager and technicians monitor and track vessel activity in coordination with law enforcement agents and officers, and catch share program staff. OLE staff in the Southeast are responsible for monitoring South Atlantic rock shrimp, Gulf of Mexico reef fish, and Atlantic highly migratory species. They also conduct customer service and coordinate VMS software updates with vendors.

Atlantic Coastal Cooperative Statistics Program – ACCSP provides standardized, centralized systems to collect and manage commercial dealer and trip reports, and for-hire trip reports through the Standard Atlantic Fisheries Information System (SAFIS). SAFIS has several applications (eDR, e1-Ticket, eTRIPS, eLogbooks) available to Atlantic coast harvesters, dealers, and anglers. Each application is developed based on common standards agreed upon by all program partners with adjustments made to better meet partner's reporting requirements. After review, these data are made available for fishery monitoring and management purposes. SAFIS provides a number of alternate mechanisms to input data that include PC systems (Primarily Trip Ticket – a Bluefin product) and flat file upload from dealer based systems. Recently, ACCSP has developed a mobile version (available on tablets only) of the SAFIS eTRIPS application.

In addition, ACCSP maintains the Data Warehouse that contains comprehensive commercial landings and catch and effort data as well as some biological sampling and copies of the recreational landings and effort estimates MRIP. These data are derived from SAFIS after quality assurance and quality control measures, as well as many other data sources, and are used for stock assessment and other purposes. ACCSP staff collaboratively develop and maintain information systems to support electronic reporting with multi-faceted data flows, and provides current and historic fishery statistics to state and federal government agencies and the public. ACCSP and its partner agencies share the benefits of centralized processing and distributed data ownership. ACCSP employs 10 staff plus contract support as needed to support the data systems infrastructure and other functions.

Gulf Fisheries Information Network - The GSMFC coordinates the development and management of the GulfFIN Data Management System that supports recreational and commercial data collected by state partners in the Gulf of Mexico. The GSMFC coordinates the collection and management of commercial landings data from the Gulf of Mexico through an electronic trip ticket collection system. Commercial dealers are provided software from Bluefin Data Inc. (a contractor to GSMFC). State and federal partners receive commercial landings data electronically through this reporting system. Additionally, the GSMFC provides for the conduct of the MRIP survey in Mississippi, Alabama, and Florida for shore, for-hire, and private modes. It provides coordination of the survey including the field intercept survey of shore, for-hire and private boat anglers to estimate angler catch using the existing MRIP methodology, and entry of the data. The GSMFC also takes an active role in the coordination of state partner research

through MRIP. In 2010-2011, a pilot electronic logbook program for the for-hire fleet was tested in the Gulf of Mexico. GSMFC coordinated with Florida and Texas to collect and manage the electronic data provided by for-hire captains. Data were submitted via a web tool and delivered to GSMFC for quality control and analysis. Data were shared with both partner states and federal partners for analyses to determine the successfulness of the pilot program. GSMFC is committed to providing support for all recreational and commercial electronic data programs that might be needed by state and federal partners in the Gulf of Mexico.

Costs

Despite the extensive amount of infrastructure currently in place, there are still additional costs that must be considered when implementing or expanding EM/ER. Costs may include, but are not limited to costs for: infrastructure (databases, data storage, hard drives), data collection tools and maintenance, data validation, quality control/quality assurance and review, and personnel. As mentioned earlier, costs must be realistic and affordable to the agency and stakeholders before proceeding. No fishery-dependent ET program will be approved by NMFS if it creates an unfunded or unsustainable cost of implementation or operation ((NOAA 2013a).

Given the wide array of EM/ER technology currently available, as well as the rapid changes in technology occurring, and the varying purpose and scope of EM/ER programs, it is difficult to quantify the absolute costs associated with implementation of specific EM/ER programs. Specific costs associated with EM/ER development will be identified for each EM/ER project during Phases III and IV of the framework implementation process. The following section describes general categories of costs that will be considered during EM/ER development.

Electronic Reporting – Costs for ER include hardware, software, field and customer service personnel, and data analysts. Hardware and software allow for input, storage, and transmission of data and are required for both the data providers (e.g., fishermen, dealers) and data receivers (e.g., NMFS, ACCSP, GSMFC, third-party vendors). Hardware includes laptops, computers, and servers for entering or receiving data, while software is required for data entry via tablets, computers, VMS, and mobile devices. Hard drives and databases are necessary for archival storage of collected data. ER start-up costs may include purchase of hardware and development of software. Longer term costs would include hardware maintenance and software upgrades.

Field and customer service personnel are often overlooked by industry participants wanting ER. They are needed to validate data, answer questions, conduct training, and troubleshoot problems. Information technology personnel are also needed for maintaining servers and databases. Costs for analysis and IT maintenance include staff or contractor salaries, training, and travel to conduct outreach with industry partners. Start-up costs may also include bulk mailings to program participants.

Video Monitoring – Similar to ER, video monitoring requires hardware, field personnel, and data analysts to collect, retrieve, and analyze catch data. Software may also be needed to

automate image review. Costs include video camera hardware and cables, sensors, hard drives for data storage, and costs for installation, maintenance, and repair of video camera systems. Start-up costs include video camera installation, which is typically done by a third-party contractor.

Field personnel are needed to install software, retrieve hard drives, conduct outreach with industry, and ensure proper installation of video monitoring systems. Once data are retrieved, analytical staff must review and analyze video data and enter results into databases. Costs associated with personnel include salaries, travel, and training.

Vessel Monitoring Systems – Costs for VMS are described in the Technological Capabilities section of this document. Costs include purchase and installation of the VMS unit by a certified marine technician, as well as transmission costs, which are typically paid for by industry. OLE VMS technicians are needed to monitor fishing activity, conduct customer service, and troubleshoot problems. There are also costs associated with software development.

Funding sources for EM/ER

Several potential funding sources exist for EM/ER implementation. These include funds from the NMFS' observer program, MRIP program, Fisheries Information System (FIS), bycatch reduction funds, catch share funds, and EM/ER budget line. Funding for new or ongoing projects is also available through a competitive grant application process to ACCSP. And NMFS is authorized to collect up to 3 percent of the ex-vessel value of fish harvested for administration, enforcement, and monitoring of catch share programs. There may also be cost savings potentially resulting from reduced reporting burdens or reduced need for observer bycatch coverage associated with EM/ER implementation. This would allow existing data collection funds to be shifted to support new EM/ER activities.

In addition to government funding of EM/ER, consideration should also be given to sharing EM/ER costs with industry and agency partners. NMFS is committed to working with the Councils, states, commissions, and industry where cost sharing of EM/ER is deemed appropriate, and develop where applicable transition plans from present to future funding arrangements. During Phase I assessment of any new or modified EM/ER program (see Framework for EM/ER Implementation section), cost sharing with industry should be considered. Costs that could be shared include, but are not limited to, purchase of hardware and software, labor costs for EM/ER administration, and transmission costs. In the Southeast Region, cost sharing is already occurring in Gulf of Mexico catch share programs, the Gulf of Mexico shrimp ELB program, and VMS programs. For catch share programs, fishermen pay cost recovery fees to support program administration, monitoring, and enforcement. In the Gulf of Mexico shrimp fishery and VMS programs, the government purchased ELBs or VMS units and fishermen pay for monthly transmission fees.

Funding Requirements

In order to implement EM, ER, or VMS, funding support would be needed for the following activities:

- Purchase of video monitoring and/or VMS hardware (if not cost-shared with industry);
- Contractor or FTE positions for ER and/or EM software development;
- Contract with VMS vendors for software development;
- Contractors or FTE positions for field personnel to conduct outreach and validation of ER data;
- Contract for EM provider company to install, retrieve, and support deployment of video cameras on commercial fishing vessels
- Infrastructure support (i.e., servers, IT personnel, etc.) for NMFS or one of its data collection partners (ACCSP, GSMFC) to build capacity to handle ER and/or EM data.

Timelines for Implementation

A primary key to successful EM/ER implementation is identifying clear timelines, expectations, and objectives (Lowman et al. 2014). Involving all stakeholders in the EM/ER implementation process is extremely important. Although NMFS may have the authority to implement EM/ER in some situations, implementation in many cases will be contingent on stakeholder buy-in and regulatory actions taken by the regional FMCs and in some cases state legislatures. **Table 4** summarizes general timelines for implementing EM/ER priorities in the Southeast Region over the next three years. These timelines are not overly prescriptive as implementation is contingent on numerous factors that may prevent or limit implementation, including but not limited to costs, infrastructure, and regulatory impediments. More detailed timelines for EM/ER implementation will be developed on a fishery and sector specific basis through the framework process outlined earlier in this document.

During the annual review of this document with regional FMCs, timelines will be revisited and new priorities will be added. This will allow for timeline modifications due to unforeseen circumstances or faster implementation than previously expected. It will also allow for removal of completed priorities and the addition of new priorities, particular those related to electronic monitoring.

Table 4. Timelines for EM/ER implementation in the Southeast Region.

Region	Priority	Implementation Timeline				
		pre-2014	2014	2015	2016	2017
Gulf and S. Atl	For-hire e-logbooks	Pilot-tested logbooks in Gulf of Mexico (2010-11)	Convene Technical Subcommittee; recommend design	Revise regulations; identify funding; develop software and infrastructure	Continue 2015 development, as needed; Begin implementation; Develop software acceptance criteria and data standards	Initial implementation; Coordination with FIN partners
Gulf and S. Atl	Commercial e-logbooks		Begin recruiting participants for pilot-testing	Pilot testing and infrastructure development	Revise regulations; Develop software acceptance criteria	Initial implementation; Coordination with FIN partners
Gulf and S. Atl	ER recreational surveys for red snapper and/or reef fish	FL begins specialized red snapper survey on east coast for 2012 recreational fishing season; LA implemented a quota monitoring system for red snapper in 2013	LA Creel implemented; AL, MS, and TX pilot test electronic reporting surveys for red snapper; meetings held with states and survey design experts to recommend improvements to surveys	LA Creel side-by-side benchmarking with MRIP; Texas A&MCC begins ER panel survey; Florida begins NFWF study to estimate reef fish landings and effort; AL, MS, and TX continue pilot studies; NC logbook program begins	Benchmarking and certification completed for LA; benchmarking begins for other state surveys	Modify processes for integrating estimates from state programs for use in quota monitoring
Gulf and S. Atl	Video monitoring of reef fish and protected resources	Several EM studies completed in Gulf and S. Atl (2008-2014); work ongoing at Mote Marine Lab	Pilot study begins for testing EM on shrimp vessels to monitor protected species bycatch	Determine feasibility of using EM on a sample of vessels and determine what improvements are needed	Work with vendors to make needed changes; Revise regulations to accommodate use of EM in SE fisheries; Develop software acceptance criteria and data standards	Initial implementation; Coordination with FIN partners
Gulf and S. Atl	Headboat data timeliness	Paper-based reporting prior to 2014; ER pilot testing conducted before making ER mandatory	ER becomes mandatory - weekly reporting, but landings data only available upon request in-season	Landings estimates will be available in two month waves; 45 days after the end of a wave. Pilot test submission of logbooks via VMS.	Modify processes for producing in-season landing estimates in more real-time	Initial implementation of all ER advances for quota monitoring

Table 4 (cont'd). Timelines for EM/ER implementation in the Southeast Region.

Region	Priority	Implementation Timeline				
		pre-2014	2014	2015	2016	2017
S. Atl	Wreckfish ITQ	Paper-based coupon system currently in place		Assess regulatory changes needed to require ER; amend regulations	Build online Web-based reporting and tracking system	Initial implementation
Caribbean	Commercial e-logbooks	Digital Deck begins pilot project testing electronic logbooks	Continued pilot testing of electronic logbook	Coordinate voluntary electronic submissions of logbooks with territories	Work with Caribbean FMC and territories to determine need for mandatory e-reporting for all or a sample of fishers	Revise regulations to accommodate e-logbooks
Caribbean	U.S.V.I. recreational data collection	Evaluation of recreational sampling and estimation methods	Characterize U.S. Caribbean boat-based fishery; pilot study to assess queen conch and spiny lobster catch and effort	Review outcomes of pilot studies; continue exploring development of a recreational survey in the USVI	Conduct additional pilot testing, as needed.	
Region-wide	Fishery-dependent data standardization and visioning	SEFSC data review conducted in 2013; headboat data migrated to Oracle database	Electric Edge Inc. begins review process for System Modernization Project	SERO/SEFSC and partners convene a Fishery Dependent data visioning workshop in late-2015	Begin addressing input from workshop and coordinate with states/territories to determine infrastructure of fishery independent monitoring program; Determine funding source	Determine preferred survey design; continue addressing fishery dependent data workshop recommendations.

Assessing Implementation Plan Progress

EM/ER is merely a tool intended to help better achieve fishery management objectives. The success of this plan will be contingent on steps taken by the agency, regional FMCs, commissions, ACCSP, and constituents to expand and successfully implement use of EM/ER in the Southeast Region. However, it should be recognized that EM/ER is only a tool and may not be applicable or appropriate for all fisheries.

NMFS agrees with the FMCs that success should not be measured based on the number of fisheries or FMPs using EM/ER technology. Rather, success should be based on whether or not EM/ER is:

1. Increasing the timeliness and accuracy of data for use in:
    a. Stock assessments (e.g., landings and discards);
    b. Management (e.g., ACL monitoring to prevent overages, bycatch monitoring); and,
    c. Enforcement (e.g., spatial-area closures, bycatch monitoring).
2. Aiding in achievement of FMP objectives and federal fishery mandates.

The benefits of EM/ER will be limited if FMP objectives are not achieved or if EM/ER fails to produce more timely and accurate data due to late reporting, non-standardized reporting practices, and lack of sufficient data validation.

When developing new programs, performance measures should be considered that are quantifiable. Such performance measures could include data timeliness (before and after EM/ER), data accuracy (number of data entry errors; reductions in data entry errors when checked at time of entry), data gaps filled, degree of participation, or other factors.

Annually, the progress made toward implementing EM/ER will be reviewed with each of the FMCs. This annual review will provide an opportunity for the FMCs to give input on the plan and recommend additional future priorities for EM/ER development and implementation. It will also allow objectives to be identified for improving data collection and documenting costs for EM/ER development. If FMP objectives are not being met, or data timeliness and accuracy is not being achieved, it will also serve as an opportunity to reconsider the use of EM/ER for management, science, and enforcement in particular fisheries.

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Scott Baker, Andrew Strelcheck, thoriumvms.com

TAB E, NO. 6(a)

Review and Discussion of MRIP Calibration

NOAA FISHERIES

Office of Science and Technology

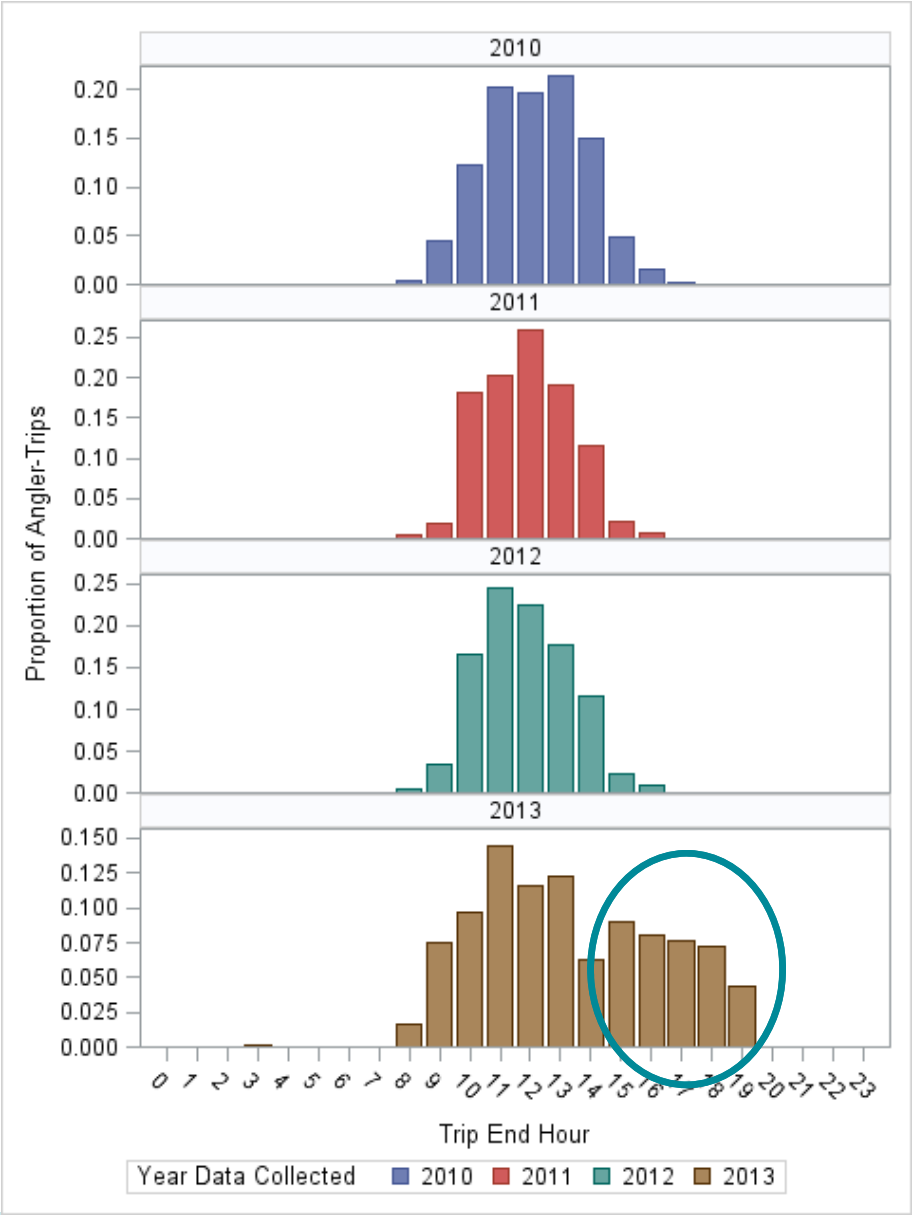
Gulf Council Meeting
Pt. Clear, AL
January 26, 2015

Back to Agenda

MRIP Design Change 2013

Changes in design led to changes in proportions of angler-Trips by Hour (previously afternoon and evening trips not always well sampled)

Example: Alabama Private Boat



MRIP Calibration Workshop

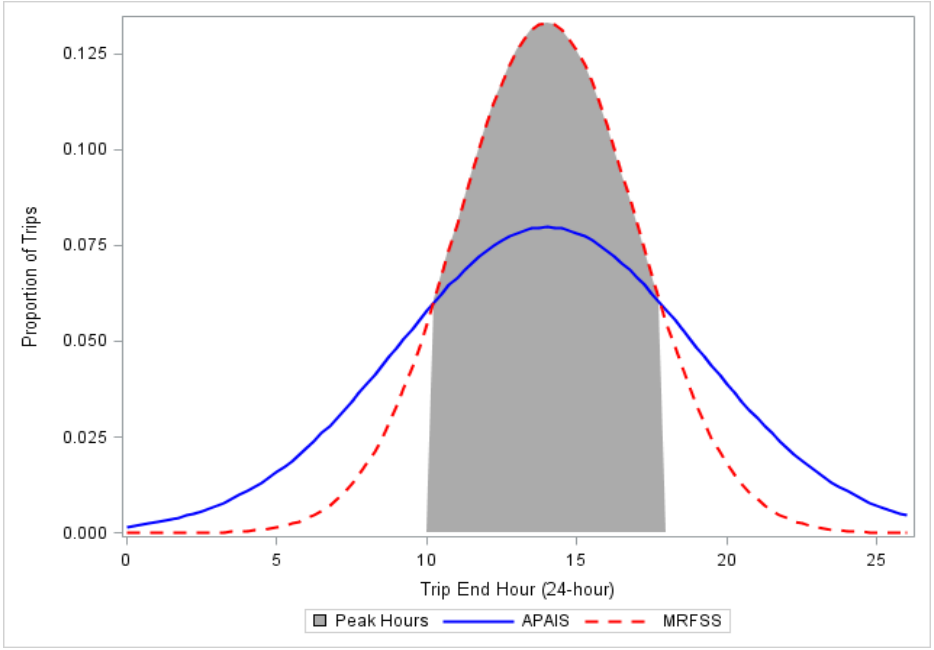
- Held September 8-10, 2014
- Concluded **calibration is required**
- Three calibration methods developed:
  - Simple ratio adjustment (Interim Recommendation)
  - Complex ratio adjustment (requires estimation of more parameters)
  - Model-based approach (longer-term, needs more data)
- Calibrated estimates used in red snapper update assessment; also being used for red grouper and gray triggerfish assessments.

MRIP Calibration Workshop II

- MRIP estimates from 2004-2012 rescaled to account for possible undersampling outside "peak hours"
- Method assumes proportion of catch made outside "peak" hours is relatively stable from year to year
- Separate ratios *R* were computed for A, B1 and B2

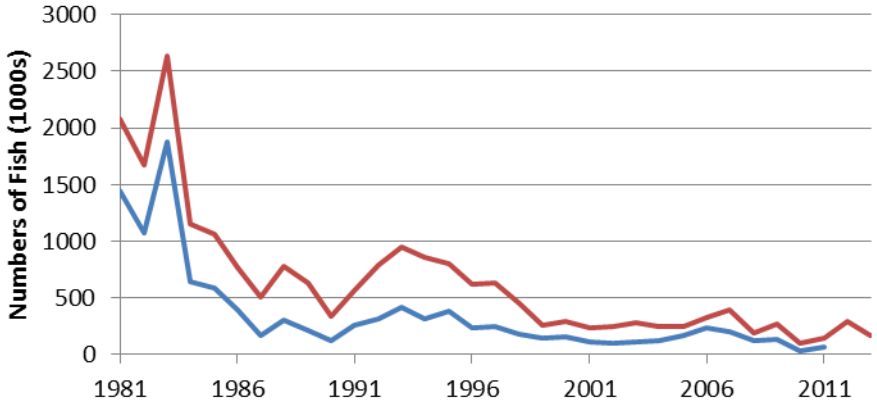
$$\hat{C}_{tot,y} = \hat{R}_{2013}\hat{C}_{peak,y}$$

$$\hat{R}_{2013} = \hat{C}_{tot,2013} / \hat{C}_{peak,2013}$$

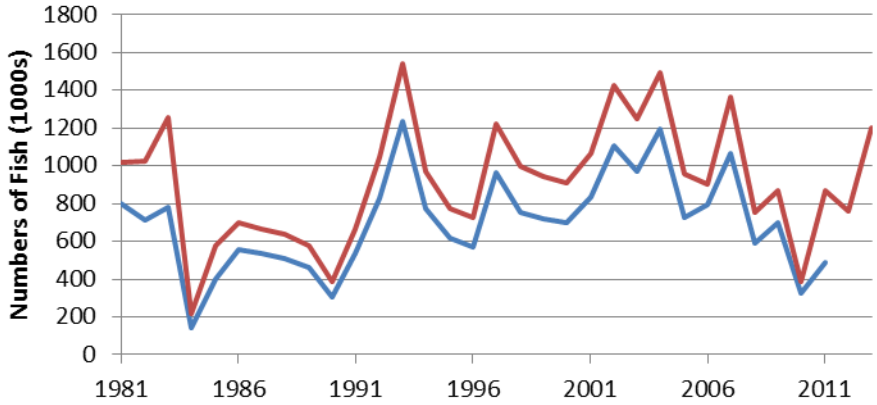


Effect of MRIP Calibration – Red Snapper

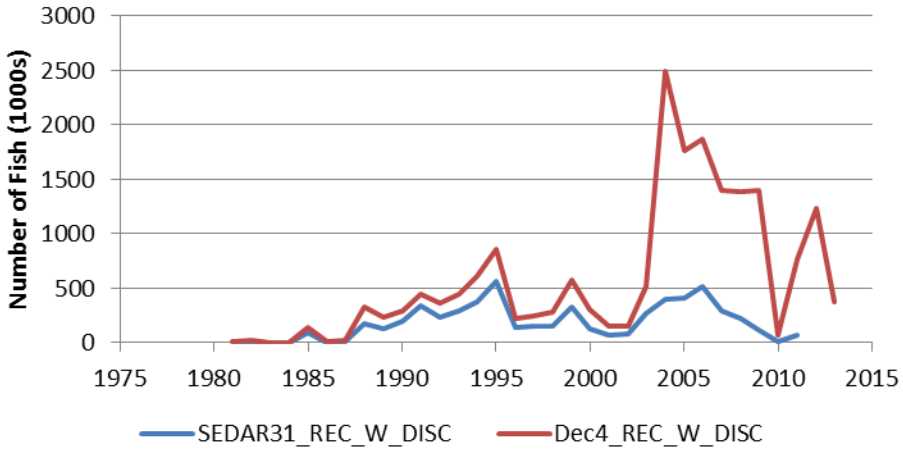
West recreational landings



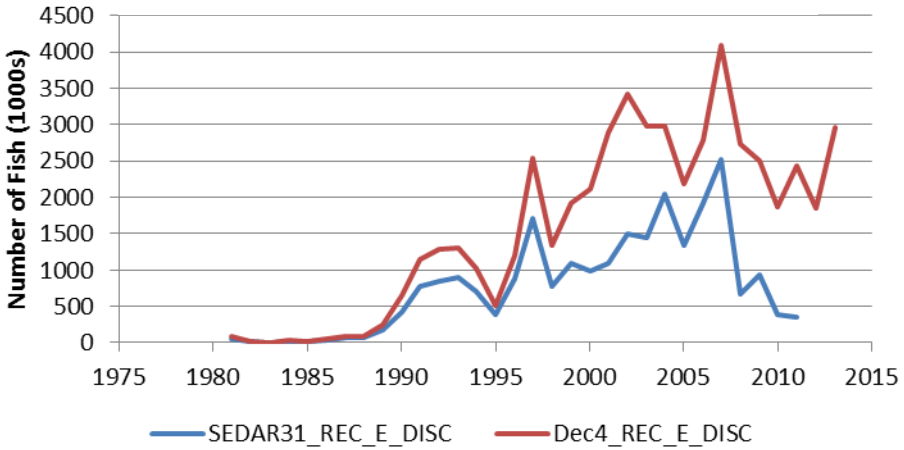
East recreational landings



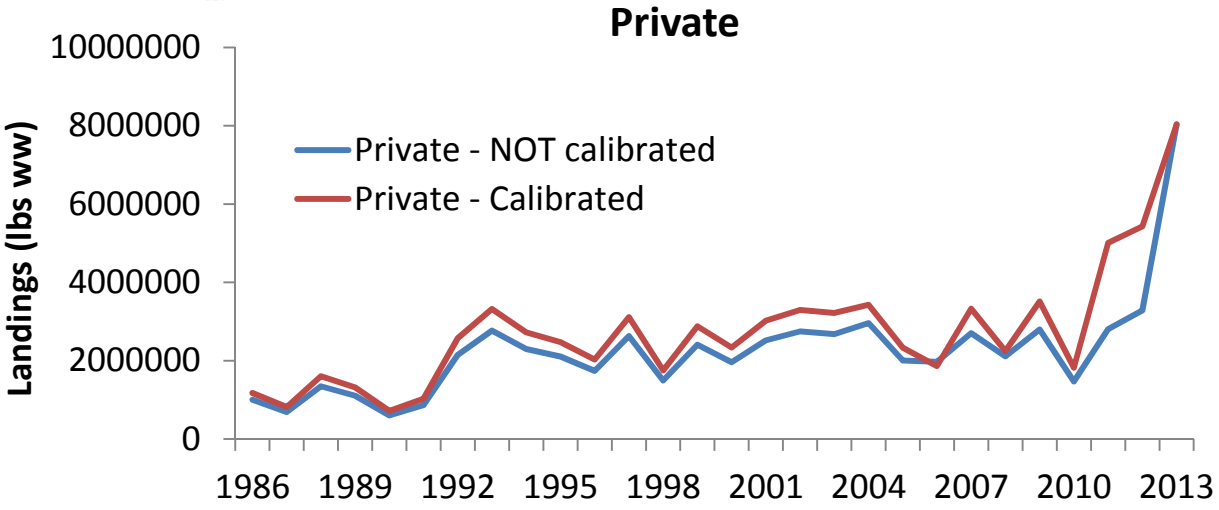
West recreational discards

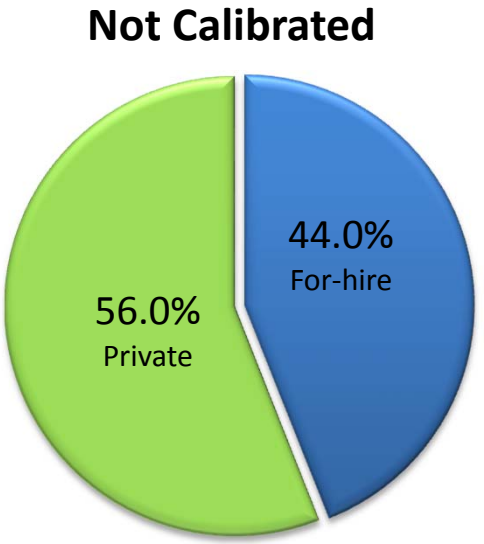


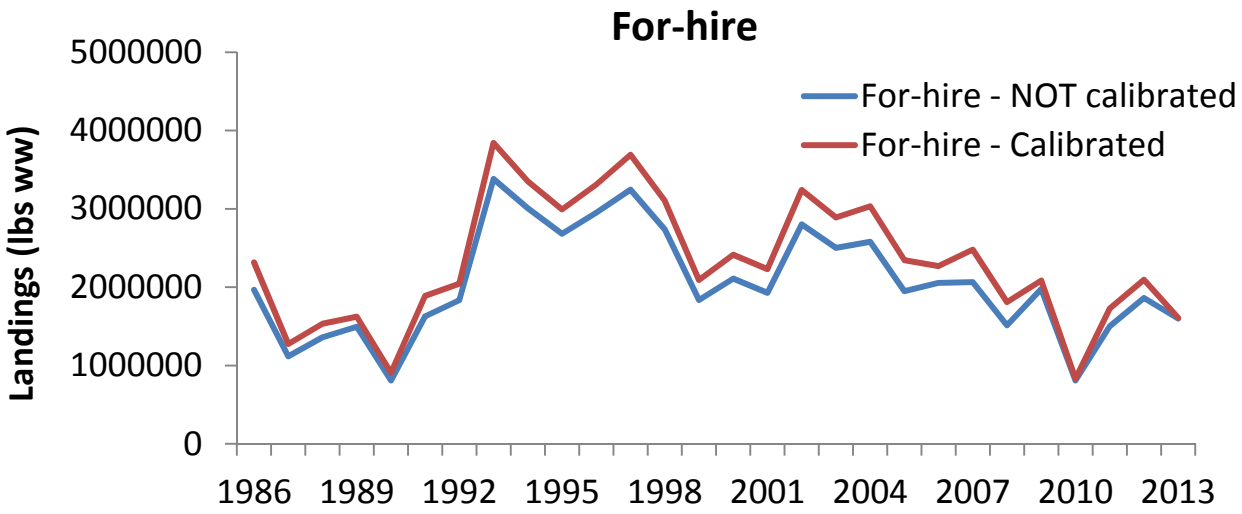
East recreational discards

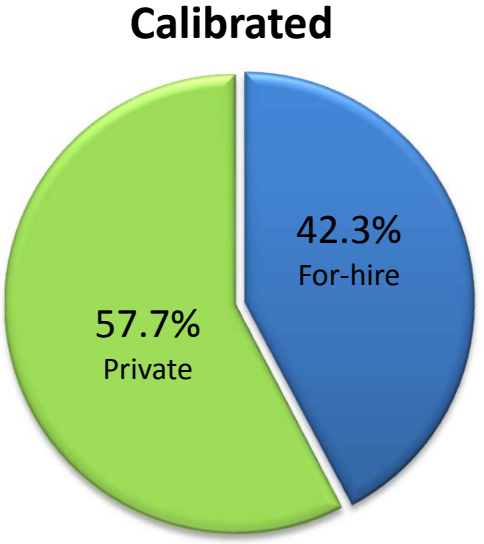


Sector Separation Allocations









Effect of MRIP Calibration – HB Collaborative Red Snapper Quota

$$\text{HBC quota} = \frac{\%\ 2011\ \text{HBC vessel landings}}{2011\ \text{recreational landings}} \times 2015\ \text{quota}$$

	2014	2015
Vessels	17	19
HBC landings (lbs ww)	228,845	268,651
2011 landings (lbs ww)	4,305,989	6,734,109
HBC % of quota	5.3146%	3.9894%
2015 quota (lbs ww)	5,390,000	5,390,000
HBC quota (lbs ww)	286,457	215,027
HBC quota (n fish)	55,527	42,690

← MRIP Calibration II

Questions?

MRIP Calibration Workshop II

September 8 – 10, 2014

North Charleston SC

DRAFT DRAFT

This is a draft version. This report has not been approved for dissemination and contents are subject to change.

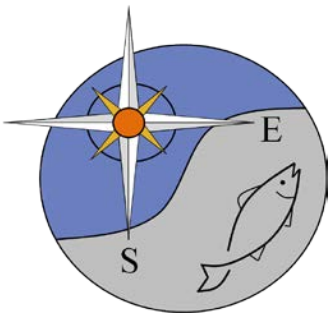
Hosted by

NOAA Fisheries, Office of Science and Technology, MRIP

and

SEDAR: Southeast Data, Assessment and Review

John Carmichael and Dave Van Vorhees, Editors



Introduction

The Second Marine Recreational Information Program (MRIP) Calibration workshop convened September 8 – 10, 2014, in North Charleston, SC to address potential impacts on catch resulting from changes in the Access Point Angler Intercept Survey (APAIS). Changes were implemented in the APAIS component of MRIP during 2013 and 2014 as the next step in ongoing efforts by the program to address issues raised by the 2006 National Research Council (NRC) review of recreational catch sampling.

While revised survey methods changes are believed to improve survey performance and reliability, implementing such changes results in survey outputs such as catch estimates that are now based on a different method than those same outputs from prior years. This creates a break in the time series of estimates that affects stocks assessments which rely up on long time series of data. It also creates an issue for management specifications and Accountability Measures (AMs) tied to catch levels, since the current catch estimates used to evaluate a fishery are based on a different survey method than the catch estimates used to develop those management specifications and AMs. Similar concerns were cited in the justification for the first Calibration workshop, held March 27 – 29, 2012, in Raleigh, NC, to address re-estimation 2004-2011 catch.

The goals of this workshop were to determine if changes made to the APAIS component of MRIP provide catch estimates that differ from prior values and how best to adjust survey estimates to maintain a valid time series of catch estimates.

Workshop outcomes include recommendations that calibration is necessary, that three alternative approaches should be considered and a list of steps to follow when dealing with future survey changes. Calibration alternatives are discussed in general in the workshop report, with detailed steps provided in Appendix 1. Because considerable time and effort will be required to fully develop and evaluate these alternatives, an interim approach was developed by a subset of workshop participants for application in assessments conducted while the 3 primary approaches are pursued. The interim methods are described in Appendix 2.

Table of Contents

Workshop Terms of Reference

1. Review the calibration approaches recommended by the MRFSS/MRIP Calibration Workshop held March 27-29, 2012, in Raleigh NC.

2. Review analyses performed to evaluate potential effects of the 2013 change in the APAIS sampling design on MRIP catch statistics.

3. Evaluate the feasibility of separating the effects of changes in the APAIS sampling design from the effects of changes in the fishery during the affected years.

    - Use red snapper as a case study and review evidence for major changes in the fishery that could account for observed changes in catch statistics.

4. Recommend appropriate calibration approaches to adjust the catch statistics (point estimates and variance) for the years prior to 2013. Discuss the key factors that the calibration approaches must take into account and how they should be modified as more years of APAIS data are collected with the new sampling design.

5. Discuss how future MRIP survey design changes should be evaluated with respect to possible needs for calibration and adjustments to past catch statistics, addressing how any APAIS design change calibration would best be integrated with any future calibrations.

6. Prepare a consensus report providing complete documentation of workshop activities and recommendations.

Proceedings and Recommendations

1. Review the calibration approaches recommended by the MRFSS/MRIP Calibration Workshop held March 27-29, 2012, in Raleigh NC.

The Workshop Panel received a presentation summarizing the approach and findings of the first Calibration workshop. The panel did not raise objections to the approaches recommended by the first calibration workshop. Discussion centered around regional implementation of recommended calibration approaches.

2. Review analyses performed to evaluate potential effects of the 2013 change in the APAIS sampling design on MRIP catch statistics

The second overview presentation addressed specific changes in the APAIS. Topics discussed included the need to change methods, findings of a pilot study conducted to evaluate method changes, and examples of how the change in methods may have impacted survey estimates. The panel recognized the need for a change in survey design and agreed that the updated methods are an improvement.

3. Evaluate the feasibility of separating the effects of changes in the APAIS sampling design from the effects of changes in the fishery during the affected years.

- **Use red snapper as a case study and review evidence for major changes in the fishery that could account for observed changes in catch statistics.**

Several workshop presentations addressed this Term of Reference. Collectively they provided a detailed evaluation of survey, evidence that survey changes affected catch estimates in 2013 and 2014, and alternatives for calibrating survey estimates in response to method changes. The third presentation addressed changes made in 2013, evaluation of those changes with regard to improving sampling productivity, and further changes made in 2014. This led into the fourth presentation, addressing MRIP staff efforts to describe how the changes in survey methods impacted survey estimates. These investigations centered around year effects and design change effects, with the goal of determining whether there was evidence that design changes impacted survey estimates. Evidence that design changes have an impact on survey estimates or catch or effort provides justification to calibrate those estimates for periods prior to the design changes. The fifth workshop presentation provided information on the variation in survey change impacts on landings,

details on observed changes in Gulf of Mexico red snapper estimates and introduced an approach for calibration.

Following these presentations, the Panel agreed there was evidence that survey estimates changed in response to changes in methods. Therefore, adjustment or calibration should be made to the survey estimates to ensure that estimates are comparable over time. Because the new survey methods are considered necessary and preferable to the prior survey methods, the panel agreed that calibration should be applied to the earlier estimates. There was also discussion of calibrating the more recent estimates to historical estimates to allow tracking of catches relative to ACLs established using prior survey methods, until such time that ACLs can be revised. The overall goal of calibration is to adjust the earlier values to be in line with what they would have been had the new survey methods been in place previously. If no calibration or adjustment is applied changes in catch estimates observed between years before and after method changes are applied, that are due to the survey changes, will be erroneously attributed to fishery, environmental or regulatory changes, and can lead to ACLs being met sooner or later depending on the directionality of change in landings estimates.

Recommendation: Calibration is required

- Discontinuity in time series of estimates is a concern for assessment and management efforts
- It is not appropriate to compare estimates based on the new survey design to management parameters such as Annual Catch Limits (ACL) based on old design.
- While there may be a need in the short-term to calibrate new estimates to align with existing estimates, this panel recommends that the appropriate long-term solution is to calibrate existing estimates to the new survey method estimates.
- Addressing existing management and assessment deadlines will require some interim calibrations. These should be based on the best insights and information available at the time required.

4. Recommend appropriate calibration approaches to adjust the catch statistics (point estimates and variance) for the years prior to 2013. Discuss the key factors that the calibration approaches must take into account and how they should be modified as more years of APAIS data are collected with the new sampling design.

Having reached agreement that survey method changes affected survey estimates, and that an adjustment in pre-change values is necessary to ensure valid comparison of results across time, the Panel began deliberations on appropriate calibration approaches. A single, most-appropriate calibration recommendation could not be reached during the workshop. Rather, the panel recognized and described three potential approaches: a simple ratio adjustment, a complex ratio adjustment, and a model-based approach. Each varies in data requirements and assumptions. In addition, while the ratio methods are fairly simple and may provide the most timely results, the model-based approach is more complex, time consuming, and may not work as theoretically envisioned. Therefore, the panel provided the following recommendations that address the methods proposed and provided guidance on their application, evaluation and final selection.

Recommendation: Pursue 3 alternative calibration approaches.

- The most appropriate calibration approach can only be determined following application and evaluation of the three proposed methods.
- The ratio methods should be applied in the short term, to address the most time sensitive management and assessment needs.
    - Apply the ratio methods to Gulf of Mexico red grouper and red snapper by October 15.
    - This is a preliminary, interim approach recommended to address the time constraints posed by upcoming assessments.
- The model based approach requires the most time and effort to implement, and is therefore unlikely to be ready in the short term for immediate management or assessment use. This option will also benefit from including additional (future) years of data in the analysis.
- All of the proposed methods key on temporal changes in survey coverage, which is considered potentially the most influential change in methods.
- Consider simulations to evaluate temporal change and sample cap effects and give some insight into the effects of each change.
- The complex ratio adjustment considers more detail of the temporal design than the simple ratio adjustment. Ratio methods vary in assumptions, with the complex ratio requiring stability of effort and the simple ratio requiring stability of catch. Which assumption is appropriate may vary by region or other factor.
- Regional assistance, ideally obtained through a subset of this workshop panel, will be needed to develop and evaluate these calibration approaches.

Recommendation: Thoroughly evaluate the 3 methods before selecting the most appropriate.

- Criteria to consider when evaluating the most appropriate calibration method should be identified in advance, and include measures of variance and ability to meet assumptions.
- Calibration methods should be applied to data from the NC Pilot Study to test their performance.
- Full application of all three methods should be completed by early 2015 so that calibrated values are available for stock assessment and management use.

Recommendation: Include this workshop panel in final selection

- This workshop panel, with its broad regional representation and varied expertise, should be involved in evaluating the calibration approaches and making final recommendations.

5. Discuss how future MRIP survey design changes should be evaluated with respect to possible needs for calibration and adjustments to past catch statistics, addressing how any APAIS design change calibration would best be integrated with any future calibrations.

The workshop panel considered lessons learned through the first calibration workshop, the NC pilot study of recent APAIS changes, and the situation described in the presentations of this workshop to develop recommendations for managing future survey changes. These recommendations are offered as a series of sequential events to apply to future changes.

1. Consider calibration needs when designing survey changes.

- Ideally, apply existing and new methods side-by-side for an appropriate period of time.
    - If full side by side comparisons are not feasible due to time or budget constraints, conduct representative side by side comparisons that measure the scale and magnitude of potential biases and enables evaluating each method change before full implementation or replacement of existing methods.
    - Pilot studies should be distributed according to a valid statistical design to address known variation in survey estimates, rather than applied to a single area or year that may not be representative of the fishery

    - Use simulations (sample new data to simulate old method) to develop understanding of potential impacts from method changes.
- Consider interactions with previous changes and maintain access to original estimates, to avoid "calibrating calibrations".
- Consider impacts on stock assessment, monitoring and management activities prior to implementing changes in survey methods.
- Consider the trade-offs between making incremental changes, with increased opportunities to ascribe changes in results to changes in methods and responds to new ideas and approaches, and clustered changes, which will reduce overall calibration burdens and provide more points of consistency in survey methods.
- Preserve the ability to calculate estimates consistent with "old" survey methods until calibration and adjustment methods are developed, peer reviewed and approved to address changes in estimates due to "new" survey methods.

2. Conduct outreach and education throughout the development, implementation and evaluation of survey changes and subsequent calibration of estimates.

3. Continue reporting survey estimates based on existing methods while developing and evaluating calibration and adjustment criteria for new methods, and securing peer review of new estimates. Design new methods with sufficient components to replicate status quo methods, and maintain the ability to replicate status quo methods as long as necessary to conduct the steps described here.

4. Conduct a peer review of calibration methods and applications.

5. Finally, revise time series of survey estimates and make them available to update stock assessments and management parameters.

    - Provide both sets of estimates until all managed species have updated catch limits and assessments

6. Prepare a consensus report providing complete documentation of workshop activities and recommendations.

This report documents the workshop proceedings and panel recommendations. It also includes, through several appendices, the result of efforts following the workshop to fully document the 3 proposed calibration methods as well as the interim approach offered for short-term assessment needs.

Further development and evaluation of the proposed calibration methods will be documented through subsequent reports, thereby allowing the work of this workshop panel to conclude.

Documents and Presentations

Supporting Documents

Breidt et al. 2012. A Pilot Study of a New Sampling Design for the Access Point Angler Intercept Survey. NMFS/S&T/MRIP, Silver Spring, MD.
https://www.st.nmfs.noaa.gov/mdms/public/finalReport.jsp?ReportID=353

Boreman, J. 2012. Consultant's Report: Summary of the MRFSS/MRIP Calibration Workshop. NMFS/S&T/MRIP, Silver Spring, MD.

Breidt et al. 2011. A report of the MRIP Sampling and Estimation Project: Improved Estimation Methods for the Access Point Angler Intercept Survey Component of the Marine Recreational Fishery Statistics Survey.
https://www.st.nmfs.noaa.gov/mdms/public/finalReport.jsp?ReportID=672
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MRIP. ?? . Chapter 2. Access Point Angler Intercept Survey (APAIS). NMFS/S&T/MRIP, Silver Spring, MD.

Salz et al. 2012. MRFSS/MRIP Calibration Workshop ad-hoc Working Group Report. NMFS/S&T/MRIP, Silver Spring, MD.

Workshop Presentations

1. Salz, R. and D. Van Voorhees. MRIP/MRFSS Calibration Workshop #1 Key Findings and Outcomes.
2. Van Voorhees, D. A New Design for the Access Point Angler Intercept Survey. 2010 North Carolina Pilot Study.
3. Foster, J. APAIS 2013/2014 Design Changes.
4. Foster, J. Evaluation of APAIS 2013 Design Changes. Descriptive Analysis Part 1: Methods and Results for Temporal Distributions and Effort Components.
5. Foster, J. Evaluation of APAIS 2013 Design Changes. Descriptive Analysis Part 2: Results for Catch Rates, Quasi Design-based Approach for Calibration.

Workshop Participants

Name	Affiliation
Workshop Panelists	
Gregg Bray	GSMFC
Anne Lange	SAFMC SSC
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Richard Cody	FL FWCC
Jon Deroba	NEFSC
Katie Drew	ASMFC
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Laura Lee	NC DMF
Virginia Lesser	OSU
John Mareska	AL DCNR
Vivian Matter	SEFSC
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Gary Nelson	MA DMF
Ken Pollock	NCSU
Clay Porch	SEFSC
Paul Rago	NEFSC
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Andy Strelcheck	SERO
Steve Turner	SEFSC
Dave Van Voorhees	NMFS S&T
Chris Wright	NMFS SF
Mike Errigo	SAFMC
Staff and Observers	
Julia Byrd	SEDAR
Julie Neer	SEDAR
Brad Floyd	SC DNR
Todd Phillips	Ocean Conservancy

Appendix 1. Detailed Implementation Steps for the Calibration Methods Proposed During the Workshop.

Summary Report: NOAA Calibration Methods Workshop - Charleston, SC
September 8-10, 2014
Lynne Stokes, Ken Pollock, Ginny Lesser
December 18, 2014

The new MRIP Access point survey has replaced the original MRFSS Access Point Survey. A variety of design changes have been made. One major consequence is that the new survey covers the fishing day more effectively than the original MRFSS Access Point Survey. Because the time series of recreational catch rate estimates form the basis of so many important fisheries stock assessments, there is the need to develop methods which "calibrate" the original time series of MRFSS estimates to the new time series of MRIP estimates. This is a difficult statistical estimation and prediction issue because both surveys were not run in parallel in any years (except for one pilot test in NC). The new estimates can be very different from the old estimates causing an abrupt change in the time series.

The purpose of this document is to outline the steps involved in implementing several model dependent calibration approaches to re-estimate catch that were discussed at the Charleston workshop. In addition, we discuss their assumptions. The first two methods use ideas of ratio estimation and assume that the major changes between the two surveys are due to a better temporal coverage of the fishing day in the new MRIP survey. The third method is a regression prediction modeling approach that will take longer to develop. None of these methods incorporate any analysis of spatial patterns or include time series methods, which might improve estimates. This would be worth exploring to determine if time series or small area estimation techniques for this short time series might provide improved estimates.

1. Direct Catch Ratio Adjustment
    - Steps in approach (for each subregion, state, mode, species.):
        i. Define peak period for each of the domains (excluding species). Peak period is defined using two criteria: 1) the contiguous range of hours during which weighted hourly proportions of total trips in the MRFSS years (prior to 2013) were greater than or equal to the corresponding weighted hourly proportions of total trips in 2013, and 2) the peak period accounted for at least 75% of the intercept data (trips) in the MRFSS years.

ii. Estimate peak and total catch using the 2013 data based on the MRIP survey method where both the peak and total fishing periods were sampled adequately. Denote these by $c_{p,2013}$ and $c_{total,\ 2013}$, respectively.
iii. Calculate the ratio $R_{2013} = c_{total,w2013}/c_{p,2013}$. This estimate and its large sample variance, based on standard Taylor series methods, can be calculated from survey sampling software packages such as SAS.
iv. Denote the estimator of catch based on the MRFSS method during the peak period in earlier year *y* (e.g., *y* = 2012, 2011, etc.) by $c_{p,y}$. Then the estimator of adjusted total catch for year *y* (i.e., a prediction of what would have been obtained if MRIP had been run) will be calculated as the product of the ratio from year 2013 and the catch for the peak period in year y; i.e.,

$$c_{tot,y} = R_{2013} * c_{p,y}.$$

iv. The variance of the adjusted catch $c_{tot,y}$ can be calculated using the expression for the variance of a product of two independent random variables introduced by Goodman (1960): .

$$var(c_{tot,y}) = var(R_{2013})(c_{p,y})^2 + var(c_{p,y})(R_{2013})^2 - var(R_{2013})var(c_{p,y})$$

By substituting estimates for each of the components in this equation, the variance can be estimated.

- Assumptions:
  i. Relative distribution of catch throughout day (i.e., between peak and total) is constant between 2013 and the year that is being adjusted for each domain

- Advantages:
  i. Simple to apply.

- Disadvantages:
  i. Information that is available for non-peak hours are not used.

- Two variations of this approach:
  i. Keep a fixed peak time the same (note this will vary by state and mode)
  ii. Use different peak times (allow this to vary by state, mode and year since this was allowed to vary in these groups)

2. Complex Ratio Method Based on Fishing Effort Distributions
   - Steps in approach (for each subregion, state, mode, species etc.):
     i. The 2013 daily relative distribution of total fishing effort is obtained and also the relative distribution of total fishing effort data for the year to be compared to (for example, for y = 2012, 2011, etc.). Total fishing effort is estimated as the fishing effort estimate from separate telephone surveys (CHTS, FHS) that is subsequently expanded by coverage correction factors estimated from APAIS.
     ii. The 2013 sampling weights are then adjusted (up or down weighted) so that the 2013 relative distribution matches the year y relative distribution. This is to be done by using discrete temporal bins with the exact bin widths yet to be determined. The adjustments made to the 2013 sample weights are a ratio style adjustment of the form:

$$w_{dti|y} = w_{dti} * \frac{\hat{p}_{dt,y}}{\hat{p}_{dt,2013}}$$

where w_{dti} is the unadjusted 2013 sample weight for angler-trip *i* in time bin *t* in subregion, state, mode domain *d*,
$\hat{p}_{dt,2013}$ is the original 2013 weighted proportion for time bin *t* of total trips in domain *d*,
$\hat{p}_{dt,y}$ is the year *y* weighted proportion for time bin *t* of total trips in domain *d*, and
$w_{dti|y}$ is the 2013 sample weight for angler-trip *i* in time bin *t* in domain *d* adjusted to year *y*.

From initial evaluations of bin width, it appears that a 3-hour bin is the smallest bin that results in no data gaps or mismatches in 2013 (data present in a bin in a prior year but not in 2013) for all state by mode domains. However, additional work could be done to fine tune bin widths for each domain cell.

     iii. Use the MRIP survey method to estimate catch for the complete 2013 data and denote it by c_{2013}. Also calculate catch for the 2013 data weighted to match the truncated distribution of effort for year y data (step ii above), and denote this estimator by $c_{tr,2013}$
     iv. Calculate the ratio of 2013 complete to truncated catch based on the MRIP survey; i.e., $R_{c/tr,2013} = c_{2013}/c_{tr,2013}$.
     v. Multiply this ratio by the year y estimate of catch c_y to obtain the adjusted year y catch estimate (i.e. what would have been obtained if MRIP survey had been run) $c_{y,adj} = R_{c/tr,2013} * c_y$.

vi. A similar approach can be used to adjust all other years one by one or alternately down weight 2013 compared to the pooled temporal distribution of all other years and get one overall ratio which can be used to adjust all the years.
vii. Explore computation of the variances of the calibrated estimates by either using a bootstrap or delta method.

- Assumptions:
  i. Relative distribution of trip/catch characteristics that must be constant between 2013 and the year that is being adjusted. In other words: the only difference between the MRFSS samples and the MRIP samples are that the MRFSS samples under represent the trips which occur at the beginning and end of the fishing day.

- Advantages:
  i. Information that is available for non-peak hours are used unlike in the previous method.

- Disadvantages:
  i. Information from non-peak hours will be limited and may be highly variable or impacted by incomplete coverage compared to information from peak hours.

- Other ideas to consider as variations of above
  i. Recalculate catch after effort has been readjusted. Therefore, both catch and effort are readjusted. The calibration methods make use of the MRIP public-use or micro datasets. The records included in these datasets come from APAIS. However, the sample weights in these datasets include a post-stratification adjustment such that the sum of the sample weights equals the MRIP estimate of total effort in domain cells defined by year, subregion, state, wave, mode, and area. To more fully approximate the effect of temporal coverage changes on catch, the MRIP estimates of total effort must be recalculated since they also include coverage correction factors estimated from APAIS. Once total effort has been recalculated, sample weights may be post-stratified to the new effort totals, and then revised catch estimates may be calculated as weighted sums using sample weights that have been adjusted to both a prior year daily distribution of effort as well as the resultant new effort total.

ii. Apply temporal distribution either year-by-year or as an average across a range of years (say 2004-2012). Then multiply this ratio by MRFSS estimates of catch in previous years. NOTE: If use each year separately, then there is no assumption that the relative distribution of catch is constant throughout the day across years, only the two years that are compared. So if only one year violates this assumption, then conducting an aggregate analysis could bias the estimator for the other years, while if it was done separately, only it would be biased by that assumption violation. Conversely, using a multi-year average distribution may work to smooth results in cases where annual level distributions may be more variable.

3. Regression Model-Based Approach
   - Steps in approach:
     i. Develop a regression model using 2013 intercept data (perhaps other years as well) to predict and classify trips into either morning, peak, or evening as predicted from their characteristics, such as type of catch and other demographic and behavior characteristics of the anglers that are available from the intercept questionnaire. Cross-validation could be used to check the model. For example, one could use approximately 75% of the data to develop the model. Then Bayes' Information Criterion (or other model fit statistic) could be used to develop the best fitting model. Once the model is built, the remaining 25% of the data could be used to predict the response variable. A statistic, such as the Press statistic, could be calculated to document how well the model is predicting the response categories. A replication approach might also be considered to look at model robustness or stability.
     ii. Use the model to predict Morning, Peak and Evening trips for 2012, 2011, etc. These classifications won't be "true" morning, peak, and evening categories, since they won't be aiming to identify when the trip took place. Rather, they will be trying to predict when a trip is similar, based on catch and demographic and behavior characteristics of anglers, to trips in 2013 in those categories.
     iii. Determine the proportion of Morning, Peak, and Evening trips in 2013. Adjust the 2012, 2011, data so that the Morning, Peak, Evening proportions are identical to the 2013 data. These are adjusted proportions. In addition to 2013 data, control proportions for prior years may be developed using trip time data from the CHTS and FHS effort surveys, which would be available for a range of years prior to 2013.

iv. This new weight, the inverse of the 'adjusted proportions', is multiplied by the existing weights for 2012, 2011, etc. to create the adjusted weight.
v. Data are now analyzed using the adjusted weights.
vi. A bootstrap method could be used to calculate variances.

- Assumptions:
  i. Reasonable predictive model can be developed using 2013 data to reasonably predict catch period type (i.e., Morning, Peak, and Evening).
  ii. The demographic characteristics of the angler/catch predict the characteristics of the catch through a "label" we are assigning about time of day.
  iii. Assumes that true time and latent time are identical in 2013 (see below for definition of latent.)

- Disadvantages:
  i. More work is required to develop the prediction model.
  The model is not designed to predict the observable characteristic (time of day), but is rather predicting whether the trip "resembles" a trip made during that time of day, which is a latent variable. Because of this, the model checking done on the 2013 data to see how well the model works is not like the target years, since we can't observe the latent variable even for 2013. It may be that some of the trips made in the morning in 2013 do not resemble morning trips, and yet the model will be examined for its accuracy in predicting true time. If we were really interested in predicting true time, we would simply use the true time as a predictor in previous years!
- Advantages
  i. A number of important explanatory variables can be incorporated in the model to better predict trips.
  ii. Approach incorporates the calibration into the sample weights, which maintains the current usability of MRIP public-use datasets for analysts.

- Other comments:
  i. As more data is collected using the MRIP design, the model development should be repeated to improve prediction.

Catch can also be added to model, but need to be careful of applying 2013 year affects to previous years.

References:
Goodman, Leo A., "On the exact variance of products," *Journal of the American Statistical Association*, December 1960, 708–713.

Appendix 2. Recommended Interim Calibration Approach, suggested for use in Assessments Conducted in Winter 2014/15.

October 30, 2014
Summary Report: Recommended NOAA Calibration Method
Lynne Stokes, Ken Pollock, Ginny Lesser

Introduction

The new MRIP Access Point Angler Intercept Survey (APAIS) has replaced the original MRFSS Access Point Survey. A variety of design changes have been made. One major consequence is that the new survey covers the fishing day more effectively than the original MRFSS Access Point Survey. Because the time series of recreational catch rate estimates form the basis of so many important fisheries stock assessments, there is the need to develop methods which "calibrate" the original time series of MRFSS estimates to the new time series of MRIP estimates. This is a difficult statistical estimation and prediction issue because the two surveys were not run in parallel in any years (except for one pilot test in NC). The new estimates can be very different from the old estimates causing an abrupt change in the time series.

Three methods of producing a calibration were suggested at the workshop in Charleston, SC held in September. Since that time, the statistical consultants have worked on investigating the properties of the three methods, and John Foster has implemented two of the three methods for some areas/species, in order to see how they perform. The purpose of this document is to describe our recommended method and to explain our choice.

Our recommendation

Our recommendation at this time is to use the method that was referred to as "Method 1" at the workshop. Our decision is based on two main factors. One is that the method is the easiest to explain and to understand of the three methods. It is based on an assumption that the ratio of catch in the peak period to total catch is stable over time. The method referred to as "Method 2" at the workshop is also a ratio method, but it is more complex (a negative feature) and uses the data from prior years more fully (a positive feature). Our reluctance to

recommend Method 2 at this time is that we have not yet been able to work out its statistical details. However, it is clear that it requires estimation of more parameters than Method 1. As a result, we are not confident that the one year of new MRIP APAIS estimates available at this time will be sufficient. Finally, Method 3 considered at the conference is a regression prediction modeling approach that will take longer to develop and also need more data. (It is the one method not yet applied to any of the data by John Foster.)

Description of the method

Here we describe the basic assumption used to justify Method 1, and then outline the steps required for implementation. First, the justification of the method requires the assumption that in years previous to 2013, there is a period of the day that can be considered to have been fully covered by the MRFSS survey, and that the bias in its estimates occurs due to undercoverage in the non-peak periods. This is a very strong, but necessary assumption for this method. Second, the method requires the assumption that the ratio of peak catch to total catch stays constant across years for subregion, state, mode, and species. So for each of these domains, the calibrated total catch for year *y* is made as

$$\hat{C}_{tot,y} = \hat{R}_{2013}\hat{C}_{p,y} \quad (1)$$

where $\hat{C}_{p,y}$ is the estimated peak-period catch for year *y* calculated from reweighted MRFSS data and $\hat{R}_{2013} = \hat{C}_{tot,2013} / \hat{C}_{p,2013}$ is the ratio of the total to peak catch for year 2013, which is calculated from MRIP data. $\hat{C}_{tot,y}$ is thus our estimate of the catch total for the domain that would have been estimated if MRIP had been conducted in year *y*.

The steps in producing this estimate are outlined below.

Step 1. Define peak period for each of the domains (subregion, state, mode). In the pilot implementation by John Foster, peak period was defined using two criteria: 1) the contiguous range of hours during which weighted hourly proportions of total trips in the MRFSS years (prior to 2013) were greater than or equal to the corresponding weighted hourly proportions of total trips in 2013, and 2) the peak period accounted for at least 75% of the intercept data (trips) in the MRFSS years.

Step 2. Calculate $\hat{C}_{p,y}$, the catch in the peak period for all years *y* < 2013 for which calibration is needed.

Step 3. Estimate peak and total catch using the 2013 data based on the MRIP survey method where both the peak and total fishing periods were sampled adequately. Calculate its ratio $\hat{R}_{2013}$.

Step 4. Calculate the estimator $\hat{C}_{tot,y}$ shown in (1).

The variance of this estimator can be calculated using standard statistical methods.

Discussion

There are at least three substantial criticisms possible for this method. First is that the method uses none of the data collected outside the peak period in years prior to 2013. The second is that the method requires an assumption that the ratio of catch in the peak period to total catch is constant across years. We are not sure if this is defensible from a scientific point of view. Third, the method assumes that the estimate of total catch for the peak period made from the reweighted MRFSS data in years prior to 2013 is unbiased. On the other hand, some type of unverifiable assumption will be necessary in order to carry out any calibration because of the lack of side-by-side data collection for the MRIP and MRFSS APAIS sampling designs.

Some variations on Method 1 are possible. For example, the choice of how the peak period is defined will affect the estimates. Peak can be determined individually for each year or based on an aggregation of years and/or domains. We believe that this definition will be difficult to specify in advance, and must be based on characteristics of the data.

We recommend that investigation continue on the remaining two methods. It is possible that one of them will be determined to be better at some future date.