Atlantic Coastal Cooperative Statistics Program
1050 N. Highland Street, Suite 200A-N | Arlington, VA 22201
703.842.0780 | 703.842.0779 (fax) | www.accsp.org

ACCSP Integrated Reporting Workshop Report

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Our vision is to be the principal source of fisheries-dependent information on the Atlantic coast through the cooperation of all program partners.

Contents

Executive Summary

The Atlantic Coastal Cooperative Statistics Program (ACCSP) held an Integrated Fisheries Reporting (IFR) workshop to initiate development of the business rules needed to create an ACCSP standard for IFR and to define requirements for incorporating these rules into the Standard Atlantic Fisheries Information System (SAFIS). IFR is a fishery reporting method that utilizes a single unique trip identifier for all reports associated with the given trip, provides a single reliable source for all data and maximum use of automatic quality control and assurance. Thus data reported by fishers, commercial dealers, dockside samplers and fisheries observers would be easily associated together. These changes will result in improved fisheries data systems for management and stock assessments and dramatically reduce data analysis and quality control associated with linking disparate reports together.

The workshop was opened by Eric Schwaab, National Fish and Wildlife Foundation and former NOAA Fisheries Assistant Administrator, who emphasized that IFR will improve data timeliness and accuracy, thus helping to build trust in the data among both management and industry users. Subsequent presentations included a synthesis of previous integrated reporting work, an overview of integrated reporting efforts outside the USA, and an update on implementation of the Fisheries Dependent Data Visioning (FDDV) project of the Greater Atlantic Region. Part of the FDDV project will be the implementation of a Trip Management System (TMS), which will drive the effort to integrate reporting for the Greater Atlantic Region.

Following the presentations, the group determined that TMS was a logical starting point for the development of an integrated reporting solution capable of meeting all ACCSP partners' needs. The consensus was that the TMS and FDDV conceptual plan should be the launching point for workshop discussions and development.

Workshop participants discussed issues associated with implementing integrated reporting, including: duplicate reporting requirements, confidentiality, trip definition, regulatory changes, and the need to adapt to circumstances in individual jurisdictions. The workshop also provided a platform to advance the discussion of current modules for the trip, dealer, biological sampling, and observers/bycatch, and expanded future business modules for the vessel monitoring system (VMS), electronic monitoring (EM), private recreational angler, and cooperative research.

Recommendations for achieving IFR in the SAFIS redesign process include:

- Accounting for the wide variety of current reporting scenarios
- Flexibility in trip identification creation
- Minimizing duplication of collected data elements
- Following existing ACCSP standards for access and confidentiality
- Creating a flexible design to accommodate future modules

This report will be used to establish a timeline and guide the implementation of IFR in the SAFIS redesign. The incorporation of unique trip identification is a critical step in IFR implementation and providing the capability for multiple sources to generate this unique trip identification will enable a more functional and flexible reporting system. Workshop participants also identified reducing duplicative reporting as a critical need. An overview of the report will be given to the ACCSP Coordinating Council in Fall 2017.

Acronym List

API	-	Application program interface
CF_ID	-	SAFIS participant identification for commercial fishermen
CTR	-	Complete trip report
DW	-	Data Warehouse
ER	-	Electronic reporting
EM	-	Electronic monitoring
eVTR	-	Electronic vessel trip report
FDD	-	Fishery dependent data
FDDV	-	Fishery Dependent Data Visioning – project of GARFO and NEFSC to modernize FDD systems
GPS	-	Global positioning system
IFR	-	Integrated fishery reporting
IR	-	Integrated reporting (synonymous with IFR)
NEFOP	-	Northeast Fishery Observer Program
PTNS	-	Pre-trip notification system
SAFIS	-	Standard Atlantic Fisheries Information System
TMS	-	Trip management system
VMS	-	Vessel monitoring system
VTR	-	Vessel trip report

Introduction

Fisheries-dependent data have been collected by both federal and state fisheries management agencies for decades and, up until a little over twenty years ago, most data were collected independently by those agencies. Beginning with the formation of the ACCSP in 1995, fisheries-dependent data collection efforts on the Atlantic coast began to systematize. Program Partners developed coastwide data standards and then the Data Warehouse to provide centralized storage of data contributed by partners. With advances in both web based and database technologies, the Program built data collection tools in collaboration with partner agencies, which were packaged into the Standard Atlantic Fisheries Information System (SAFIS). SAFIS collects, processes and disseminates fisheries-dependent data that are consistent across the Atlantic coast.

SAFIS applications are rapidly evolving in response to new technologies, particularly in the handheld mobile arena. This evolution, in combination with the changing requirements of partner agencies and constituents, has precipitated the need for a redesign of the system. The SAFIS redesign offers the opportunity to develop and implement IFR at the same time.

Pursuit of Integrated Reporting

One of the longstanding, unresolved issues with fisheries-dependent data collection efforts, across both federal and state agencies, is the problem of linking catch data from a fishing trip with either the landings data reported by the dealer to whom the catch is sold, or the biological/observer data that may be collected during or at the end of the trip. Improving the relationship between individual trip records will help to reduce reporting errors and allow for more timely, accurate data, which in turn can help management, science and stock assessments as well as the fishing industry. Furthermore, other data sets collected independently, such as those provided by vessel monitoring systems (VMS) or electronic monitoring, need to be integrated more efficiently with trip data.

Starting in 1994, certain federally-permitted harvesters were required to report their fishing activities on a pre-printed paper form, or vessel trip report (VTR), which contained a unique identification (ID) number. The ID number on the report, in theory, would then be passed on to the dealer to be included with the dealer's report so that the two data sets could be integrated after they were collected. Similarly, samplers or observers on trips would do the same.

Electronic Technologies and Integrated Reporting

Even with today's advanced technologies, this process is still largely being used for fisheries-dependent data collection. The continued reliance on manual data entry, error-checking and trip matching means that data are not as accurate and timely as they could be.

Federal fisheries-dependent data managers have been exploring ways to improve the data collection and management using electronic technologies for some time, identifying integrated reporting as a critical component of plans to improve fisheries-dependent data. Likewise, an integrated reporting solution was identified as a priority during the functional-requirements-gathering phase of the SAFIS redesign. Along with other state and federal plans, these initiatives provide an opportunity to develop and implement a flexible integrated reporting component into SAFIS that can be used by all ACCSP partners. This workshop helped define the scope of a solution by identifying and addressing potential issues or impediments to implementation. All workshop definitions, participants and presentations are contained in Appendices 1, 2, and 3, respectively.

Methods

The workshop planning team created a terms of reference document to identify the core concepts and objectives of the workshop. Those were:

- Review background and the current state of affairs (work to date), and confirm that process is on target. In particular, need input and confirmation from non-federal partners.
- A Trip Management System (TMS) solution has already been developed conceptually by the NE Region. Consider using that as a starting point and develop further.
- Define the scope of the solution.
- Identify and attempt to address issues or impediments to implementation.
- Identify core business rules/requirements.
- Review and consider future potential fisheries-dependent data collection modules (e.g. EM, dealer-to-dealer transactions, traceability), both federal and state, and possible need to interact with those eventually.
- Provide a report of findings and recommendations.

The report entitled *FIS Integrated Reporting Research & Design Project***,** initiated by NOAA Fisheries employee Mark Brady, coupled with regional federal data visioning project reports on the Atlantic coast, formed the bulk of the background material for review. The Atlantic States Marine Fisheries Commission (ASMFC) Spring Meeting week was the preferred timing for the workshop as it allowed managers and others to attend. Individuals were selected to participate in the workshop based on a range of expertise. Several are members of various ACCSP technical committees.

Presentations highlighted the importance of an integrated reporting framework, summarized work previously accomplished in the USA and internationally, and described the Greater Atlantic Regional Fisheries Office (GARFO) and Northeast Fisheries Science Center (NEFSC) IFR plans based on their data visioning process.

After the presentations, participants identified impediments to IFR implementation for each existing reporting module - trip, dealer, biological and observer/bycatch. Workshop participants then broke into smaller discussion groups for each reporting module to attempt to address the identified issues.

Finally, future modules that might affect how an integrated fisheries reporting solution is designed – such as VMS, electronic monitoring (EM), and product traceability– were considered as well.

Results

GARFO and the NEFSC have already developed, in concept, an integrated reporting solution for federal fisheries data collection in the northeast: the Trip Management System (TMS). Given that GARFO/NEFSC has committed to working with ACCSP to develop an integrated reporting solution as part of the SAFIS redesign, it is incumbent upon ACCSP to explore options that build upon the proposed TMS concept. The TMS, which will be first developed in the Greater Atlantic Region, integrates various components of the trip report, exchanges information among various databases, e.g. VMS, pre-trip notification system (PTNS), observer data, dealer reports, and trip reports, in an integrated system.

As described by Barry Clifford in his presentation (Appendix 3), a TMS would operate autonomously, communicating with all of the current data collection modules (trip, dealer, biological and observer/bycatch) and potentially others like VMS. As trips are declared or initiated, a record is generated in the TMS by the harvester (either directly or via VMS), capturing important attributes such as vessel identifier, fishermen identifier and trip date. Reports submitted from other sources, such as a dealer buying from that vessel/fishermen, or an observer working on that trip, can then use that record, and its unique identifier, to link the records together.

Workshop participants were asked whether GARFO and NEFSC's TMS integrated reporting solution would be a logical place to start in terms of devising an integrated reporting solution to meet the needs of all ACCSP partners. The consensus was that the GARFO/NEFSC conceptual plan provided a template for workshop discussions and future IFR development.

Data Modules in ACCSP Integrated Fishery Reporting System

Data components of the integrated fishery reporting system were separated into four initial modules: trip, dealer, biological, and observer/bycatch. Workshop participants identified additional modules that may be incorporated into the system in the future including EM, GPS, and traceability data.

The ACCSP integrated fishery reporting system design will be flexible enough to accommodate additional modules in the future, all of which will be linked with the existing modules using the unique trip identifier. As is the case with ACCSP's current suite of data systems and products, all data modules in the integrated fishery reporting system will adhere to federal and state confidentiality rules.

Trip Module

The trip report is a record of a fishing trip or event and includes most importantly the trip date and vessel/harvester permit identifiers. In addition, trip reports usually include information about the catch (species and quantity) as well as the effort, gear, and location of fishing.

Commercial trips often indicate which dealer the catch is sold to. For more in-depth information about standard data elements for this module, as well as the others that follow, see the Atlantic Coast Fisheries Data Collection Standards. The audience for the trip report includes harvesters, dealers, state and federal managers, samplers, and observers. Trip reports are housed both in SAFIS and the Data Warehouse.

Integrating the Trip Module

Ideally harvesters would generate a TRIP ID electronically either before, during or shortly after the conclusion of the trip. This might be done either by the harvester or via the VMS upon trip declaration.

Federal and state rules might differ in terms of the information required of harvesters to generate a record in the TMS, and those differences would be accommodated. For example, while a federal trip entry requires the vessel permit identifier, a state trip entry in the TMS would require the state permit identifier.

Furthermore, if no vessel is used during the trip, this might be recorded as occurring from shore. Other special cases, such as multiple trips occurring on the same day, carring, or the co-mingling of the catch from multiple trips, and trips offloaded at multiple ports would all require careful consideration. Recording trip type would be important, particularly in terms of associating a dealer record, and how to handle recreational sales that occur in some jurisdictions from for-hire trips. If a trip is only declared in the TMS with no associated catch information, harvesters would need to easily identify that record later in the TMS to be able to associate and add their catch data.

Critical issues with respect to the trip module that were raised by workshop participants are included in the Table 1.

Table 1: Trip module issues and suggested solutions as reported by Workshop Small Group

Issue	**Solution**
No vessel for identification (i.e. shore fishing)	Need valid fisherman identification link to TMS
Split permit trips	With properly identified vessel, link permit information to data management system during processing
Moving port on a trip	Turn report into two trips or add a sub-trip identifier
Discards on next trip (regulatory requirement)	Add a disposition code for this circumstance
Carring (practice of aggregating catch from multiple trips (catch co-mingled from multiple gears, fishing events, fishermen))	List sale disposition rather than catch disposition

Personal sale (individuals or restaurants)	Refer to the Recreational Technical Committee for suggested standards solution
Vessel takes two trips in one day	Unique trip identifier for each trip
International trips	None suggested
States that require legislative action to implement electronic reporting	Build integrated reporting system to allow ongoing non-electronic reporting until states make needed changes
Move to electronic reporting hampered by lack of broadband access	Build integrated reporting system to allow ongoing non-electronic reporting until broadband access is upgraded or focus on data transmission by cell signal (which does not need signal strength needed for voice or video

Dealer Module

This module refers to the report made by dealers. The dealer report provides the market and grade distinctions and landed weight of the species sold by the harvester, as well as the price paid for the landed catch. It can also provide important information depending on the species landed and jurisdiction, such as area fished or port of landing.

In a two-ticket reporting scenario, this report is submitted independently of the trip report submitted by harvesters, whereas in a one-ticket reporting scenario, commonly used in the southeast, the dealer collects and submits the trip information along with the dealer information on a single report.

Most of the dealer information generated on the Atlantic coast is submitted to SAFIS in near real time or up to a week after it was generated. In some cases, the dealer information is submitted instead directly to the Data Warehouse. The data are used by a variety of stakeholders, including the dealers themselves; the harvesters from whom they purchase; federal and state managers, and biologists; academic researchers; the media; and the general public.

Integrating Dealer Report with Existing Trip Report

Perhaps the most complicated piece to the TMS is the integration of a dealer report. Conceptually, if a trip is already declared, and a TRIP ID is already generated for a particular vessel or permit holder in the TMS, regardless of the source, the dealer would have the ability to select that trip to associate the landings report with it. In some instances, the dealer might initiate a report by swiping a harvester card. The swipe application would then have to negotiate the trip integration if a single ticket was not warranted.

To match their reports with existing declared trips in the TMS, dealers would require access to a list of declared trips by vessel or permit holder. A list could allow dealers or other harvesters that are also dealers, to "shop" the TMS and take advantage of the information contained. Workshop participants suggested developing a "consent" process for the harvester, likely as part of the permit management module of SAFIS, which would indicate to the TMS that a harvester's trip info may be accessed by dealers. The consent process could be tailored in many ways, such as for a range of explicit dates, or that only specific dealers have access as opposed to all.

Additionally, the consent process might incorporate the notion of intent, where a harvester actually indicates to which dealer he/she intends to sell to when the trip is declared. This solution could also be used for the release of data in the traceability process, providing value-added incentive. Harvesters would have the ability to revoke their consent to a given dealer, and would likely need to renew their agreement periodically. If consent is not given, then the dealer would not have access to that harvester's trip information in the TMS and would instead generate a new TRIP ID in the TMS that could be used for pre- or post-matching, depending on the timing of other submissions.

TRIP ID Generation by Dealers

If the report is not initiated via a swipe application, or the dealer does not find a suitable trip in the TMS, then a TRIP ID could be generated as part of the dealer report. This may also include having to accommodate the manual transfer of a pre-generated TRIP ID from legacy paper forms or for entry in external programs such as the Bluefin software. Validation rules could also be developed to minimize mistakenly reusing a TRIP ID, or one initiated from another state. Regardless, a record would be entered in the TMS indicating how integration was handled, if at all, and the type and quality of match tracked to help with post-processing.

Certain fishing industry practices will warrant the need for additional flexibility. For instance, the catch from a trip might be sold to more than one dealer, which means that the TMS would need to allow multiple dealers the ability to use the same TRIP ID. Conversely, catch from multiple trips can be co-mingled and sold together in one transaction, and the TMS would need to handle this scenario as well.
Critical issues with respect to the dealer module raised by workshop participants are included in the Table 2.

Table 2: Dealer module issues and suggested solutions as reported by Workshop Small Group

Issue	Solution
Reporting Timeliness (Multiple TRIP ID could be created)	TRIP ID generation directly proportional to the quality of match (i.e. the sooner the generation, the better the match). TRIP ID ideally generated prior to sale by harvester and dealer pre-matches record to that.

Pre-matching of TRIP ID cannot occur	• Swipe card or manual transfer can be used • Format of TRIP ID could include a set of codes within the TMS record • Validation process for when a match doesn't make sense (e.g. FL trip matched to a ME dealer record). • Qualifiers are entered along with the TRIP ID when created to identify the source and confidence level of match, Use "match" confidence codes (e.g. perfect, manual, fuzzy).
Harvester report does not exist prior to the dealer transaction	Inform the dealer during the creation of the report that no TRIP ID exists to be matched to, and that a new TRIP ID should be generated.
Paper reporting	Program partner enters electronically and rely on partner to match or fuzzy matching.
File upload submissions (i.e. Bluefin)	Rely on manual entry of TRIP ID or fuzzy matching.
Data isn't submitted to SAFIS	Rely on fuzzy matching in Data Warehouse.
Dealer selecting matching Trip ID without violating confidentiality	• Develop "consent" process for the harvester for the release of necessary data elements to one or more dealer(s), either on a trip-by-trip basis or for a range of trip dates. • This data agreement could also be used for data release with respect to traceability, a value-added encouragement. • Harvesters would have the ability to revoke their consent and may need to renew their agreement periodically.
Single Trip for Multiple Dealer Reports	Each dealer report uses the same TRIP ID
Multiple Trips for a Single Dealer Report	Multiple TRIP ID's associated with one dealer report
Product that is carred or trucked (commingling of trips' product)	Might need to be an orphan trip. Pooling TRIP IDs, the utility of this will need to be further discussed

Biological Sampling Module

This module refers to the data collected and reported by biological samplers who are Program partner employees or contractors. This involves the dockside and at-sea sampling of individual fish to collect biological parameters of a trip's catch. Currently, the information generated on the Atlantic coast is maintained by Program partners, a portion of which is submitted to ACCSP and stored in the Data Warehouse. In the future, more of this information could be submitted in near real time to the biological module in SAFIS. The data users are mainly the scientists who collect or use the data, as well as state and federal managers.

At a minimum, the data collected include species, sample type, sample data, and unit of measure. Currently, biological data are generally only collected from commercial or for-hire trips. In the future, it may also be collected from private recreational trips.

Integrating Sampling Report

Partner agencies would also have the need to link their biological sampling data to the original trip through a newly developed TMS. In most cases, this would be done after the trip was declared or even submitted in full to SAFIS, either through direct trip-by-trip submissions in near real time or after the fact. However, it is conceivable that biological sampling reports may, in rare cases, be submitted before any other modular data. Similar to circumstances in which the dealer is creating that initial record, processes would be required to manage the matching of these data sets as they are added.

Critical issues with respect to the biological sampling module raised by workshop participants are included in the Table 3.

Table 3: Biological sampling module issues and suggested solutions as reported by Workshop Small Group

Issue	Solution
Link in cases of mandatory trip reporting and if trip exists (pre-matching)	Match biological data to existing trip in TMS, if it exists.
Link in cases of non-mandatory reporting or trip does not exist.	Allow for TRIP ID creation in TMS by the sampler, but only if the trip does not exist. Would need to qualify these TMS records differently as they could be permanently "orphaned" records, or without a true trip record to match to. This means parameters normally collected and stored with a trip record (e.g. area, gear, etc.), may not be available.

Observer / Bycatch Module

The observer report is a record of an observed trip made by a fishery observer or at-sea monitor. A fishery observer collects data about catch (numbers, sizes, biological samples, protected species interactions, etc.). At-sea monitors are more narrowly focused on monitoring catch and compliance with regulations, e.g. discarding at sea. For this report and module, the data in the observer/bycatch module will include catch monitoring and compliance data; biological sampling from observer trips will be included in the biological sampling module.

Data from observers are currently stored at the Northeast Fisheries Science Center and Southeast Fisheries Science Center. When the Integrated Reporting project is implemented, these data will be linked to other trip data through the trip management system and unique trip identifier.

Integrating Observer Report

Partner agencies would also have the need to link their observer data to the original trip through a newly developed TMS, and in most cases, this would be done after the trip was declared or even submitted in full to SAFIS, either through direct trip-by-trip submissions in near real time or after the fact. However, it is conceivable that observer data may be, in rare cases, submitted before any of the other modular data. Similar to circumstances where the dealer is creating that initial record, comparable processes would be required to manage the matching of these data sets as they are added.

Critical issues with respect to the observer/bycatch module raised by workshop participants are included in the Table 4.

Table 4: Observer/bycatch module issues and suggested solutions as reported by Workshop Small Group

Issue	Solution
Confidentiality of observer reports	Work with federal partners to disseminate information to observer/bycatch monitoring programs
Need for automation in data entry, QA/QC, and the use of automation to reduce duplication is a challenge for observers and at-sea monitors	Ensure that the IFR system incorporates elements that address these issues to the extent possible.
Need for "one-touch" data entry (including automated length and weight collection, and reducing duplicative auditing)	Design data entry equipment to accept peripherals for length, weight, etc.
Report data elements need better definition (see list in Appendix 2)	Refer to the Bycatch Prioritization Committee for consistency and clarity

Future Modules

A module for geographic location data could be created using VMS or other geographic location tracking systems data. Incorporation of VMS geographic location data could be possible when

these data are made available for uses other than law enforcement compliance. Potential uses could include location data linked to trip, biological, and observer data to geographically mark and link these data types. A module for EM data (imagery) could be added if SAFIS is used for data collection and EM data is stored within the Data Warehouse. A module for product traceability was discussed and could be added if consistent data standards are developed for such a system.

Summary of Recommendations for Achieving IFR in SAFIS Redesign

Timeliness of TRIP ID Generation

Building upon the GARFO/NEFSC conceptual design of a TMS, it would appear the timeliness of the unique identifier or TRIP ID generation and how it is handled under the multitude of reporting scenarios on the Atlantic coast is probably the most important piece of the process when considering an integrated reporting solution. In an ideal world, the TRIP ID would be generated electronically by the harvester before or during the trip, and integrating the other components would involve searching for and selecting that trip and then associating that trip to the follow-on report. Workshop participants felt the longer it takes to match a module's data to a trip, the more likely today's standard of "fuzzy matching" will be required. However, not all trips along the Atlantic coast operate and are reported in that fashion, and thus a new solution should take into consideration the wide variety of reporting scenarios that exist. Furthermore, the solution might also be built with future data modules in mind, such as electronic monitoring, traceability, or GPS files.

Flexibility of TRIP ID Generation

Ultimately, it is recommended that a newly developed TMS be flexible enough to handle TRIP ID generation from multiple sources, not only from the harvester but also from the dealer if that trip has yet to be declared. TRIP ID generation might also be available to agency biologists and observers as well as by VMS services. This would mean the TMS would play an important role in deciphering who is submitting a report in addition to whether that report is intended to declare a trip or to be matched to another one, and it would have to be flexible enough to accommodate the multitude of reporting conditions that occur on the Atlantic coast. The TMS would also have to function with all the different systems and software applications that currently interface with SAFIS, such as the Bluefin software, eDealer, eTrips, etc. A TMS that functions this way then plays a very important role not only in a pre-processing mode where data modules are matched in real time as they are submitted, but also in a post-processing mode where data are matched after the fact, not only within SAFIS, but potentially within other repositories such as the Data Warehouse. A system that provides that flexibility gives each partner the ability to use the system as it sees fit. Furthermore, as the partner's data collection needs evolve, a flexible TMS can meet those changing needs.

Minimizing Duplication of Collected Data Elements

One important concept, regardless of the order of submissions, would be minimizing the duplication of overlapping data elements, such as trip date and vessel/permit holder identifier. Perhaps this could be accomplished by locking those common data elements and making them unchangeable downstream, in their respective modules, once established in the TMS.

Access and Confidentiality

Another overarching question had to do with access or credentials to the system. Everyone agreed that a SAFIS account would be required in all cases, with partner agencies having administrative access to enter a report under each of the modules as well as the ability to access all TMS information for matching purposes, if necessary. The TMS will be an integral component of the redesigned SAFIS and will not require log in. Integrating the TMS into SAFIS makes this task relatively straightforward.

Flexible design for Future Modules

The last portion of the workshop was spent discussing potential "future" modules, and two were identified that might be worthy of integrating through a newly developed TMS. The first was location monitoring services over and above the VMS technology that is currently in use in some federal fisheries, such as GPS tracking applications. The second was EM or electronic monitoring. In each case, it is plausible these data sets would be submitted independently, either by the harvester or partner agency and would require similar processes as the already established modules to be integrated into the reporting system. By following a particular formula, a flexible TMS can take on new modules as they develop.

Conclusion

The general overall concept of a newly developed TMS wrapped into the redesign of SAFIS is relatively clear. The autonomous service would be linked to and dependent on other portions of SAFIS, and would be the core nexus to most fishery-dependent report submissions, both commercial and recreational. It would orchestrate, through specific business rules, how those submissions are matched to the original trip either before, during or after the trip is completed, regardless of which submission is received first. Although this solution would not completely eliminate the need for post-matching, having a source record in the TMS for all modular submissions should make the process more efficient and accurate, particularly if those reports are made electronically and in near real time.

Next Steps

Implementing integrated fishery reporting will take time, investment, and clear communication and implementation planning. Initial steps forward include:

1) Communication about report

   This report will be disseminated to ACCSP partners and others interested in data modernization. This will include a briefing to the ACCSP Coordinating Council at the next meeting following completion of the report. The report will also be posted on the ACCSP website, and a summary will be included in the next ACCSP newsletter.

   The report will be made available to the NOAA Fisheries Electronic Reporting Professional Services Group and other relevant groups to make them aware of the effort and to get feedback on the report and the integrated fishery reporting concept.

   The report will also be shared with other data modernization efforts such as the Greater Atlantic FDDV[1] team and the Net Gains[2] steering committee.

2) Planning meeting

   To continue the work on the ACCSP Integrated Fishery Reporting effort, the workshop steering committee, other ACCSP staff, and selected system designers will meet as needed in Fall 2017 to map out the steps needed to implement the project. This will include discussion of:
   a. Software and hardware needed for IFR
   b. Design the implementation process in a way that allows program partners to implement when it is feasible and possible in their jurisdictions
   c. Further development of the four reporting modules (dealer, trip, biological sampling, and observer/bycatch
   d. Other topics

[1] http://s3.amazonaws.com/nefmc.org/FDDV-Presentation-NEFMC-June-2017.pdf
[2] http://www.pcouncil.org/wp-content/uploads/2017/05/InfoRpt3_netgainsreport_JUNE2017BB.pdf

Appendix 1: Definitions

Carring – The aggregation of catch from more than one trip for storage and subsequent sale.

Electronic Technology(ies) (ET)[3] – Any electronic tool used to support catch monitoring efforts both on shore and at sea, including electronic reporting (e.g., e-logbooks, tablets, and other input devices) and electronic monitoring (Vessel Monitoring Systems, electronic cameras, and sensors onboard fishing vessels).

Electronic Monitoring (EM)[4] – 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)[5] – The use of technologies – such as smart phones, computers, and tablets – to record, transmit, receive, and store fishery data.

Fuzzy Matching – The use of non-automated techniques to match various data sources from one trip without the use of a unique trip identifier occurring during post processing.

Global Positioning System (GPS)[6] **- global** navigation satellite **system** that provides geolocation and time information to a **GPS** receiver anywhere on or near the Earth where there is an unobstructed line of sight to four or more **GPS** satellites.

Integrated Fishery Reporting System (IFR)[7] – A fishery reporting designed according to the following principles:

- All reporting for a single trip is done on a single report or the logical equivalent.
- Use the same trip ID codes in all subsystems.
- Rather than depend on redundancy, use the single, most reliable source for each data item.
- Prevent errors first, look for those that remain, and correct them.
- Determine the predominant source of errors and address those first.

[3] http://www.nmfs.noaa.gov/op/pds/documents/30/30-133.pdf
[4] http://www.nmfs.noaa.gov/op/pds/documents/30/30-133.pdf
[5] http://www.nmfs.noaa.gov/op/pds/documents/30/30-133.pdf
[6] https://en.wikipedia.org/wiki/Global_Positioning_System
[7] FIS Integrated Reporting Research and Design Project report

Match Based Reporting[8] - Match Based Reporting is the reporting method currently in use throughout NMFS. It is based on the assumptions listed above. Its primary architectural feature is the matching of trips across data streams after the trips have occurred, based on data that was reported by humans. This design feature makes Match Based Reporting unnecessarily complex and error prone.

Traceability[9] - the ability to trace and follow fish and fish products through all stages of production, processing, and distribution.

Vessel Monitoring Systems (VMS)[10] - VMS is a satellite surveillance system primarily used to monitor the location and movement of commercial fishing vessels in the U.S. Exclusive Economic Zone (EEZ) and treaty areas. The system uses satellite-based communications from onboard 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.

[8] Integrated Reporting: Motivation, Definition, and Implementation (M. Brady)
[9] Modified from FAO - ftp://ftp.fao.org/fi/DOCUMENT/COFI/cofift_13/5e.pdf
[10] http://www.nmfs.noaa.gov/ole/about/our_programs/vessel_monitoring.html

Appendix 2: Workshop Participant List

Donna Bellais, Gulf States Marine Fisheries Commission
Mike Cahall, ACCSP
Julie Califf, Georgia Department of Natural Resources
Karen Cannell, ACCSP Contractor
John Carmichael, South Atlantic Fishery Management Council
Barry Clifford, NOAA Fisheries, Greater Atlantic Regional Office
Alex DiJohnson, ACCSP
Erika Feller, National Fish and Wildlife Foundation
Matt Gates, Connecticut Department of Energy and Environmental Protection
Dave Gloeckner, NOAA Fisheries Southeast Fisheries Science Center
Karen Holmes, ACCSP
Fiona Hogan, New England Fishery Management Council
Tom Hoopes, ACCSP Contractor
Stephanie Iverson, Virginia Marine Resources Commission
Heather Konell, ACCSP
Erin Kupcha, NOAA Fisheries, Northeast Fisheries Science Center
George Lapointe, ACCSP Contractor
Rich Malinowski, NOAA Fisheries, Southeast Regional Office
Amy Martins, NOAA Fisheries, Northeast Fisheries Science Center
Ian Miller, NOAA Fisheries, Highly Migratory Species Division
Josh Miller, NOAA Fisheries, Northeast Fisheries Science Center
Brandon Muffley, Mid-Atlantic Fishery Management Council
Nico Mwai, ACCSP
Joe Myers, ACCSP
Jennifer Ni, ACCSP
Ali Schwaab, ACCSP
Eric Schwaab, National Fish and Wildlife Foundation
Karen Sender, NOAA Fisheries, Pacific Islands Fisheries Science Center
Julie Defilippi Simpson, ACCSP
Rob Watts, Maine Department of Marine Resources
Anna Webb, Massachusetts Division of Marine Fisheries
Geoff White, ACCSP
Jackie Wilson, NOAA Fisheries, Highly Migratory Species Division
Coleby Wilt, ACCSP
Elizabeth Wyatt, ACCSP

Appendix 3: Workshop Presentations

ACCSP Integrated Reporting Workshop - Overview

Eric Schwaab, Vice President of Conservation Programs
National Fish and Wildlife Foundation

Hawksbill sea turtle

Start with Why……

Why Integrate Fisheries Data?

- **Better Science** – Generate better information to protect fish stocks and support fisheries sustainability.
- **Better Business** - Promote the efficiency, competitiveness and productivity of fishing businesses - - regionally, nationally and abroad.
- **Better Management** - Improve the efficiency and effectiveness of fisheries management activities of government agencies at state, regional and national scales.
- **Improved Transparency** - Better engage all stakeholders proactively and positively into the US fisheries management system.
- **A Better Fishing Future** - Prepare fishing businesses, regulators and constituents to adapt effectively to environmental change.

NFWF

The current state of fisheries-dependent data collection and management:

Large number of federal, state, and regional fisheries data management systems

Within individual systems, data are collected from multiple sources

RESULT Reduced effectiveness, efficiency and credibility of the results

Trust in the data = trust in the decisions

"It's a fairly archaic system. And there's a lot of consternation about the lack of good data being used to make decisions that affect watermen."[1]

"They'll send people down to the docks to do random sampling surveys of our catches, and that's what they use as data to make decisions. In the meantime, we have daily fishing vessel trip reports that we all have to fill out and it's not getting used."[2]

The Virginian-Pilot
PilotOnline.com

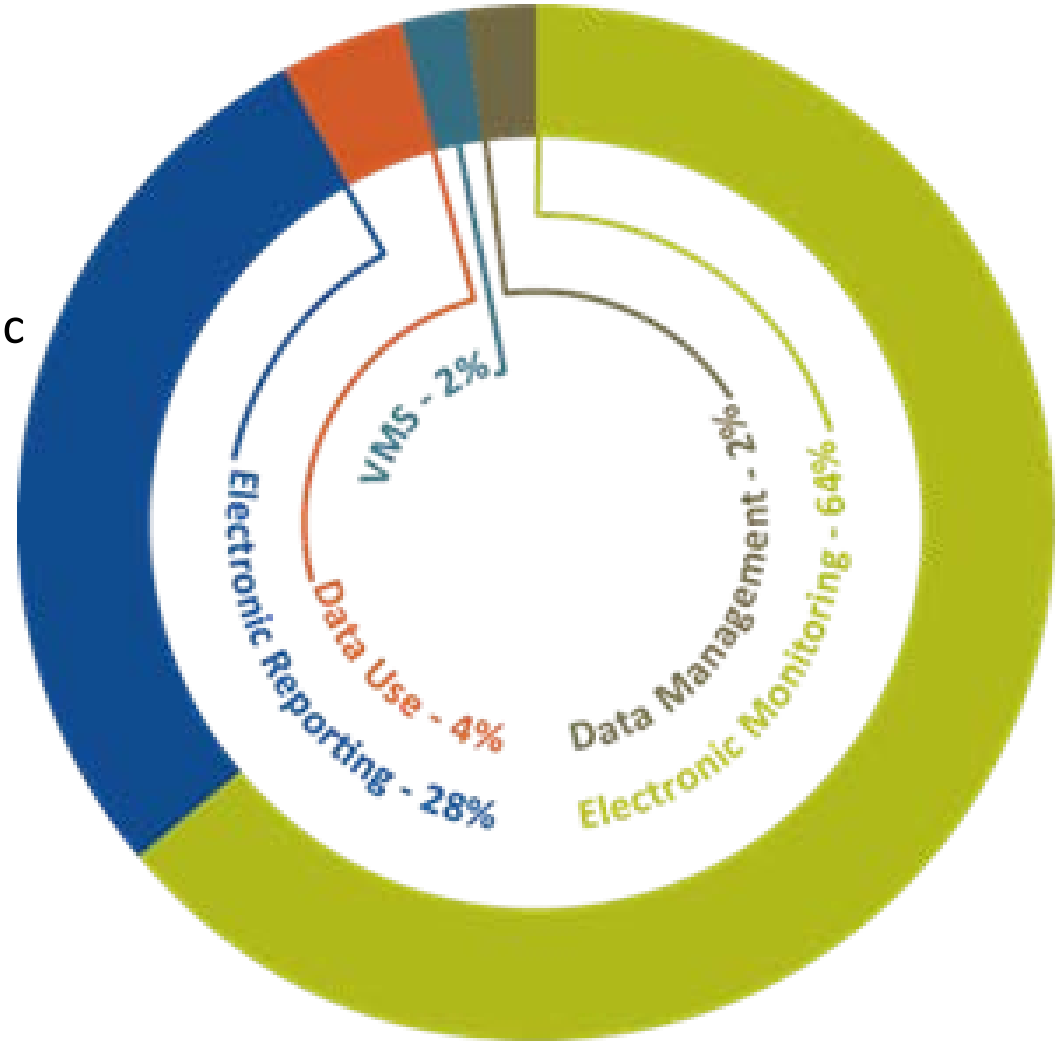
"I agree with the charter captains. They provide real-time data that is extremely useful, and it's not being used."[3]

Quotes from "*How many fish are really in the ocean? Some congressmen think federal fisheries can do a better job of finding out*" by Lee Tolliver, Virginian-Pilot

NATIONAL FISH AND WILDLIFE FOUNDATION NFWF

NFWF Interest in Fisheries Data

- Fisheries Innovation Fund
- Electronic Monitoring and Electronic Reporting appropriations
- Fisheries Improvement Program
- Support for “Net Gains”



Fishery data technology projects funded through the FIF and EMR Grants programs (2010-2016).

NATIONAL FISH AND WILDLIFE FOUNDATION NFWF

In 2017, NFWF will use its Fisheries Innovation Fund to…

- Promote full utilization of Annual Catch Limits and minimize bycatch

- Support improvements to recreational fisheries conservation and management

In 2017, NFWF will use its Electronic Monitoring and Reporting Fund to…

- Implement E-technologies in data collection

- Improve data management, integration and utility

- Address key data uses

NFWF

Overall goal - Integrate fisheries-dependent data

- Improved accuracy and timeliness for science
- Better management solutions – access, quota monitoring and use
- Facilitates business planning, efficiency and performance
- Government efficiency
- Builds trust among users

NFWF

Terms of Reference

- Review background and confirm process is on target
- Define the scope of the solution
- Identify and attempt to address issues
- Define the core business rules of the solution
- Consider other future potential Fisheries Dependent Data (FDD) collection modules (e.g. EM, dealer-to-dealer transactions, traceability), both federal and state, and possible need to interact with those eventually.

Integrating reporting allows us to…

- Limit human data entry → reduce the reporting burden
- Expedite data collection
- Eliminate fuzzy matching of reports→ reduce errors, increase timeliness
- Enhance traceability of data
- Streamline/simplify the process→ make it easily understandable for all user groups

Key steps - Many data collection tools & systems in place…

- But need a way to connect these together in order to make data most useful! → Integrated Reporting
- Must proceed through an inclusive process and fully consider user needs
- Builds on the work already underway, including process, tool and technology improvements in use in particular fisheries and regions

Elements of Success

- Interagency alignment
- Agreement on technical requirements
- A PLAN for achieving full scale integration
- Resources for execution
- Communications of the plan, progress and outcomes

Major challenges

- **Cost –** Ensuring investment at regional and national scales, including initial costs, to move forward
- **System Design** - Striking the right balance between a common national architecture and local program development and execution
- **System Ownership** - Continue to promote broad ownership among scientists, managers, fishermen and users
- **Data Confidentiality** - Addressing data confidentiality requirements and concerns while promoting transparency
- **Unique Recreational Data Issues** - Bringing recreational catch data to a higher and comparable level of performance
- **Managing Transitions** - Transitioning data streams in a scientifically useful way – Need for some side by side overlap periods; Retain or build adequate checks in the system to retain enforcement utility; Ensure continued efficient science access to representative biological samples

NFWF

Recommendations

- **Confirm a National Vision** - Build on the case for improved fisheries data systems as a component of a broader national environmental data modernization effort.
- **Establish Broad Ownership** - Promote regional and national system ownership among managers, scientists, fishermen and other users.
- **Create a Technology Solutions Framework** - Establish clear criteria for national architecture; development and shared awareness of modular, regionally based components; interoperability.
- **Build on Progress to Date**- Highlight and replicate successful pilots, models, best practices and tools within the context of a national architecture.
- **Address Policy Issues –** Confirm balance between confidentiality and access; authorities to participate and share data;
- **Identify Resources Needed** – Dedicate new attention to national leadership and a national architecture supported by multiple stakeholders.

NFWF

Questions or Comments?

Eric Schwaab
Vice President, Conservation Programs
Phone: 202-595-2475
Eric.Schwaab@nfwf.org

Coral reef

Caribou

American avocet

NFWF

Integrated Reporting: How Did We Get Here and Where Are We Going?

Tom Hoopes

ACCSP Contractor

Our vision is to be the principal source of fisheries-dependent information on the Atlantic coast through the cooperation of all program partners.

Integrated Reporting Presentation Overview

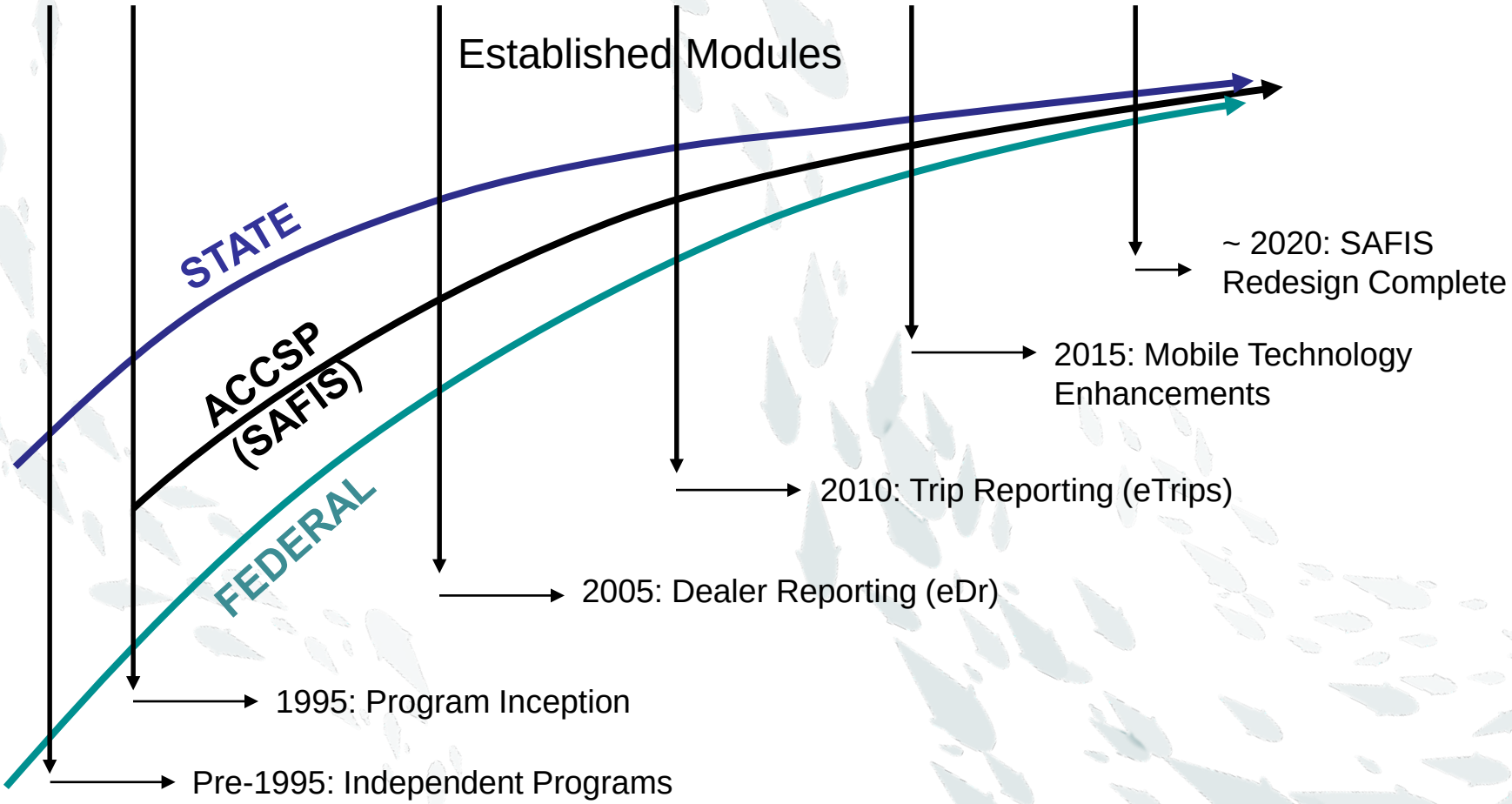
ACCSP
Good Data, Good Decisions

- Provide Background – Fishery Dependent Data Collection (FDDC) on Atlantic Coast
- Confirm Problem & Definition of Integrated Reporting
- Converging Data Needs, Both Established & Future
- Lay Out the Intended Goals of the Workshop
- Begin Group Discussion After Presentations by George and Barry

Our vision is to be the principal source of fisheries-dependent information on the Atlantic coast through the cooperation of all program partners.

Integrated Reporting
FDDC on Atlantic Coast

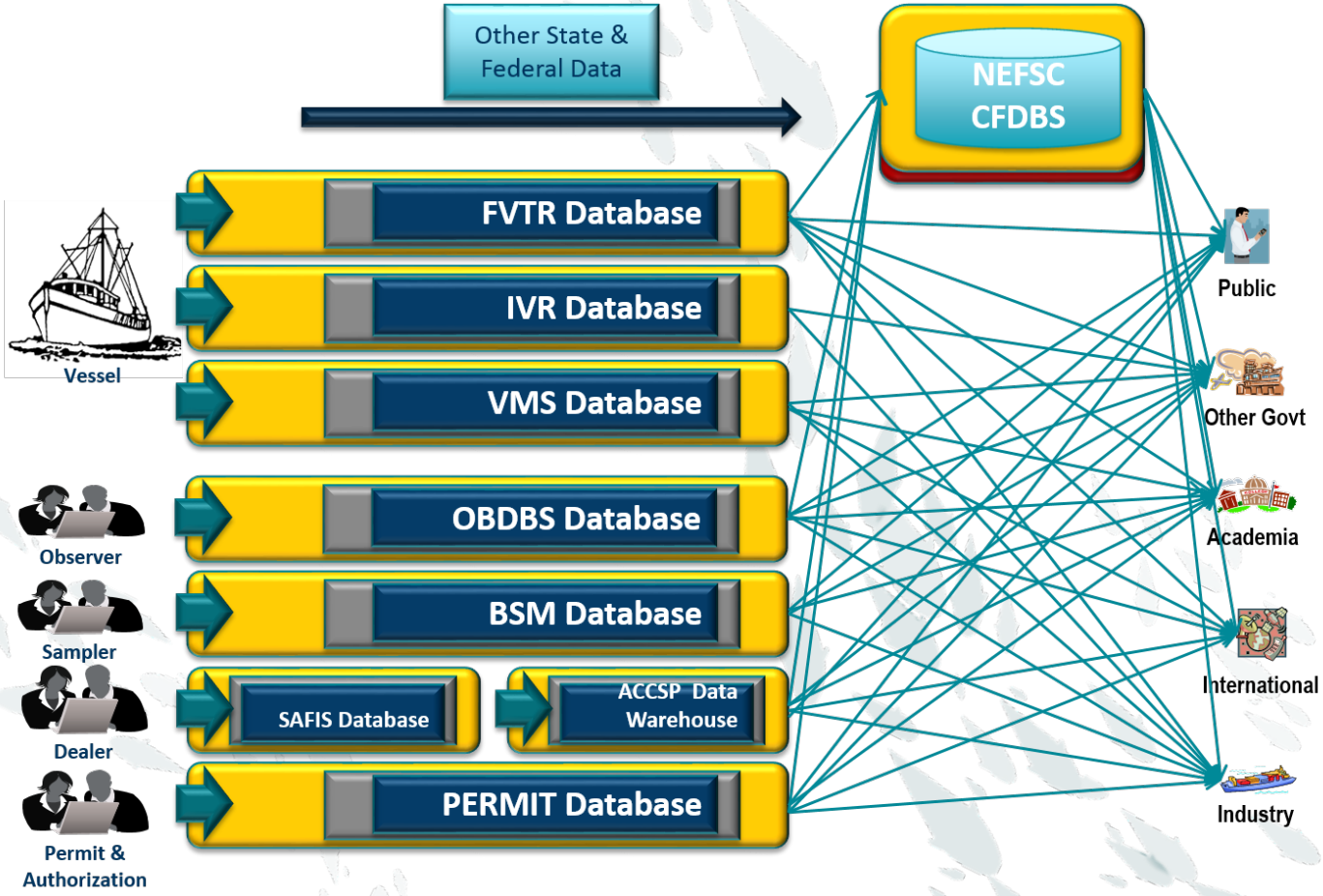
ACCSP
Good Data, Good Decisions



Our vision is to be the principal source of fisheries-dependent information on the Atlantic coast through the cooperation of all program partners.

Integrated Reporting
Established Fed Modules

ACCSP
Good Data, Good Decisions



Source: NOAA Fisheries

Our vision is to be the principal source of fisheries-dependent information on the Atlantic coast through the cooperation of all program partners.

Integrated Reporting Key Issues

ACCSP
Good Data, Good Decisions

1. Lack of integrated data
2. Redundant reporting of many data elements
3. QA/QC protocols require excessive manual intervention and as a result cannot be fully implemented for all data
4. Duplicate data sets/tables and processing protocols for similar tasks and analysis
5. Not all data are available in a timely manner

Source: NOAA Fisheries

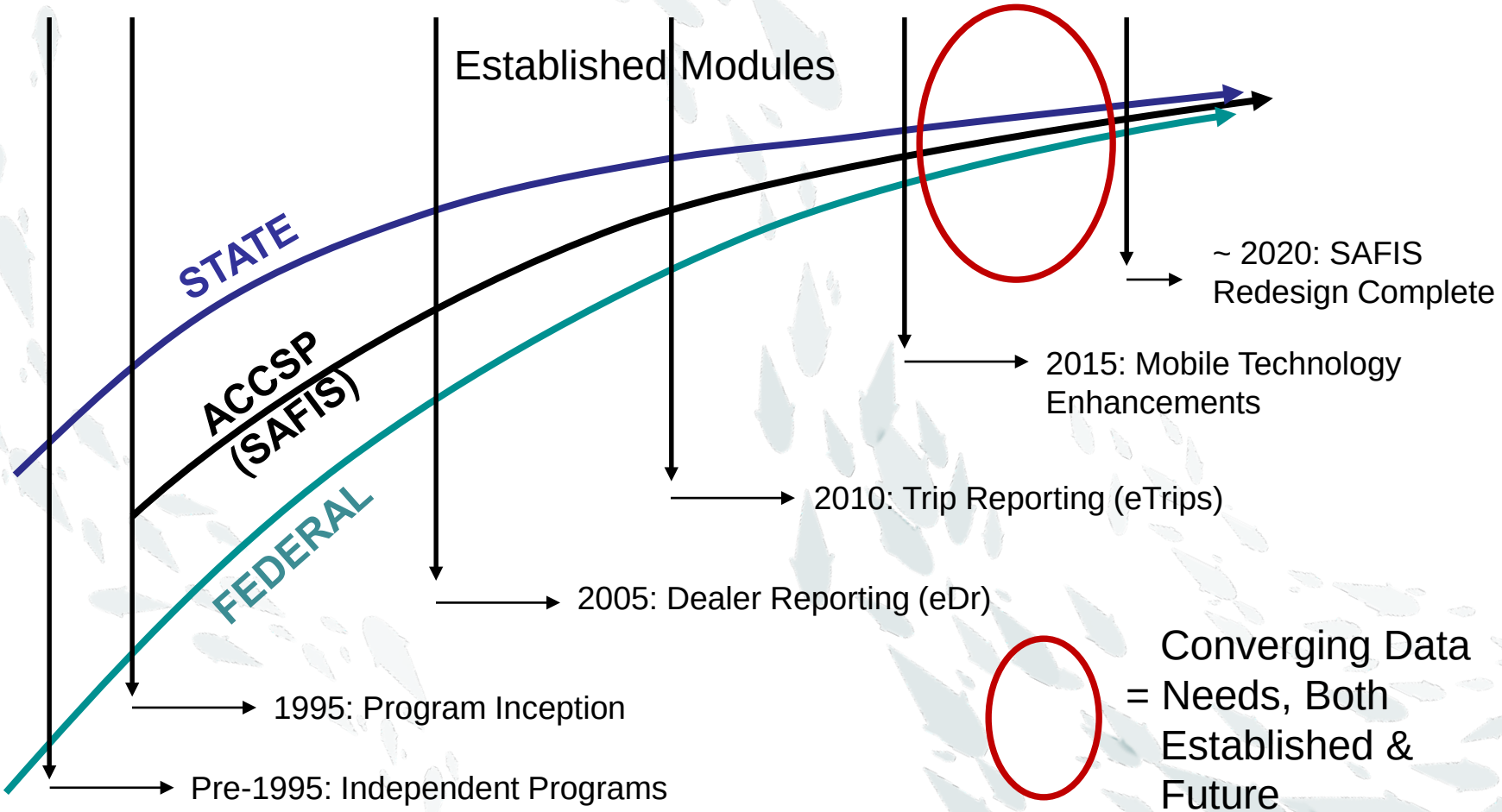
Integrated Reporting Definition

Ideally:

- All reporting for a single trip is done on a single report, or the logical equivalent.
- Use the same TRIP ID code(s) in all subsystems.

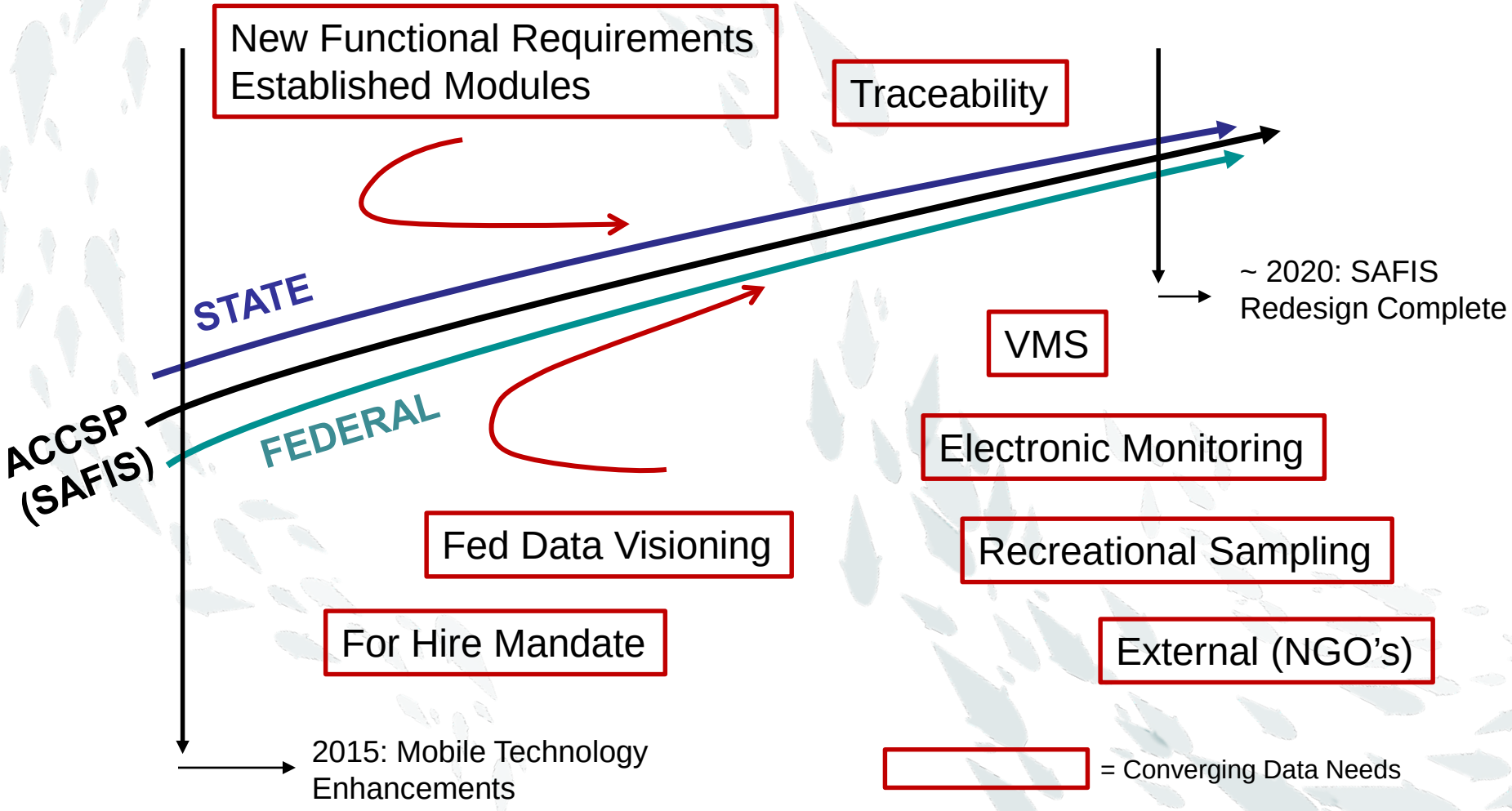
- Other definitions included in Workshop materials.

Integrated Reporting
FDDC on Atlantic Coast



Our vision is to be the principal source of fisheries-dependent information on the Atlantic coast through the cooperation of all program partners.

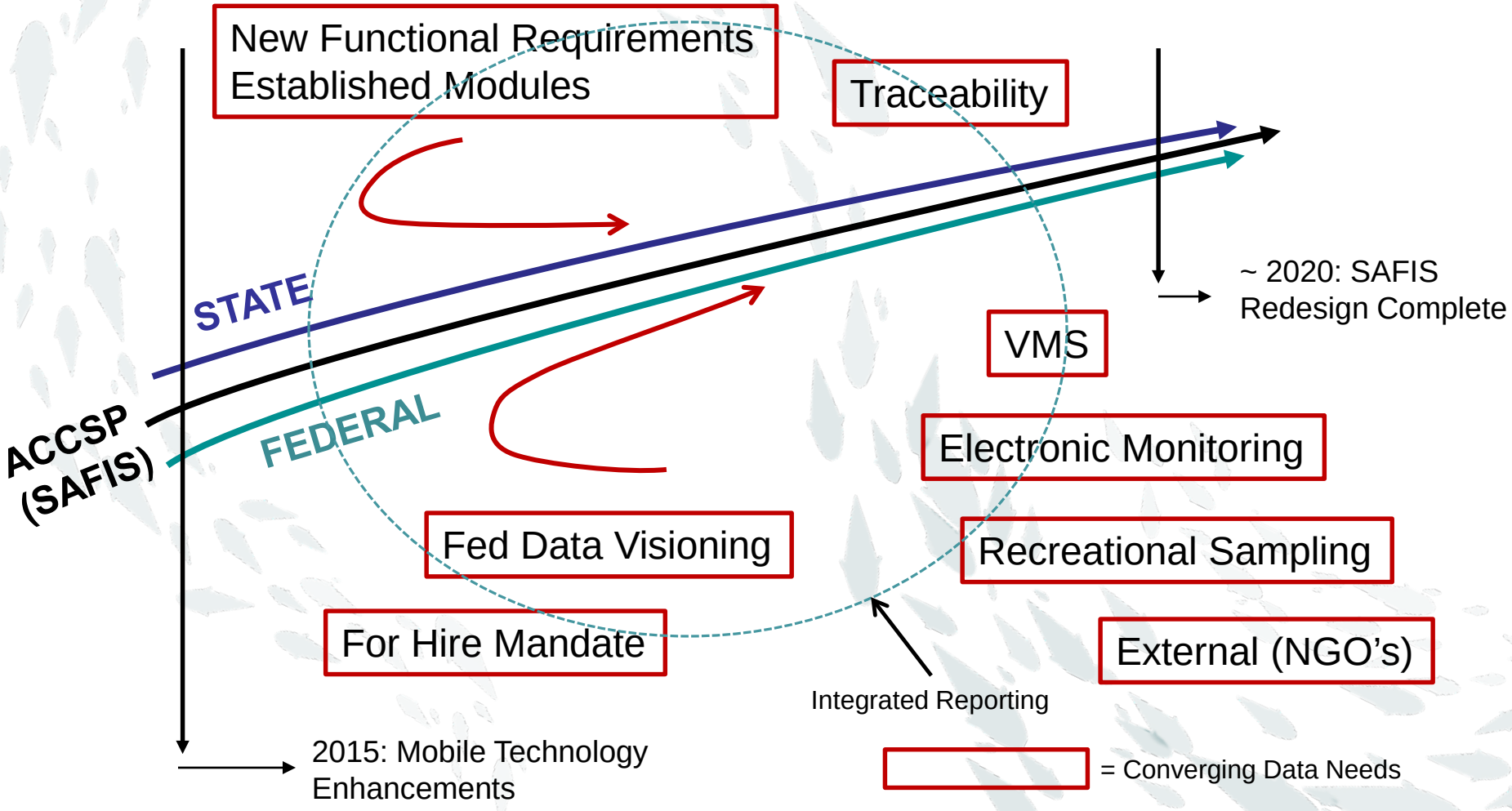
Integrated Reporting
FDDC on Atlantic Coast



Our vision is to be the principal source of fisheries-dependent information on the Atlantic coast through the cooperation of all program partners.

Integrated Reporting
FDDC on Atlantic Coast

ACCSP
Good Data, Good Decisions



Our vision is to be the principal source of fisheries-dependent information on the Atlantic coast through the cooperation of all program partners.

Integrated Reporting Workshop Goals

ACCSP
Good Data, Good Decisions

After Presentations by George & Barry:

- Come to consensus on overall scope of solution
- Identify and address impediments to implementation (by Established module)
- Define core business rules
- Identify and discuss Future potential data systems (modules)

Integrated Reporting outside the Atlantic Coast

George Lapointe
George Lapointe Consulting

Our vision is to be the principal source of fisheries-dependent information on the Atlantic coast through the cooperation of all program partners.

ACCSP
Good Data, Good Decisions

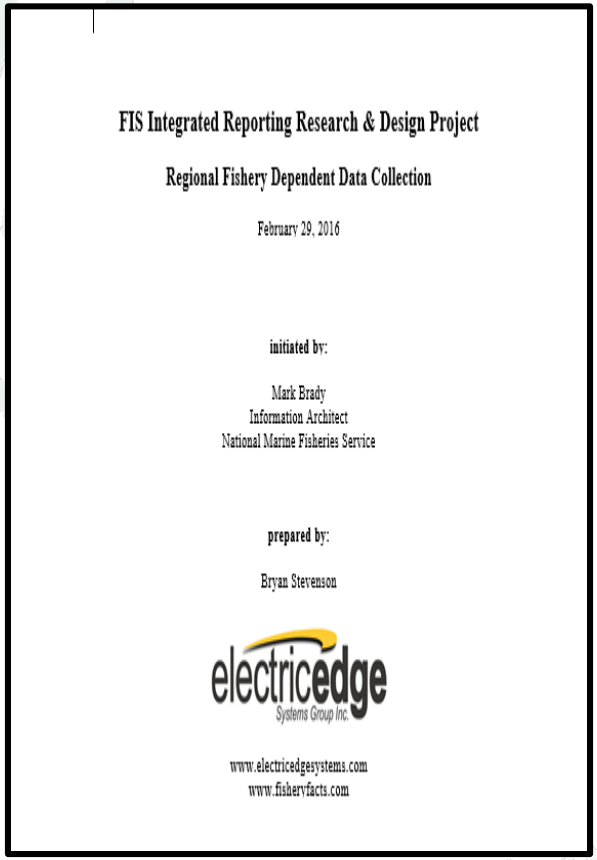
Not much out there!

Our vision is to be the principal source of fisheries-dependent information on the Atlantic coast through the cooperation of all program partners.

Different ideas about what integrated fishery reporting is

Our vision is to be the principal source of fisheries-dependent information on the Atlantic coast through the cooperation of all program partners.

NMFS Integrated Reporting Efforts



FIS Integrated Reporting Research & Design Project

Regional Fishery Dependent Data Collection

February 29, 2016

initiated by:

Mark Brady
Information Architect
National Marine Fisheries Service

prepared by:

Bryan Stevenson

electricedge Systems Group Inc.

www.electricedgesystems.com
www.fishervfacts.com

- All reporting for a single trip is done on a single report
- Use the same trip ID codes in all subsystems
- Rather than depend on redundancy, use the single most reliable source for each data item
- Prevent errors first, look for those that remain, and correct them
- Determine the predominant source of errors and address those first
- Limit human reporting, especially when it involves trip matching data
- Make accurate reporting easy. Make inaccurate reporting difficult.
- Simplicity
- Integrated reporting is all electronic
- Utilize existing technology infrastructure

Our vision is to be the principal source of fisheries-dependent information on the Atlantic coast through the cooperation of all program partners.

What success might look like

- One-touch reporting
- Verifiable real-time data
- Technology that performs and is widely available
- Increased data access
- Business and government reap efficiency dividends
- Organizational effectiveness

Our vision is to be the principal source of fisheries-dependent information on the Atlantic coast through the cooperation of all program partners.

Canada

- Automatically generated hail out number (Unique trip ID)
  - Hail In notification
  - Observer data
  - Fishing log
  - Dockside data
  - Quota status report

New Zealand

- **Linking fields that in combination will provide a unique identifier for each fishing event.**
  - **Location (lat/lon),either generated automatically by the electronic reporting tool, or entered manually from another source**
  - **Time**
  - **Date**
  - **Vessel identifier (unique legal number attached to each vessel)**
- **Future proofing for additional information sources**
  - **Electronic catch reporting by fishers**
  - **Automated geospatial reporting from vessels by e,g, AIS, VMS**
  - **EM**

Australia

- **Wholesale redesign of system architecture and data capture programs over next four years**
- **Aim – data integration by design rather than back end processes**
- **Preference for an output control model, specifying the data needed and format. Under new architecture:**
  - **Process that either allows for automatic integration of data sets i.e. a common key, or for integrated design**
  - **Allow for industry to work with third party providers to design systems that work for their businesses while at the same time getting the information needed for management.**

South Africa

- **OLRAC – private company that has an ER system**
  - **Approved eVTR vendor in Greater Atlantic region**
  - **When asked about integrated reporting capability; the replay -" the items listed below and far more"**
  - **Review of materials doesn't demonstrate IFR**

European Union

- Regional DataBase - 

- Framework for the collection, management and use of data in the fisheries sector
  - Electronic reporting - ✓
  - Electronic completion and transmission - ✓
  - Integrated reporting, integration of data - X

Our vision is to be the principal source of fisheries-dependent information on the Atlantic coast through the cooperation of all program partners.

Fishery Dependent Data Visioning Project

Barry Clifford

May, 2017

NOAA FISHERIES

Greater Atlantic Regional Fisheries Office

Northeast Fisheries Science Center

Source: www.visualphotos.com

Outline for today:

- Background
- Vision recommendations
- Collaboration with ACCSP and States
- Accomplishments
- What are we doing?
- What will this achieve?
- Example of how this works
- Challenges
- Next steps

Background

Comprehensive Data Needs & Requirement Analysis:

- All stakeholders affected by NEFSC/GARFO data
- All sources of fishery dependent data

Internal & External Interviews:

- 180 individuals
- 17 NMFS offices and branches
- 13 states, 2 Councils & 2 Commissions
- 3 NGOs
- Harvesters, industry reps, and dealers

The Vision Recommendations

- Focus on data streams
- Build flexible systems that can adapt to changing needs, uses, and technology
- Implement vessel electronic data collection in all fisheries
- Reduce redundant data collection and processing
- Improve data quality and timeliness
- Improve access to data

Integration with ACCSP and States

- FDDV and ACCSP's modernization efforts moving forward together
- Goal is a data structure that can support both Federal and State data
- Improvements to data systems will benefit all users:
  - More complete and comprehensive fisheries data
  - Consistent and reliable data products
  - Easier and standardized data access
  - Timely availability of trip level data
  - Efficient use of resources

What have we accomplished?

- interviews and initial vision document
- requirements analysis
- developed high level system design
- designed business process models
- developed high level implementation plan
- designed data validation services
- clarified vision project (phased approach)
- preparing to move into the development phase

What are we doing?

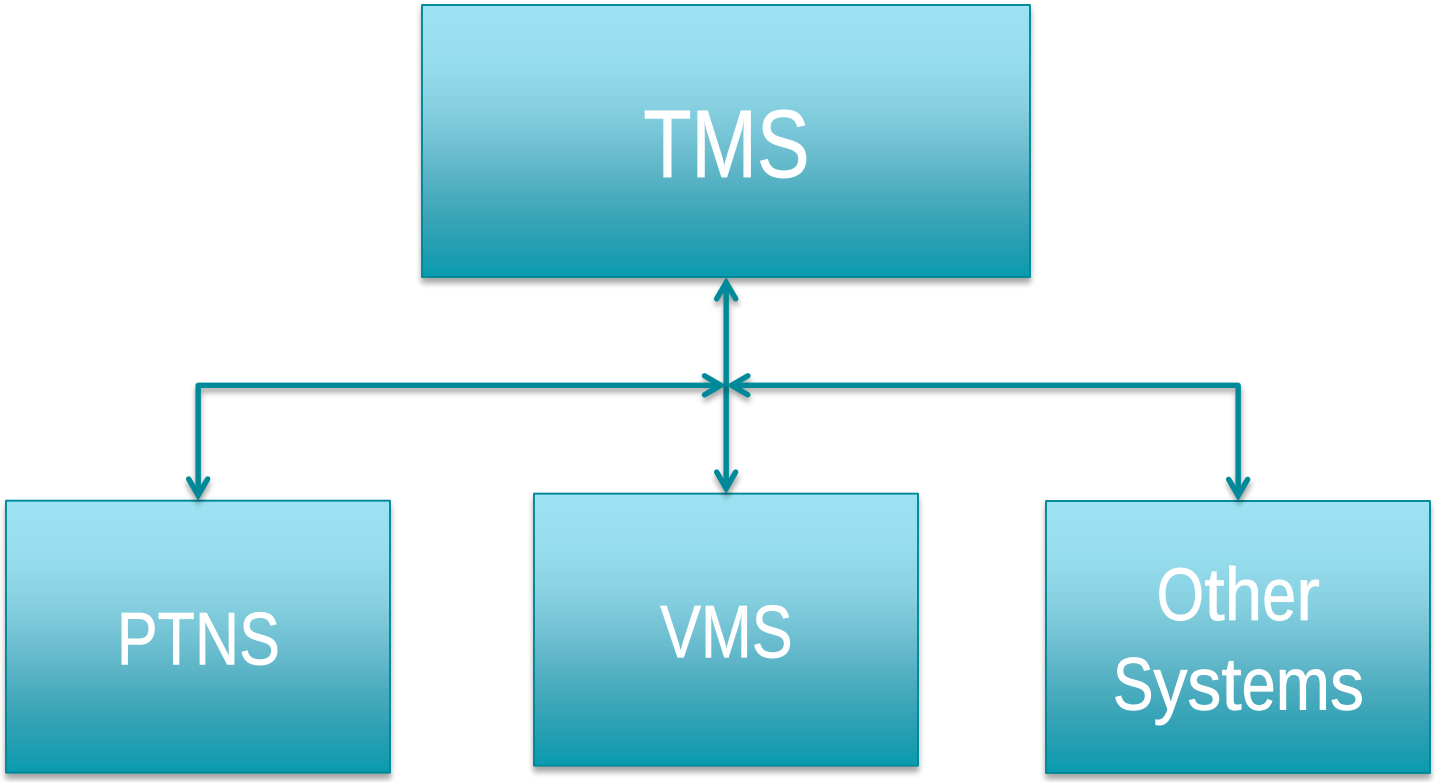
- First change is the adoption of the Trip ID
  - Integrate system components electronically

- Trip ID will be generated by the Trip Management System (TMS)
  - TMS is much more than a Trip ID generator
  - TMS is the brains of the system
  - TMS will exchange information with PTNS, VMS, NEFOP, VTR & Dealer databases as well as other system components as needed

What will this achieve?

- Trip ID will serve to integrate the various individual collection programs
- Integration will provide a more complete, accurate, timely and accessible data set
- Reduce and eliminate data redundancy and inefficiencies
- Lessen burden to industry by reducing reporting systems
- Develop a modernized database structure
- Create a system that is adaptable and flexible

Example Depiction



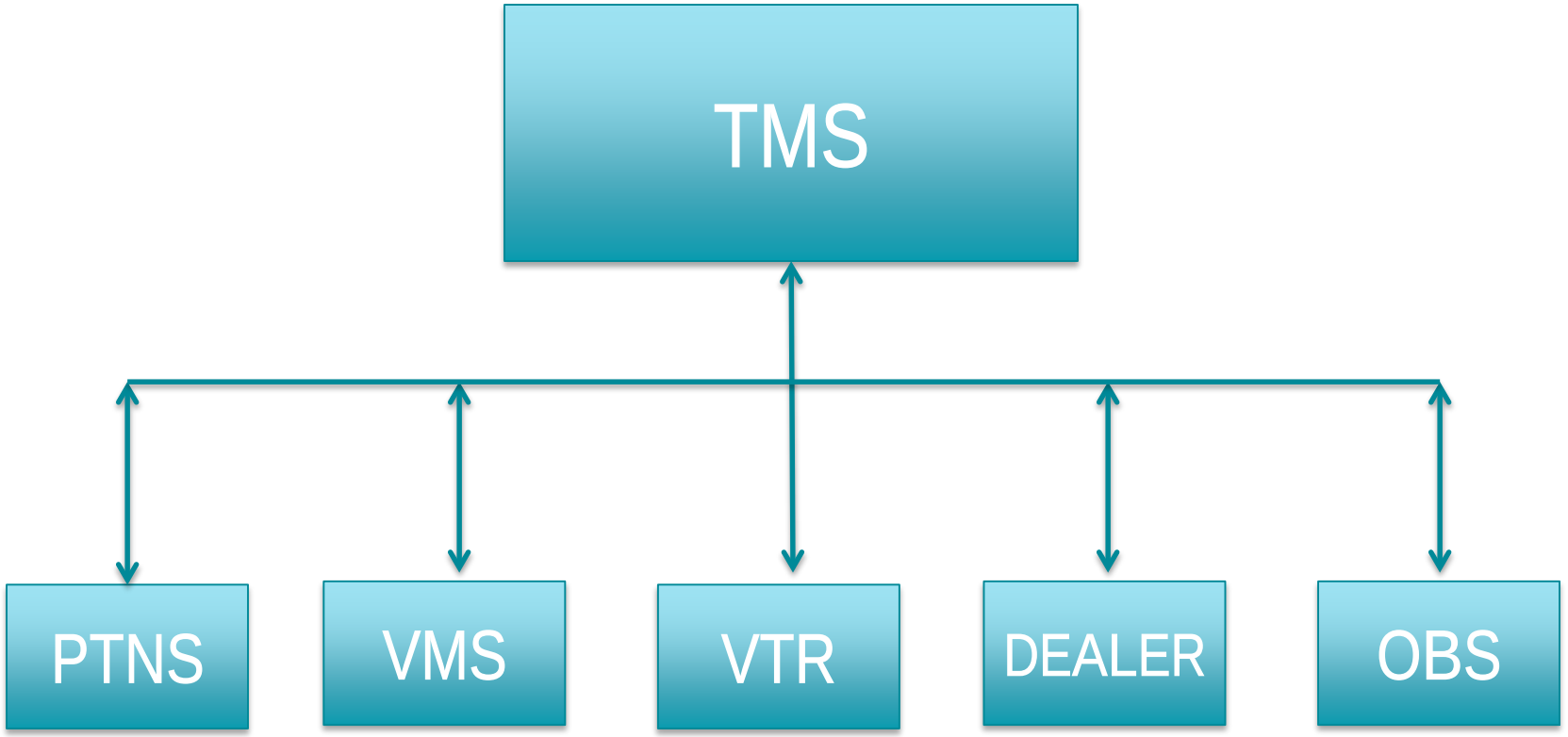
Example of how it works

- a vessel operator decides to fish:
  - access web-based TMS user interface
  - record the intent to fish (declaration)
    - will serve to fulfill existing PTNS requirements
    - will fulfill VMS declaration requirements
    - other pre-trip requirements
  - a unique Trip ID is generated and associated with all data submitted for that trip

Example of how it works - continued

- Trip ID is integrated into the eVTR
- Trip ID is integrated into the Observer record
- Trip ID will be pushed to dealers identified on that VTR as having bought catch
- Trip ID will be pushed to other associated data streams

Example Depiction



Impediments to Implementation

- Examples of challenges in the Trip ID
  - propagating Trip ID to dealers while ensuring confidentiality
  - eVTR
    - Required
    - reporting frequency
  - offload of multiple trips during single offload event
  - the use of trucks and consignment houses
  - incorporating Trip ID into proprietary dealer reporting applications

Where do we go from here?

- Assembled a project team to design and build TMS
- Assembled a project team to develop methods to propagate the Trip ID to all trip level activities
- Hired two developer/programmers
- Next up is the design of how TMS, PTNS, VMS, eVTR will be integrated
- Identify in what scenarios we can first implement the Trip ID
- Identify issues requiring Council input and guidance

Conforming Changes

- Examples:
  - TMS requires regulatory action
  - Required eVTR
  - eVTR Reporting frequency
  - Multi-trip offloads

Integration

- Unique identifier?
- Single reporting application?

- Eliminate redundancy
- Achieve efficiencies
- Automate Trip ID propagation

Questions?

Greater Atlantic Regional Fisheries Office

Northeast Fisheries Science Center

barry.clifford@noaa.gov

978-281-9148

Atlantic Coastal Cooperative Statistics Program
1050 N. Highland Street, Suite 200A-N | Arlington, VA 22201
703.842.0780 | 703.842.0779 (fax) | www.accsp.org

TO: ACCSP Coordinating Council

FROM: ACCSP Operations and Advisory Committees

With regard to the FY18 proposal to ACCSP from the Mid-Atlantic Fishery Management Council entitled, *Evaluating Angler Perception, Handling Practices, and Maltreatment of Smooth Dogfish in the Mid-Atlantic Recreational Rod-and-Reel Fishery*, the Committees do not recommend the project for funding for the following reasons.

1) The project would not directly address Program priorities. The primary objective of the project is to generate a recreational discard mortality rate estimate for smooth dogfish. While an accurate discard mortality rate is a valid fisheries research concern and needed for stock assessment, the data collected would not address ACCSP's core priorities to collect catch and effort, biological, or bycatch information.

2) There are concerns about the proposed study design and methods, notably the small number of dogfish to be tagged (n=10). The project is unlikely to provide a scientifically robust discard mortality estimate, and overall project goals may not be achieved. Also, posting an angler survey to an online forum may not result in a sufficient response rate or produce diverse responses truly representative of the recreational fishery.