

# **Developing a Methodology and Indicators for Evaluating Catch Sectors in New England**

**Workshop Summary Report**  
**MRAG Americas, Inc.**

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**Portsmouth, NH**

## **1 Background**

The use of catch shares as a fisheries management tool has become increasingly popular with legislative mandates to end overfishing, rebuild fish stocks, and develop Annual Catch Limits (ACLs) and Accountability Measures (AMs) for all fisheries. NOAA Fisheries has encouraged the use of catch shares in fisheries management through a National Catch Share Policy, whose stated purpose is "to encourage well-designed catch share programs to help maintain or rebuild fisheries, and sustain fishermen, communities and vibrant working waterfronts, including the cultural and resource access traditions that have been part of this country since its founding (p.1).<sup>i</sup>" Though despite the attention, both positive and negative, that the move towards output based management such as catch shares is receiving, there is insufficient effort underway to adequately monitor the effectiveness of these programs and their total cost to both fishermen and the government.

MRAG Americas and a University of Washington-led team of scientists convened a technical workshop of experts on New England's catch sectors in Portsmouth, NH on February 7, 2011. There are several catch share programs currently in use in the National Marine Fisheries Service (NMFS) Northeast (NE) Region (that includes New England and the Mid-Atlantic) The most controversial of these has been the Sector Program (similar to cooperatives) developed through Amendment 16 to the Northeast Multispecies (groundfish) Fishery Management Plan (FMP) (Amendment 16) and ultimately implemented May 1, 2010. The purpose of the workshop was to use that program as a case study from which to discuss ideas and develop indicators for evaluating that program that could also apply to assessing other catch share programs, namely, the Pacific groundfish ITQ system. Participants included the MRAG and UW team, NOAA Fisheries scientists and managers, New England Fishery Management Council (NEFMC) staff, Sector managers, conservation advocates and stakeholders both inside and outside the Sector programs. A similar workshop is being conducted in Portland, OR on February 21, 2011 using a case study of the West Coast ITQ Trawl Program developed under Amendment 20 of the Pacific Groundfish FMP.

The workshops are a component of a 6-month planning exercise to develop a durable and pragmatic system for monitoring and evaluating the performance of U.S. catch share programs, with an emphasis on the Pacific groundfish ITQ program and the New England groundfish Sector program. These two catch share programs are in the preliminary stages of implementation, and the project team is working to incorporate pre- and post-implementation social, economic, and ecological information. Discussion issues include: What are the goals against which we judge success of these programs? What is

necessary to monitor? What information already exists? Where are there gaps? The goal of this 6-month project is to develop a methodology for this investigation that represents multiple disciplines, diverse expertise, and a variety of regional and sectoral experiences.

## **2 Overarching Principles**

Throughout the day a number of ideas circulated repeatedly with respect to 1) evaluating management programs and 2) indicator development. These ideas are provided here as ‘overarching principles’ to inform development of an evaluation plan. This workshop focused on technical measures for consideration in evaluating catch share programs, though catch shares are only one tool available to fishery managers, and any fishery management tool should be regularly evaluated against performance measure criteria. Some indicators are specific to catch shares in general, or even to particular types of catch shares, while other indicators are useful not only for catch shares but for fisheries more broadly. This means that catch share programs can be evaluated not just against each other but also against other management regimes.

As a preliminary matter, the goals against which one would measure performance must be clear and established. One of the threshold issues the project team examined was whether catch shares should be evaluated only relative to the goals set out in each catch share program’s documents, or whether goals should be assumed to include underlying goals contained in an FMP (such as rebuilding) or in the National Standards. Discussion at the workshop was mixed on this question and further conversation about the scope and source of goals will occur at the Portland workshop.

Overarching principles to consider when developing indicators and evaluating catch share (and all management) programs include:

### **General Guiding Principles**

- Catch shares are one management tool among many, and all tools used to manage fisheries require evaluation and performance measures.
- The evaluation must be guided first and foremost by the goals and objectives of the programs under review; those goals and objectives come from a hierarchy of sources, including but not necessarily limited to Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) including its National Standards, the Administrative Procedures Act (APA), the National Environmental Policy Act (NEPA), the Endangered Species Act (ESA), the FMP under which the tool is implemented, the specific amendment or framework (if applicable), community desires and economic drivers, ecological concerns, innovation and competition. They may or may not be explicit in documents of the catch share program itself, and can be conflicting. Evaluation should also be explicit about the goals or objectives of the Moore Foundation, which is sponsoring the work. This is extremely important when developing objective indicators.
- It will be important to set boundaries for the study, to focus on the specific fisheries rather than examine larger questions of net benefit to the nation or non-consumptive values of special groups or the general public.

- Evaluations of catch share programs need to compare with realistic alternatives, which in New England were Days-at-Sea, with 24 hour clock, trip limits, etc., and proposed alternatives such as a “point system”.

#### **Establish a Baseline**

- It is important to establish a clear baseline for measurements, and to accept that this baseline will shift with data availability.
- There may not be consistent data collected to explicitly establish a baseline relevant to a “before-and-after” evaluation; there will need to be consideration in any evaluation plan on how to triangulate through this problem.
- Take caution with comparisons – construct means to compare before/after Sectors that help understand the relative contribution of various changes (ACLs, Sectors, overall economy, etc.), so that there can be proper context for change already occurring in the fishery with or without Sectors.
- There is likely to be difficulty in attributing certain changes (e.g. in the ecological metrics – particularly stock status) to the Sector program given the timing of Sector implementation and other management decisions.
- Translate issues, program elements, outcomes into quantitative/numerical indicators wherever possible. But recognize that not all outcomes are easily measured, and thus some room must be made for qualitative data.

#### **Data Considerations**

- When establishing indicators consider that there may be sources of data available outside of NMFS and the regional Fishery Management Councils (Councils), including studies not constrained by limitations against reporting on units where there are fewer than three entities involved. Ensure that confidentiality rules do not force aggregations of data that may mask significant information about outcomes and consequences.
- There must be caution taken with aggregation of data; averages can skew data and mask valuable trend information.
- Tools and strategies for collecting data for evaluation may vary depending on the issue, and can include both metric/objective data and subjective information elicited in surveys, interviews, ethnographic studies and documentary reviews. Data from outside NMFS and the Councils should be consulted where available, i.e., an evaluation need not be limited to NMFS data.

#### **Scaleability**

- The timescale over which indicators measure change is important and must be carefully considered. The time interval at which data are provided is also an important consideration.
- Geographic scalability is also important as data may not be provided at the same resolution, or may be aggregated at a greater geographic scale because of restrictions on confidentiality.
- Any measurements need to consider the timing of discussions and decision making for the evaluation to be meaningful and useful.
- Data and data analysis should be reported in time scales that are useful to managers and stakeholders.

#### **Socioeconomic Considerations**

- Consider socio-economic and ecological effects in parallel, particularly if the expectation is that economic benefits will only follow from ecological responses. The notion of “sustainability”

should incorporate both socio-economic ecological sustainability, and identify that there is some degree of interrelationship.

- Full accounting for economic and time costs of both fishermen and government has not been represented, and is a valuable aspect of a program evaluation.
- The well-being (social, economic, financial, health, etc.) of participants in the fisheries is essential in understanding the impact of management measures and should be captured in the indicators.
- Whenever possible, measures of variance as well as measures of means should be reported for socioeconomic data.

### **3 Data Considerations**

There was discussion during the workshop on data availability and current evaluation efforts underway. During this session the group discussed some of the potential issues with aggregating data to either illustrate means or comply with confidentiality requirements. Cautions regarding these issues are provided in the previous section. Sector activity is captured through dealer reports, vessel trip reports, fishing vessel logbooks, dockside and at-sea monitors, annual reports by Sectors and annual reviews of Sectors by NMFS. Select biological data is collected through the Northeast Observer Program and NMFS trawl surveys. Staff from the Northeast Fisheries Science Center (NEFSC) Social Sciences Branch (SSB) provided an overview of existing and future socio-economic performance measure data. There is also some degree of data reporting redundancy in the Sector program at present; these multiple reporting methods create problems for data reconciliation.

#### **3.1 Available data from NOAA**

Fishery data presently collected by NMFS includes fishing vessel activity comprised of seafood dealer reports (pounds and value by species), fishing vessel logbooks (area fished, time at sea, catch by species and port landed), vessel owner information (homeport, principal port, home address, and permits held). Socio-economic data includes ongoing collection of operating costs (observer sampled trip costs and survey of fixed costs), two 2010-only surveys (a job satisfaction survey for fishermen in general and a social capital survey of NE groundfish permit holders) and a rapid assessment of NE groundfish crew. New ongoing surveys to cover these areas are under creation, as described below.

The NEFSCSSB has been dedicating considerable effort to understanding the socioeconomic impacts resulting from the groundfish Sector program. This has involved studies with workshops and pilot surveys to develop social and economic performance measures and indicators to evaluate catch shares in New England and to assess industry's response to those performance measures (See Clay et al., 2010, and Mendelson and Joyce, 2010). While the initial focus of their work has been on catch shares, the performance measures and indicators will be used over the long-term to evaluate fisheries management programs in general. The SSB has recently conducted a mid-year Sector evaluation report (expected early spring 2011) that measures prices/landings/gross revenues, aggregate effort (active vessels, number of trips and days absent), average vessel performance (revenue per vessel, trip, and days absent - cost data will be integrated for year-end report), distribution of revenue by vessel size and revenue category, vessel level consolidation, and employment – with a current focus in crew.

In addition, the SSB is presently developing two surveys designed to provide data currently unavailable for some indicators that are part of the performance measures. In addition, ethnographic and other research are in process or planning to provide context and deeper understanding of the indicators, and for use in assessing impacts to individuals, firms (e.g. vessels, processors), households and communities. The two surveys currently in development are an owners/owner-captains survey and a crew survey (that will include hired captains). Key topics that will be captured in the surveys include: Standard population demographics (age, marital status, race/ethnicity, education, household size); primary fishery (defined by FMP and motivation); fishery demographics (homeport, primary landing port, crew payment system, years fishing, generations in fishing); involvement in fishery management and views on the management process; views on current management tools; family involvement in fishing and related industries; contribution of fishing to household income; job satisfaction; ease of entry for new fishermen; and trends in bycatch. The surveys are expected to be fielded sometime in 2012. While this data will be valuable, it will not be available in time to inform a before-after type evaluation that is the aim of the project in assessing the impacts from the change in fisheries management. A 2010 URI survey (partially funded by NMFS), however, captured some of the same elements and can be used to create a partial “before” baseline.

### 3.2 Missing Data

There was discussion among workshop participants aimed at identifying missing information that is not presently being collected. Below is the compiled list of what is missing, or at least would be important to look for and often hard to find in current NMFS data sets:

- Should identify a strategy to target information collection on the number of people who have left the fishery (sold permit vs. leased quota.)
- Evaluations need to consider the broader community impact.
- Employment data has not been well captured.
- General well-being including physical and mental health. (Well-being is one topic included in the URI survey described above, as well as the two new NMFS surveys under development.).
- Capturing general change, in resources (time), fleet structure, etc.
  - Changes in cost of fishing to individuals, processors, etc.; changes in daily cost, overall, and fixed/annual. There is a general lack of “cost” data in NMFS studies; it is very hard to get detailed cost data, and any ideal catch share program would require some such data provision from at least a sample of participants.
  - Change in time use due to new management technique (requirements for reporting and other tasks). This should include documentation of the kinds of things people have to do that they did not do before; shifts in responsibilities for monitoring, reporting tasks, and the costs of these shifts.
  - New personnel (required to keep up with new paperwork), ease in understanding new regulations (and frequency of new regulations). It will be important to distinguish between “one-time” transition costs to a new system and ongoing management and fishery costs after the change.
  - Changes by boat size, gear, Sector, port. Changes related to crew: how much crew turnover in a year. Many noted the importance of disaggregating as much as possible to capture information on the distribution of costs and benefits.

- In a new management regime - how easy is it for new entrants to access a fishery/how quickly are people leaving a fishery?

### 3.3 Alternative Data Sources

During the workshop we learned that there are additional sources of data (outside of NMFS) that could be useful during the program evaluation. One of the phases of the methodology being developed will consider the need for scoping to identify specific pieces and source of data available and their utility. Some of these sources will include:

- Academic studies
- NOAA Sea Grant studies/surveys
- Private data sources (Non-Governmental Organization (NGO), association, Sector)
- Census
- County, state, local government

## 4 Issues and Indicators

During the workshop the group considered a selection of issues and key questions to drive the discussion for identifying indicators. The issues and related questions were developed prior to the workshop through project team discussions and reviews of 1) current literature, 2) fisheries legislation, policy and regulations (Magnuson-Stevens Act, FMPs, Amendments, NOAA Catch Share Policy), and 3) strategies for the Moore Foundation Marine Conservation Initiative. Participants added definitions to the issues identified. These are provided below with indicators suggested in the workshop. During the course of the workshop, participants identified a large number of specific indicators that would be of value for any evaluation on the NE Sector program. A complete selection of potential indicators for measuring performance will be drawn from existing literature, interviews, project team experts, and both workshops (NH and OR) and provided in the final project report. There is likely to be overlap on the indicators suggested for the various issues, since specific variables can be used for multiple indicators.

Indicators should be designed to measure a change independent of analysis, that is, they should be non-normative. An indicator should provide an index of change that is objective and available for determining whether the trend—when placed in the context of program goals and objectives—aligns with the direction required for achieving one or more of the goals. Indicators generally can help people make judgments, and their objectivity is important to that process. Both the indicators study (phase 1 of the Moore Foundation project) and the longer-term evaluation (phase 2) can also be useful to management Councils, fishing associations, individual participants, and community organizations seeking to become better informed and through that to engage more meaningfully and constructively in the policy process.

### 4.1 Design

The issue of program design is intended to capture 1) the drivers for the process, 2) whether it was transparent and accessible, 3) where in the process does stakeholder involvement begin and continue, and 4) how people perceive both the process and their role in it. Questions related to this issue will consider if the program was designed consistent with the stated goals (that come from multiple sources). It was suggested that indicators assessed against the goals stated in Amendment 16 would be

a good starting point since that is where the NEFMC will begin their evaluations. Program goals could be further mapped alongside other sources of goals (as will be provided with the final evaluation methodology) to provide context for measurements. Appropriate program design requires time, deliberation, and full exploration of the management alternatives. Within the design, evaluation programs for any fishery management tool should be incorporated into design considerations at the earliest possible stage. There should be thorough consideration of potential management decisions and their implications to the entire fishery, where possible. For example, in a quota based catch share fishery this would include identifying what history was used to make the initial allocations of catch and how was it decided which period of catch history should be used.

Suggested indicators include:

- Transparency, stakeholder (including community) involvement
- Procedural history, documentation, record of decision
- Drivers for program adoption (overfished species, race to fish, pilot group allocation, ACL requirements, etc., pressures and incentives from interested parties, including ENGOs, foundations, NOAA leadership)
- Method for initial allocation, and likely initial allocation to each individual, did the program relay that to the participants?
- Roles and level of stakeholder participation: Attendance, change in participation
- Are people a part of the system – do they feel that they are considered to be - do they have an impact in the results?
- Process for approval and amendment
- Challenges (legal and political intervention); issues highlighted in lawsuits and political intervention; linkages, if any, to dissatisfaction with participatory process; etc.
- Tracking of public comments
- Alternative measures considered?
- Issues not considered during Council process; why not, and whether/how being addressed subsequently; accumulation caps; links between Sectors and area-based or community-based management proposals.

## 4.2 Effectiveness

Program effectiveness should include indicators that can capture if this was the right management choice with respect to the most effective and appropriate way to meet program goals. In current fisheries management, a change had to occur in order to meet mortality targets (ACLs), independent of the Sector program. It will be valuable to consider what would have ensued if a different management choice had been made (not one based on Sectors). Additionally there were two significant changes happening in the NE groundfish fishery at same time: the mandate for ACLs and implementation of the Sector program. The Amendment 16 Environmental Impact Statement should include some analysis of consequences. Program effectiveness will include any consideration of how to attribute change to the Sector program versus some other stimulus, and whether the program was effective at accomplishing goals – with careful specification of which goals. As noted earlier there are tiers of goals that guide fisheries management, these include *Sources of Authority & Required Goal Elements* (Magnuson-



Stevens Act, especially the National Standards, APA, NEPA, ESA, etc., FMP Amendments and Frameworks), *Non-Legally mandated Sources of Goals* (e.g. community desires, economic drivers, ecological concerns, NMFS and other agency policies, innovation, competition), and *Additional Sources of Catch Share Program Elements* (including catch history, expert guidance, local/fleet circumstances). These goals and elements can often be contradictory and indicators must be considered in light of the desired goals.

Suggested indicators include:

- Stock condition
- Selectivity/bycatch reduction
- Changes in capacity , efficient use of capacity
- Meeting/exceeding Total Allowable Catch (TAC)/ACL
- Gear changes
- Effort displacement
- New entrants (are they allowed? How easy is it to enter after the initial allocations are granted?)
- Changes in fleets/sectors/gears not in program
- Amount of data available for stock assessment
- Changes in buffers
- Changes in the relationship of catch to effort
- Ability of management system to be adaptive, conduct in-season management
- Change in business and investment certainty
- Shifts in proportion of management from NMFS to fishery participants, what was expected
- Changes in flexibility in fishing (number of restrictions, changes in procedures)
- Ease of enforcement and degree of compliance
- Changes in small boat fleet (income and ability to fish relative to large boats, relative proportion of total fleet, differential impacts of new paperwork, etc.)

#### 4.3 Sustainability – adaptability

Measurements of sustainability were initially intended to capture resource (biological) sustainability. This is the premise of National Standard 1 of the Magnuson-Stevens Act:

Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry. (16 U.S.C. § 1851(a)(1))

Though participants argued that sustainable fisheries include the human component and there is the need to use clear language when discussing sustainability. Common fisheries management objectives also include community sustainability, as advised in National Standard 8:

Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities. (16 U.S.C. § 1851(a)(8))



Therefore the group recommended expanding ‘Sustainability’ to include notions of adaptability and resilience. These encompass biological, ecological, community, fleet, business, and individual components. Participants noted that indicators relevant to this issue should include some evaluation of hard TACs. One means to evaluate sustainability may be to use human behavior as an indicator.

Below are some ecological issues surrounding catch shares (and all) fisheries, that can be developed into indicators to measure change. Ecological changes may most easily be revealed by looking at changes in mesh size, location, gear, vessel, landing locations. It will be important to consider how these might change through the Sector program. These are also important socioeconomic indicators of sustainability that human behavior can point to, e.g., effort, efficiency, health, changes in patterns of landing relative to residence.

- Changes in ecosystem values
- Stock status, F and B – more specifically, the proportion of stocks overfished, might be a good proxy, as might the proportion of overfished stocks that have recovered to reference points
- Question quality of assessments
- Changes in catch to quota ratios
- Track overages
- Habitat impacts
- Changes in gear used
- Threatened, endangered and protected species impacts
- Non target and target species landings and discards
- Impact of zero retention (Ocean pout, Northern windowpane flounder, SNE/MA winter flounder, Southern windowpane flounder, Atlantic wolfish)
- Choke species (e.g. Atlantic Pollock in the Northeast)
- Considerations of boat size, gear type
- Effort (total and time/space distribution)
- Landings over time, by gear type, location
- Discussion of fuel efficiency, ocean acidification, other collateral sustainability issues
- Changes in human behavior with respect to fishing operations – more specifically, changes in targeting practices (changes in mesh size, time / location of fishing). The best way to get at some of this might be through surveys of fishing participants.
- Changes in age structure of fish populations under catch share program
- General assessment of availability, use, quality and redundancy of data

#### **4.4 Socioeconomic Impact**

As previously discussed there is currently an effort underway by the NEFSC SSB to capture the socioeconomic impacts that have resulted from implementation of the NE sector program. This work has provided a clear performance measure plan with indicators. Using these indicators as a starting point will avoid duplicate efforts and build on existing work.

A wide array of topics for consideration as indicators of social and economic impacts came from the discussion. For instance, an assessment of socioeconomic impact must consider mental and physical costs to fishermen and their families, and the well being of the impacted individuals, households and communities. In general, given that many factors come into play when trying to understand economic impacts at the community or fleet level (the downturn in the national economy, past and current trends in fleet consolidation, ACLs and Sectors) it may be difficult to identify causality:

- In regard to utility of disaggregation by gear type, boat size, geographic location; measurements should use the place-based definition of fishing community provided in the Magnuson-Stevens Act, but not be constrained by it (noting that section 303, for instance, allows analysis by such non-place-based communities as gear group, target species, etc).
- There must be careful consideration in selecting the appropriate and most meaningful time scale for assessment, and comparing fleet sectors (e.g. if analyzing revenues from 2004-09, certain categories of the fleet may be better aggregated than others at different times).
- There is a critical need for cost data, not just revenues.
- Indicators need to consider economics over the short-term and the long-term, and how various costs are amortized (e.g. owned fishing vessel vs. leased quota).
- Evaluations should include a broad scope of economic analysis, e.g. include federal government costs; monitoring and reporting costs (e.g. high cost of observers in NE Sector program compared with other fisheries); ancillary industries, such as welding, engine repair, dry docks, chandleries, trucking, etc.
- Document the involvement of processors—is there adequate support in providing information; recognize reliance on imports as well as locally caught fish. whether markets are gained or lost due to workings of program;
- Be aware that existing economic analyses under the Regulatory Flexibility Act (RFA), Small Business Regulatory Enforcement Act (SBREA), etc. may have differing scopes of analysis (e.g. RFA covers only people with permits; SBREA is broader).
- Employment indicators are central.
  - For example, how many more people need to be hired to handle monitoring, reporting, and other requirements; [Note; could be considered a plus, from perspective of jobs in a community, but also a cost to fishing enterprises and Sector groups].
  - Changes in work and income opportunities for harvesters: not just # jobs but nature of jobs, income, seasonality and full-time/part-time; job satisfaction according to criteria of income, challenge, time with family, opportunity for advancement, etc. A lumper is not the same as a deckhand is not the same as a captain...and a day boat is not the same as a trip boat.
  - What happens to crew, captains and others who lose their jobs or withdraw from active participation in the fishery? Indicators of improved, neutral, or worsened economic/social position for those who stay in, those who leave. [note: one alleged benefit of ITQs is that they provide a mechanism for industry-based buyout, so that those who leave have some compensation; but if they are accompanied by a

sizeable decline in fishing opportunities, the level of compensation may not be very high].

- Effects on patterns of entry and advancement in the fisheries. Indicator could be # of new permit holders and their ages and backgrounds (i.e., can young people who worked as deckhands and mates get the capital required to become permit holders in a catch share fishery? Or only older people? Owners of existing fleets? People from other fisheries, e.g. scallop?). From surveys, expectations about future in the fisheries.
- Indicators of shifting market power among share owners, harvesters, wholesalers, processors. Lease and sale prices over time; contingencies attached to transfers. Sources of financing, e.g., buyer-harvester arrangements.
- Ownership indicators: how many, distribution and consolidation, extent to which permits are sold rather than kept, leasing out quota Geographic and fleet sector implications of ownership changes. (Remember that it is possible to both lease out some quota and actively fish other quota at the same time.)
- Patterns of shifts between active fishing and leasing.
- Geographic indicators: where fish landed, processed sold; location of permit holders relative to active fishing fleets.
- Indicators of distributional outcomes (many of which are already captured): Changes in employment levels, employment opportunities, infrastructure; number of permit holders that fished in previous year then completely leased out (and to where), geographical changes in landings (species-specific); un-harvested amount by species (with changes in allocation).
- Indicators of changes in who pays costs of administering the program; issue of cost recovery for 3rd party observers, other costs.
- Implications of reduction in fishing capacity for stewardship, compliance, creative responses to changing conditions. Indicators: participation in cooperative research; incidence of violations; participation in management advisory committees, Council activities; rise/fall of fishery associations; collaborative arrangements with NGOs, foundations; investments in improved technology or education; innovations in Sectors in their management, handling of “choke species” and other issues.
- Knowledge of the management changes under consideration.
- Sense of stewardship – from surveys.
- Governance: roles Sector managers perform that formerly were conducted by government; how Sectors organize themselves and conduct business, oversight, planning, financing.
- Social networks to measure changes in connectivity of participants and communities.

## 4.5 Cost

There has been repeated mention of the importance of collecting cost data and to reflect the impact on costs to the entire system or community (costs beyond the vessel or firm level such as costs to government and communities). Perception of cost impacts will vary with context; some of the

management costs have been pushed from government to the fishing community, reducing the burden on one component while increasing it on another. Total cost should include, but not be limited to, costs inherent to fishermen, Sectors (including variability), government, and others; loan issues; administrative cost of organizing and managing Sectors; Sector and monitoring fees, lease expenses; and external inputs (e.g. technology, loans, fuel). There need to be effective mechanisms to collect information on costs. Some general cost information was thought to be available from existing sources such as economic indicators, county and state information, and cost-of-living indexes and so forth.

Select issues and indicators that arose out of the workshop discussion include:

- Consistency of product throughout year (landings over time), stability (or lack of) in price, supply
- Breakout by short-term and long-term, economic, social and other benefits
- Costs to processors
- Changes in implementation/administration over time
- Program cost in personnel
- Cost in loss of fishermen
- Comparison of incremental cost of program with prior management
- Costs of having not moved toward this system, costs of staying with former system
- Transferability of costs
- Cost of lost jobs other than in fishing

#### 4.6 Management Efficiency

Most of the information in the different issues is interconnected. Changes in management efficiency will be measured through many of the indicators that have already been provided and the evaluation of efficiency should be designed to capture whether the program is flexible, resilient and adaptable for participants, whether there is a vehicle for change if regulations aren't meeting stated goals and objectives, ease of amendment, and so forth. Efficiency indicators should capture and track the winners and losers in the program. This issue should consider the application of data into management and science, redundancies in data collected and data collection vehicles, and identification of the intent and use of data. There are clear issues with data use and collection in the fishery and participants would be more accepting of the data reporting requirements if the intent were more clearly articulated and expected uses of the collected data were more clearly explained.

### 5 List of Workshop Participants and Observers

Project team indicated in *italics*.

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### **Literature Cited**

Clay, P.M., P. Pinto da Silva, and A. Kitts. 2010. Defining Social and Economic Performance Measures for Catch Shares Systems in the Northeast US. IIFET 2010 Montpellier Proceedings.

Mendelson, M. and J. Joyce. 2010. A Report on Industry Response to Draft Performance Measures and Indicators for Catch Share Programs in New England.

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<sup>i</sup> [http://www.nmfs.noaa.gov/sfa/domes\\_fish/catchshare/docs/draft\\_noaa\\_cs\\_policy.pdf](http://www.nmfs.noaa.gov/sfa/domes_fish/catchshare/docs/draft_noaa_cs_policy.pdf) (accessed 23 Mar 2010)