Report for the Program Review of the Northeast Fisheries Science Center Fisheries Sampling Branch

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Executive Summary

This document reports on an independent, 3rd party review of the performance of the NEFSC's Fisheries Sampling Branch (FSB) and its various observer programs. The review examined more than 100 documents and files and interviewed over 80 people throughout the North East, including FSB staff, managers, scientists, fishermen, observers, Council staff and members, observer provider companies, Headquarters staff, state fisheries staff and socio-economists. Several consistent themes emerged during the review and these form the basis of this report and our associated recommendations.

The FSB finds itself "at the coalface" of a very complex fisheries management situation in the NE because it is the branch whose job is to provide a major source of the information used by fisheries scientists, managers, Councils, Sectors, NGOs and others to manage these fisheries. Indeed, like most parts of the world, many fisheries issues in the NE often require, in some way, shape or form, more and/or different observer data. The demands on the FSB are therefore many, complex, constantly changing and increasing.

In handling these demands, it is clear that the FSB do remarkably well in what many consider a very difficult job. The staff in the branch are described by most as "can-do" people, who are very responsive, professional, able to handle rare, special needs well and fast, and are constantly trying to accommodate the myriad of ever-changing requests asked of them (often at short-notice). But it is also recognised that, in so doing, the branch (in its current structure) has reached a point where such responsiveness cannot continue.

Over the years, the FSB has grown in an ad-hoc way - growing as needed in direction and magnitude - rather than in any planned manner. This has occurred, at least in part, due to the very "can do" attitude of the individual staff involved, where the ever-growing demands of the program are simply tacked on to existing work. The result is a very flat structure with little internal organisation.

The FSB's size, diversity and importance to the NE has grown to a level where, if one is to be consistent with other divisions in the Center, the branch could be elevated to "divisional" status. Further, this "division" should be restructured into 3 sections, Training, Operations and Data Handling, each with its own Lead, and reporting directly to the Chief. In addition to current tasks for each section, these Leads should also take on more responsibilities for external engagement with appropriate Council meetings, sub-committees, GARFO managers, Woods Hole scientists, and take a lead role in the high priority Fisheries Dependent Data Committee. Further, this restructuring should include the creation of 3 additional FTE positions, a Contract Procurement expert, at least one Database/IT expert and an Executive Assistant. These latter positions are required to take ill-fitting tasks (like contract accounting, database development and Tech Park logistics) off the senior staff.

Our review uncovered several communication issues in and around the branch, the most notable being that the FSB holds no regular meetings of senior staff. Clearly, formal, minuted monthly meetings should be held to discuss issues that arise inside and outside the branch. There should also be occasional attendance by temporary staff, observers and contracting companies for appropriate agenda items and senior people from Woods Hole and GARFO should also attend as required.

Other communication issues identified included the overuse of email and google chat within the branch, perceptions about inequities in the treatment of temporary staff, the need for better "in-reach" training to educate observers in how their work is being used, and better vertical communication from officers up the chain of command in the Center. Other communication recommendations concerned the nature of correspondence to fishermen, forging linkages with all state-based observer programs and comparable programs overseas.

Our review identified a need for greater oversight of the FSB by the Divisional Director, augmented by frequent and regular visits to the branch, perhaps via the above monthly meetings. Another useful initiative may be occasional workshops with the fishing industry to identify their priorities for data collection (especially for those fisheries that are paying for observers).

Our review identified concerns regarding the random allocation of observers, which could be remedied via the periodic production of metrics that explain such allocations to stakeholders. Further, to start an observer trip in a more positive way, when allocating observers (in the PTNS system), FSB should provide the actual name of the fisherman along with the contact number.

In terms of data and databases, we identified several issues that need attention, the more important being:

- the many types of data being collected by observers should be examined via a risk assessment to compare the time required to collect, enter, check and analyze the information versus its final utility;
- the FSB's data cycle will need to be reviewed as part of the roll-out of electronic data collection;
- a data warehouse would greatly benefit the branch in meeting reporting needs, and should include "canned" editor and auditing reports, progress reports, and a public website to help deal with more general external requests.
- NOAA's region-wide Data Visioning Project should be expedited, and the FSB should be engaged as fully as possible in its processes; and
- because of the success of the FSB tablet technology as an E-reporting tool, DMS should consider stopping work on their hardware system and support the FSB tablets for full implementation as soon as possible.

In terms of costs, to satisfy the requests of many stakeholders, we suggest expediting the current project examining the costs associated with "an observer sea day". This should include appropriate uncertainty bounds as well as the numerous caveats and assumptions.

To improve efficiencies within the branch, reduce observer turnover, reduce training and editing costs, and improve data accuracy and consistency, we recommend that NOAA consider:

- combining the two tiers of observers in the NE (ASMs and NEFOP observers) into the one cadre of fully-trained observers who are able to fulfil <u>all</u> tasks required and not just a subset;
- doing a cost-benefit study of re-introducing full-day payments to observers and data quality bonuses which should retain more observers; and

- evaluating the performance of the observer provider companies currently contracted to FSB.

The PTNS system as it currently operates in the NE is more of a PTCS system ('C' for "cancellation") because most day vessels record that they are going to fish and yet cancel more than 50% of the time. This causes significant costs to the program in travel and waiting times and ill feelings throughout the industry. NOAA should examine the performance of this system and consider ways to increase its flexibility – perhaps by examining the utility of the day scallop process across other fisheries.

In terms of enforcement activities, we saw a need for strengthened enforcement support concerning unsafe boats and fishermen refusing, harassing or assaulting observers.

In terms of Electronic Monitoring, a logical group to administer and organize the necessary contracts, roll-out and data systems, will be the FSB, with significant involvement of the OLE (another possible group could be the team running the impressive Fishermen's Logbook and Data Recording System – FLDRS). And to expedite the roll-out, an early test of EM as a routine data collection tool could be to examine the slipping issue in the herring fishery.

The issues and their solutions discussed in this review should, if implemented, lead to a more efficient, cost-effective division/branch, that is better engaged in the NE's fisheries management processes, that provides accurate data and reports faster and more efficiently, is better able to respond to its growing demands, and be well-positioned to adapt to new initiatives such as E-reporting and E-Monitoring in the future.

Background and Conduct of this Review

This document reports on an independent, 3rd party review of the performance of the NEFSC's Fisheries Sampling Branch (FSB) and its various observer programs. The specific aim was to assess the progress, performance, achievements and lessons learned (and to be learned) in the Branch, and across its 3 observer programs, and to recommend any changes in organizational structure, and internal and external processes that will improve the operational efficiency, quality and impact of the Branch and its work.

The work done by the FSB involves the collection, maintenance and distribution of data for fisheries science, management and compliance purposes in the Northeast US (NE). It manages three main observer programs: the Northeast Fisheries Observer Program (NEFOP), the At Sea Monitoring Program (ASM) and the Industry Funded Scallop Program. Each year, these programs (and other, more occasional, smaller observer programs) deploy large numbers of observers (who work for contracted observer provider companies) on over 800 vessels from 125 ports in 12 states. Around 12,000 observer days are deployed each year.

The drivers for this large effort are many and cut across the entire gamut of fisheries data collection needs - from the gathering of bycatch and discard information on protected and other species, catch/effort data and biological samples for stock assessment purposes, assessing the compliance level of fishing operations to regulations, through to operational information on individual vessels, gathering data from particular trials or experiments, and many others. The data obtained forms a vital component of the scientific information used to manage fisheries in the NE and are used by NMFS' NEFSC to support its core programs – as defined most recently in the NEFSC Science Plan (2013). Furthermore, as seen in the recent NEFSC Stock Assessment Data Collection Program Review (2013), the work done by this Branch is considered to be very high priority and integral to the core Research Themes of the Center and the fisheries management needs of government in the region.

This particular review is therefore required to satisfy a very important, and timely, need to examine this vital Branch to ensure that it is operating as professionally and efficiently as possible.

The first stage of this review provided an inception report to provide NEFSC with a starting point. That report derived from the collection, examination and preliminary analysis (through desktop review) of project material that was provided up-front. A total of 52 documents were examined for that report, some of which were provided from a recent review done by the Office of the Inspector General (the 2014 audit of the Observer Program) and others were provided by FSB. These documents and files included a variety of information about the Branch, previous reviews done, fiscal plans, manuals, protocols, enabling legislation, policies, etc.

The inception report was completed in November 2014 and provided initial information about the review, preliminary findings and a proposed direction forward for the remainder of the review - which was accepted by senior staff at the NEFSC. The next stage was the main fact-finding step which served to build up the flesh of the review around the skeleton

developed during the inception stage. This involved interviews and meetings in the NE during December 2014 with as many relevant stakeholders as possible. These meetings were held in Falmouth, Woods Hole, Gloucester, Newburyport, Scituate, Chatham, New Bedford, Point Judith and Davisville. We also conducted numerous phone hook-ups and skype calls with people while in the US and also back in Australia. In addition, many more files and documents were gathered and read during these months.

Over 100 documents and files have now been examined. Over 80 people have been interviewed, most in person, some in groups, some by phone and others by skype from Australia. Many were interviewed more than once. Some asked for complete anonymity, some asked that their comments remain anonymous. So, to respect those wishes, and for the sake of uniformity, we do not provide any names in this report. However, the affiliations of those we interviewed were: 16 FSB staff, 16 from GARFO, 13 Woods Hole, 13 fishermen (note that we use the NE's convention of a masculine gender for this term), 6 observers, 3 Council staff and 2 Council members, the 3 observer provider companies, 3 staff from NOAA Headquarters, 2 staff from Massachusetts Fisheries, 2 socio-economic scientists from NOAA, 1 representative from the Association for Professional Observers and 1 representative from GMRI.

During the course of the review, several themes emerged that, gradually, became regular in their occurrence and led us to be quite confident that we were getting a reasonably accurate impression of certain key issues. These issues form the basis of this report and our associated recommendations.

Introductory Comments

One of the requirements of this review was that it attempt to be a "high-level" one, examining ways to improve the operations of the FSB from a strategic standpoint and avoid getting "bogged down" in the minutiae of issues that surround the branch. However, as one synthesises the materials, one cannot help but consider the minutiae that exists – simply because many of the strategic, "high-level" issues are caused by them. So whilst we attempt to focus on strategic "big picture" issues (like Branch Structure, Communications, Data flows, etc.), the conduct of this review has provided us with opportunities to contribute (we believe positively) to some of the smaller-scale problems detected.

Fisheries management in the NE is particularly complex. It has evolved over the past few decades under an array of influences including: overfishing, public scrutiny, media attention, politics and litigation. Many entities are involved including fisheries managers, scientists, Councils, Sectors, fishermen, industry groups and NGOs. There are many types of vessels and fishing methods involved, many species that have booms and busts, and a rich and colourful 400 year history.

The FSB finds itself "at the coalface" of this complex situation because it is the branch whose job is to provide a major source of the scientific information used by fisheries scientists and managers in the region. Indeed, like many parts of the world, many fisheries issues in the NE often require, in some way, shape or form, more and/or different observer data. The demands on the FSB are therefore many, complex, are constantly changing and increasing. And, to deal with these demands, the FSB needs careful strategic management, structures and processes.

Examples of the sorts of demands placed on the branch are provided below:

- It is considered that the bycatch and discard data collected by the FSB is the only source of reliable discard information available in the NE and there are many (and changing) requirements for such data that comes from the Councils and management sectors. These mostly concern bycatch and discard estimates for quota setting and other regulations. They lead to a variety of coverage requirements and exemptions which are growing in number and importance to fisheries management;
- The two Councils meet every month and also have several sub-committees – most of which have questions of the FSB, particularly concerning coverages and information on how data is collected and funded;
- The Population Dynamics Branch at Woods Hole are among the primary users and analysts of the observer data gathered by the FSB. And the Protected Species scientists and managers would have no data without the observer program - which is used to respond to FOIA requests and satisfy requirements under the MMPA and ESA;
- The Analysis and Program Support Division of GARFO heavily rely on the catch and discard information from the observer program to validate catch reports and for determining discard estimates in real time for groundfish, and a week later for herring and scallops;

- The US National Bycatch Reporting system relies entirely on the FSB's observer data for bycatch and discard information for the NE;
- The NEFSC Social Sciences Branch assigns a very high priority to the cost information gathered by the observer program over the past 15 years ; and
- In terms of additional requests, we were advised that the fishing industry want more data collected concerning particular product information such as meat weights, diseases, condition of flesh, etc., whilst Massachusetts Division of Fisheries would like more data collected on sexes and maturity of herring.

In handling these demands, the overall impression we received from virtually all people we interviewed was that the FSB do remarkably well in what many consider a very difficult job. The staff in the branch are described by most who interact with them as being very responsive, great to work with, professional, able to handle rare, special needs well and fast, and are constantly trying to accommodate the myriad of ever-changing requests asked of them (often at short-notice). Comments such as these were regularly made by most interviewees including those from Headquarters, Woods Hole, GARFO, all 3 observer provider companies, the fishing industry, state fisheries, Council staff and members, socio-economists, staff from other data collection programs and other external contractors.

Clearly the FSB has been very good at responding to all these groups. But it is also recognised that, in so doing, the branch (in its current structure) has reached a point where it is doubtful that such responsiveness can continue. That is, senior staff in the branch are unable to respond as rapidly to the demands placed on them as was the case previously. Further, responding to external requests has meant a decline in the efficient operations of the branch as we shall see in the coming pages. This review of the FSB's structure and operations is therefore very timely and, hopefully, its recommendations will assist in ensuring that the FSB will continue to provide its vital service to the NE in coming years.

Branch Structure

General

One of the most obvious issues that arose during our review was that the structure of the FSB is very flat, with little internal organisation. Over the years, the FSB has grown in an ad-hoc way - growing as needed in direction and magnitude - rather than in any strategic or planned manner. This has occurred, at least in part, due to the very "can do" attitude of the individual staff involved, where the ever-growing demands of the program are simply tacked on to existing work. That is, basically, the branch contains many smart, hardworking people who are very adept at "making-do". The result is that the branch finds itself to be constantly in a reactive mode – rather than a proactive one which a more organized structure would encourage. Obviously such a reactive mode of operation has limits, especially if particular individuals should leave or their "can-do" attitudes change. There is universal recognition that the FSB has now reached this limit. For this crucial, large and expensive program, ideally one should have specialists in particular key positions and such positions should be built around a proper, strategically-focused organizational structure.

The current structure is a cumbersome one, where all 11 senior FTE (permanent) staff, and several contracted (temporary) staff report directly to the Branch Chief (see Fig 1). This structure can create numerous problems such as: the Branch Chief being "spread too thinly" inside the branch; too much pressure on one individual with associated risks to the agency; unfocussed and/or inadequate supervision; overlaps in responsibilities among senior staff; the lack of a succession plan and an associated career path for staff; limited opportunities for staff lower in the organisation to contribute to external processes; and a lack of clarity over acting arrangements when the Branch Chief is absent. All such symptoms add to inefficiencies, transaction costs and, ultimately, the total costs for running the program.

The FSB's size, diversity and importance to the NE has grown to a level where, if one is to be consistent with other divisions in the Center, the branch could be elevated to "divisional" status. Such a decision is, of course, for senior management as they balance resources across all sections and therefore resides outside the purview of this review. In any case, irrespective of the status of the Fisheries Sampling Branch/Division, the group should be nevertheless re-structured as follows (and see Fig 2):

Fig 1 – Current structure

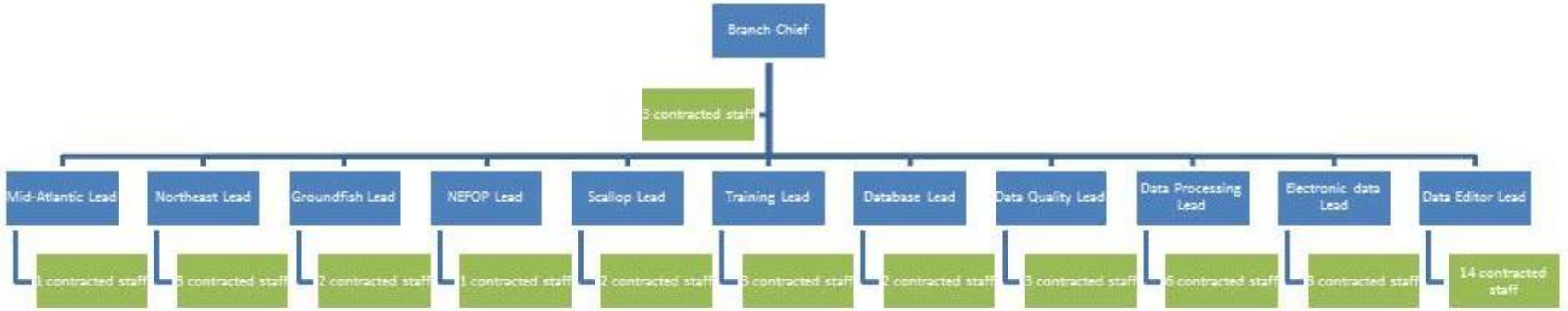
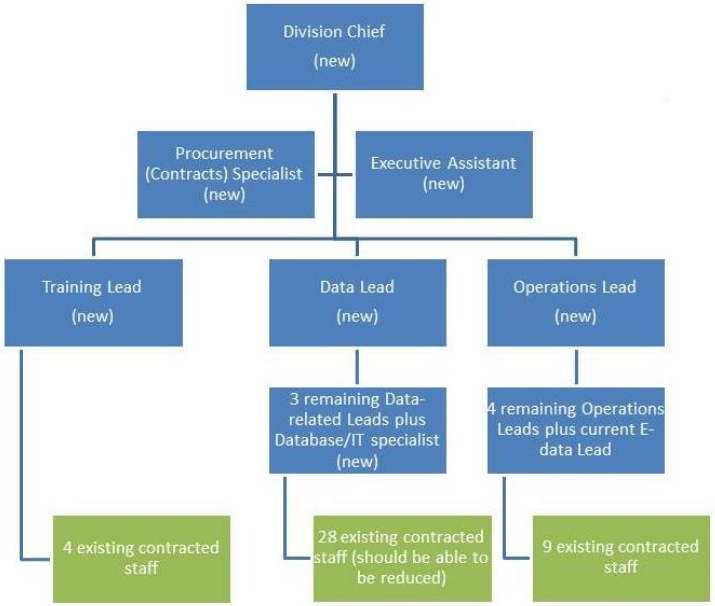


Fig 2 – Proposed structure



There are basically 3 core activities in the FSB, and its structure should reflect those activities. These are Training, Operations and Data Handling. All existing positions in the FSB should be placed in these sections according to the most logical allocation of their current roles according to these activities. Currently these positions and roles are spread somewhat arbitrarily throughout the branch, based on history, experience and personalities. Each section should be led by a dedicated FTE staff member (the Section Leads) who will be directly answerable to the Chief. And each position should be able to be recruited out of the existing cadre of FTE positions currently employed, albeit at a higher pay scale commensurate with added responsibilities. Further, when the Chief is absent, one of these 3 senior Section Leads would act in the role, on a rotating basis, ensuring an unbroken and clear chain-of-command. Taking each in turn:

Training Section

This is the most important section as its functions underpin everything else that occurs in the branch. That is, this section provides the trained observers who are deployed by the Operations staff and who provide the data which is organised by the Data Handling staff. The current training load on the branch is excessive (due to high observer turnover and the various types of training that occur), costs the Center a large amount of money, and affects all parts of the branch in terms of time and workload.

There exists a significant dysfunction within the current Training section(s) in the FSB, which is causing cascading negative impacts throughout the rest of the branch. This is because there are 2 individuals in charge of training, who are based in different sections of the branch. The solution is to identify one individual to lead the new Training Section, and combine all staff who spend the majority of their time running the training modules into the new section (these would include the positions and staff associated with the current Training Lead FTE, the Groundfish Training Coordinator and all Trainers).

In addition to current training requirements and protocols, this section should also be responsible for examining novel training techniques like webinars, skype conferencing, etc. and be able to adapt appropriately in the transition to electronic logging and, perhaps, Electronic Monitoring. An early challenge for this section would be to streamline ASM and NEFOP training to avoid any duplication (this is discussed later).

Data Handling Section

This section should contain all staff who are engaged in data entry, data checking and editing, observer debriefings, data interrogation, database operations and IT issues. It would encompass the positions and staff associated with the current Database Lead, Data Quality Lead, Data Processing Lead, Data Editor Lead and all Data Editors. Note that the Electronic Data Collection Lead should (at the current time) not fall into this group but be part of the Operations Section discussed below.

During the process of this review, many internal and external interviewees indicated that, while most staff in the FSB were fully- or even over-worked, there was one group of staff that were probably underworked – the FSB's contracted Data Editors. In particular, it was felt that there were inconsistent levels of work among the Data Editors, with some fully occupied and others much less so – even to the point where some are provided the

opportunity to do small "side-projects" that are not core business of the branch (e.g. working up data on particular species and/or gear types). There was mention that, on occasion, Data Editors were actually less experienced than the observers they were working with, and that information/advice provided to observers sometimes differed among Editors. Such issues are important from an internal resource-use standpoint but also important from an external view – as observers notice such inconsistencies, talk among themselves about them and also to fishermen – who can then exacerbate the problem further and undermine the credibility of the program.

The solution to such problems will include a shedding of some of the Data Editor positions either by reducing numbers of full-time staff or reducing those numbers at times of the year when the workloads are low. Workloads among the Editors should be distributed more evenly and restricted to the core operations of the branch – not side- or "pet" projects which, if not core business, should be discouraged. Further, the information and advice provided to observers by Editors should be checked for relevance, consistency and accuracy. One way to assist in this regard, is to have Editors do regular (once/quarter) actual observer trips (not just trip training certification trips) to keep up-to-date with activities at sea.

A clear need was identified by many staff for greater IT and database support within the FSB. This is due to the growing reliance on technology in the branch and observer programs in general. Currently this support is provided by occasional visits from Woods Hole IT people and "making-do" by staff at Tech Park. But database manipulation, interrogation and IT support in the FSB should be handled by a new, full-time, specialist. This person would take responsibility for producing data reports, "pulling data" for everyone at Tech Park, dealing with data requests from GARFO, Councils, Woods Hole, Universities, etc., developing and maintaining in-house data editing and data management applications, as well as tracking the progress of data through the cycle. This person would also assist with other IT issues at the FSB, in addition to (but not instead of) the current general IT support coming from Woods Hole. It should be noted that one additional position for such an important and growing role may prove to be insufficient but at least one should be recruited initially. (We discuss this position in additional detail later in this report.)

Operations Section

The Operations section of FSB would contain all FTEs currently with responsibilities for deploying observers. These coverages and fisheries sometimes change so the roles (and titles) of the staff in this section need to be flexible in terms of the fisheries, regions and gear-types they each are responsible for. The section would contain the positions and staff associated with the current Mid-Atlantic Lead, the Northeast Lead, the Groundfish Lead, the NEFOP Lead, the Industry Funded Scallop Lead and the Electronic Data Collection Lead. Whilst the latter position could probably also fit into the above Data Handling section, the flexible and embryonic nature of Electronic Reporting and Monitoring in the NE at the present time, and the fact that a great deal of the work done by this position over the next year or so will involve deployment work, warrants its inclusion in the Operations section.

Like the other Section Leads, one of the existing FTE positions should be recruited to be the leader of this section (the Operations Lead). Interestingly, 7 years ago the current Branch Chief was in a role similar to this position but when she became the Branch Chief, the two

roles were fused. This worked well for some time but, as the branch has grown, this situation is no longer tenable.

The leader of this section should be given responsibility for being engaged in (and/or further delegating his/her staff to be engaged in) the various external committees and processes that occur in the NE that traditionally have been handled by the Chief. That is, the Operations Lead position (and its direct reports) should be heavily involved in appropriate Council meetings and sub-committees, liaise with GARFO and Woods Hole over legislative amendments, and take a lead role in the new (and high priority) Fisheries Dependent Data Committee – not only to represent the FSB as a service provider but to contribute to broader discussions regarding observer work, industry liaison, patterns occurring, or that may occur in the industry, other fishery-dependent data activities, etc. That is, the expertise of these fishery-specific leads (given the fact that they are very close to the on-ground operations of the fishing industry) should be harnessed more effectively by NOAA via their engagement in activities that are external to the branch itself. These staff are at the front line of customer service for the Center and are very good at it – more should be made of such expertise – a situation that would probably also be welcomed by those individuals involved. Whilst this expansion of the role of the Operations Lead and his/her staff would seem to be an increase in workload for people who are already extremely loaded, there are certain functions that should be taken from these staff and given to 2 new FTE positions (a Contract Procurement/Accounting officer and an Executive Assistant - see below).

In terms of the Mid-Atlantic Lead, it was mentioned that travel restrictions preclude the position's interaction in that region. Yet, one must question why this position is not actually based in the Mid-Atlantic. Depending on available resources, it would probably be most efficient to move this position to either Sandy Hook or, due to logistics, to Cape May, as a "satellite" office of the FSB. This would resolve several other issues identified in this review in terms of the quite different nature of fisheries in the Mid-Atlantic including the significant needs of the Protected Species Branch in that region.

Additional Changes

Some of the existing tasks done by the FTE staff in the FSB should be re-allocated to other staff in other sections as part of the overall restructure. For example, the Database Lead FTE currently handles the PTNS system (due to history) yet clearly this is an operational task that should be allocated to the Operations Section. Many other minor tasks like this need to be re-allocated when establishing the new sections.

Many of the FTEs in the FSB currently deal with contracts of various types (it was said that approximately 30 such external contracts exist). These include contracts with observer provider companies, temporary Tech Park staff (through Integrated Statistics), IT equipment providers, Observer equipment providers, EM providers, training vessel providers, etc. All such contracts carry significant administrative and accounting burdens (often more than 1 day per week per person) and are currently handled by senior FTEs (mostly in the Operations area), but all of whom have little (if any) professional expertise in contract negotiation, procurement and accounting. The branch therefore should engage one additional FTE (who would report directly to the Chief) who is a specialist in accounting and contract negotiation/execution. The existence of such a position should significantly reduce the administrative workload on the operational fishery-specialists, and free them up for

their above-mentioned (additional) engagement in processes external to the FSB (including the FDDC).

It is worth noting here that one of the first tasks for this contracting specialist will be to deal with certain issues that exist with the main provider of temporary contracted staff at Tech Park. Currently all the in-house contractors in the branch technically report to Integrated Statistics which is actually off-site and apparently rarely visits. This causes problems in terms of reporting lines and the appropriate supervision of staff. Therefore, as part of any renewal of such a contract, such problems should be addressed, by requiring the establishment of clear reporting lines and the regular (at least once or twice per month) visit to the site by representative(s) of the provider company.

Another task for this new position will be to negotiate with the Observer Provider companies. We were advised by many stakeholders of significant issues associated with such contracts, one of which involves the large amount of time spent by FSB staff in dealing with accounting processes.

One final inclusion to the structure of the branch should be an Executive Assistant position to provide support for the Chief and senior staff. An unfortunate set of circumstances has led to the current situation where this role is currently filled by a temporary employee which greatly curtails the ability of the position to do tasks that technically can only be done by a federal employee. As a result, many of the tasks that would normally be done by an Executive Assistant (e.g. site security, facility management, international visits, maintenance, cars and boats, etc.) have been loaded on to senior operational FTEs – a far-from-ideal situation. The solution is clearly to resolve the current Executive Assistant situation and recruit such a person as soon as possible.

In summary

The above restructuring would (ideally) involve the creation of 3 additional FTE positions (a Contract Procurement expert, a Database/IT expert and an Executive Assistant). The existing positions should be restructured into 3 sections (Training, Data Handling and Operations), each with their own Leader that would come from existing positions – albeit at an increased pay scale commensurate with responsibilities. The whole group should be (ideally) organized into a stand-alone Division with a Divisional Chief.

Communications

There exist several issues regarding how the FSB communicates internally, with the rest of NOAA, and externally with outside entities. Taking each in turn:

Internal Communications:

One of the preferred mechanisms for communication within the FSB involves email (and more recently google chatting) – even when the staff communicating are within yards of each other. Whilst email has its advantages (in terms of keeping records, allowing people to respond in their own time, etc.), its overuse can lead to confusion regarding content, staggered, disjointed "conversations" and reduced two-way personal interactions - which remain the best way for our species to discuss things. Greater personal interaction within Tech Park should be encouraged among all staff and especially when senior staff are interacting with their staff.

The review team was very surprised to learn that there currently existed no formal, regular (i.e. monthly) meetings of senior staff within the branch. This is highly unusual for a team of this size and diversity. The Data Quality Lead hosts regular meetings about data quality but because they are the only meetings, staff attend these to discuss all kinds of issues, making them default, but not formal, FSB meetings. As a result, information tends to be spread throughout the branch in a piecemeal fashion, often via email.

There really should be formal, minuted monthly meetings of all senior staff in FSB (chaired by the Chief) to discuss the range of issues that arise in and outside the branch. There should also be occasional attendance by temporary staff, observers and contracting companies on a needs basis for appropriate agenda items. Further, senior people from Woods Hole should also attend as often as possible.

We were advised that there exists a dichotomy in the FSB between permanent FTEs and the contracted temporary staff- where the latter feel disenfranchised due to being on lower pay, having different working conditions, etc. For example, several of the contracted temporary staff at Tech Park were not happy that FTEs work from home occasionally. We were also told that communication can be variable and sometimes difficult with the senior FTEs. We even received feedback from some temporary staff who felt that our review schedule had been "sanitized" to avoid us talking to active observers - we ensured that this was not the case.

Whilst not a great deal can be done about the above perceptions (whether they be based on fact or not), nor about industrial issues caused by the different awards and contracts, certain improvements can be adopted in the workplace to alleviate such ill-feelings. These include office/workspace allocations, engaging temporary staff in internal and external meetings, social events, etc. (and we acknowledge that the latter do occur). However, it is worth noting that dealing with such problems is very important for this branch. Allowed to fester, such perceptions can be quite quickly blown out of proportion should observers and/or Data Editors interact and complain about such issues to the fishing industry.

Currently, many observers in the program feel underpaid, dispensable, unloved, and when at sea, are often treated poorly by fishermen. However, they should be highly appreciated

by government and those companies that employ them as they are doing what is one of the most important (and hardest) jobs in the NE's fisheries and one which feeds most other areas of NOAA's operations in the region. The FSB (and NOAA more broadly) would benefit from having better "in reach" processes to educate observers in how their vital work is being used. This will not only encourage them personally but will also tool them up to discuss the benefits of their work with fishermen. It is a fact that (everywhere in the world) observers talk to fishermen more than anyone else involved in the administration of fisheries – they are, after all, with fishermen in small confined spaces for very long periods of time. What observers tell fishermen can have a huge bearing on the attitude of the fishing industry to government and such interactions should be utilized by governments to the maximum benefit.

Communications within NOAA:

In general, the vast majority of feedback we received regarding how the FSB communicates with other parts of NOAA was very positive. It was stated time and again by most people that the senior staff of the FSB liaise extremely well, promptly and professionally with their counterparts throughout the agency. There were, however, a few issues that may require attention.

Communications with Woods Hole

Physically, Tech Park is only 15 minutes away from Woods Hole yet we received consistent comments that there is a significant schism between staff at the two locations. Scientists at Woods Hole who use the Observer data all stated that they wished the FSB were nearby (when we stated that 15 minutes is nearby, we were usually met with silence!). In any case, even if FSB was located at Woods Hole, there would probably still be communication issues - it is an unfortunate feature of most scientific agencies (where closeted personalities and behaviors can predominate) that direct and easy interactions among individuals are difficult to encourage. Having groups separated by stairwells can be just as difficult to overcome as being separated by a beautiful 15 minute drive. Despite this, it is clear that there is insufficient room at Woods Hole for all and, for whatever reasons, there are inadequate physical interactions between Woods Hole staff and those at Tech Park.

But these geographic issues could easily be overcome with some simple effort by the relevant staff. For example, we identified the need for greater oversight by the Divisional Director of FSB, augmented by frequent and regular visits to the branch. The regular monthly FSB meetings mentioned earlier would provide one such forum.

Another forum for such interactions (at officer level) involves Observer Trainings. Currently some Woods Hole staff give presentations at trainings – which is very well-received. But such interactions could be increased and should (ideally) also include GARFO managers and even Council staff.

Engagement with the Fisheries Dependent Data Committee (FDDC)

The Fisheries Dependent Data Committee meets monthly and is responsible for coordinating issues concerning all NOAA's fisheries dependent programs. Changes to these programs generally come from changes in regulation, and new sector management arrangements for groundfish have significantly increased their number. All such changes need to go through a proper change management process which now falls under the

responsibilities of the FDDC. As a consequence, it is very important that the FSB be fully engaged with this particular committee on a regular basis.

At the present time the FSB is mainly represented on the FDDC by one of the Branch FTEs. But many participants in that committee felt that more engagement by the FSB would be beneficial for the work of the group and also for the FSB. Indeed, it would be ideal if the FSB is engaged in the FDDC in something of a leadership role – not merely as a service provider. That is, while FSB should maintain their current responsiveness to requests from the committee, their expertise and experience working at the front-end of industry-based data collection means that they are ideally placed to contribute to decisions on what can and should be done - not just simply accepting the demands of others. For example, there are many people in the NE (observers, fishermen, scientists and managers) who believe that there are many uses for observer data that are currently not being fully realized. FSB staff should be in an ideal position to identify such uses and communicate them to appropriate scientists using the FDDC forum. One logistic comment that we received which may facilitate such interactions involved rotating the physical location of the monthly FDDC meetings.

Another possibility for better integration of the Observer program with other fishery-dependent data collection programs may be to re-invigorate the former in-person meetings/gatherings of all NOAA field staff (observers, port samplers, enforcement officers, etc.). Having an occasional gathering of such people (just once every few years) where they could meet and share information should be beneficial for all involved in terms of exchanging intel and trends in the industry, as well as developing more informal contacts among staff during the regular year.

Fisheries Management Communication

The NEFMC has fishery-specific Management Plan Development Teams comprised of managers, scientists and staff from the FSB. And the MAFMC has (slightly different) Fishery Management Action Teams. All people interviewed about these relationships indicated excellent participation of the FSB staff in these teams which, most importantly, involve the senior FTEs (i.e. the actual Operations Leads). Outside these formal teams, GARFO Fisheries Managers also brainstorm with senior staff from the FSB when new exemptions and regulations occur.

Whilst these teams work well, there were comments raised concerning a need for FSB staff on the teams to advise their superiors in the Center about changes that are being developed in the teams. Apparently there have been occasions where the teams work on, and are ready to implement, changes (in response to a changed regulation or Council resolution) but the changes are halted at a higher level (either in the Center, GARFO or at Council level) due to other circumstances not appreciated or understood by less senior staff. An example was an apparent disconnect concerning the call-in requirement for butterfish in the squid fishery compared to SBRM requirements. After months of development by staff, the proposed changes fell over due to reversals at a higher level, which led to consequent embarrassment at the Council. Another example was changed data collection protocols in the FSB which could have been better communicated to scientists at Woods Hole before they were implemented. Clearly better vertical communication on the management teams upwards throughout the organization would alleviate such problems and could, for example, be quite

easily dealt with at the suggested monthly FSB senior staff meetings mentioned above – especially if those also included senior Woods Hole staff.

Headquarters Communications

Comments from NOAA Headquarters staff were also, in general, quite positive regarding the FSB and its interaction. However, there were a few issues worth noting.

Headquarters staff sometimes detected a certain disconnect between FSB, GARFO, and Woods Hole. That is, instead of receiving a cohesive response from the region in relation to an issue, they felt that the initial response received (often hurriedly) differed somewhat after the response has been checked, fully thought-through and vetted. They see internal communication problems within the NE as the cause. For FSB-related matters, such a situation may be due to the FSB's "can-do" responsiveness which leads to quick and sometimes premature answers being provided. Better adherence to defined communication chains throughout NOAA should rectify such situations.

One recommendation from Headquarters concerns the need for greater contact between the Alaskan and NE programs as it is felt that there are areas where both programs could learn from each other. We consider it important, however, that such contact not be just at the highest level– but also at lower levels (i.e. at least involving appropriate senior FTE staff in the FSB) to ensure that the information exchanged includes practical matters and solutions. It is noted that the facilitation of such contacts should reside within the responsibilities of staff at Headquarters.

External Communications

Virtually all people interviewed that were external to NOAA were unanimous in stating that their interactions with the FSB were excellent, rapid and professional. Many of these communications were directly with the Branch Chief, clearly showing how that position's time is dominated by external dealings. As is the case with other aspects of this review, however, a few issues concerning external communications arose.

One matter that should be relatively easy to fix concerns about the overall tone used by the FSB in mailings to fishermen. It was noted by fishermen's groups that the tone used in letters was unnecessarily "formal and testy" and could, with little effort, adopt a "softer" tone. For example, we saw a letter being drafted and signed off by a relatively junior temporary staff member to accompany the observer data sent back to a fishermen following a trip. Our impression is that such a letter should be signed-off by a senior member of staff and be a more appreciative, "thank you", sort of letter. Adopting such a practice would definitely not hurt the relationship between the FSB and industry.

Clearly FSB already undertakes a significant amount of outreach to fishermen and sector managers and these interactions appear to work very well. Only a small number of the fishermen interviewed indicated that they had problems with the FSB and, of course, more outreach and communication with industry is always asked for. But we believe FSB do an admirable job in achieving the current levels of outreach given the resources available.

Some comments arose indicating that the Fisheries Management Councils (and the FSB itself) would benefit from a greater involvement of FSB staff at meetings of the Councils and their sub-committees. However, we were also told that apparently certain travel

restrictions can preclude such engagements. Whilst we are unaware of the internal issues of federal travel approvals throughout the NE, such travel for senior staff in the FSB (under the proposed structure above, this would include the Operations Section Leader and his/her staff), as well as the proposed Mid-Atlantic satellite office (also mentioned earlier), should allow the Observer program to run more efficiently and become even more responsive to its key stakeholders.

In terms of other, non-industry, external communications, the FSB has an excellent relationship and mutually-beneficial interaction with the Massachusetts State Fisheries Department and their observer program. They share observer deployments, software and databases (with the only problem being when Massachusetts Fisheries lose access to the database it can take weeks to get it back - which should be easily fixed). The relationship has been built up mainly through personal contacts to the point where (in contrast to everyone else interviewed), staff at Massachusetts Fisheries like the FSB's flat structure because they currently have direct personal access to the Branch Chief (in an ideal situation, such an interaction should be with the appropriate Operations specialist at FSB).

We also learnt of the North Carolina Observer Program which is becoming quite large. We feel that FSB should continue to collaborate with this and other state programs under the goal of increasing coverage levels and to augment the data obtained by the federal program.

Data collection, Databases and Data Flows

Data Collection

The types of data collected by observers in the FSB's programs are large in number, wide in diversity and are constantly increasing. This places significant strain on the observers at sea but also on the back-office tasks needed - in terms of training, data entry, data checking, maintaining databases, administration and, ultimately, the full costs associated with running the program. During the course of our review we learned of several issues that require attention in terms of the data being collected, the data that actually needs to be collected and rationalizing the two.

We regularly heard (from fishermen, observers and others) about the repetitive collection of data concerning items that: did not appear to be of particularly high priority; that could be collected by other means; or that rarely changed. Examples included: data on sea-surface temperatures, wind speeds, wave heights (which many suggested can be obtained more accurately from other NOAA datasets), the dimensions of trawl doors, lengths of scallop dredges, sizes of meshes, numbers of cookies in sweeps, etc. (which rarely change), data on retained catches of species (which are recorded on VTRs and port landings records), and otoliths for ageing purposes (which may be more efficiently sampled at the dock – at least for retained fish). Further, it was felt that some data derived from interviews with fishermen was inaccurate (eg. economic and cost information). The net result is that fishermen have trouble understanding why such information is gathered and so reduces the credibility of the program in their eyes.

Ideally, a separate, detailed review should be done of the efficacy and priorities of the many types of data being collected. That is, a helpful analysis would be to assess the time required to collect, enter, check and analyze certain information and to weigh this against the value of the data in terms of its end-use. Such a review may, for example, detect certain functions currently done by observers that could be done by alternative means (like the above physical measurements of sea state) or by one-off, short-term, targeted programs on particular issues. That is, not all the data may need to be collected all the time.

Two other issues that arose which are noteworthy are:

- We were advised that Data Editors, when checking the data, may, for various reasons, label particular tows as "unobserved". If this is the case, then this could lead to underestimates of catches and perhaps inflated discard estimates of species versus retained catches of target species. If this situation is occurring, the end users of the data (Woods Hole population dynamicists) need to be aware of the issue.
- Some trawl fishermen were concerned about observers gathering data from the last tow of a trip which is often done to wash out the net - ie the codend is left open. Fishermen see this as an error as the gear is not actually fishing and they are concerned that the data are being treated as an additional deployment, affecting estimates of catches and discards per average tow.

Databases and Dataflows

The Observer databases are jointly managed by FSB and the Data Management Systems Division (DMS). There is much to admire about this system. The data are stored on a centralized Oracle system that is well maintained, regularly backed up, well documented (including a data dictionary and historical record) with well-managed standards, security and license agreements incorporated into access rights. There are, however, certain issues with these databases and the branch's dataflows:

- The co-management strategy of the system was designed to blend the biological expertise of the staff in FSB with the technical knowledge of the IT specialists in DMS. However, we have been advised that, over time, limitations in DMS resources have led to DMS only managing the primary observer database, leaving FSB to manage a number of secondary databases, reports and data entry applications – all of which have grown in importance over time.
- Although the FSB staff have done an admirable job of managing these additional IT needs, they are biologists by training and do not have all the expertise required to properly design and maintain databases, reports and applications to the standards required. That is, many of the FSB databases have been built on an ad-hoc basis and therefore may contain potential errors. Examples include:
    - Primary and foreign keys between tables are managed by hand;
    - Certain queries fail to adequately capture historical changes; and
    - End-users with direct access to the database tables create their own queries and get confused with their size and complexity.

  Such situations can lead to spurious outputs from the databases, depending on who has constructed the query.

- For end-users who do not access the database directly, concerns were raised regarding the 3 month delay in getting 'cleansed' versions of the data. For Protected Species and OLE staff, such a delay is particularly problematic.
- The history of the development of the FSB databases has led to quite a cumbersome (and costly) data entry cycle:
    - Observers submit electronic data, paper logs, worksheets, biological samples, and digital photographs;
    - Most of these are hand-entered into one of two separate preliminary databases – the groundfish and non-groundfish databases;
    - These are then verified against the original paper logs (and through interviews with observers) and edited;
    - They are then hand-entered a second time into the production database;
    - The data are then checked and edited again, this time against the preliminary database records and the original paper logs.
- To add to these duplicative processes, the electronic tablets have introduced a new problem where observers who prefer to enter data straight into the tablets fill out their paper logs based on what is already entered in the tablets. Since the paper copies are used as the original record, another area for data entry errors is introduced that cannot be checked.

- DMS only allows changes to the main database every 3 years - to reduce unnecessary changes, and possibly due to a lack of resources. Although this policy has contributed to the stability of the system, it creates problems when it comes up against the "can do" attitude of FSB staff. That is, in order to satisfy non-standard requests without changing the database, FSB has been forced to construct "work-arounds" involving tables and fields that were not originally intended for such purposes. This leads to tables containing data from side projects or other work, and then later confusion amongst those interrogating the database for different purposes. While FSB instruct their staff about such problems, such a situation is far from ideal.
- Finally, FSB have built and operate an impressive array of in-house applications. However, we saw a genuine need for experienced IT expertise to develop and maintain these applications and their reports. Examples include: the Excel/VBA application (built for data-entry and editing) is currently susceptible to problems due to a lack of automated record locking; Google documents and spreadsheets are emailed to FSB staff by provider companies to inform about which boats are taking observers, making the job of tracking observers difficult, inefficient and prone to error.

Based on the above issues, we make the following points regarding possible improvements to the databases and dataflows in the branch:

- NOAA staff in the region are currently working on the comprehensive Data Visioning Project – which involves taking a holistic view of the data being collected and rationalizing the various sources so that they align. Such a new system should resolve many of the problems identified above and this project needs to be expedited. Furthermore, FSB need to be as fully engaged in the processes of this project as appropriate.
- As mentioned earlier, we recommend FSB recruit a specialist database administrator/developer with experience in database administration, reporting and programming, and this person should work full time with the FSB data experts at Tech Park. This new position should also work closely with DMS to ensure that their security policies and standards are applied, and be allowed to make changes to the primary database when required (and approved by the FDDC) - not once every 3 years.
- A significant proportion of senior FSB staff time is occupied with handling external data requests. Whilst the granting of direct access to the database to certain end-users may reduce this workload, it could lead to information being incorrectly queried. We recommend building a data warehouse to meet most of the reporting needs of the branch. It should provide a timely, consistent set of reports designed to satisfy the needs of many end-users without requiring input from FSB staff. These may include "canned" editor and auditing reports, progress reports, and a public website to help deal with more general external requests. It should also provide a dynamic reporting tool that allowed users to easily drill into the data and extract more value from it. Such a warehouse would also ensure that the history of changes in the data is consistently maintained and appropriately incorporated into queries.
- As part of the roll-out of electronic data collection, the FSB data-cycle processes will need to be re-mapped. This process should be done by an experienced business

analyst working closely with FSB staff, should maintain the separation of the preliminary and production databases, and should eliminate duplicate hand-entry. Observers will still require notebooks for working on deck which can be used as part of the data validation process.

- The FSB data entry and editing staff are doing an excellent job of reducing transcription errors and some measurement errors. However, more attention could be given to observation error. One way this could be done is with the aid of Electronic Monitoring - which could not only be used to collect data but also provide a means to validate, monitor and train observers.
- Finally, all changes to data handling processes should be accompanied by an outreach program that provides information to end-users of how the FSB datacycle works and the data queries and reports that are available.

Electronic Reporting by Observers

We were very impressed with FSB's progress in developing Android tablet technology for use by observers to enter their data at sea. The vision is that this will greatly contribute to paperless reporting, improve accuracies, reduce data entry errors and reduce the need for data scanning, editing, verification and QA. The hardware and software we saw was excellent, very comparable to a similar system currently being rolled out in the huge Papua New Guinea Observer Program. It also contains a generic forms-building component that allows it to be flexible to new developments. The system is currently being used by many observers in the NE and very close to becoming the routine data collection tool for the program.

There is, however, alternative hardware being developed by DMS at Woods Hole using Windows. Apparently the last update on that development was a year ago with a possible completion date in 2017. But this compares to the FSB hardware which is being deployed right now (110 observers are using them with 33 to go). Because of the high observer acceptance and advanced nature of the FSB tablets compared to the DMS tablets, in addition to the fact that developments in such technologies proceed at a fast rate (i.e. by 2017, the technology will probably be more advanced than either), we believe that it would be more cost-effective for DMS to stop work on their tablet system and for the Center to concentrate on supporting the FSB tablet technology for full implementation into the observer program.

There remain, however a few issues to be considered as the new system is implemented including:

- As we saw earlier, some observers treat their formal paper data sheets as redundant and enter all data on the tablets first, then transcribe the data from the tablets onto the paper forms, which are then re-entered again at Tech Park. Further, any discrepancies between the two are resolved by taking the paper version as the most accurate. Clearly this could lead to significant transcription errors and such double handing should be stopped.
- Some dropdown menus on the tablets can lead to the odd keypunch error. This should be a simple fix using kickback queries, bigger fields for bigger fingers, etc.
- Going completely paperless is not ideal when working at sea and we feel that observers would still need their water-proof paper notebooks when they are working on deck and as a record for later checking if required.
- There were some complaints from a few observers about having to do data entry using the tablets as they see themselves as 'field biologists' and not "data-entry" clerks. But younger generation observers had no problem with this.
- The tablets need a tool for users to be able to add drawings to specific observer records as such drawings can be crucial for conveying information on unusual gear and the shapes of catch containers.

As mentioned earlier, the full roll-out of the electronic data tablets to all observers will necessitate significant changes in the way the data cycle is handled at FSB, particularly in terms of the duties and numbers of data entry and data editing staff. Such a re-organisation

should be informed by the separate process review recommended earlier and undertaken by a professional business analyst. This task should first document all current processes and data flows before producing revised processes under the new electronic data regime. In addition, it would be worth considering an examination of other tablet-based systems currently being implemented elsewhere (in particular in the Papua New Guinea Observer Program) to share problems and solutions.

Electronic Reporting by Fishermen

Before leaving electronic reporting, it is worth noting some of the uses of electronic reporting by fishermen in the NE as they may eventually impact on the Observer Program. These include the following:

- Massachusetts Department of Fisheries and the FSB employ a system to obtain information on mid-water river herring. With normal data flows, such information can take many days to come through to managers but instead, observers use the captains' VMS system to provide real-time information which allows managers to direct boats away from areas with significant quantities of river herring.
- In some fisheries, some fishermen are reporting their VTRs (Vessel Trip Reports) in near real time using the VMS system. Whilst it is highly questionable whether such data can be used for reporting on discards, for retained target species and retained bycatch species, such data should be as accurate as that collected by observers, perhaps reducing the need for observers to collect such data.
- A similar, but more thorough system is in development through NOAA's Fishermen's Logbook and Data Recording System (FLDRS) where fishers electronically record retained catches of target species, retained bycatch species and estimated discards. Some fishermen see an ideal future where such a system, in combination with (say) a 10% validation of footage using EM cameras, could yield a low cost, fishery-dependent data collection system which would replace a lot (but not all) of the data collected by observers. A smaller cadre of professional observers who are trained in all e-reporting, EM and conventional observer protocols would still be required to collect data not recorded or validated through such a system.

Electronic Monitoring using Cameras

As is the case in many parts of the world where Observer Programs have been operating for some time, the NE has been exploring the utility of Electronic Monitoring (EM) – which uses onboard cameras to record much of the data collected by observers. As in other parts of the world, there are many issues associated with the development and eventual roll-out of EM in the NE. The main ones are discussed below:

- The fishing industry are, for the most part, generally supportive of EM as a replacement for onboard human observers as they see it as a cheaper option. They also see it as more convenient because it means not having to organize and carry an extra person. They are mainly concerned that the implementation of EM is taking too long.
- The Councils are also interested in EM as a means of increasing sector-based coverages and as a way to allocate discard rates to individuals. Because of these areas of support, political pressure to implement EM is mounting and we have been advised that GARFO are currently working on an EM implementation plan and an associated cost assessment.
- Notwithstanding the above, there are, however, fishermen who are less supportive of EM – especially those with small boats who believe that they will have problems carrying the extra equipment.
- Most people agree that EM is more suitable for certain fisheries than for others. For example, EM works quite well in long-line, gillnet and trap fisheries (where catches tend to come aboard individually) but less well in trawl fisheries where large quantities of species are landed together in heterogeneous piles. For the latter, conveyor-belt technology for discards has been shown to facilitate data collection using cameras. We inspected one such installation in Pt Judith and saw how such a system can lead to reasonably accurate data on discards from a small trawler – albeit probably less accurately than that which a human observer could collect. Another application in the NE where EM may prove fruitful is in the herring fishery to monitor and quantify incidences of slipping.
- If, or when, EM is implemented as a routine data collection tool in the NE, one of the more appropriate groups to administer and organize the necessary contracts, roll-out and data systems, would be the FSB (another could be the group running FLDRS). The FSB has significant recent experience with EM trials, are experts in the collection of the data that EM collects, and have significant experience dealing with external providers. However, if this is the case, the OLE also needs to be heavily involved as EM is usually also used for compliance purposes.
- Several interviewees raised issues concerning EM that still required resolution prior to full implementation. These included clear delineations of roles and responsibilities among the players (NOAA, EM provider companies, the fishing industry), data and video ownership and chains of custody, cost-benefit issues, and the collection of information that cameras may not collect (e.g. length data on discards from trawls, interview-based data gathered from captains, data on the condition of Protected Species, etc.).

Despite the above, several pilot EM projects have been done in the NE and there is a great deal of interest from many parties to see NOAA move ahead on implementing it (in some way), sooner rather than later. And, as a starting point, perhaps an early mainstream application of EM in the NE could be quantifying the slipping issue in the herring fishery, before full implementation in more complex fisheries.

Costings

Several people we interviewed attached significant priority to getting accurate cost estimates for observer services. This came from most managers at GARFO, scientists at Woods Hole (particularly those in the Protected Species Branch), Council staff and fishermen. In particular, people wanted to know the entire costs associated with putting an observer on a vessel for a day so they could: (i) make comparisons with other programs; (ii) determine the cost-benefit associated with increasing coverages to improve accuracies and/or spatial/temporal coverages; (iii) for comparisons with alternative options to human observers, like Electronic Monitoring; (iv) assess how particular fund sources are being applied (eg funding for Protected Species coverages, Sector coverages, etc.); (v) identify how coverages (and therefore costs) are re-allocated as fishing effort shifts or is reduced due to management changes; and (vi) identify the number of sea days that may be fundable from alternative sources such as the industry itself or from NGOs who may be interested in augmenting coverages for particular reasons (such as Protected Species work, etc.).

All these reasons are valid yet the people who raised them seemed to be having difficulties in obtaining clear estimates of such costs. The reason given from FSB is because the full costs include a variety of non-deck (or back-office) costs that vary substantially within and between years. For example, the costs associated with such things as training varies greatly as observers undergo high turnover, the costs associated with data editing varies greatly as the experience of observers change, the costs associated with travel and waiting times for observers changes due to the vagaries associated with the PTNS system (see below), and the costs of administering all these fluctuates accordingly. All these factors change constantly throughout the year, and between years, yet are real costs paid directly by the FSB (not the observer provider companies) and all add to the total cost of putting a person on a boat. So, whilst one would be forgiven for thinking that the estimated cost per day should be simple to calculate, it is not.

We were advised that the FSB is working with the economists at Falmouth on providing clear estimates of costs, including associated uncertainty bounds and the numerous caveats and assumptions involved. We recommend that this work be completed as soon as possible so that the stakeholders requiring these estimates can gain some appreciation of such costs but also the complexities that contribute to them.

Observer Provider Companies

The FSB interacts with three main observer providers and, whilst some organisations have problems with multi-contractor systems, most would agree that the competition provided by adopting an outsourced, competitive system is a sound model that should be more cost-effective and efficient than one operated solely by a government department or a single provider. However, our review revealed several issues with the system in the NE. These chiefly concern differences in the working conditions, efficiencies and experience among the provider companies and these are causing quite significant problems in the operation and costs of the entire program.

Perhaps the most worrying issue concerns the very high turnover of observers. Examples given to us were that, in one ASM class 3 years ago, 18 people started and only 2 are now left (one of whom is a coordinator). Whilst in a NEFOP class 2 years ago, 22 started and only 3 are left (2 of whom are coordinators). That is, after the successful training of 40 people by FSB, only 2 active observers remain. Reasons cited for such high turnovers included dissatisfaction with pay, frustrations with not getting on trips, and variable working conditions under the different providers (in terms of health plans, holidays, scheduling, bonus structures, etc.).

Such high turnovers mean more inexperienced observers on boats, reduced data quality, increased time (and money) needed for data checking and quality assurance, and more time and money for training new observers.

In terms of travel costs for observers, we were surprised that this can be up to 60K per month. Like training and editing, this is a cost that is borne by FSB - not the provider companies – meaning that there is no incentive for providers to locate their observers better or more strategically.

The fishing industry in particular were scathing in their criticisms of one or more of the observer provider companies, citing issues such as a general disrespect from staff when interacting with fishermen and variable performance and professionalism. Such perceptions and their continual discussion are causing all kinds of ill feelings in the NE.

Clearly the above issues are costing FSB significantly and need to be resolved as soon as possible. It is therefore timely to review the current contractual arrangements that FSB has with the observer providers to reduce observer turnover and travel time and, generally make the government/provider interaction more streamlined and cost-effective.

Observers versus At-Sea Monitors

During the course of our review we heard a great deal about the two types of observers in the NE - NEFOP observers and At-Sea Monitors (ASMs). The latter were established to work in the Sector management system. We learned about the reasons for the demarcation, its history and the many issues that the two systems have had for the FSB. The following are some of them:

- The creation of ASMs arose from the Sector management system which required greater observer coverages for individual sectors over and above the coverages required by the more generic, longer-running NEFOP program. These additional coverages did not require as much data to be collected on a trip as that in the NEFOP program (i.e. mainly catch and discard information) which meant that a new cadre of observers could be used that would not be as highly trained as NEFOP observers, were not required to have scientific degrees and were not paid the same. Having ASMs was therefore seen as something of a cost-saving exercise, tailoring a group of observers to collect just the required data needed for Sector management purposes.
- As with most observer programs in the world, however, more and more tasks have been added to the ASM's tasks while on board, with consequent additions to the training required. This has now grown to the point where, we are advised, there really are few differences between the duties (and training) of ASMs compared to NEFOP observers. The main difference is that ASMs are not fully trained in dealing with Protected Species interactions – an issue that causes significant consternation for scientists and managers working in the Protected Species sections at Woods Hole, GARFO and HQ.
- There are separately-run training programs for NEFOP observers and ASMs, with different manuals and standards. They are administered by different staff in the FSB and, at around 17K per training, costs the FSB significant resources and leads to some unnecessary duplication.
- ASMs are remunerated differently and are quite heavily affected by the PTNS system's propensity for many day trips to be cancelled (see below). The consequence is that ASMs tend to have a higher turnover than fully trained NEFOP observers which, in turn, leads to more time and money being devoted to the training of replacements.
- The fishermen we spoke to have a lower regard for ASMs compared to NEFOP observers because they see them as more temporary, less skilled, less experienced, and less safe onboard. They also see little difference in the actual data that is supposed to be collected by the two types of observers and make something of a joke of the fact that there exist the two tiers. This is unhealthy for the overall credibility of the program.
- Further, according to the Association for Professional Observers, the existence of the two systems undermines national standards for observers, standards that apparently do not recognize the delineation.
- ASMs themselves have issues with the delineation as they feel like 2nd class workers and, for at least one (who later became a NEFOP observer), he felt like he could have more effectively been used while working at sea. That is, he felt that "since I was

already at sea, on a vessel, being a pain to fishermen, I might as well collect all the data I can – irrespective of the status of observer I am".

- Several people suggested that the quality of data collected by ASMs was, in general, of a lower quality than that collected by NEFOP Observers. That is, besides not gathering information on injuries to Protected Species, etc., the actual discard data collected was said to be of a lower quality – possibly because ASMs were, in general, less experienced than NEFOP counterparts. This has consequences in terms of the overall accuracy of the data as well as costs for the additional time required for Data Editing and checking, and keeping the two data sources separate.
- The issue concerning ASMs not collecting Protected Species information is particularly important because such interactions are so rare that collecting biological data on every interaction is vital for Protected Species scientists and managers. ASMs simply do not do this as well as NEFOP observers because they are not trained to, not paid to, nor expected to.

So, the situation now is that there appears to be little difference between ASMs and NEFOP observers in terms of their respective duties on board, qualifications, training and provisioning. Yet, the existence of the two systems is costing the FSB significant time and money in administering and training those involved. Whilst the training demarcation is trying to be resolved by the current use of bridging courses, a cleaner, more generic solution would be to simply dissolve the two systems into one. We therefore consider it timely to consider combining the two tiers of observers into the one fully-trained cadre of observers who are able to fulfil all tasks required and not just a subset.

The Pre-Trip Notification System (PTNS)

The PTNS used in the NE is causing some significant problems in the deployment of observers, the overall costs of the observer program and the acceptance of the program by fishermen. The reality is, for the majority of the vessels involved in the NE (in particular the day boats), the PTNS system is not a "notification" system but a PTCS system (i.e. a Pre-Trip Cancellation System). This is because the default position for most fishermen is to advise the system that he/she intends to fish and then (more than 50% of the time) cancel the trip.

The system works like this: Depending on the fishery, a fisherman must post his intention to fish electronically on the PTNS 48 hours prior to fishing and, through an algorithmic process, the automated vessel selection leads to the fisherman either being issued a waiver (so that he/she is not required to take an observer on that trip) or is assigned an observer for the trip. The system then distributes the sea day assignments to each of the three observer provider companies. For multi-day trips, there is seldom a problem with the system, because these trips may postpone a day or two (due to weather or some other factor), but generally sail as planned. However, the fleet is dominated by small day boats (about 80% of all trips). And because there is no flexibility in the selection or assignment of observers, a captain will generally post his intent to fish for several days in a row, not necessarily knowing which of those days he will fish. Weather (most fishermen do not decide to go fishing until after the 6pm weather forecast the previous evening), prices, mechanical problems, family issues, and many other factors affect his decision to fish or not. But the inflexibility in PTNS means that he MUST give 48 hours' notice before fishing – otherwise he is not allowed to go. The result is that the fisherman might (and often does) get observers assigned for every day for which he has posted. The observers must then try to contact the captain to confirm that he will fish, and also ask where the vessel is tied up, where to park, etc. The captain is not required to return these calls and a good number of them do not. They often get so frustrated by the volume of calls that they do not keep up such correspondence (multiple observers from the different provider companies call them almost every day).

So the observer gets the assignment 48 hrs out, calls the captain, leaves a message, keeps trying and, if no response occurs, he/she must go to the dock. If the captain does not show up, then that is labelled a no call/no show and the observer gets compensated ($17/hr travel time, $25 per hr at the dock waiting time for 2 hrs - 1 before and 1 after the schedule departure time - plus 56 cents/mile he/she has driven). If the captain cancels at any time (even right up to departure time), the observer gets nothing. Because there is such a high rate of trip cancellations among the day boats (more than 50%), this results in a great deal of lost work opportunities for observers (and provider companies), and significant costs to the FSB (all of these travel costs are borne by FSB separately – and not by the contracts with the observer provider companies). Further, good observers are a significant asset – they should not spend their time on docks waiting for phantom trips, while at the same time, forgoing other trips.

Fishermen also "game" the PTNS in order to get an observer when they want one and not getting one when they don't want one. This may occur if boats dial in for single day trips when in reality they intend to do multi-day trips. Further, captains may dodge a day with an

observer because the system has given him a waiver the next day. Also captains sometimes wait to see who calls before cancelling if they don't like the observer.

The system is quite complicated and can lead to confusion for multi-day, multi-species vessels. An example we saw while on board a large, multi-fishery vessel involved a discussion among the captain and senior crew about what they needed to call in as their target and whether they were in breach or not if they did or did not take an observer. That is, they were concerned that the system was locking their vessel into a particular fishery when they go out for 2 weeks or more and conduct opportunistic targeting.

The first "touch" with a fisherman for an observer trip is via the PTNS and, currently, is quite a negative one. It also appears that GARFO, Woods Hole scientists and others are all aware of these pitfalls. Whilst we offer no easy fix for this problem, a solution clearly needs to be identified as soon as possible as the current system is causing a sizable loss of time, expertise, effort and money as well as significant ill-feeling throughout the small boat section of the industry.

Clearly there is a need for a separate, detailed examination of PTNS in order to develop a more practical system. Suggestions we received included:

- An examination of the utility of the General Category scallop fleet (day scallop fleet) system where, once selected for coverage, a vessel has a seven day period in which to fulfil its observer obligation. This means leaving logistics to the observer and captain to work out in terms of what day is covered in that period. This reduces the number of phone calls that captains get from several observers; the observer would actually get to take the trip he/she worked hard to set up, and will allow for a more personalised initial interaction between the captain and the observer.
- Another possible solution is the Alaskan system which assigns an observer for a vessel's next x number of trips – regardless when they go.
- Another is to have individual sectors contract ASMs directly for the extra coverages required and run their own PTNS.

The Random Allocation of Observers

A set of issues arose during our interviews (mainly from fishermen) that concerned the way vessels are selected for observer coverage. These issues included:

- Concern that sending observers out on a fleet during the first few weeks of a season when vessels are 'searching' fishing grounds may bias discard estimates as compared to data collected during the rest of the season;
- Concern that the observer program avoids “unsafe” boats – which is seen to be “rewarding” such practices whilst “penalizing” vessels that are safe. We were subsequently advised that there are only 12 such vessels listed in the NE (out of 1200);
- Some fishermen noted that, from their perspective, some boats seem to get no observers at all, leading to requests for greater transparency around the boat selection process;
- There was also concern that, because fishermen know that the discard rate calculated from observed trips can lead to reduced quotas, they may fish differently to avoid discards when an observer is on board. Interestingly, NOAA social scientists found a significant bias in pair-wise analyses of data from observed vs unobserved boats and such biases may be causing over-confidence in stock assessments;
- Finally, with the groundfish fleet having reduced opportunities for fishing, there is concern from the other sectors about more observers being focused on their operations to maintain coverages.

Whilst there are no easy fixes to remedy the above, greater transparency and reporting on the vessel allocation process would alleviate many of these concerns. That is, there is a need (perhaps at the end of seasons) to produce metrics that explain the allocation of observers on vessels to assure stakeholders that concerns over random allocations are being addressed. However, this needs to be done without compromising the statistical design of the program and also respecting the privacy of individual fishermen.

A much more difficult issue to address concerns the differential fishing practices of captains when an observer is on board – as it is impossible for NOAA (or anyone else) to force fishermen to behave “normally”. Occasional studies of appropriate datasets on landings from vessels with and without observers (obviously this cannot be done for discards) can at least assist in giving an indication of the scale of the issue and whether it is of sufficient importance to warrant its accounting in stock assessments.

Specific Issues from Observers

Several issues arose during our review concerning the work and working conditions of observers in the NE. Some of these seem quite easy to remedy whilst others may be more difficult.

Communication with Fishermen

Perhaps the simplest observer-specific issue to remedy concerns the initial contact made between an observer and the target vessel. Currently, when this relationship comes out of the PTNS system, the observer is notified of a trip and boat but he/she only receives a contact phone number, without any name or alternative number. So, when making the initial call, he/she cannot ask for any particular person, nor drop a name, making the initial contact a somewhat awkward one – especially if the person answering the phone is the not the actual fisherman but his wife or one of his children. The result can be a poor first impression. So simply providing the actual name of the fisherman along with the contact number (as well as an alternative number) would start the entire observer/fisherman interaction for that trip on a better footing.

Species Verification Program

Another issue that may be quite simple to remedy concerns the Species Verification Program. This is an excellent initiative of the FSB that is currently being shared with the Alaskan program. It involves the submission of photos of fish every 3 months to validate observers' identifications of species. The issue for experienced observers is the need to do this activity so often. That is, we were advised that it seems unnecessary for observers who have been observing for years to submit photos just like somebody who has been observing for only a few months. A possible solution is that, perhaps once an observer has correctly identified a species (say four times in a row), he/she should only need to submit photos once a year or so instead of having to do repeatedly (at significant cost to the program in processing). The new Database specialist recommended earlier should be able to develop a reminder system along these lines.

Morale, High Turnover and Payments

Other issues that are more difficult to fix include the morale and high turnover of observers in the NE. We were told that morale is at an all-time low, with many observers either seeing the job as a stop-gap, one year (or shorter) one, while others leave after a very short time due to the toughness (and relatively low pay) associated with the job. As we saw earlier, such a short longevity causes major problems for the FSB including a lack of experience and professionalism, increased frustration among fishermen having to accommodate inexperienced people on their vessels, and a constant need to train new observers (few of whom last) at significant direct cost to the program. Further, and of significant concern, is the fact that fishermen repeatedly told us that this has greatly contributed the decreasing confidence they have in the program.

One of the factors that we were advised contributed to this low morale of observers and high turnover was a decision to go from whole day payments for observers to quarter day billing. This, naturally, led to a significant pay cut for observers and a consequent loss of experienced ones (we were told that the majority of experienced observers left the program

as a result). It has also contributed to significant ill feelings between observers and Data Editors (who apparently did not experience a similar reduction in pay). That is, whilst observers had previously been paid by the sea day (i.e. one rate per 24 hr period), the sea day has been cut into quarters.

Whilst these changes were brought in to save money, they may have led to a false-economy due to the need for the program to pick up large costs in additional trainings, loss of experience and expertise and a consequent reduction in the credibility of the whole program in the eyes of fishermen.

Another issue concerning payments concerned the dropping of the data quality bonus. It was stated that the effect of this was for an overall decline in observers caring about the quality of their work, an increase in incidences of incomplete data and sloppy calculations.

The solutions to these problems are simple but, at least in the short-term, may prove costly. That is, going back to the former system of full-day payments and data quality bonuses may lead to higher up-front costs, but much of this may be offset by higher retention rates of observers (and so less trainings – which are expensive), more accurate data (and therefore less money spent on Data Editing) and, more importantly, more experienced observers being employed and therefore the enhanced credibility of the program.

More Observer Issues

Other issues that were raised by observers concerned relatively detailed, individual issues and included some comparisons with the Alaskan program (made by observers with considerable experience in both the NE and NW). These included the following:

- At each training session, more tasks are added to the jobs observers need to do whilst on board. They felt that it would be beneficial to have an ordered list of priority tasks to complete (apparently this is done in Alaska). For example, gathering 100% of the data on groundfish would seem to be a higher priority than weighing all rocks and shells – perhaps visual estimates of the abundances of the latter (or a subset of tows sampled for such) may be sufficient if it means more complete data collection about groundfish.
- An apparent lack of randomness in the way subsampling is done where, we were advised, in the NE, catches are subsampled using buckets whilst in Alaska, the catch is divided into grids and random numbers are used to identify subsamples.
- Another concern was the accuracy of the data recorded where, instead of using significant figures (as in Alaska), we were told that NE Observers round off to 1/10ths.
- Also, there were inconsistencies in the work required of observers where, for example, they were told in training not to lift more than 50 pounds yet the special scales provided to them to use on board weighed more than this. While we are mentioning scales, it is worth noting that many fishermen (and others) were concerned about the need to carry and use such cumbersome scales, when much lighter, smaller (albeit perhaps less precise), dial-type scales are the norm in many other observer programs.
- Finally, fishermen's perceptions of observers can be damaging when they talk about observers being inexperienced, poor workers, sitting in the wheelhouse and not

actually measuring fish but just estimating or faking data, etc. Whether such perceptions are true or not is, obviously, concerning but the fact that such comments are made at all leads to bad feelings about the program and therefore poor overall credibility.

Additional Issues from the Fishing Industry

In addition to the numerous issues relayed to us by fishermen discussed in previous sections of this report, we also received commentary on several other concerns:

- In general, as is the case in most observer programs, the vast majority of fishermen do not particularly like taking observers on their vessels. They cite the inconvenience in organizing an additional person for a trip, captains often don't know the observer, have concerns over their safety, observers getting in the way of on-deck operations, observers bringing too much equipment onto their small boats (such as heavy scales), frustration with answering the same questions each time, a perceived increase in the "policing role" of observers, the costs of observers, concerns over how data on discards may be used, etc.
- There were also some concerns over female observers – where accommodating them can be difficult on a boat designed for men (with respect to bathrooms etc.) and the fact that some wives and very conservative/religious captains can have problems with taking a female out on a vessel.
- However, some parts of the industry had fewer issues with taking observers than others. We were told, for example, that herring fishermen generally are less concerned about taking observers than groundfish fishermen - apparently because herring captains are quite involved in the management process and understand the need for observer data. Also, squid fishermen (with their large boats) have few issues accommodating observers. And the scallop fishery is very supportive of the program – mainly because they make money every time they take out an observer.
- Some fishermen working in fisheries where cost recovery is occurring (i.e. the scallop fishery) feel that, since they are paying for the program, they would like the observers to collect more data that the fishermen are interested in, such as scallop disease prevalence, meat weights, basic biology of target species, etc.
- Many fishers would like to see more use of observer data for stock assessment purposes than, for example, the heavy weighting given to fishery-independent data.
- Some fishermen would like to see sector management taken further with individual sectors managing their own observer programs, providers and, ultimately, lead to boat-specific discard rates.
- Most fishermen would like observers to be given some discretion over certain data collection protocols, especially those that involve asking captains questions about items that rarely change (dredge lengths, mesh sizes, etc.).
- Some felt the observer program should become voluntary – in order to reduce biases caused when fishermen fish differently when an observer is on board.
- Finally, another suggestion was that, to save costs, consider using shorter-term (2-3 year) targeted, observer programs that are repeated every 10 years or so, instead of trying to continually do everything in perpetuity.

We believe that some of the above issues have merit. For example, the last point regarding small-scale, targeted observer programs is a model used in many parts of the world where costs of ongoing programs are problematic. Whilst such programs present challenges to stock assessment modelling (or at least lead to greater assumptions), such an approach often works well in small boat fisheries.

Another idea worth considering is giving some discretion to observers regarding the repetitive asking of the same questions about items that rarely change. Flexibility around such things can make a great difference to the attitude of captains towards the observer program.

Finally, trying to capture industry-based priorities for data collection in the program at periodic workshops (especially for those fisheries that are paying for observers) can lead to improved relationships and better quality data about species that are currently unavailable.

Enforcement Issues

Several important law enforcement issues surfaced during our review that are worth noting:

Refusing, harassing and assaulting observers

On occasion, fishermen break regulations associated with taking observers such as refusing them, harassing them or even, in rare cases, assaulting them. For such issues observers are required to report the breach – although sometimes they are concerned about repercussions from industry. When boats refuse observers, the initial course of action is to either undertake a formal enforcement case or, in most cases, start off with outreach activities by the OLE officer to the fisherman involved. We are advised that 80-90% of such issues are resolved via this outreach without need for a formal case. However, for the more serious harassment and assault cases, most become civil cases and, on rare occasions (2 cases in past 9 years), criminal cases can ensue - for example, for physical or sexual assault.

Whilst all these activities are serious, we were advised that there is some variation in the follow-up of OLE in undertaking investigations regarding them. It was felt by FSB staff, Council staff and indeed most fishermen we interviewed that there was insufficient support from OLE in chasing up refusal cases. That is, these groups felt that fishermen who break this regulation should be heavily penalized – and when they are not, this leads to those fishermen who do not refuse observers feeling unfairly penalized instead. A similar situation concerned boats that were deemed to be “unsafe” and therefore excluded from having to take observers. That is, there was concern from the FSB and fishermen that, despite a list of unsafe boats being provided to OLE, there appears to be little follow-up in policing such vessels, so that such vessels are “rewarded” by not having to take observers.

These situations improved significantly when the FSB were allocated a dedicated OLE staff member. Clearly this role needs to continue and, if possible, strengthened via broader OLE support of the above issues throughout the NE.

Compliance Monitoring by Observers

When the observer program began it was a scientific program but, as the program has increased it has, like most observer programs, taken on more compliance uses. These can cause subtle changes to the data collected – especially if fishers fish differently in the presence of an observer. Whilst there is an acknowledged need to keep the scientific aspects of the observer program separate from compliance and enforcement activities, such separation needs to be carefully managed so that it does not compromise the value of observer information for enforcement activities.

When observers witness a fishing regulation violation they are required to record it accurately but do not have to directly report it to OLE. Notwithstanding the above delineation between the scientific and enforcement roles of observers, it may be prudent to explore a process where such violations by particular fishermen (especially if they are regular breaches) are flagged for follow up by OLE – even if it means perhaps doing so in a future (seemingly unrelated) investigation so that the reporting observer can remain anonymous.

Summary of Recommendations

The previous pages contain a large amount of commentary, peppered with numerous recommendations regarding how to improve the FSB and its operations. In this section we summarize these recommendations according to those that should be handled within the FSB and those that require more complex, external attention.

Internal Recommendations

Structure

- Consideration should be given to making the FSB a division within the NEFSC, led by a Divisional Chief.
- The FSB be re-structured into three sections, Training, Operations and Data Handling. Each section should be led by a dedicated FTE Section Lead, directly answerable to the Chief and can be recruited from the existing cadre of FTE staff, albeit at a higher pay scale commensurate with the added responsibilities. One of these 3 senior positions would act in the Chief's role when he/she is absent, on a rotating basis.
- The Training section should contain all staff who spend the majority of their time running the training modules and include the positions and staff associated with the current Training Lead FTE, the Groundfish Training Coordinator and all Trainers.
- The Operations section would contain all FTEs currently with responsibilities for deploying observers throughout the NE and Mid-Atlantic. The actual roles will need to be flexible as operational priorities and coverages change. The section should also include the Electronic Data Collection Lead.
- The Operations Lead should be engaged in (and/or further delegate his/her staff to be engaged in) external committees and processes that traditionally have been handled by the Branch Chief. This would include the Fisheries Dependent Data Committee. Further, consideration should be given to relocating the Mid Atlantic Lead to either Sandy Hook or Cape May as a "satellite" office of the FSB.
- The Data Handling section should contain all staff who are engaged in data entry, data checking and editing, observer debriefings, data interrogation, database operations and IT issues. There may be scope to reduce some of the Data Editor positions at times of the year when workloads are low.
- Augment the above structure with an additional 3 FTE positions, a Contract Procurement expert (to handle all contracting and accounting issues), an Executive Assistant (to assist with logistic matters for the senior staff) and a Database Administrator/Developer.

Communications

- There should be formal, minuted monthly meetings of all senior staff in FSB to discuss issues that arise inside and outside the branch. There should also be occasional attendance by temporary staff, observers and contracting companies on a needs basis for appropriate agenda items. Senior people from Woods Hole and GARFO should also attend as required.

- Greater personal interactions should occur within Tech Park among all staff and especially when senior staff are interacting with their direct reports. Email and google chat communications for staff within the building should be reduced.
- Perceptions regarding inequities between permanent and temporary staff should try to be reduced using tools such as office/workspace allocations, engaging temporary staff in internal and external meetings, social events, etc.
- The FSB should develop better "in reach" processes (during trainings) to educate observers in how their work is being used. These should be augmented by staff from Woods Hole, GARFO and even the Councils.
- FSB representation on the FDDC committee should be a high priority and involve the Branch Chief, the Operations Lead and other senior staff as appropriate. These staff should adopt a more leading role in the Committee by contributing on what can and should be done - not just simply accepting demands.
- FSB staff and GARFO managers need to adhere to defined vertical communication chains so that their superiors are aware of the work occurring in the Fisheries Management Teams.
- Letters sent to fishermen from FSB (such as those accompanying data from trips) should be signed-off by a senior member of staff and take a more appreciative, "thank you" tone.
- FSB should continue to develop relationships with all state-based observer programs under a goal increasing coverage levels and augmenting the federal program's data.
- Greater contact and information exchange should occur between the Alaskan and NE observer programs as well as with other international programs – especially the Papua New Guinea program.

Operations

- Consider the utility of producing metrics once per year that explain the allocation of observers on vessels in order to assure stakeholders that their concerns over random allocations are being addressed.
- When allocating observers to trips (in the PTNS system), provide the actual name of the fisherman along with the contact number (as well as an alternative number) to start the entire observer/fisherman interaction for that trip off on a better footing.
- If, or when, EM is implemented as a routine data collection tool in the NE, a logical group to administer and organize the necessary contracts, roll-out and data systems, will be the FSB, with significant involvement of the OLE.

Data

- Consider a separate, detailed review of the efficacy and priority associated with the many types of data being collected by observers. That is, a risk analysis should be done to compare the time required to collect, enter, check and analyze the information against its end-use.
- Provide some discretion to observers regarding asking the same questions to fishermen about items that rarely change.
- In the Species Verification Program, once an observer has correctly identified a species (say four times in a row), consider allowing them to only need to submit photos once a year or so instead of having to do so repeatedly.

- Re-map the FSB's data cycle as part of the roll-out of electronic data collection. This process should be done by an experienced 'business analyst' working closely with FSB staff.
- Develop a data warehouse to meet the reporting needs of the FSB which will include "canned" editor and auditing reports, progress reports, and a public website to help deal with more general external requests.

Costings

- Expedite the current report concerning the costs associated with "an observer sea day". This should include appropriate uncertainty bounds as well as the numerous caveats and assumptions.
- Explore a cost-benefit study of re-introducing full-day payments to observers and data quality bonuses as a means to retain observers and so save costs of trainings, data editing, etc.

External Recommendations

Communications

- There should be greater oversight by the Divisional Director of FSB, augmented by frequent and regular visits to the branch.
- Consider the re-invigoration of the former in-person staff meetings/gatherings of all NOAA field staff (observers, port samplers, enforcement officers, etc.) once every few years.
- Consider holding a yearly workshop with the industry to identify fishermen's priorities for data collection from the observer program (especially for those fisheries that are paying for observers).

Operations

- Consider combining the two tiers of observers in the NE (ASMs and NEFOP observers) into the one cadre of fully-trained observers who are able to fulfil all tasks required and not just a subset.
- Review the PTNS system because currently it is being used as a PTCS ('C' for "cancellation") system by most day vessels, resulting in significant costs to the program and ill feelings throughout the industry. Perhaps explore the utility of the day scallop process or the Alaskan system.
- Consider an evaluation of the performance of observer providers to address the high turnover rates of observers which is causing reduced numbers of experienced observers and elevated training and editing costs.

Enforcement

- Strengthen enforcement support concerning unsafe boats and refusing, harassing or assaulting observers.
- Explore a process where violations of fisheries regulations by particular fishermen (especially if they are regular) are flagged for follow-up by OLE.

Data, Electronic Reporting and Monitoring

- NOAA's Data Visioning Project for the region should be expedited, and the FSB need to be engaged in its processes as fully as possible.
- DMS consider stopping work on the tablet technology currently under development and support the FSB tablets for full implementation as soon as possible.
- Consider an early test of EM as a routine tool to quantify the slipping issue in the herring fishery, prior to full implementation for more complex fisheries and issues.