Summary Report on the Quality Management Workshop for the For-Hire Electronic Reporting Requirements in the Southeast Region

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Abbreviations

Abbreviation	Description
ACCSP	Atlantic Coastal Cooperative Statistics Program
aGPS	archival Global Positioning System
APAIS	Access Point Angler Intercept Survey
API	Application Program Interface
CI	Continual Improvement
eNGO	Environmental Non-governmental Organization
FINs	Fishery Information Networks
FIS	Fisheries Information System
GPS	Global Positioning System
Gulf	Gulf of Mexico
Gulf Council	Gulf of Mexico Fishery Management Council
GulfFin	Gulf of Mexico Fishery Information Network
MRIP	Marine Recreational Information Program
QA/QC	Quality Assurance / Quality Control
QM	Quality Management
QMPSG	Quality Management Professional Specialty Group
Regional Office	Southeast Regional Office
Science Center	Southeast Fisheries Science Center
South Atlantic Council	South Atlantic Fishery Management Council
SRHS	Southeast Region Headboat Survey
TIP	Trip Information Program
VMS	Vessel Monitoring System

Background Information

Fisheries Information System

NOAA Fisheries' Fisheries Information System (FIS) program began in 2003 to improve the nation's ability to manage its living marine resources, while still preserving regional fishery science and management autonomy. The FIS program works collaboratively with partners at the federal, regional, and state levels to ensure every stakeholder can easily access comprehensive, high-quality, timely fisheries information. Through these partnerships, FIS works to improve access to these data by investing in three broad areas:

- Data gaps and data quality,
- Efficient technology and data integration, and
- Effective coordination and communication in the design, collection, and uses of data.

Because each stakeholder and region have unique data needs and management challenges, there will never be a "one-size-fits-all" approach. However, there is a need for cross-regional strategies to capture and share best practices, spark innovation, and integrate information. One way in which to share these cross-regional experiences is through Professional Specialty Groups (PSG). PSGs consist of experts from multiple disciplines who address a specific need or issue identified by the FIS management team. Typically, these PSGs are composed of representatives for NOAA Fisheries headquarters, regional offices, science centers, Fisheries Information Networks (FINs), and state partners. FIS currently has four PSGs: Data Access and Dissemination, Electronic Reporting, Highly Migratory Species, and Quality Management and Continuous Improvement (QMPSG).

In addition, FIS supports a variety of projects across the nation through an annual competitive request for proposal process. FIS funds projects that fall within one of the four priorities:

- Quality Management and Continuous Improvement,
- Electronic Reporting,
- Electronic Monitoring, and
- Fishery Information Network Improvement.

FIS has funded a wide scope of projects over time, which can be viewed on their FIS webpage[1]. The Southeast Regional Office (Regional Office) has had two proposals for the for-hire electronic reporting programs funded through FIS. One of the proposals allowed the Regional Office to contract a strategic planner to aid in the implementation process, while the second proposal provided a portion of start-up costs for electronic for-hire reporting.

Quality Management and Continuous Improvement Professional Specialty Group

The QMPSG, which was formed in 2010, develops and hosts quality management trainings to provide participants with methods and tools for improving data collection and reporting processes. The QMPSG also guides the implementation of quality management principles and tools into the daily business practices of NOAA Fisheries to ensure continuous improvement in ongoing projects. Aspects of quality management include leadership engagement, strategic planning, the use of process improvement tools, and listening to the customer. When organizations include these principles, data quality improves. A

[1] https://www.fisheries.noaa.gov/national/commercial-fishing/fisheries-information-system-program

goal of the QMPSG is to promote a culture of quality management and continuous improvement throughout NOAA Fisheries. More information on the QMPSG can be found on their webpage[2]. This website also contains a variety of tools used in quality management (QM) and for continuous improvement (CI). The tools are found under the "QM and CI Toolbox" header. For each tool, there is information on why, when, and how to use the tools. The QMPSG meets regularly through webinar style meetings and once per year hosts an annual meeting that also serves as a training session.

For-hire Data Collection

Currently, charter vessels catch and effort are collected and compiled through Marine Recreational Information Program (MRIP); with the exception of Louisiana and Texas, which use their own state surveys. MRIP uses a survey-based method to estimate catch by for-hire vessels through dockside monitoring and calculates fishing effort (i.e., number of trips and types of trips) based on a phone survey that samples 10% of the federally permitted charter vessels. Information is reported in two-month periods (waves), with preliminary data released 45 days after the end of each wave. The Southeast Fisheries Science Center (Science Center) applies a standardized methodology for weight estimation of the MRIP catch before it is used for management or stock assessments. These data are typically available for use 15 days after the Science Center receives the data from MRIP. Therefore, catch estimates are first available to management approximately 60 days after each wave ends.

A subset of for-hire vessels (n=143) that meet the criteria of a headboat are selected to report fisheries data via the Southeast Region Headboat Survey (SRHS). This program focuses on the larger capacity for-hire vessels and collects vessel specific information about catch and effort.

The Gulf of Mexico Fishery Management Council (Gulf Council) and South Atlantic Fishery Management Council (South Atlantic Council) developed and submitted generic amendments to fishery management plans that would require electronic reporting of landings, effort, and economic data by federally permitted for-hire (charter and headboat) vessels[3] in the Gulf of Mexico (Gulf) and Atlantic. Initially, there was one amendment developed jointly by both Councils. As the intended requirements began to differ between the two Councils, the amendment was separated into two amendments, one for each region[4]. Once implemented, the Gulf amendment will require all federally permitted for-hire vessels to declare a fishing trip before leaving port (declaration or commonly called 'hail-out'), to submit an electronic report prior to offloading harvested fish, and to have a location tracking system (i.e., archival global positioning system [aGPS] or vessel monitoring system [VMS]) that is always turned on and permanently affixed to the vessel. Once implemented, the South Atlantic amendment will require submission of trip level catch and effort data on a weekly basis. The South Atlantic amendment does not include declarations of a fishing trip or permanently affixed global positioning system (GPS) device.

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[2] https://www.fisheries.noaa.gov/national/commercial-fishing/quality-management-and-continuous-improvement

[3] These amendments are applicable to the following permits: Atlantic charter/headboat for dolphin/wahoo, Atlantic charter/headboat for coastal migratory pelagics, South Atlantic charter/headboat for snapper-grouper, Gulf charter/headboat for coastal migratory pelagic fish, Gulf charter/headboat for reef fish, Historical Captain Gulf charter/headboat for coastal migratory pelagic fish, and Historical Captain Gulf charter/headboat for reef fish.

[4] The two amendments are the Gulf of Mexico Modifications to Charter Vessel and Headboat Reporting Requirements and South Atlantic Modifications to Charter Vessel and Headboat Reporting Requirements.

The intent of these amendments is to improve the timeliness and accuracy of catch data, including information on catch, effort, discards, and socio-economic data.

Census-style electronic reporting could reduce the likelihood that annual catch limits are exceeded and accountability measures are triggered. Increasing the reporting frequency along with enhanced data collection and validation could improve quota monitoring, stock assessments, and catch and discard estimates. For rarely encountered species with low catches, the current survey based methods may not by precise; therefore, electronic reporting may reduce uncertainty in catch and effort data in the for-hire component of the recreational sector. Before the data collected through the electronic-for hire reporting programs are used for official estimates of for-hire catch and effort, multiple years of side-by-side data collection with the MRIP survey would be needed. In addition, *t*here are currently no funds available to hire additional staff to validate effort and catch, and as such, the data collection programs may not be robust enough to be certified through MRIP.

For-hire electronic reporting implementation

In early 2017, NOAA Fisheries formed an implementation team to develop the electronic reporting programs. The team's objectives were to determine the minimum standards for electronic reporting, identify appropriate system(s) for reporting, estimate timelines and costs associated with the program, and identify a process for comparing the data collected to current existing programs. The wide geographical coverage of the programs (Texas through Maine), required a large diverse group of team members to represent the different stakeholders (Appendix 1). Team members included over 50 representatives from:

- Regional Office's Gulf of Mexico branch
- Regional Office's South Atlantic branch
- Regional Office's Limited Access Privilege Program/Data Management branch
- Regional Office's Socio-economic branch
- Science Center staff
- SRHS staff
- Office of Science and Technology
- Atlantic Highly Migratory Species staff
- Northeast Fisheries Science Center
- Greater Atlantic Regional Office
- Atlantic Coastal Cooperative Statistics Program
- Gulf States Marine Fisheries Commission
- South Atlantic Council Staff
- Gulf Council staff
- Mid-Atlantic Council staff
- NOAA Fisheries Vessel Monitoring System branch
- NOAA Fisheries Office of Law Enforcement
- NOAA Fisheries General Counsel
- Regional Office's Information Technology branch
- Regional Office's Permits branch
- For-Hire Electronic Reporting Strategic Planner

During the first set of meetings, representatives of electronic recreational reporting programs were invited to present the current known electronic reporting systems. These presentations were intended to provide the implementation team with current information about on-going technologies and the types of data collected (Appendix 2). These presentations allowed the team to learn from past projects and utilize the aspects of each program that applied to the for-hire amendments. The team developed six sub-groups and assigned representatives based on their expertise. The six sub-groups were:

- Data Housing
- Minimum Standards
- Survey Design
- Compliance and Enforcement
- Outreach and Education
- Program Management and Budget

The full implementation team met every two weeks, with sub-groups providing updates

Data Housing Sub-Group

The goal of the data housing sub-group was to determine the data repository and first receiver for the information being collected through the electronic reporting programs. The data housing options were limited to those that could provide governmental level security to the data being collected. Three options for the data repository (Regional Office, Science Center, or Atlantic Coastal Cooperative Statistics Program [ACCSP]), were chosen based on current existing programs housed in each location. For each option, the data housing sub-group compared the ability to access data across all interested partners, the ability adapt the system to future changes, the integration of the data without agency programs, staffing needs, and funding needs. Neither Regional Office nor the Science Center had a ready-made system available, while ACCSP's system could be readily adapted at no cost the NOAA Fisheries. ACCSP was selected as the best option based on funding and staffing needs, flexibility in design, back-up system procedures, and the ability to integrate various data from other regions. At the point of the QMPSG workshop, NOAA Fisheries was working with ACCSP to establish the data housing requirements, although there were many questions about data process flows that still needed to be answered.

Minimum Standards Sub-Group

The goal of the minimum standards sub-group was to develop identify data transmission needs, including technical guidance for vendors, identify potential hardware vendors for the GPS requirement in the Gulf amendment, type approval process for software/hardware, and final codified text relating to these standards for the regulations. With the decision to move forward with ACCSP as the data warehouse, the group adopted the application program interfaces (API) standards used by ACCSP for the logbook reports. These specifications would be available to all software vendors who wish to develop an application to submit for-hire electronic reports. The use of these technical specifications would allow federally permitted for-hire operators to choose the reporting platform and application that best meets their needs. At the point of the QMPSG meeting, NOAA Fisheries was working in conjunction with ACCSP to modify the API to suit the data elements selected by Science Center Director.

The strategic planner contracted through FIS funds was also able to identify numerous vendors for the archival GPS requirement for Gulf federally permitted for-hire vessels. These hardware vendors must be able to record and later transmit through cellular service specific location information (latitude/longitude) along with required fisheries information prior to returning to the dock. However, some areas do not have cellular service even at the dock, so those vessels would likely need a satellite-enabled device to submit records before removing fish from the vessel. A FIS grant was obtained to test a number of location tracking devices in the Gulf in fall 2018. Under this grant, tracking devices will be acquired from 4-5 vendors and placed on for-hire vessels to test for reliability in operation and data transmission, and to receive feedback from vessel operators on device function and usability. At the point of the QMPSG meeting, NOAA Fisheries had determined a GPS positioning rate of once per hour. Additional questions still need to be resolved around the type approval process, the ability to monitor the units, and compliance and enforcement for reporting.

Survey Design Sub-Group

The goal of the survey design sub-group was to define the data elements necessary, consider integration with existing programs, create a process to validate data collected, and create factors to calibrate new

data to past data collected. While each amendment described the types of data collected, the survey design group needed to balance the data needed for management and stock assessments with reporting time (e.g., length of time to complete the logbook) and accuracy of the reported fields (e.g., willingness to report correctly). The survey design team agreed that maintaining consistency with each new program and existing surveys was a high priority. Consistency in data elements between the two Gulf and South Atlantic electronic for-hire reporting amendments is expected to aid in system development (i.e., relational databases architecture, database outputs) and reduce reporting burden. An area where burden on fishermen could be reduced would be the ability for the logbook form to retain static information (e.g., vessel name, vessel identifier). Information that is more dynamic for each trip would be completed by the fishermen, but tools such as drop down boxes or favorites may aid in completing this task more timely.

Integration with existing streams of data would be necessary to reduce duplicative effort, avoid double counting, and enforce compliance (i.e., permits data, VMS). A key factor for data integration would be the creation of a region-wide trip management system. Such a system is in development by the NOAA Fisheries' Greater Atlantic Region in partnership with ACCSP. While it is not realistic to expect all data collection systems to use one trip management system, this may reduce duplicative reporting among the federal programs across regions.

The survey design subgroup recognized that the advantages of the electronic reporting can only be realized through validation of the self-reported data. Without the proper safeguards for compliance monitoring, data quality assurance, and enforcement, the resulting census-style data would be considered less reliable than the current sample-survey approached used within MRIP[5]. The subgroup identified three main sampling strategies that may aid in validation: dockside landed-catch validation, dockside biological sampling, and at-sea observation. Dockside landed-catch validation would focus on verification of vessel effort and landed catch. At a minimum, this effort would be required to validate catch for statistically robust capture/recapture methods to estimate non-compliance and mis-reported catch. Recognizing that 100% compliance with timely and accurate reporting is not realistic, the validation methods must be able to identify and correct for non-compliance and reporting errors. Biological sampling will supply needed information for stock assessments about catch's length, weight, age, and sex. At-sea observers would provide additional validation of discarded species for stock assessments. While both biological sampling and at-sea observers record helpful information, the costs may prohibit the collection of such data at this time.

The capture/recapture logbook study completed by ACCSP and South Carolina's Department of Natural Resources is being analyzed as a potential validation tool for the for-hire electronic reporting programs. This type of methodology utilizes the catch information from logbooks and evaluates it against the MRIP's Access-point Angler Intercept Survey (APAIS) to develop a catch estimation. In this method, the capture is the logbook reporting and the recapture is the APAIS intercept. Key challenges in this approach are the ability to match trips, choosing a correct estimator, and having the logbook submitted prior to the APAIS intercept.

[5] For more information on estimation processes and understanding differences between census and sampling surveys, visit the MRIP website on Understanding Estimation.

Once a validation method has been implemented, the validation process must run for a number of years to calibrate the new data stream with currently used or past data streams (i.e., Marine Recreational Fisheries Statistical Survey, MRIP, SRHS, state surveys). Components of data calibration include side-by-side sampling for a minimum of three years and overlapping coverage levels with other survey. After the minimum of three years, the data collected will be statistically compared and calibration factors will be developed.

Compliance and Enforcement Sub-Group

Compliance and enforcement of the electronic reporting requirements are critical to the implementation and success of the programs by ensuring accurate, timely reporting and adjusting data for non-compliance. The sub-group reviewed two other electronic reporting programs, SRHS and Highly Migratory Species (HMS) eDealer program, to learn how compliance and enforcement function in each program. In both programs, outreach and communication were key for compliance. Outreach allowed the participants to understand the consequences of non-compliance, both direct (e.g., permit renewal delay, sanctions) and indirect (e.g., ability to use the data for management purposes). The SRHS program, due to the small number of vessels participating, used directed observation through port agents monitoring vessels. This type of compliance observation is not scalable for the number of vessels expected to participate in the for-hire electronic reporting programs. Other means of electronically monitoring the vessels for compliance can ease the burden and cost of direct observation. Lessons from the HMS eDealer reporting noted that even with effort directed at outreach and compliance, it was not until after their fourth month before the majority were complying with the reporting requirements. The sub-group identified four areas that may help improve compliance and enforcement: identify the full universe of federally permitted vessels, automate compliance related efforts when possible (e.g., notifications of late or no reporting), create protocols for late submission of data and actions against non-compliant permit holders (e.g., summary settlements, sanctions), and coordinate with dockside staff to remind participants to report. Additional questions still need to be resolved about notifications to enforcement (e.g., email 'hail-outs' similar to the commercial individual fishing quota programs), methods for enforcement to view submitted reports, detailed protocols for enforcing the program, review and authorization of archival geographic positioning system (aGPS) or VMS systems (Gulf permitted vessels only), processing and maintenance power-down exemptions (Gulf permitted vessels only), landing location submission process (Gulf permitted vessels only), and funding to increase enforcement efforts.

Outreach and Education Sub-Group

Outreach and communication are key to the successful implementation of these reporting programs. The outreach sub-group reached out to other groups to determine the best practices for outreach. Outreach goals included ensuring that participants were aware of the reporting requirement, creating materials for outreach, identifying methods for reporting (e.g., hardware, software), and identifying where a participant could learn more about the programs. Since electronic reporting would be new to the federally permitted fleets in the South Atlantic and Gulf, additional time was spent on educating participants on how to report and why it would be important to report the data. Outreach begins prior to the implementation of the program and extends into the actual implementation. The potential tools chosen for outreach could include, but are not limited to: in-person workshops, webinars, letters to permit holders, print media, electronic media (e.g., webpages), industry partnerships/collaborations, and training videos. The outreach group also recognized the need for outreach and education to other

groups that may interact with the program, such as Councils, state samplers, port agents, and law enforcement officers. Outreach efforts are in preparation, with toolkits and materials for website being developed now.

Program Management and Budget Sub-Group

NOAA Fisheries recognized and communicated early in the amendment process that the implementation of these programs will require significant investments in staff and funding to develop, implement, and maintain the programs. Without adequate funding, the data collected by these programs will not be as useful as was intended by the Councils. Without adequate funding there is a risk that support from the for-hire industry could decline and disappointment limited usage of the data, which may decrease overall reporting compliance. While other regions have seen a cost savings in moving to electronic reporting, those regions have all moved from paper-based reporting to electronic, and therefore may not have need additional staff or funding. Program and personnel costs for compliance, quality assurance, validation, and enforcement with the South Atlantic and Gulf electronic for-hire reporting programs would require additional staff and resources, and costs would be substantial (>$5 million start-up, and >$3 million annual) for each program. The Regional Office applied and received funding for implementation from FIS in 2017 and 2018. These funds were used to contract a strategic planner, and for start-up infrastructure and software costs.

Workshop Background

In 2018, the QMPSG met at the Regional Office in St. Petersburg, FL and selected the South Atlantic and Gulf for-hire electronic reporting programs as the hands-on training session. The QMPSG contracted Dr. Jack West of the ASQ Learning Institute to lead the exercise. Prior to the meeting, QMPSG leads, Dr. West, and the Regional Office for-hire electronic reporting implementation team leads met to discuss the background of the project, the intent for the in-person workshop, and the tools that would be appropriate for the meeting. The Regional Office identified different stakeholder groups, based upon the intended data flow and interactions. Stakeholder groups included direct data providers (i.e., fishermen), ancillary data providers (e.g., permits, vessel monitoring staff), data warehouse provider (ACCSP), and data middle and end users (e.g., Science Center, Office of Science and Technology, Regional Office, Councils).

Based on the advice of Dr. West and the QMPSG leads, representatives for each stakeholder group were selected. The number of stakeholders invited was limited to a smaller group structure that allowed stakeholders to interact, discuss, and reach consensus on a variety of topics. The stakeholders groups identified were:

- Gulf of Mexico Fishery Management Council
- Gulf of Mexico Charter operator
- Gulf of Mexico Headboat operator
- Atlantic Coastal Cooperative Statistics Program
- For-Hire Electronic Reporting Strategic Planner
- Southeast Regional Headboat Survey Program
- Southeast Fisheries Science Center
- Office of Science and Technology
- South Atlantic Fishery Management Council
- South Atlantic Charter operator
- South Atlantic Headboat operator
- NOAA Fisheries Vessel Monitoring System branch
- NOAA Fisheries Gulf of Mexico branch
- NOAA Fisheries Limited Access Privilege Program/Data Management branch
- NOAA Fisheries Office of Law Enforcement

The representatives of each the stakeholder group who participated in the three-day meeting are listed in Appendix 1.

A brief overview of the South Atlantic and Gulf electronic for-hire reporting programs was provided at the start of the QMPSG meeting. The presentation detailed the requirements for each program, and the steps taken to date by NOAA Fisheries to implement the program. This allowed all participants to begin the workshop with the same knowledge.

Workshop Results

Quality Management Tools

On the first day of the workshop, the participants learned about the quality management tools used during the workshop: process mapping and outreach engagement. Process mapping is a visual tool that describes the steps and decisions points within a project. Process maps are best created in a team environment with contributions from participants involved in the project. As the process workflows are developed, the process mapping provides an avenue for insight into a project, identify areas for improvement, and further communication among participants. There are different varieties of process maps that occur in different levels of describing a process. In our workshop, we used three main levels of processing mapping: block diagrams, swim-lane maps, and input/output flows (Figure 1).

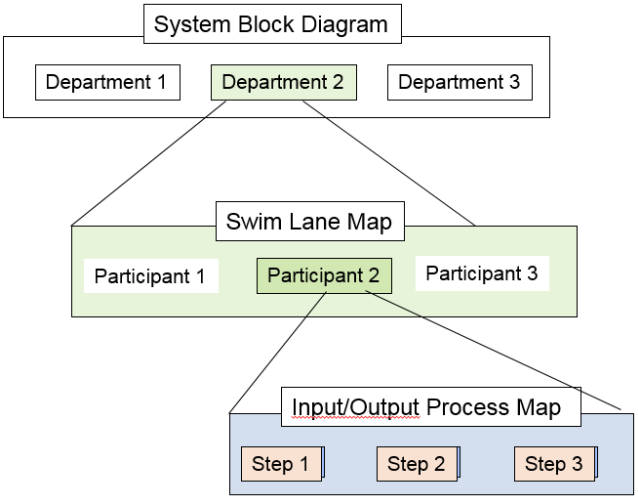

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Figure 1: Hierarchy of process mapping

Block diagrams are formed based on key actions that define the project set in the order they occur (Figure 2). Additional information about the people involved in each 'block' help to identify what the roles or actions may be for each participant. A swim-lane map, or cross-functional map, can be used to define the sub-processes within each key action (block). Before beginning a swim-lane map, the team needs to consider the 'who' and 'what.' The 'who' is the functional group and the 'what' are the actions taken by the group. Swim-lane maps contain three features: the functional group, the actions taken by each group, and a timeline (Figure 3). Functional groups are listed one columns, with each row

representing their own 'swim-lane.' Events are added to each swim lane, in the order they are completed. Arrows are drawn between events and 'swim-lanes' to depict the process flow. Swim-lane maps can be used to help understand the interaction and relationships between participant roles, decision events, and time. Benefits of swim-lane maps may be identification of bottlenecks to the process, responsibilities of each functional group, missing actions, and redundant actions.

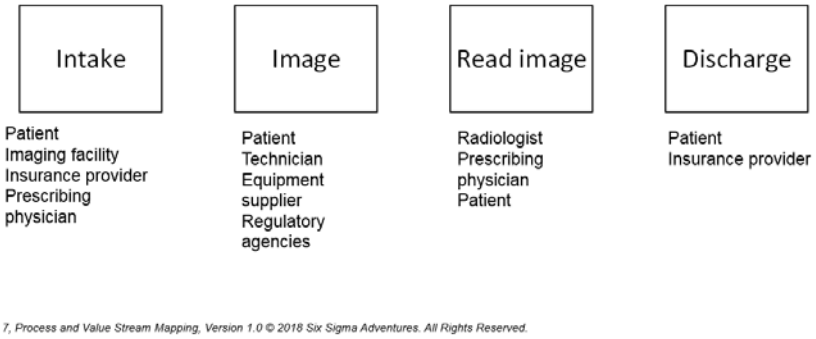

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Figure 2: System Block Diagram

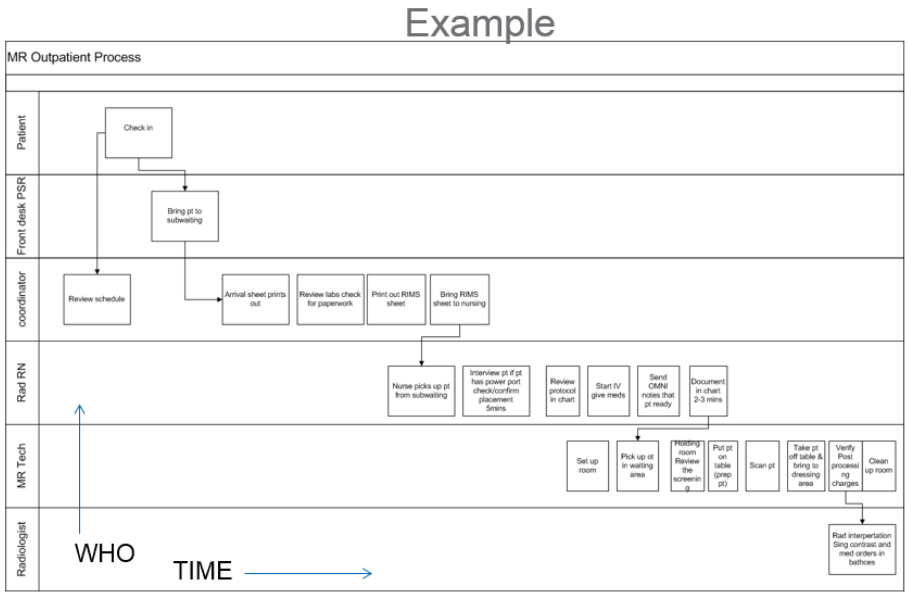

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Figure 3: Swim-lane map example

Input/output maps create a diagram depicting the inputs and outputs map for the different steps identified in the swim-lane map (Figure 4). Inputs are typically information, people, materials, or methods, while outputs are a measureable or assessable end-product. The input/output maps are detailed descriptions of the actions needed to complete each step. Input/output maps also identify the acceptance criteria for each input, measures and metric applied at each step, monitoring actions for inputs, downstream effects from each input, and controlled and uncontrolled (noise) factors for inputs. Often times there is not a one-to-one relationship between the inputs and outputs.

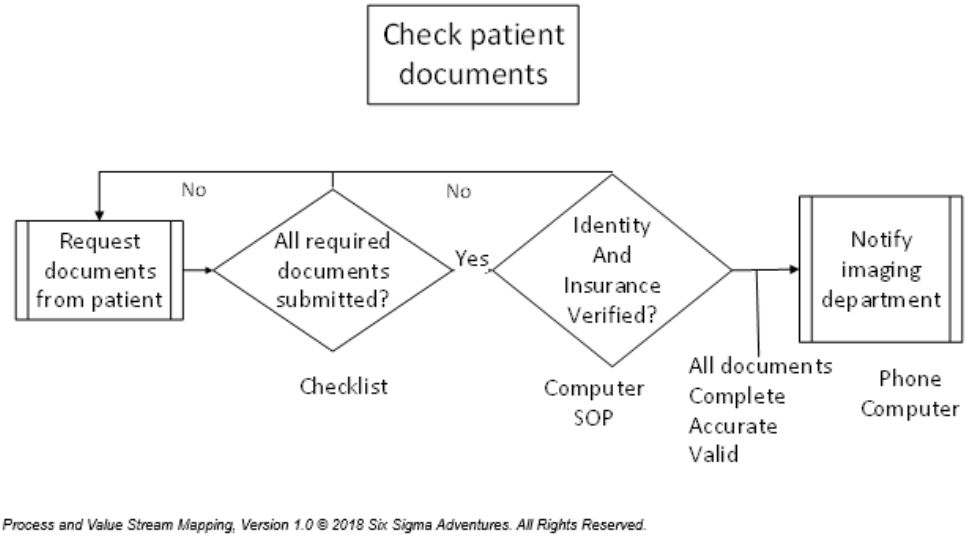


Figure 4: Input/Output Process Mapping Example

Outreach Tools

The final day of the workshop concentrated on outreach and engagement tools. Successful outreach and engagement occurs through a multi-step approach to identify the target audience. When planning outreach, the outreach group needs to identify what they want to achieve through the outreach effort (e.g., desired response from audience such as feedback, information providing, or actions performed), who the message reaches (audiences), method to reach your audience (i.e., social media, letters, in-person meetings), and what is the message. The message should be the *end result* of the outreach planning process and not the starting point of the process. The starting point of each outreach effort is the goal of the outreach. The goal of the outreach needs to be measureable, meaningful, and achievable, so that it can be evaluated and changed to achieve the goals centered on the correct audience.

Outreach Process

When developing an outreach effort, you should consider, in order, the following:

1) Goal of outreach effort
2) Audience to reach
3) Channels to reach audience
4) Message to audience

There may be multiple audiences for an outreach effort, based on each audience's role in the project. Outreach is more successful when time is spent specifically identifying audiences through analyses of what the project needs from each audience and the audience's self-interest in the project. When thinking about your outreach efforts, it is key to understand the types of people in that audience. Within each audience, there are one or more people who are considered influencers. Influencers are primary participants (e.g., people required to activate your plan) that understand and support a project. Because they are participants in the project, they can help with outreach efforts to other primary participants.

When considering the channel or type of outreach effort, it is beneficial to understand the typical channels your audience uses on a daily basis (where they look to for information) and the resources available for the different channels. Examples of channels include social media, newsletters, webinars, face-to-face meetings, letters, advertising, etc. When choosing channel, the outreach group should consider the trade-offs of the resources available and the channels used by your audience.

The message delivered for any outreach effort should be one that helps to motivate an interest in the project. Messages need to be clear, convincing, and compelling. Messages also need to include a 'call to action', that is telling the audience what they specifically need to do to reach your outreach goal. Based on the analysis of the audiences, your messages may need to be targeted to your audience, but need to remain complimentary and consistent. Finally, outreach should be adaptable based on the feedback from each outreach effort. Feedback can occur immediately (e.g., lack of participation at a face-to-face meeting) or may occur at a later time (e.g., phone calls with questions). If a particular feedback is given often, then outreach needs to adapt to address that concern in future outreach efforts.

Workshop Activities: Process Mapping

On the first day of the workshop, the team discussed the concerns for each representative stakeholder. Concerns listed included:

- Reduce implementation time
- Reporting burden
- Duplicate reporting
- Cost to fishermen
- Flexibility in reporting standards
- Contingency planning (e.g., alternative work flows)
- Determine reasonable minimum standards
- Benefits from reporting (incentives to report timely and accurately)
- Understanding compliance measures (e.g., purpose of declaration ('hail-out'), location tracking, reporting time-frame)
- Understanding validation requirements for use in management (e.g., statistical design, reporting requirements)
- Understanding spectrum and timeline to apply data to management needs
- Differences between scientific uncertainty and management uncertainty
- Clear process to develop minimum standards and validation
- Reduce data uncertainty
- Understanding validation purpose ("trust but verify")
- Improve communication and outreach
- Communication and monitoring outside of workday hours
- Managing expectations of project
- Cost to implement the program
- Develop big picture of data flow

Based on these objectives, the team determined a goal for this workshop would be to create process maps to define a single reporting system to collect for-hire catch and effort that would aid in reducing time to complete a report, data uncertainty, while still providing flexibility to the fishermen. After discussions, the team determined that the system block diagram would have four main elements: Trip Occurs, Data Compilation/Audit, Data Integration/Analysis, and Data Access and Dissemination (Figure 5).

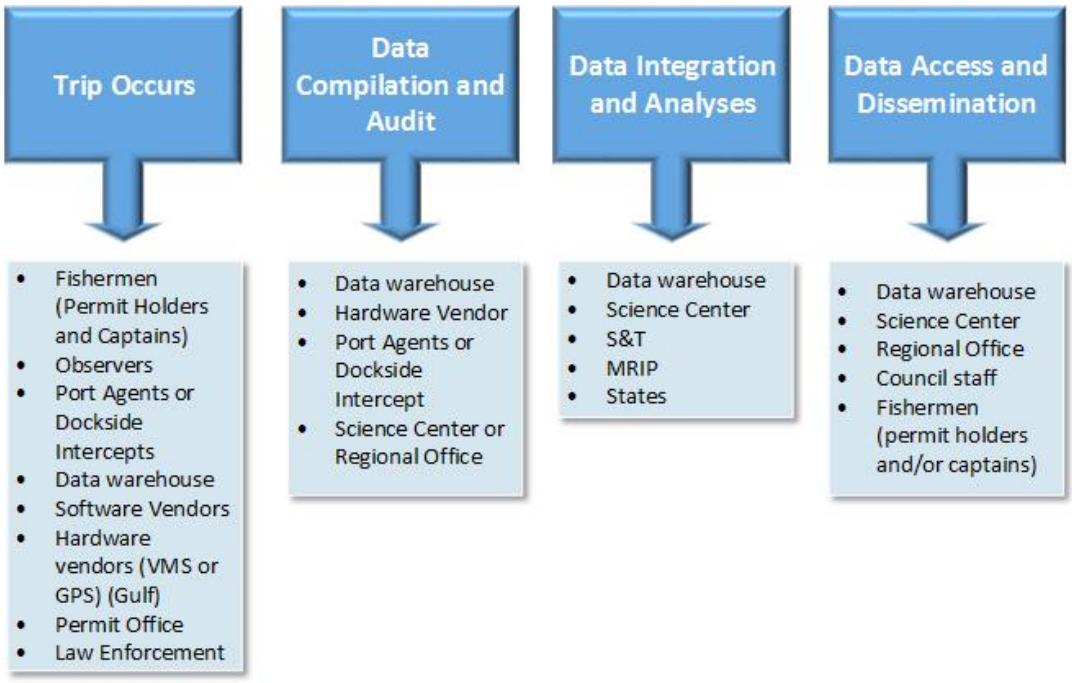


Figure 5: Data blocks and associated groups for each block.

To use time wisely, the workshop divided into subgroups for in-depth discussions, followed by full discussion with the entire team. On the first day, groups were formed based on interest or knowledge relating to the system block element. Each group used the process mapping tools (detailed system block diagrams, swim-lane maps, and input/output maps) to document the work flows for each element. Day 1 ended with groups completing their process maps. The second day was spent going over the process maps as a group and discussing concerns and issues relating to each element.

Trip Occurs Process Mapping

The first element in the system block diagram considered activities that directly related to a fishing trip. The group defined two types of inputs: (1) pre-existing information needed to record a trip (e.g., vessel and permit information), and (2) the information to be entered during or after a trip (logbook records entered by fishermen). The pre-existing information is needed to ensure the data collected can be related to existing NOAA Fisheries known information and is critical when vessels logbooks need to be reported to multiple regions or states. This information may also impact a fisherman's user account with ACCSP, the types of data they are required to fill out, and who is allowed access to the data collected. The activities that occur during a trip need to be entered by the fishermen to create the required logbook record (Gulf and South Atlantic), the trip declaration (Gulf only), and the correlate to the tracking information (Gulf only). Additional information about the trip may come from sources outside of the fishermen, such as at-sea observers, dockside intercepts, compliance audits, and law enforcement. Not all sources of information outside of the required elements may be captured on every trip (e.g., at-sea observer discards, dockside sampling biological information).

After the initial input/output diagram (Appendix 3.1), the group concentrated on mapping out individual elements in the general input/output diagrams (Appendix 3.2). The logbook map considered actions that need to occur prior to the trip (permit validity checks, permit information sharing process,

fishermen account, and software/device initialization), actions if no fishing trip occurred (i.e., no fishing report), and activities during or after a fishing trip and feedback loops. The feedback loops considered the ability to have tech support for entering a logbook record and the quality assurance and quality checks (QA/QC) on data entry. At the end of the trip, the group documented the different submission timelines for vessels with permits in the Gulf or South Atlantic.

As the Gulf requires a trip declaration ('hail-out'), the group mapped out the process for this action (Appendix 3.3). While the input/output map for this process was rather simplistic, it raised a number of questions about the pathways to submission (VMS vs non-VMS software). The group discussed the pathway taken for typical VMS form submissions and discussed whether there was potential for the non-VMS software to use the same pathways. All declaration data must eventually be submitted to the ACCSP data warehouse, so discussions also centered on finding the pathways needed for VMS data to be submitted to ACCSP. The final point of discussion for this action addressed how to generate a unique trip identifier. Having different starting points of data submission that may not interact with other data submissions until after all data has been submitted, creates a challenge for a unique trip identifier being applied at the start of a trip. For example, a VMS declaration may be available to law enforcement immediately, but not available to ACCSP until after the logbook information has been submitted. This discussion allows the implementation team to delve more deeply into the exact details of data transmission before finalizing the implementation plan.

The process map for tracking vessel activity (Appendix 3.4) for compliance focused on general concepts rather than actual data flow, as the survey design for vessel tracking and compliance has yet to be established, and these may differ between the Gulf and South Atlantic regions. The major concepts listed were; the selecting of a vessel for tracking (potentially based on a survey design protocol), identifying if the vessel was at a known or unknown location, and tracking the vessel status for that day (e.g., time in and out of slip). This information would then need to be related to the actual logbook records, those monitoring the vessel activity, and potential those monitoring compliance.

The process map for an at-sea observer (Appendix 3.5) and dockside port sampling (Appendix 3.6) followed some protocols already in place for the commercial observer programs, SRHS sampling, or Trip Information Program (TIP) sampling. Again, general concepts were fleshed out in the process map, with a need for further detail, if and when, at-sea observers are used in this fishery. The general concepts included vessel selection, observer trip scheduling, trip departure, trip data collection (e.g., discards, landings, lengths), and submission of observer data to a variety of potential sources (e.g., ACCSP, SRHS, TIP, and MRIP). Additional questions were generated in relation to vessel cooperation, required compliance, and the ability of vessel to refuse an observer. The dockside reporting process flow included using the trip declaration (Gulf only) and site registry through a survey design (both regions) to determine intercept locations, the interview process (biological data and angler interviews), and the submission of the data.

Data Compilation and Audit Process Mapping

The second element in the block design dealt with data compilation and auditing processes. The identified inputs into this block included the trip declaration, VMS or archival GPS track information, logbook, activity report, at-sea observer, dockside intercept or port sampler, and information from law

enforcement. The output would be creating a method to match the different records for the same trip, performing QA/QC measures on the data, and creating outputs for fishermen, managers, and stock assessments. The group concentrated on looking at the data process flows specifically related to the trip declaration, logbook, and VMS or archival GPS validation.

The trip declaration assumed all information would go to one source, same as is used for the VMS data. After this meeting, it was discovered that the database that hold VMS data cannot directly receive data from non-VMS units and therefore, NOAA Fisheries staff would have to adjust this process map (Appendix 4.1) to identify correct pathways for trip declarations. The general concepts that should be identified during a trip declaration process include a system to generate email to law enforcement and dock side samplers based on the supplied landing location. This would be accomplished in a similar manner as is used for the commercial Individual Fishing Quota programs in the Gulf of Mexico. Law enforcement pathways would include compliance and monitoring and potentially filing compliance reports, while dock side samplers pathways would include sampling schedule and sampling reports.

The logbook data compilation and audit map (Appendix 4.2) began with the logbook data being sent to ACCSP via a standardized transmission protocol, referred to as an Application Programming Interface (API). Based on criteria for the API and any other automate validation checks (e.g., return date must be after start date, vessel and permit must exist in the system, number of characters per field), the data would either be accepted or rejected by ACCSP. Rejected data would need to be submitted in the correct format. NOAA Fisheries would also be auditing the data for any errors not caught through the API, such as outlier values for a given field. This process map revealed that there are still additional steps ACCSP and NOAA Fisheries need to take to allow the auditing and correction of data by NOAA Fisheries. There was also some discussion about allowing fishermen the ability to correct some of the fields submitted.

This group began mapping the process to receive the tracking information from either the VMS or archival GPS systems (Appendix 4.3). Similar to the trip declaration process, additional information after the meeting revealed that the information could not all flow through the VMS database. NOAA Fisheries will be working on an alternative process map to determine how each data stream would be sent to ACCSP and accessed by management, compliance staff, stock assessment scientists, and law enforcement.

Data Integration and Analysis Process Mapping

The third block mapped out the processes for data integration and analysis. The input data streams for this block included information directly and indirectly related to the data collected through the for-hire programs. Inputs into this process map included compiled information from the logbooks (e.g., annual catch and effort, socio-economic data), from compiled information biological samples (e.g., size, age, and sex), and survey design (e.g., to expand for non-reporting). The indirect information would include the need to calibrate the collected information from historical datasets (see Calibration ad hoc section below for more information), and data streams from SRHS, MRIP, and state surveys. The outputs resulting from this data block would include for-hire recreational catch and effort series, socio-economic analyses (to be determined), size, age, sex, and maturation values (e.g., size at age curves, age or size at maturation or sexual transition), and catch per unit effort.

The group created a high level view of the potential process map for expanding the datasets to account for non-reporting (Appendix 5.1). In this process map, data begins with entered logbook information, which can be compared to the vessel activity. For the Gulf, the vessel activity check would include looking at the VMS or archival GPS, while in the South Atlantic the vessel tracking would require staff to monitor vessel activity through a statistical design method developed by the survey design team. The survey design team would also create a formula to estimate for non-reporting based on the matching between the vessel logbooks and vessel activity. This process will need to be further detailed by the survey design team. Preliminary methods are being considered by the Office of Science and Technology using a mark and recapture study being tested in a pilot study in the South Atlantic. A crucial component to this type of study is the ability to have the logbook submitted prior to an intercept by a dockside sampler.

Data integration (Appendix 5.2) and calibration (Appendix 5.3) were key concepts discussed within this group. The current MRIP methodology for collection of for-hire data includes both state and federal permitted for-hire vessels. There are also states that are collecting data in addition to or in replace of MRIP. NOAA Fisheries must create a method to integrate data collected by both states and federally permitted for-hire vessels, so that there is no duplication of effort or catch. Data calibration, a method used to create a conversion factor between the two data sets, is required to compare information collected in these new for-hire programs to information collected in the past from other programs (e.g., MRIP, SRHS, state surveys). The process maps for both data integration and calibration were general in concept, and NOAA Fisheries would need to detail out these processes as the program develops.

Data Access and Dissemination Process Mapping

The final block considered in the process mapping related to data access and dissemination (Appendix 6). The identified inputs into this process map were the raw and compiled information from the for-hire programs, as well as the outputs from the Data Integration and Analysis block. Those who would receive the output of the information could include management, scientists (e.g., stock assessment biologist), Council staff, and fishermen. Output products might include information to aid in ACL monitoring, regulation modification (i.e., amendments), in-season actions, accountability measures (e.g., ACL pay backs), compliance monitoring, outreach, stock assessments, and ledgers for fishermen.

Workshop Activities: Outreach Discussions

On the third day, the group learned about outreach tools and methods (see Outreach Tools section). The day began by each person writing down one or more goals for the outreach effort in the for-hire reporting programs on sticky notes and placing them on the wall. The group then moved the notes to formulate common ideas for outreach goals (Figure 6). The enabled to group to see identify three key concepts in relation to outreach: how to report under the for-hire programs, expectations of the program, and funding for the program. Three groups were formed to discuss each outreach goal with respect to a) who is the audience or audiences, b) what is the message, and c) what channels would most effectively convey the message to the selected audience(s).

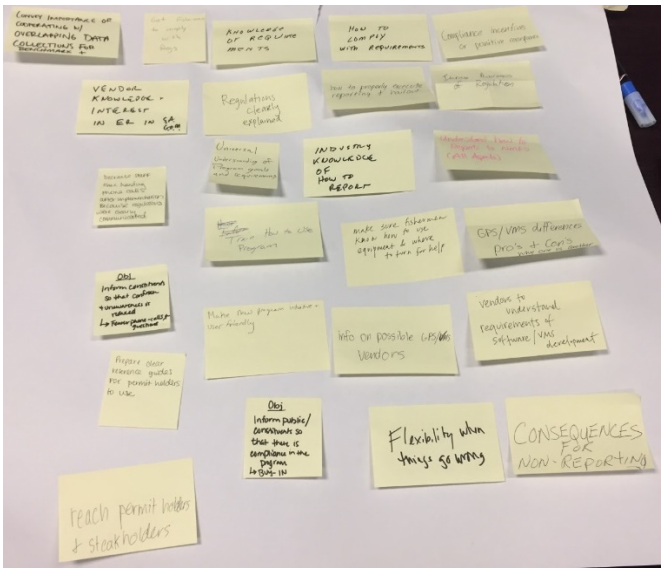


Figure 6: Picture of outreach sticky note exercise.

The first group discussed the outreach goal of "How to report under the for-hire programs" and identified a diverse audience group, with the different but sometimes overlapping information needs: permit holders, vessel captains, fishing industry (e.g., fishing associations), dock-side samplers or port agents, law enforcement (including state and federal), Councils and Fishery Information Networks for each region (ACCSP for the South Atlantic and Mid-Atlantic; GulfFIN for Gulf), fishery managers (state and federal), environmental non-governmental organizations (eNGOs), and regional political entities. For each audience, the group discussed ways to trigger the audiences' self-interest in the success of the programs. Some self-interest motivators included better data streams, increased potential profits, professionalism, cooperation, less litigation needs, more effective management, better information when making decisions, and happy constituents. The group also identified a variety of channels in which to communicate the message to each audience, including but not limited to user packets, webinars, workshops, online help, letters, one-page fact sheets, presentations, and in person visits. The group also discussed ways that some audiences could also be messengers to the other groups, such as utilizing fishing associations to generate acceptance and understanding of the program.

The second group discussed how to clearly communicate the expectations of the data collected through the electronic for-hire programs. During discussions throughout the meeting, it became clear that there was a wide variation in expectations of how the data collected from the electronic for-hire programs would be used and the relation of those data to MRIP collected data. Discussions centered on key concepts (see Workshop Ad Hoc Discussions section) relating to validation of data, compliance with the requirements, calibration of data to historical dataset, and potential uses of the data under the proposed plans with and without hiring of additional staff. The group also discussed the timelines for data usage under different assumptions. With these topics in mind, the group identified a variety of audiences that would need information regarding expectations of the program. These groups included the for-hire industry, vendors, Council members, agency line offices, NGOs, and Congress. The message to the for-hire industry balanced the costs and benefits of the programs to the fishermen, with emphasis on the actual costs to fishermen, the need for compliance and accurate reporting, and the need for advocating their support for the program. In order to accurately understand the benefits to the

fishermen, there should be messages about the timelines for data usage and clear understanding of when or how the data collected could be applied to management. For Council members, the group concentrated on messages regarding ways to collect better data for sustainable fisheries, reducing uncertainty, and meeting industry requests for electronic reporting. The agency's outreach was broader and took into consideration concerns about funding for the program, the potential disruption of existing programs to fund for-hire programs, and methods to deal with non-compliance of the regulations.

The third group discussed the cost of funding these programs. While the costs were discussed in each amendment and during Council meetings, there was little consideration at the meetings that the data collected from the programs would not be able to be used to estimate catch levels without additional funding opportunities. In these programs, costs would apply both to the fishermen and to the agency. Initial calculations of funding costs considered a minimum standard needed for the collection, validation, compliance, and calibration of data indicated a need for ~$5 million dollars to start both programs, and ~$4 million each year to continue to run the programs. The high costs are due to the large fleet size, the large geographic range of the fleet, and the need for validation and compliance measures. The costs differ between the Gulf and South Atlantic due to the different requirements for each program. The additional requirements of a declaration ('hail-out'), VMS or archival GPS, and reporting prior to offload decrease the costs within the Gulf. The South Atlantic requires an additional $1 million dollars to support compliance agents to verify a 10% sampling coverage of vessel activity. The costs of compliance agents could increase or decrease based upon the degree of compliance from fishermen. In comparison, the Gulf is utilizing the VMS and archival GPS and declaration ('hail-out') requirements to account for compliance, which reduces the agency's overall costs. Similar to the other groups, a wide range of audiences were identified as needing outreach in relation to the costs of the programs. The group highlighted the need to inform Congress and eNGOs of the need and benefit to the region despite the costs. Within the industry, there was a message to help the industry understand the costs of comprehensive program and the risks of not funding a comprehensive program. The message to Council members indicated the need for awareness of program costs and expectations that may be dependent on costs to fishermen and the agency.

Workshop Ad Hoc Discussions

Several times during the workshop, discussion centered on concerns discussed during the first day that were not directly related to the data process flows and were brought up either through natural conversation or at the request of participants. The information below is meant to highlight the discussion topics, but not delve into the details of each topic. Additional information relating to these topics will be available in the electronic for-hire reporting development plans being written by the Regional Office.

Scalability

Early in the workshop, there was a discussion about scalability, or the ability of a process to grow and meet increased demands. The scalability discussion focused on the differences between the SRHS versus the entire fleet of for-hire vessels reporting.

The SRHS program is divided into discrete statistical areas and consists of three main components: dockside intercept sampling, headboat activity, and logbook reporting. Port agents are assigned to a

statistical grid and complete both dockside sampling and track headboat activity. The headboat activity report and dockside sampling are the validation methods used to validate trips and, when necessary, calculate estimated total trips and landings. Port agents monitored headboat activity through direct observation, contacting the ticketing office to confirm activity, observations from other surveys (e.g., MRIP), and website verification. The SRHS program utilizes 13 port agents to observe 136 vessels, or approximately 1 agent to monitor 10 vessels.

The SRHS program is not scalable to the entire for-hire fleet due to the ratio needed for port agents to vessels (~3,400). Additional technological requirements, such as integration with other reporting programs (e.g., state programs, Mid-Atlantic programs) and data accessibility, required NOAA Fisheries to create a new program to capture the catch and effort of the for-hire fleet that is not captured under the SRHS program. While the SRHS program was not scalable, it did provide significant information towards the creation of the new reporting system. Likewise, information from other projects, such as the South Atlantic charter pilot project and South Carolina's charter program, provided valuable information during the implementation process.

Validation and compliance

Validation and compliance measures were another key discussion point among the group. With the understanding that the SRHS program was not scalable due to staffing and funding needs, alternative methods need to be developed to equate to the port agent validation actions in the SRHS program. With an eye towards cost, the implementation team calculated the minimum number of compliance agents and validation agents needed for each region. Even at minimal levels, the cost of validation and compliance is outside current funding available at NOAA Fisheries. There are elements that can decrease the cost of the compliance and validation, such as reporting at sea or prior to offload, mandatory notifications of trip departures and expected return, using electronic technology to monitor vessel activity, and at-sea observers to record discards. The Gulf Council chose three additional elements to aid in validation and compliance: reporting of logbook prior to offload of fish, VMS or archival GPS system, and declaration ('hail-out') with return time and location via approved software. Reporting prior to offload allows a capture/recapture statistical design to be used to estimate catch from misreported or unreported trips. The VMS or archival GPS monitors vessel location to determine when vessels left for trips, and the notification allows sufficient planning for dockside sampling of catch. While these elements decrease the number of dockside monitors, additional staffing would still be needed to evaluate and track the incoming information before it can be considered for management purposes.

Calibration

Calibration of the collected data was another topic briefly discussed. Whenever changing to a new data collection method, there is a likelihood that the new data collected would differ from past estimates. Examples of such differences could be marked increase or decrease in catch rates or numbers of fish landed between the two data collection methods. It is important to determine if those differences are related to a change in the fishery or a change in the data collection method. Depending on numerous factors, it may be necessary to use a conversion factor to adjust historical data. Calibration refers to the method used to create a conversion factor between the two data sets. This is a mathematical approach to treating two different data sets of numbers in a comparable way. When possible, the best method to determining a conversion factor would be to run the different data collection programs side-by-side for

multiple years. Multiple years are best for a calibration factor so that any one anomalous factor in a year (e.g., hurricanes, cold water event, oil spill) does not unduly influence the calibration factor. The calibration study can only begin after there is sufficient validation and compliance measures in place.

Use of Data

As discussions continued, it became clear that there was confusion regarding how the new data collected would be available for use in management (e.g., stock assessments, in-seasons actions, amendment actions). Based on the current amendments and assuming full staffing, the Science Center has recommendations about the use of data in management. For the South Atlantic plan, it was recommended the data could be used to validate minimum estimates of charter fishing effort developed by the For-Hire Survey conducted by MRIP. The data collected would not be considered useful for official estimates of catch and effort from the for-hire fishery until the approach is considered statistically valid by MRIP. A primary concern is that catch cannot be independently validated until vessels reports are required prior to offload. Incorporating an independent validation process would improve the usefulness of the catch information for estimation. For the Gulf plan, the data collected would be part of a broader effort needed to produce final estimates of total catch and effort by the fishery. At a minimum, one or more surveys are needed to validate the accuracy of the vessel reports. MRIP's APAIS may be such an independent survey. For both programs, it is recommended to have multiple years of side-by-side comparisons with the MRIP survey before the can be used for for-hire catch and effort estimates. Calibration between the surveys would be needed to maintain the integrity of past and current information.

Costs

The last discussion centered around the cost of the program, both to the fishermen and to NOAA Fisheries. At this point in time, no additional funding has been made available to NOAA Fisheries for the collection of data and QA/QC for these programs. General costs estimates generated by NOAA Fisheries staff suggest a minimum of $5 million is needed across the region to fully implement the projects. Implementation would include recommendations from the Science Center to have staff to: 1) obtain, maintain, and distribute data, 2) monitor and improve compliance, and 3) develop statistically robust estimates of catch and effort.

With no additional funding, there would be considerable consequences to the applicability of the data for management. At the bare minimum, additional staff are still needed to perform quality assurances and quality checks on the data being submitted, approve software and hardware vendors, monitor and approve archival GPS units, and enforcement of the program. To have adequate validation and compliance, additional staff are needed to monitor vessel activity (i.e., compliance agents, VMS staff, and archival GPS staff) and estimate unreported or mis-reported catch (i.e., dock-side samplers and statisticians to calculate estimates).

After-meeting Actions

The meeting ended with a list of items to be addressed after the conclusion of the workshop. The items requested by the group include: a report addressing implementation tasks to date, a summary report of the meeting, distribution of workshop materials and products, creation of outreach documents, glossary of terms, defined data elements, and periodic updates to the working group. The implementation team has nearly completed the report detailing the tasks taken to date to implement the program and is currently confirming the list of data elements. The data elements will be found in the report from the

implementation team. This summary report fulfills the request to create a summary report of the meeting, distribution of workshop products, and a glossary of terms. The outreach team is working on creating outreach materials based on lessons learned from the outreach sessions. All outreach material will become available on a website once completed.

Glossary of terms relating to for-hire electronic reporting

API - API stands for Application Programming Interface, which is a software communication protocol that allows two applications to talk to each other. A well-written API defines the specifications needed for communication between the two softwares. An example of an API would be a mobile app on your phone that tells you the weather.

Calibration – A method used to create a conversion factor between the two data sets; a mathematical approach to treating two different data sets of numbers in a comparable way

Data integration - The combination of technical and business processes used to combine data from disparate sources into meaningful and valuable information. A complete data integration solution delivers trusted data from various sources.

Global Positioning System (GPS) - GPS is a satellite navigation system used to determine the earth position of an object

Trip Management System – A system used to track and manage all the records associated with an individual fishing trip

Vessel Monitoring System (VMS) - VMS is a satellite surveillance system to monitor the location and movement of commercial fishing vessels. The system uses satellite-based communications from on-board transceiver units, which certain vessels are required to carry. The transceiver units send position reports that include vessel identification, time, date, and location, and are mapped and displayed on the end user's computer screen.

Appendices

Appendix 1. List of Workshop Attendees

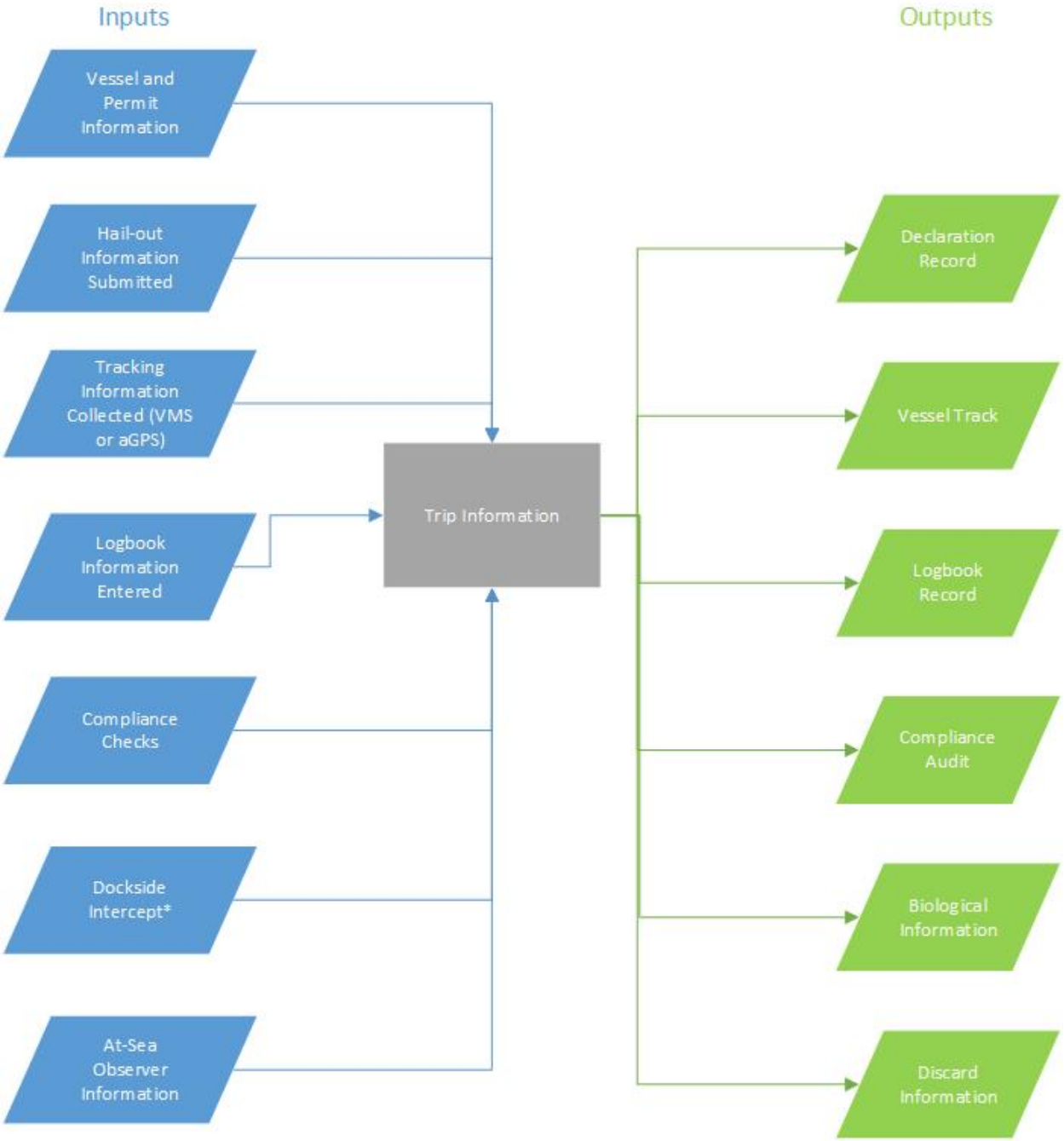
Attendee	Affiliation
John Sanchez	Gulf of Mexico Fishery Management Council Member
John Froeschke	Gulf of Mexico Fishery Management Council Staff
Dylan Hubbard	Gulf of Mexico Charter operator
Susan Boggs	Gulf of Mexico Headboat operator
Mark Brown	South Atlantic Fishery Management Council Member
Chip Collier	South Atlantic Fishery Management Council Staff
Jessica Stephen	Southeast Regional Office, Limited Access Privilege Program/Data Management Branch Chief
Rich Malinowski	Southeast Regional Office, Gulf of Mexico Branch
Karla Gore	Southeast Regional Office, South Atlantic Branch
George Lapointe	For-Hire Electronic Reporting Strategic Planner
Jess Leslie	Southeast Region, Vessel Monitoring Systems
Carolyn Sramek	Southeast Region, Vessel Monitoring Systems
Manny Antonaras	Southeast Region, Office of Law Enforcement
Tracy Dunn	Southeast Region, Office of Law Enforcement
Ken Brennan	Southeast Fisheries Science Center, Southeast Regional Headboat Program
Vivian Matter	Southeast Fisheries Science Center
Jay Boulet	Southeast Fisheries Science Center
Laura Johansen	Office of Science and Technology
Geoff White	Atlantic Coastal Cooperative Statistics Program
Julie Defilippie Simpson	Atlantic Coastal Cooperative Statistics Program

Appendix 2. Presentations to Implementation team

Presentation	Presenter	Description
ER National Overview	George Lapointe	Overview of current electronic reporting throughout the nation; Highlighted NOAA Fisheries programs and state run programs; Take aways – pilots testing, enforcement/compliance; outreach and education
ACCSP eTrips online and eTrips Mobile	Michael Cahall	Description of their reporting system (both web-based and mobile) used by states and Mid-Atlantic. Highlights need for data standardization, confidentiality, user interfaces, and benefits to managers.
SAFMC Pilot Charterboat ER	John Carmichael; Mike Errigo	Overview of the SA pilot study, emphasized different components (logbook, dockside validation, electronic measuring boards, enforcement app)
TX Charter Pilot Study	Benny Galloway	Overview of the project as used for Texas charter vessels using an Apple platform for catch and effort data; Statistical analyses were not yet completed on the project at the time of presentation.
NOAA Shrimp cELB Program	James Primrose	Overview of the current hardware utilized in shrimp fishery in the Gulf of Mexico; Explanation of one type of cellular logbook system; Highlights that hardware rapidly ages, need for rugged hardware, cost for individuals, security and encryption challenges; and compliance/permit challenges.
iSnapper	Tara Topping	Overview of mobile app used to report data; Discussed login challenges, validation process, high costs to create the app, costs to maintain the system, and user buy-in

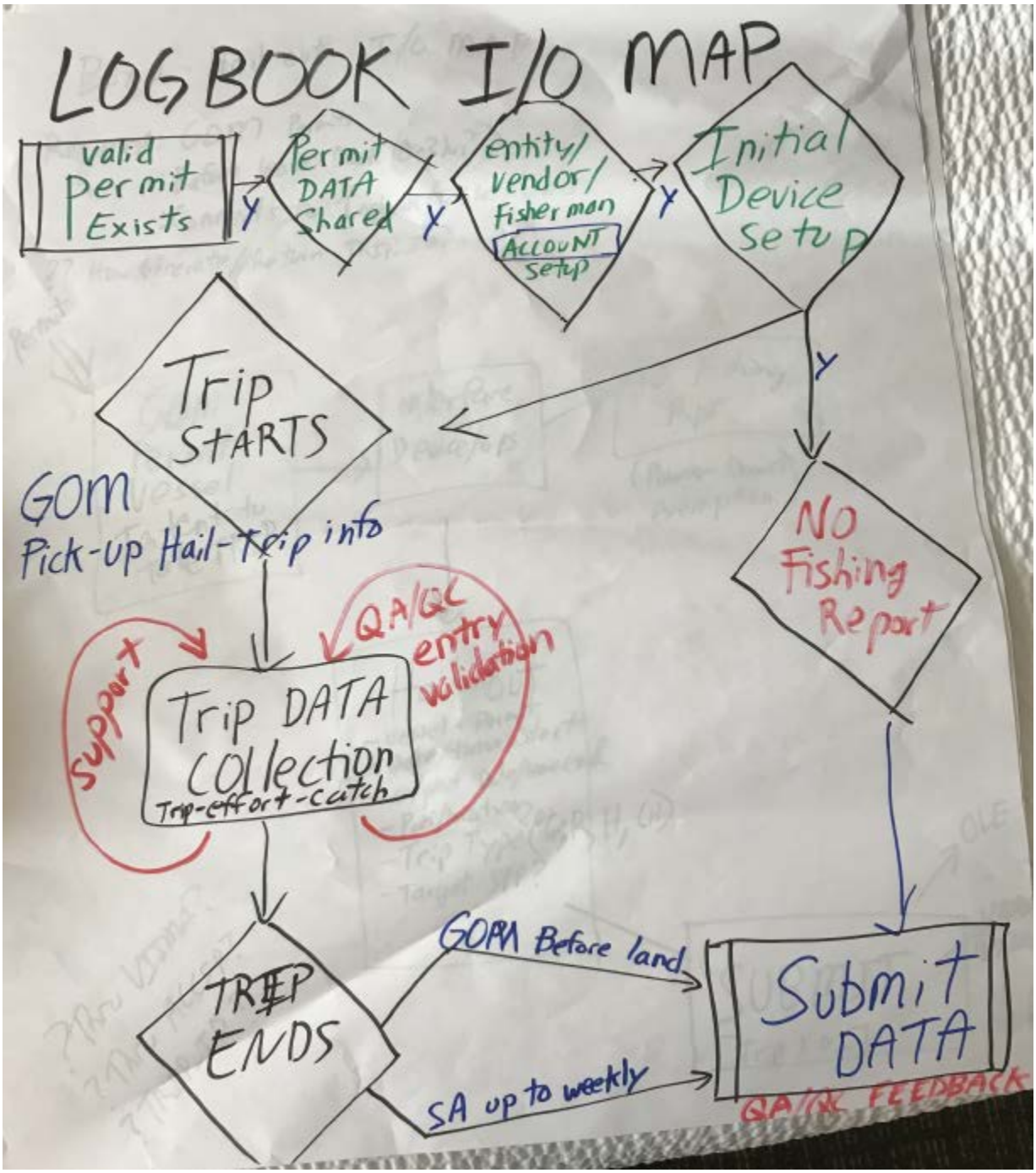
Appendix 3. Trip Occurs Process Maps

3.1 Trip Occurs Input/Output Flow

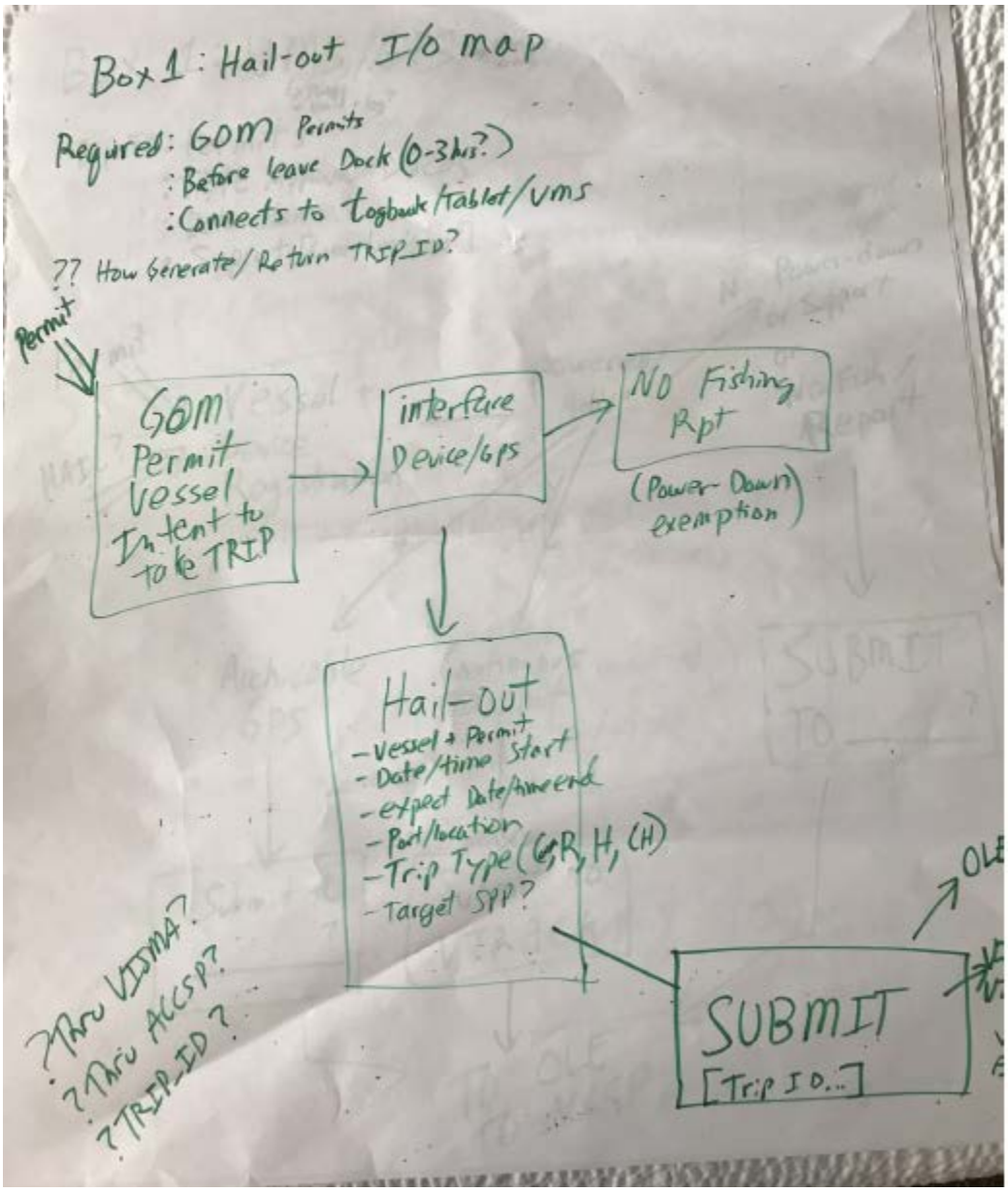


* Intercept may mean the SRHS port agents, dockside samplers for charter/boats, or law enforcement intercepts.

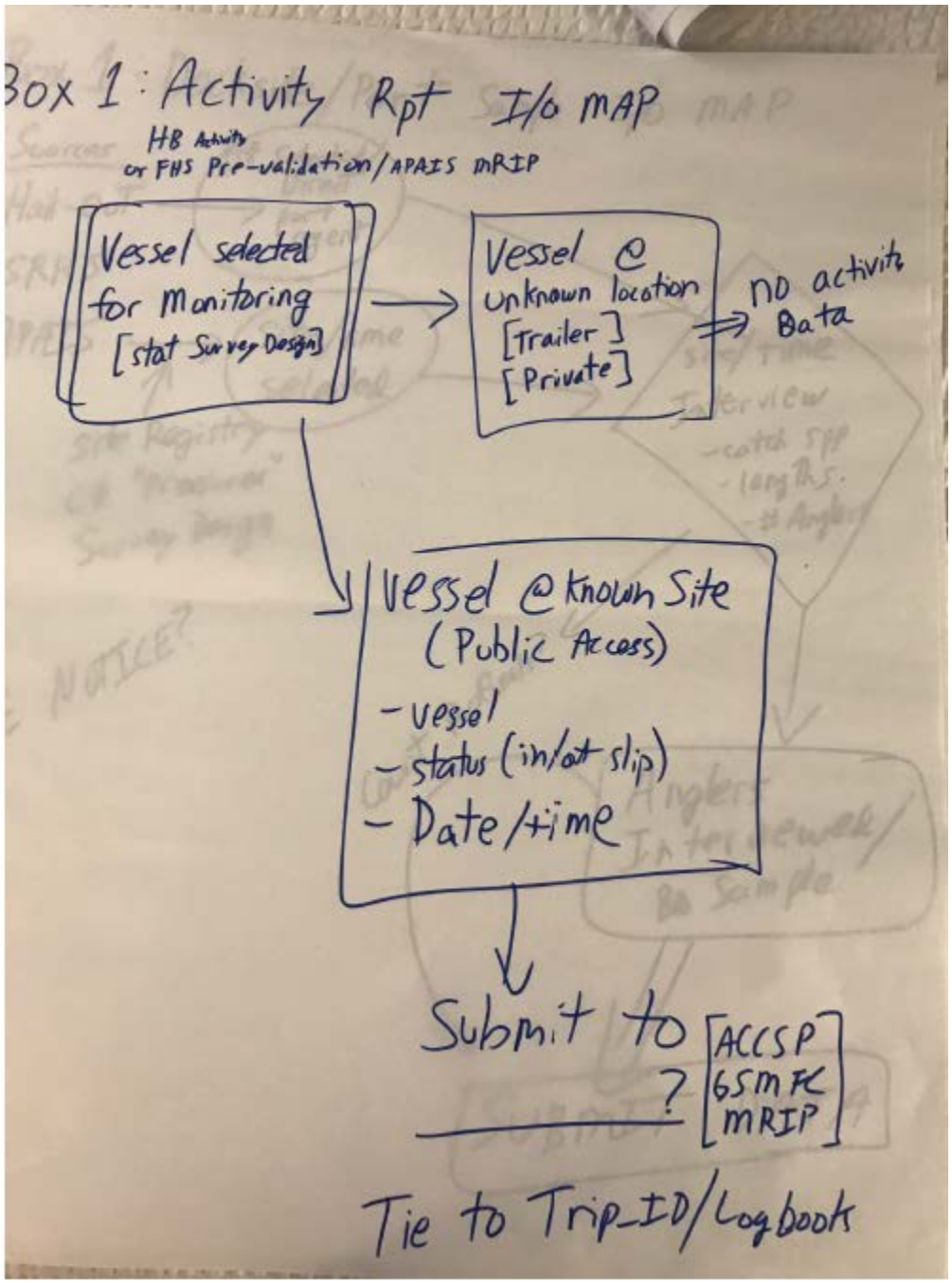
3.2 Logbook Input/Output Map



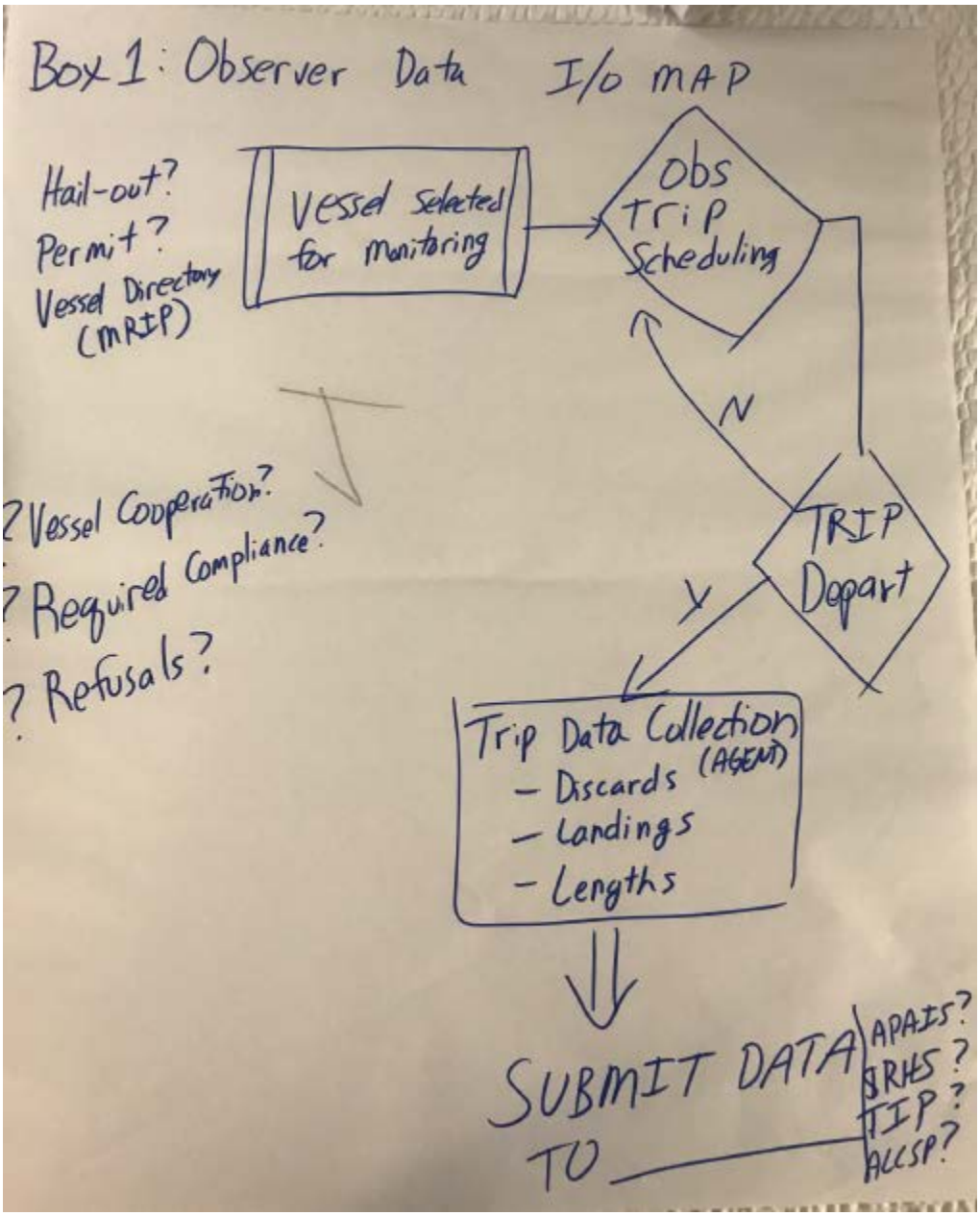
3.3 Trip Declaration Input/Output Map



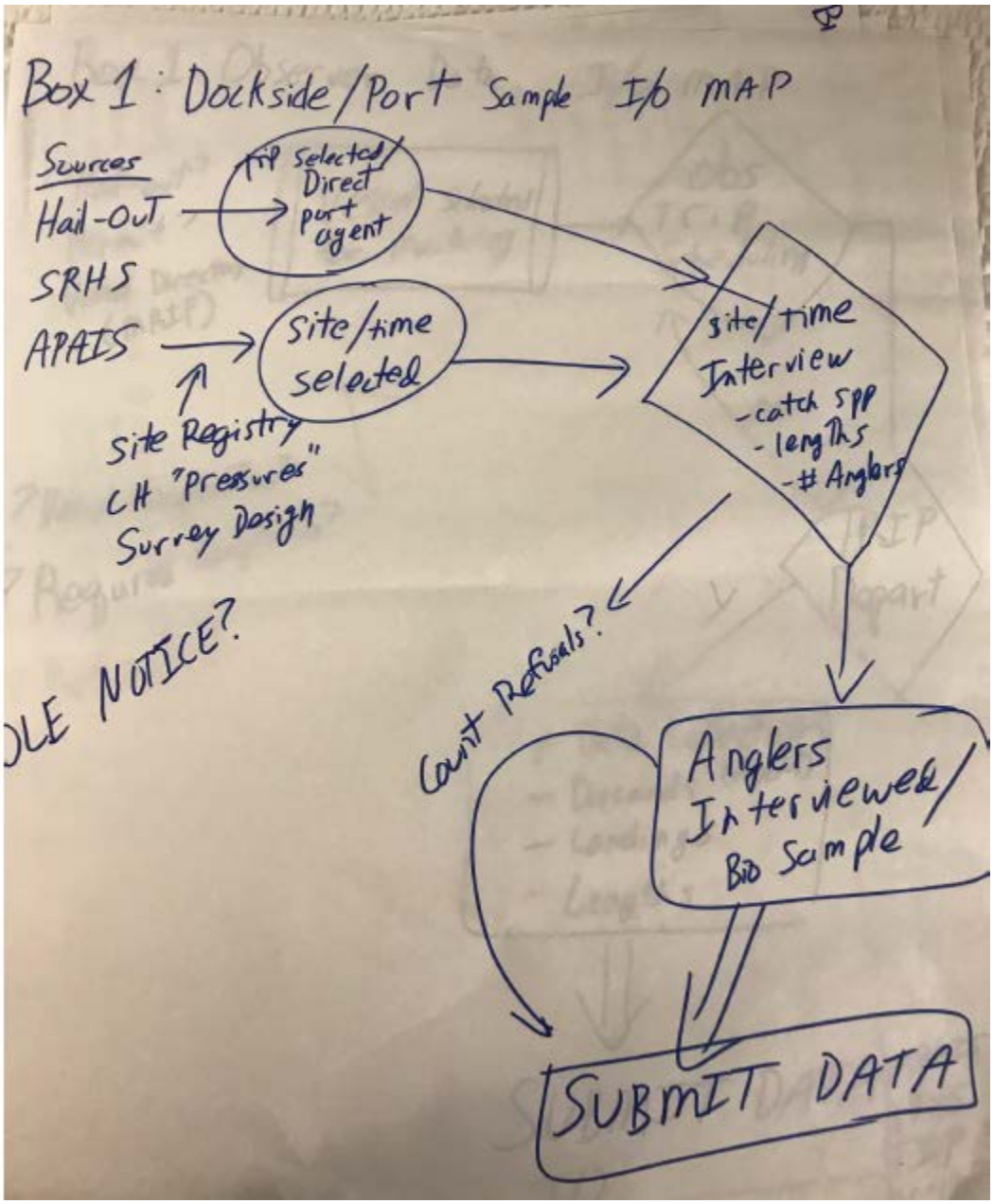
3.4 Activity Input/Output Map



3.5 At-sea Observer Input/Output Map

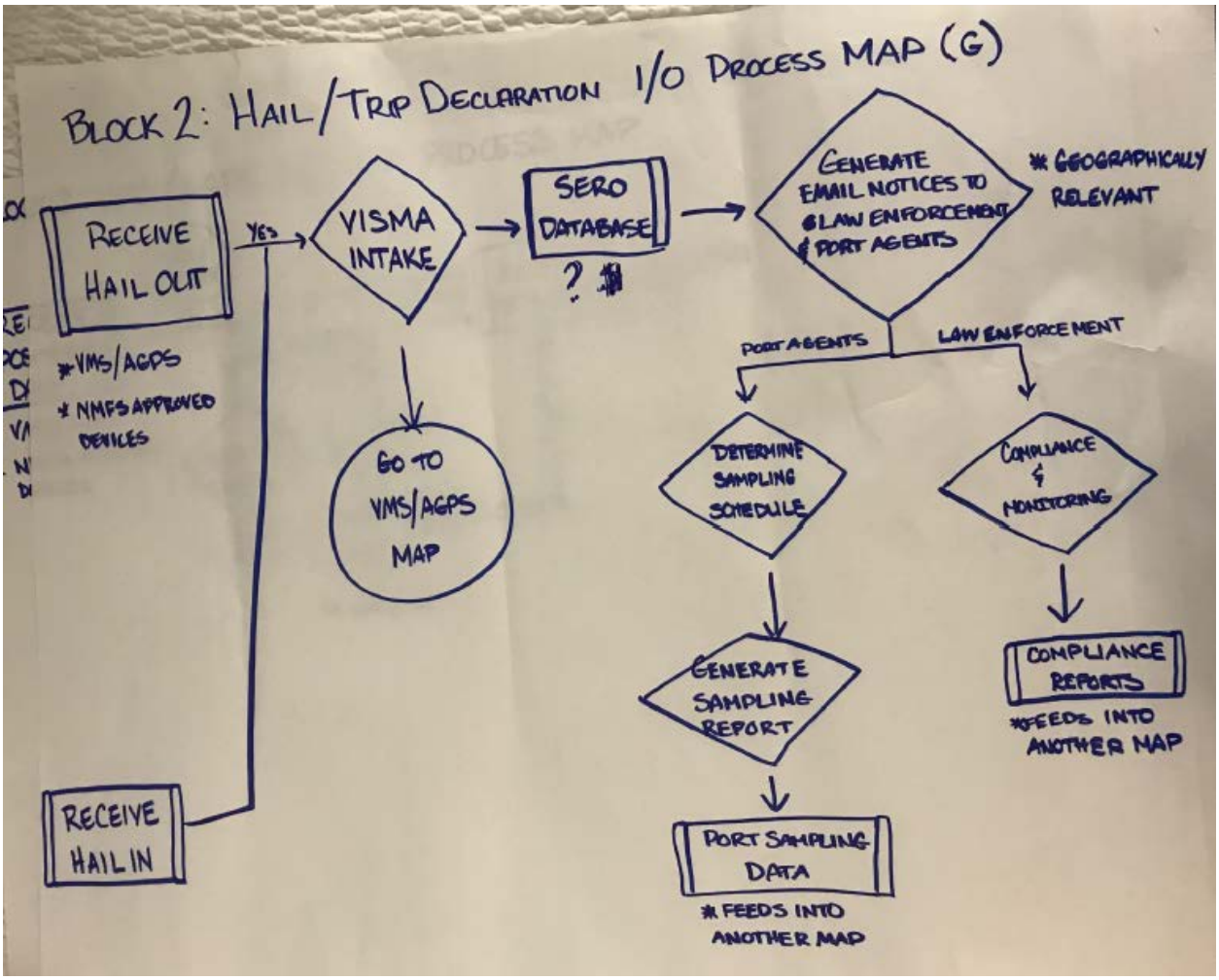


3.6 Dock-side Intercept Input/Output Map

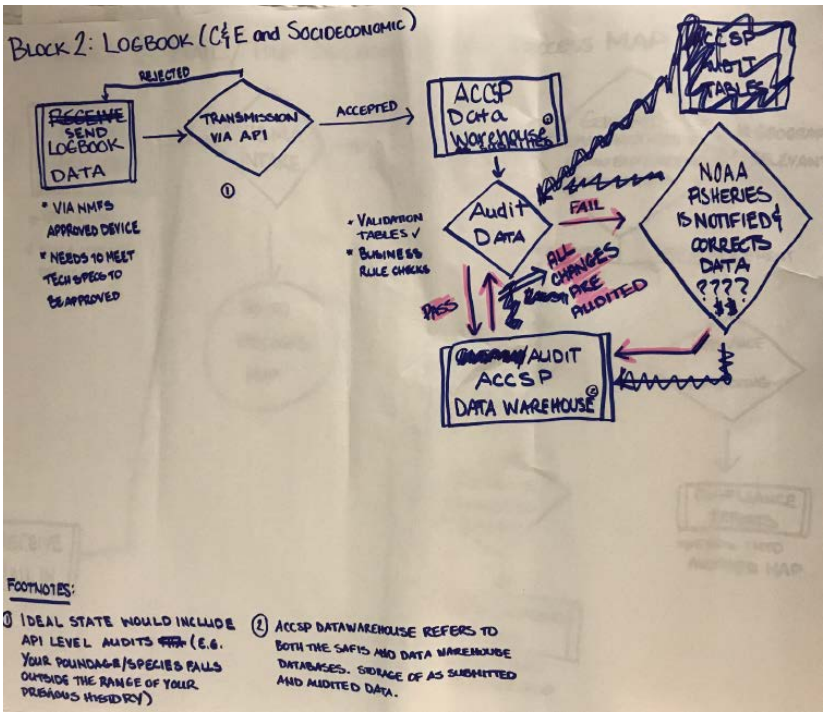


Appendix 4. Data Compilation and Audit Process Maps

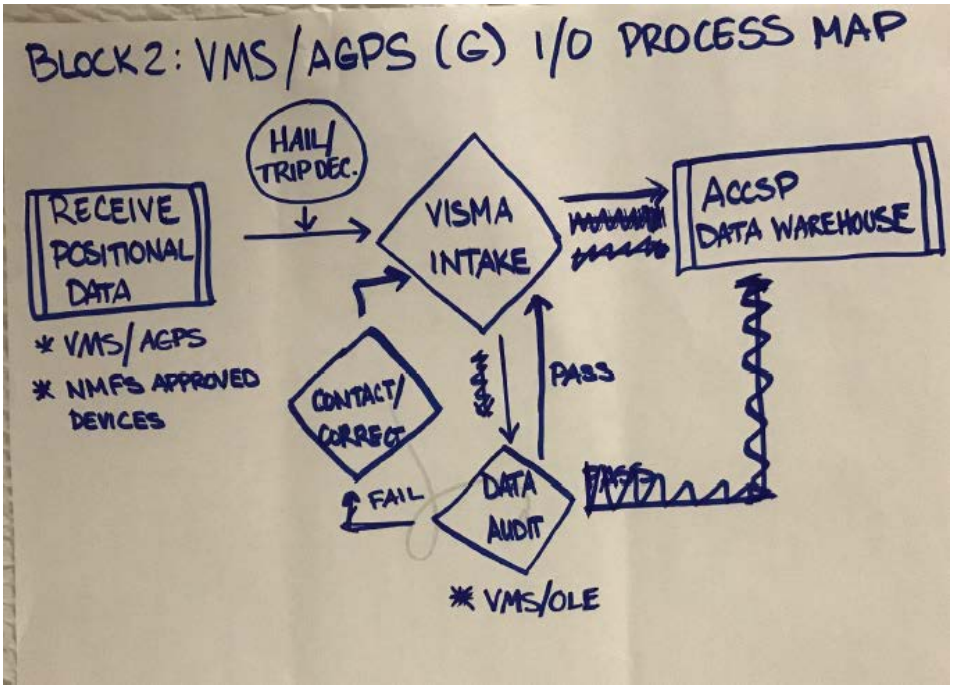
4.1 Trip Declaration Input/Output Map



4.2 Logbook Input/Output Map

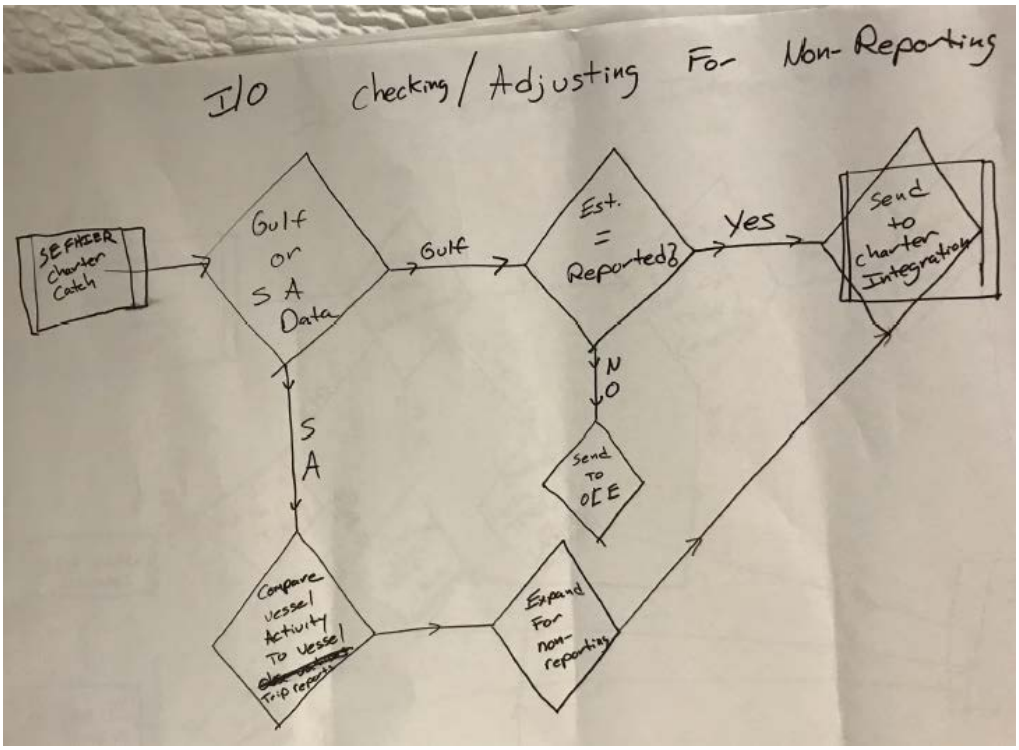


4.3 VMS and archival GPS Input/Output Map

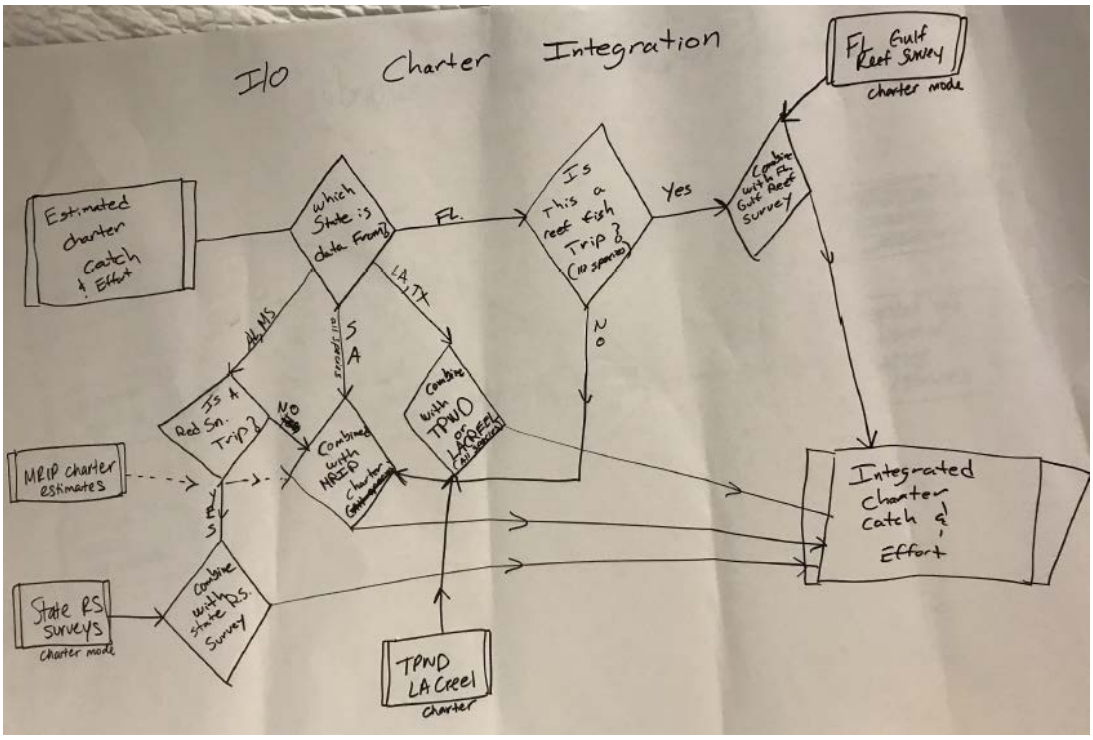


Appendix 5. Data Integration and Analysis Process Maps

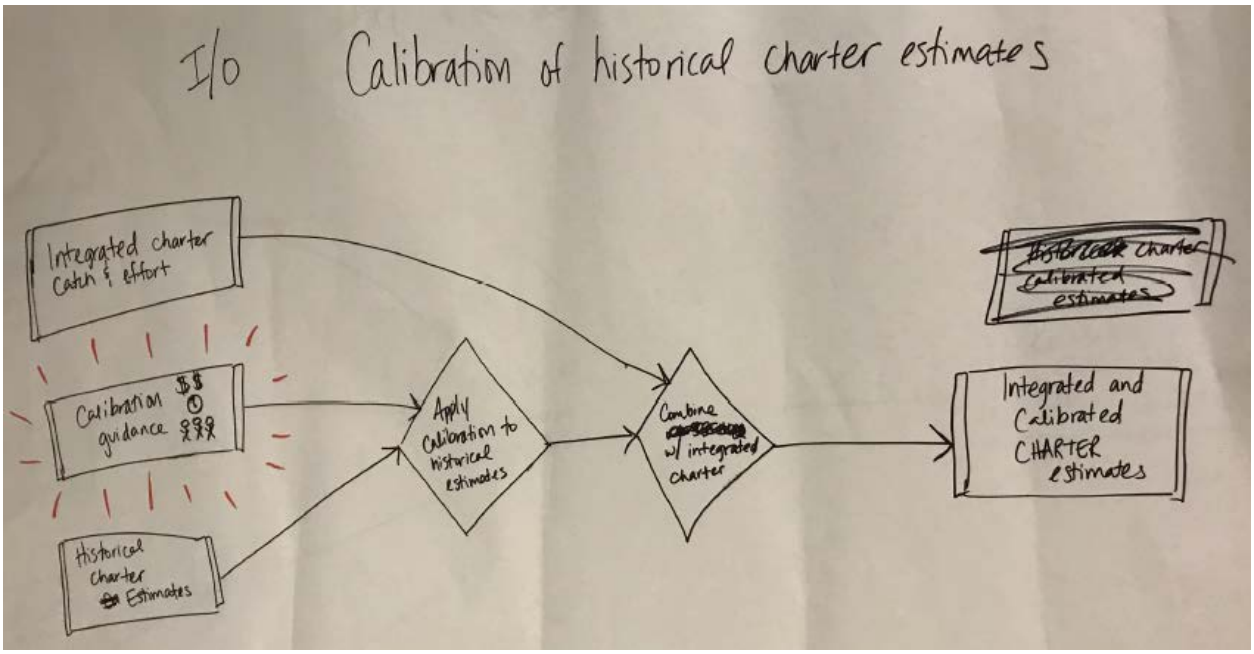
5.1 Non-reporting Input/Output Map



5.2 Integration Input/Output Map

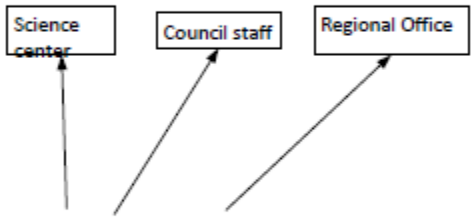


5.3 Calibration Input/Output Map



Appendix 6. Data Access and Dissemination Process Map

Data Access and Dissemination



Inputs from Data Compilation and Audit
Recreational catch series
Socio-economic data
Recreational effort series
Size data

Outputs
ACL Monitoring
Amendments & regulations
In-season management
ACL pay backs
Science center reporting compliance
Outreach
Survey design feedback
Stock assessment inputs
Fisherman access their vessel data

Appendix 7. Outreach, How to Report Subgroup Flipcharts