

External Review of Economic Analysis in Draft Amendment 13 to the Northeast Multi-species Fishery Management Plan (including a Draft Supplemental Environmental Impact Statement and a Preliminary Regulatory Economic Evaluation. Vol I: Management Alternatives and Impacts; Vol II: Affected Environment; Vol III: Appendices) plus Public hearings comments.

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January 26, 2004

## Executive Summary

The terms of reference for this external review asked for:

- 1) an assessment of the scientific soundness of the economic analyses in the Draft Supplemental Environmental Impact Statement (DSEIS) of Amendment 13 for the Northeast Multispecies Fishery Management Plan (FMP);
- 2) an analysis to what extent the results in the DSEIS effectively compare economic impacts overall and on individual communities;
- 3) a concise conclusion about the economic impact of the alternatives analyzed in the DSEIS; and
- 4) an assessment of whether the DSEIS provides information on likely economic impacts on communities. (The full terms of reference are in Appendix 1).

1. The methods used to analyze the data meet accepted professional standards for economic analysis and are scientifically sound. Available data were used appropriately but might have yielded more information with minor adjustments. The overall approach to both data collection and analysis is focused on vessel level fishery management strategies. The strength of this approach is that it more easily accommodates the biological components of the FMP. The limitation is that the economics may be data poor in the sense that industry specific information is not available to actually assess and or compare impacts to on-shore entities. Relative to other DSEIS, this one contains an extraordinary amount of information gleaned from the various analyses. The effectiveness of the information is compromised in several areas because of lack of clarity in presentation.

2. The results in the DSEIS do not effectively compare economic impacts across communities. The analysis is ordinal with respect to alternatives. It is possible to evaluate the relative impact of an alternative by vessel size or gear type.

3. With respect to rebuilding alternatives, there is little difference over the long term among the alternatives. With respect to revenue and income losses related to various alternatives, it appears that Alternative 1b, the phased reduction of DAS, has the least immediate impact in the short term (one year). The stream of income and revenue losses into the future is not available. With respect to vessels, the largest economic impacts will fall on those vessels most heavily dependent on groundfish which fish inshore. The GB (Alt 2) cod trip limit will have the most impact on vessels homeported in Massachusetts and those with hook and gillnet gear. Employment, income and sales will decline the most under Alt 2a and 4 and the least under Alt 1a. Most of the impact will occur in New Bedford, Boston, Gloucester and Lower Mid-Coast, ME.

4. The DSEIS provides relatively little information on the likely economic impacts on communities in absolute terms and on allocation consequences of the

alternatives. This information is still a challenge for most DSEIS. Data on fishing communities have not traditionally been collected by NMFS. The parameters for the analysis of community impacts have only recently been clearly defined for practitioners. The data in this document is incomplete but represents a reasonable attempt to provide analysis given the complexity of the task and available resources.

5. Although the economic analysis meets the professional standard and in many cases far exceeds that standard, the analysis could have been better used to sharpen and clarify the impacts of alternatives for the decision maker. The impressive amounts of analysis are not effectively presented or interpreted for the reader in several areas of the document.

## 1. Introduction

### 1.1. Terms of Reference.

The terms of reference (TOR) (the complete TOR are in Appendix 1) for this external review asked:

1. Are the economic analyses in the DSEIS scientifically sound, based on the following considerations:
  - appropriateness of the data used;
  - assumptions made in study design, data collection, and analytical methods;
  - overall approach to analyzing the impacts of each alternative and the economic and statistical methods and models employed in each analysis;
  - accuracy, relevance and applicability of findings of impacts on fishing communities; and
  - completeness of analyses given the available data, and as compared to other DSEISs for fishery management actions?

2. To what extent do the results in the DSEIS effectively compare economic impacts, overall and on individual communities?

3. Give your concise conclusion about the economic impact of the alternatives analyzed in the DSEIS, in terms of gross and net revenues and employment in the short term, long term, and overall:

- relative to each other;
- relative to conditions in the year 2002 (the most recent year for which complete economic data are available);
- relative to economic conditions since 1986 (the first year considered in the analysis); and
- on specific ports, gear sectors, and communities, including shore side industries.

4. Does the DSEIS provide information on the likely economic impacts on communities in absolute terms (as opposed to providing comparative analyses) and on allocative consequences of the alternatives? If so, provide a concise summary of your interpretation of this information. If not, would you expect such information based on your knowledge of other DSEISs for fishery management actions?

**1.2. Overview of Economic Analysis.** There were seven different models used for the economic analysis of the alternatives considered in the DSEIS: two area closure models (one with displacement and another without), a price forecast model, a net benefits model, a break-even analysis, and two different input-output models. The predictions of one model were often used as input into another.

The data were chosen from the following sources: vessel trip reports (logbooks), observer data, dealer weighout database, vessel permit files, DAS call-in database, U.S.

Census data, research vessel survey data, cost data collected by University of Massachusetts –Dartmouth, University of Rhode Island, Rutgers University 1996-2001 survey of major New England fisheries, Marine Recreational Fishing Statistics Survey (MRFSS) and economic add-ons, Logbook program for federally permitted party/charter vessels. There are additional data sources, which will be available in the future to improve the overall ability to develop necessary economic research for this fishery. The data available for this FMP reveals a preference for collecting data that supports management decisions rather than decisions about economic impacts. Data to analyze economic and social impacts would include more information on vessel economics (costs and earnings) as well as information on determination of prices and quantities at various market segments (wholesale, retail, fresh, frozen, canned).

The applicable laws under which the DSEIS was developed were Executive Order 12866 which focuses on determination of net national benefit and analysis of distributional effects on individuals, businesses of differing sizes and small communities and Regulatory Flexibility Act which focuses on regulated small business.

The models and analysis were completed over a four-year period. This four-year period and the time since Amendment 7 (A7) of this FMP was adopted in 1996 are characterized by several benchmarks. Among them: Passage of the SFA, 1996; Passage of A9, 1998; Report of the council to Congress on overfishing, 1999 (which triggered the requirement for plan submission within the year); Framework 33 submitted; CLF lawsuit filed; A13 development begun; development of F36; a buyout program along with several regulations; and Judge Kessler's ruling, August 2002. None of these events alone is significant enough to have an impact on the process of Amendment development. Cumulatively however, they contribute to issues at National Marine Fisheries Service identified by the National Academy of Public Administration (NAPA) in their evaluation of the agency (NAPA, 2002), which noted that "the system is stressed"; and "NMFS needs to take more explicit consideration of socio-economic consequences of regulation." A comparison of FMPs by NAPA across fishery management regions determined that 30 FMPs have not had a comprehensive EIS in five years and seven had no EIS at all. The NAPA panel expressed disappointment in the degree of progress made in implementing socio-economic analysis and NEPA programs. As of Feb. 2002 there had been 227 total cases filed against the agency since pre-1977 (NAPA: 13). The need to meet various obligations for analysis and to be responsive to the public in this "stressed" context is reflected in the organization and presentation of this DSEIS, which in many sections is not as effective as it might be. In addition, the public comments reflect that the many alternatives, options and choices overwhelmed the public with information and perhaps compromised their ability to fully participate in amendment development processes.

Although the economic analysis meets the professional standard and in many cases far exceeds that standard, the analysis could have been better used to sharpen and clarify the impacts of alternatives for the decision maker.

Each model is evaluated in this review with respect to the use in the DSEIS. That is, each of the models, standing alone, conceptually satisfies the professional standards of the economics profession. The models, regularly used in policy analysis, are often elaborated in the DSEIS by application of new methods to standard problems (e.g. co-integration in the price forecast model). This review simply considered whether first, the model and assumptions were appropriate in order to analyze a particular alternative and second, if the appropriate data were used.

The analysis was done for two time periods: **long run** net benefit calculations for alternatives associated with rebuilding strategies for 2003-2026 with net benefits calculated for rebuilding times to 2009 and to 2014; and **short run** analysis (one year impacts) which evaluated specific alternatives such as closed areas. The analysis was prepared only to produce relative (ordinal) rankings of impacts of alternatives rather than absolute rankings of impacts (in actual dollar terms, losses or gains).

The **price forecast model** (differently estimated with older data) and the net benefits models were used in previous analyses (e.g. A5, A7 and Framework 36). One input-output model, the area closure model, the vessel-level revenue change model and different alternatives were developed for this document. The practicability analysis for the essential fish habitat impacts used a combination of a no-displacement area closure model and another input output model. In the Final Environmental Impact Statement (FEIS, December 2003), a profitability analysis and analysis of business failure rates were included.

The **net benefits analysis** for the long run (2003-2026) was based on a **net present value model** of consumer and producer surplus. Prices for the net present value were predicted from the price forecast model, landings from the assessment models and fixed and operating costs (linked to fishing mortality) from the break-even analysis. The discount rate was seven percent, which met OMB requirements. The model excluded non-use values or values to other groups beyond consumers and producers. The **price forecast model** consisted of inverse demand functions estimated with a two stage least square procedure combined with **Monte Carlo simulations**. The model was estimated using annual data in order to fit into the net benefits analysis. Data were from the dealer weighout database. This model was used to estimate long run outcomes for the no action alternative, outcomes for the 2009 and the 2014 ending date for stock rebuilding as well as three alternative rebuilding schedules (different levels of fish mortality). All results were compared to the no action alternative.

Management measures (for a one year period) were evaluated using the **area closure model** (non-linear mathematical programming methodology). Monthly data were from logbooks and dealer weighout databases. The **vessel fishing revenue analysis** used input data from the area closure model to calculate relative losses from non-groundfish and groundfish trips. Revenue losses were reported by several categories: dependence on groundfish, groundfish sales, total sales, vessel length, gear, gear/length, home port state and port groups. The adapted **input-output model** which produced regional impacts of various alternatives in the short run used standard IMPLAN software and

data with adaptations to the Northeast conditions, which enabled the model to capture more specific sector information (e.g. wholesale seafood dealer sector – one for each subregion).

The **hard TAC model** was used to evaluate the alternatives for each TAC regulated stock. This model had limited economic content instead focusing on determining how long a fishery would last under each TAC constraint; what would be the trip limit which would prolong the fishery; and what discards might result from trip limits and retention prohibition. The **break-even model** produced estimates of levels of days-at-sea (DAS) required to cover various costs by gear and vessel size categories expressed as days at sea (DAS) (e.g. DAS required to cover operating or crew costs which were not included in the cost data for this model). The **recreational impacts** were produced with a standard IMPLAN software and data with angler expenditures as input. The **essential fish habitat model** was developed through a collaborative project and involved a no-displacement area closure model with an input output model only for New England states. The **social impact analysis** used secondary information, NMFS economic data and data collected during social impact assessment information meetings.

**1.3 Structure of Remaining Sections.** This review gives a detailed evaluation of sections of the DSEIS where economic analysis was used. The economic analyses are generally in sections 4.3.10.3; 4.4; 5.0; 9.0. The review takes each of the questions of the TOR and responds separately for each economic analysis. There are additional comments on the effectiveness of various sections of the DSEIS in conveying necessary information about methods, results and impacts. Those comments on effectiveness are point 4 of each subsection below. These comments respond to the general requirements of an EIS as stated in 40 CFR 1502 (e.g. Section 1502.8 says: Environmental impact statements shall be written in plain language and may use appropriate graphics so that decision makers and the public can readily understand them.) Some concluding remarks and recommendations follow in the last section of the review.

**1.4 Primary Issues Requested in the Review.** The review requested asked four questions explicitly:

- 1) are the economic analyses scientifically sound in the DSEIS of Amendment 13 for New England Groundfish Fishery Management Plan; Yes, the economic analyses and data used are scientifically sound;
- 2) to what extent do the results in the DSEIS effectively compare economic impacts overall and on individual communities; The results do not effectively compare economic impacts overall and on individual communities.
- 3) what is your concise conclusion about the economic impact of the alternatives analyzed in the DSEIS; based only on the analysis presented in the DSEIS and without additional background information, it appears that Alternative 1b has the least overall economic impact on the greatest number of groups while the Alternative 4 will impose the greatest economic impacts. Geographically, it appears that vessels with the highest dependence on groundfish, those in New Bedford, Boston and small ports in Maine will experience the largest economic

impacts; in several analyses, the results do not clearly indicate the distributional impacts.

- 4) give an assessment of whether the DSEIS provides information on likely economic impacts on communities. The DSEIS in sections on social impact, human environment and in some of the economic analysis (e.g. vessel revenue change, regional economic impacts) provides information on likely economic impacts on communities. The information is spread throughout the document and is incomplete in some cases or inconclusive in others. This distribution makes it difficult to find and use effectively.

**2. Soundness of the Economic Analysis.** This section evaluates the economic analysis one section at a time. Each section may refer to more than one methodology previously discussed. The findings and effectiveness of presentation are assessed.

### **2.1 Assessment of the No Action Alternative (DSEIS 3.6.1; 4.4.1.1)**

2.1.1. Appropriateness of Approach. The no action alternative is the first alternative evaluated with the net benefit model. The net benefit approach is appropriate for long run analysis but has weaker predictive value the farther into the future the model projects. The approach is useful to value a future stream of expected income but not as useful for valuing non-use (or intrinsic) benefits, which were excluded in this analysis. Overall the approach provides relative information with respect to the alternatives but is sensitive to what data are used and the number of years over which the analysis is run. Exclusion of non-use benefits is a reasonable assumption in this application given data constraints.

The analysis is applied to two different rebuilding timeframes (2009, 2014) and three different levels of fishing mortality (constant, phased, adaptive) and assesses the cumulative probability that each outcome will occur. The values are discounted at a 7% rate to determine net present value from the stream of revenues-costs into the future. Net benefit streams were calculated other alternatives for rebuilding and were compared to the no action alternative using the same approach (net benefit). As constructed in the DSEIS, the model likely overestimates benefits accruing to the fishery from rebuilding over the period 2003-2026. The graphical presentation is somewhat confusing as it reflects a comparison of the no action alternative with the other alternatives. This presentation obscures the expected flow of income from each particular alternative.

2.1.2 Appropriateness of Data and Models. The revenues for net benefits are estimated from the price model and landings from a stock assessment model; costs are estimated from survey data and observer reports. The price model uses a two stage least square process on a system of equations to estimate a dockside demand of Atlantic cod, haddock, redfish and yellowtail flounder. The remaining “large mesh species” were aggregated into a single equation for the analysis of most management alternatives. The assumption of linear relationships in coefficients is reasonable. This method follows the early literature (Bockstael, 1977; Hudgins, 1980), which used systems of demand equations for fresh fish markets in the U.S. A co-integration research study determined



that cod prices led other whitefish prices in this market. The price model specifies relevant substitutes and a time trend.

The results indicate that the demand for whitefish in this market is quite flexible with many close and available substitutes. The results would have used all available information had they been estimated using monthly data. The prices per month could then have been converted to yearly data and entered into the biological models which required the estimates. This would have provided some consistency with the price models that were used for similar analysis in A7 and A5 although it is not clear that the predictive power of the model would have been significantly enhanced. The model might have been useable in the break-even analysis rather than having to develop a separate monthly model for the break-even. The model might be improved in the future by attempting to capture the interaction of domestic catches with imports for this market. The prices predicted from this model were used with landings to calculate revenues, which were then projected out to the year 2026.

Operating costs were indexed to fishing mortality, which is a way to include demand and supply dynamics. As fishing mortality increased (and supply to market increased), prices fell; therefore revenues in the model fell. The cost data are probably the weakest component of this model because of lack of adequate data. This might be strengthened in the future with better data. The current cost database under represents small and/or unsafe vessels. It does give reasonable estimates of operating costs. If costs increase over time for example from fuel increases, the net benefits from various rebuilding programs are overestimated; if price relationships change such that demand is less flexible than in the price model (prices increase more with fish scarcity than under current conditions) then the net benefits from the model are underestimated. The probability analysis is helpful and indicates that the gains to rebuilding require several years to realize essentially regardless of discount rate. These findings are sensitive to the biomass data used as input.

2.1.3 Appropriateness of Findings. The findings indicate that average landings level out and increase by only about 3 million pounds per year after 2012. Revenue streams increase almost linearly over time. This alternative is not evaluated for the 2014 ending date.

2.1.4 Effectiveness of written analysis in conveying methods and findings. This section is critical to lay out the analysis of all the rebuilding alternatives relative to the no action alternative.

## **2.2. Assessment of Rebuilding Programs for Overfished Stocks (DSEIS 4.4.1-3)**

2.2.1 Appropriateness of Approach. The approach, net benefit analysis is the same as that used for the no action alternative.

2.2.2 Appropriateness of Data and Models. Scientifically sound.

2.2.3 Appropriateness of Findings. The results are reported relative to the no-action alternative. None of the alternatives look good for at least the next 14-17 years for groundfish to rebuild. It will take at least (depending on changes in prices and costs) until 2026 to recover economically. The adaptive approach has the highest probability of out performing the no action alternative. The overall economic gains to rebuilding are relatively small regardless of the alternative chosen. In the long run it appears possible to return to 1986 levels of landings with the no action alternative within a few years (Figure 176: p. I-548). It is not possible from data presented to assess the impacts of various alternatives on communities or groups of vessels or geographical areas. These findings simply reinforce that the stocks are overfished and that the rebuilding will take several years.

2.2.4 Effectiveness of written analysis in conveying methods and findings. This section would benefit from moving much of the methodology into a concise appendix, reducing the numbers of figures which are somewhat repetitive and replacing these parts with more analysis of what the results mean to fishery participants. It is unfortunate that the legal context created a “no action” alternative that cannot be implemented. The findings are in relative position therefore, to a non-compliant reference point, which makes it difficult to articulate an interpretation of the results.

### **2.3. Assessment of Fishery Program Administration Alternatives (DSEIS 3.4.1, 4.4.9.2)**

2.3.1 Appropriateness of Approach. There are seventeen alternatives considered, many of which have several options. Most of the impact analysis is qualitative and written up in discussion form. The DAS leasing option has a relatively complete economic analysis of the consequences of this action. VMS has a complete analysis of the consequences of this action. The hand-gear only permit is evaluated with respect to numbers of impacted participants by state and category activity with no specific economic references.

2.3.2 Appropriateness of Data and Models. The DAS leasing alternative uses the break-even model to assess impacts. VMS is evaluated with an economic approach, which takes into account the cost of VMS across rebuilding alternatives. The other alternatives were analyzed with qualitative narratives (e.g. hand gear only alternative).

2.3.3 Appropriateness of Findings. Under the DAS option, fewer vessels would fish, but incomes would increase over those under the court appointed allocations both for the vessels fishing and those leasing their DAS. These results hold for the hook fleet, the trawl fleet and the gillnet fleet. The cost per day leased ranges from \$738 (gillnet) to \$1,153 (hook). The distributional effects indicate that smaller and medium sized vessels especially those more dependent on groundfish will use more DAS. Smaller ports will be impacted more than larger ports (e.g. Montauk and Camp Ellis).

2.3.4 Effectiveness of the written analysis in conveying analytical methods and findings. This is one of the more effectively written sections. The analysis not only includes appropriate tables and data but thoughtful interpretation of the results with respect to impacts on fishery participants. Some of this analysis might have been better utilized in section 4.4.

#### **2.4. Assessment of Alternatives to Control Capacity (DSEIS 3.5.1; 4.4.9.4)**

2.4.1 Appropriateness of Approach. These alternatives, related to permit absorptions and transfer, DAS transfer, DAS freeze, DAS reserve were attempts to consider latent capacity. The various alternatives 1-4 were evaluated using a simulation model of trading between like size vessels, which predicted how DAS allocations would be allocated under different scenarios. Alternative 5: defining effective effort had 9 options and was evaluated with respect to creating a scenario, which reflected the fishery post (2002) buyout under each option. Alt 6 had no analysis.

2.4.2 Appropriateness of Data and Models. The data are appropriate. The models developed to calculate the DAS allocations under different scenarios for Alternatives 1-4 is creative. It would have been helpful to have some sort of evaluation criteria with respect to the robustness of the model's predictions. The calculations used to determine post 2002 buyout DAS allocations need to be clearly described.

2.4.3 Appropriateness of Findings. The post buyout scenario developed in the analysis gives the predicted number of DAS by permit type, homeport state and vessel size category. This scenario reflects the impact of vessels (and their DAS) being withdrawn from the fishery. Under some options, some vessels will be left with reduced allocations, some with increased allocations and some with no allocations. Vessels between 30-50' will be most affected by any of the options. In absolute terms, vessels from states with large participation (MA, ME, NY) seem to be more severely affected. Relative impacts are not presented for comparison.

2.4.4 Effectiveness of the written analysis in conveying analytical methods and findings. The section on Alternative 5 lacks clarity in terms of how the tables showing distributive impacts were calculated. The text does not go far enough to explain either the analysis underlying the calculations or the appropriate interpretation of the results. The relationships seem to be non-linear with respect to pre-buyout days and post buyout days. If this is the case, it needs to be explained to the reader, as this is a critical table in the document.

#### **2.5 Assessment of Management of Alternatives to Address Rebuilding Requirements (DSEIS 3.6.1; 4.4.4; 4.4.9.5)**

2.5.1 Appropriateness of approach. There are four alternatives plus the no action alternative. Alt 4 has three options associated with it. There are no economic impact analyses associated with these alternatives listed in section 4.4.9.5. The economic

analysis is in section 4.4.4 and is for the short run (one year). The area closure model based on mathematical programming produces the short run input to the vessel revenue change model. The results are reported relative to the no action alternative.

2.5.2 Appropriateness of Data and Models. The alternatives are analyzed using the models described above with vessel trip data and dealer weighout data. The analysis of DAS requirement for each alternative is based on the break-even model. The regional impacts were predicted by the modified input output model which produced direct, indirect and induced impacts on sales, personal income, employment from a reduction in commerce associated with the alternatives. This model was usefully adapted to this situation.

2.5.3 Appropriateness of Findings. The findings on vessel revenue change are very difficult to interpret because of the way they are tabulated and presented. The percentiles are not helpful in interpreting the results of the analysis. The information in these tables is valuable and core to the DSEIS. It appears that about 10% of vessels which would realize increased revenues under Alt 1. The overhead analysis for DAS requirements reported by vessel gear and size is strong and shows effectively numbers of vessels and the impact by each alternative (e.g. Table 217). The findings from the input output model are straightforward. They show that major impacts fall on the New Bedford area from Alt 1a, 1b, 1c, and 1d. Alt 2 had the largest impacts on the Boston area, New Bedford subregion and the Gloucester subregion. Significant job impacts were in the same areas as well as Lower Mid-Coast Maine. Alt3/4 and 4a had most significant effects on Boston and the New Bedford subregion. Employment effects are strongest in Boston, New Bedford, Gloucester and Lower Mid-cost Maine subregions.

2.5.4 Effectiveness of the written analysis in conveying analytical methods and findings. This section's effectiveness was seriously compromised by presentation. The tables using percentiles were difficult to decipher and interpret.

## **2.6. Assessment of Net Economic change to fishery from Essential Fish Habitat (EFH) closures (DSEIS 4.3.10.3.1)**

2.6.1. Appropriateness of Approach. This approach measures changes to the fishery from various approaches to habitat protection and through closures assuming no-displacement. The overall approach is trying to do a lot at once by combining the EFH level with various area closure alternatives and other alternatives. EFH analysis has high information costs and this approach uses available information to develop the area closure alternatives and link the alternatives to economic losses. Several alternatives which are not related to area closures are missing economic analysis. For these alternatives the assessment is qualitative. Overall the approach is scientifically sound and provides useful information on relative impacts but is incomplete in assessing all alternatives.

2.6.2 Appropriateness of Data and Models. A no-displacement model with vessel trip report (VTR) data combined with an input-output model is appropriate to this analysis.

The limitation is that the input-output model reflected only New England states. This is not the same input-output model (adapted model) referenced earlier. This analysis was done on a research cooperative basis. It might have been helpful to be able to integrate these findings with the net benefit approach, which used a similar model, and/or with the other input output model that was used for short-term analysis of management measures. The relative rankings might not change with such an integration but there may have been some gains in consistency across economic analyses.

2.6.3 Appropriateness of Findings. The findings enable the reader to make several comparisons by geographic sub-region and by fishery across alternatives. For example, Alt 3a, 3b, 4, 5b, 6 all hurt New Bedford the most with respect to gross sales impacts; 5c and 5 d hurt the Gloucester area the most; 10a and 10b have low impacts and these are more evenly distributed impacts; Alt 6, 10a, 10b impact Lower Mid-Coast Maine and New Hampshire seacoast more than the other areas. Overall Alt. 5b has the largest economic impacts followed by 3a and 3 b. Alt 1A employment impacts are greatest in New Bedford, Boston, Gloucester, Lower-mid coast Maine; Alt 2 has largest personal income impacts followed by Alt 4 and 1A. Alt 2a has the largest change in number of affected jobs in the NE region followed by Alt 4 and 1A. Alt 2 has the largest impact on hook and gillnet vessels. These losses can be mitigated by choice of preventative, corrective or precautionary approach (levels 1-3). E.g. “overall the relative difference between a preventative and precautionary approach closure mitigates about 22% of the total revenue losses for Alt 3a, 3b and 4; a level 3 habitat closure would have the largest mitigating effect on Alt 6,10A, 10B (at 64%).” The findings would have been enhanced by including some of the analysis done in 4.6.2.3 of the DSEIS, which evaluated revenue loss impacts by port and region for each habitat alternative.

2.6.4 Effectiveness of written analysis in conveying methods and findings. This analysis is spread across four parts with weak references between them. Section 4.3.10.3.1 (Net economic change in fishery from EFH- practicability analysis) comes almost 200 pages before the economic analysis is explained and has no appropriate citation to direct the reader to section (4.4.8) which *is* effectively written. Section 4.4.2.3 in the social analysis section has additional analysis, repetitive, at the port level, which could be combined here.

In Section 4.4.8 there is a presentation problem with respect to the absolute and relative impacts of the habitat alternatives. Although Alts 6,10a and 10b have the largest relative reduction in total revenues associated with them, the revenue impacts are the lowest in absolute terms. Alts 3a, 3b and 5b, 5c have ten times more revenue losses in absolute terms. For example, 5b results in between 14-21% of groundfish revenue lost depending on level of closure. It would be helpful if the analyst could provide more concise discussion of relative and absolute impacts to enable these contrasts to be more easily drawn.

## **2.7 Assessment of Social Impact Analysis (DSEIS 4.6)**

2.7.1 Appropriateness of Approach. This section presents a large amount of important information about communities of interest for the groundfish fishery. The information is presented in a discussion format rather than adhering to a particular approach or model although relevant literature is cited.

2.7.2 Appropriateness of Data and Models. Guidance for preparation of Social Impact Assessments (NOAA, 1999) provides that an “SIA provides systematic, science based information concerning the relative social and cultural benefits and costs of maintaining the status quo regulations and of adopting each reasonable management alternative that the fishery manager or” Council might choose. In that sense, there is no formal Social Impact Assessment. The discussion of the impacts of specific alternatives on community groups and vessel groups enhances and supports portions of the larger economic analysis. The measure of groundfish fishery dependency was calculated as a percent of groundfish revenues relative to total federally permitted fishing revenues. The SIA identified communities of interest and sorted them into (8) primary and (7) secondary community groups and then reported on levels of fishing dependence and information on social factors expressed at informational meetings. The data used to identify and discuss the impacts were information from a series of informational meeting held in various parts of New England. Focus groups are an accepted form of interview for gathering data for qualitative research such as recording experience of a particular phenomena. In addition to using focus groups to identify issues of concern, focus group interviews can provide qualitative information for analysis.

2.7.3 Appropriateness of Findings. The findings indicate that Downeast Maine, Upper Mid-Coast Maine and Cape and Island communities in Maine have the highest percent of occupations related to fishing, they are also isolated with few alternatives to fishing and have relatively high dependency on the groundfish fishery. This is consistent with findings in other parts of the document (e.g. Table 171) where several alternatives for rebuilding have relatively larger impacts on vessels with higher dependence on groundfish as well as certain gears (e.g. vessels using gillnet or hook gear with gross sales of \$35,000 or less are less impacted. (p. I-561)

2.7.4 Effectiveness of the written analysis in conveying analytical methods and findings. This section is effective in conveying findings about the communities of interest. It would have enhanced its effectiveness by being shorter and having more information into tables if possible.

### **3 Comparison of Economic Impacts**

3.1 Summary of findings. This DSIES is a complex document with an enormous amount of information. Without additional information and analysis it is not possible to make a definitive statement about distribution of economic effects amongst certain populations or groups. There are several sources for this. Some of the analysis (e.g. break-even) although strong do not have the impacts presented by geographical area for example. There is information which link vessels and ports by gear and size which does not seem to be in the document.

With respect to rebuilding alternatives, there is little difference identified among the alternatives. With respect to revenue and income losses related to various alternatives, it appears that Alt 1b the phased reduction of DAS has the least economic impact. This alternative was analyzed for only one year so it is not possible to know without further analysis what the stream of income and revenue losses might look like into the future. With respect to vessels, the largest economic impacts will fall on those vessels, fishing inshore areas, and most heavily dependent on groundfish. The GB cod trip limit will have the most impact on vessels homeported in Massachusetts and those using hook and gillnet gear.

3.2 Impact assessment for buyers, processors and other business directly and indirectly involved with the groundfish fishery. Employment, income and sales will decline the most under Alt 2a and 4 and the least under Alt 1a. Most of the impact will occur in New Bedford, Boston, Gloucester and the Lower Mid-Coast, ME. It appears that there may already be structural change occurring in the onshore segment of the industry. According to the DSEIS, wholesalers are moving to function as agents rather than processors as in the past. It would be helpful to have some analysis of the economic relationships currently established onshore.

Appendix 1: Terms of Reference for External Review of Economic Analysis related the Northeast Multi-species Fishery.

## **TERMS OF REFERENCE for External Examination of Economic Analyses Related to Amendment #13 to the NEFMC's Multispecies FMP**

### **Background**

A required Draft Supplemental Environmental Impact Statement (DSEIS) was developed by the New England Fishery Management Council (Council) for Amendment 13 to the Multispecies Fishery Management Plan (FMP). This was the source document and basis for the summary Public Hearing Document that was distributed at the Council-managed public hearings this fall.

The economic and socioeconomic sections of the DSEIS were developed jointly by staff of the Council and the Social Sciences Branch of the Northeast Fisheries Science Center. The requirements for assessing regulatory impacts are found in several statutes and Executive Orders, including the Magnuson-Stevens Fishery Conservation and Management Act (M-SA), Executive (EEO) 12866, the National Environmental Policy Act (NEPA), the Paperwork Reduction Act (PRA), the Regulatory Flexibility Act (RFA), and the Administrative Procedure Act (APA).

The M-SA contains ten National Standards that must be met in the specification of alternatives for FMPs, amendments, framework actions, and specification-setting exercises in order for them to be approved. Guidelines for meeting these standards were published on May 1, 1998, and codified at 50 CFR Part 600. In addition, NOAA has published "Guidelines for the Economic Analysis of Fishery Management Actions" (revised August 2000).

At its 4-6 November 2003 meeting, after consideration of the public comments received, the Council recommended to NOAA Fisheries a suite of management measures to be implemented by Amendment 13 to the FMP. The Groundfish Plan Development Team (PDT), which developed the DSEIS, is now modifying the DSEIS accordingly, and the final draft will be sent out for public comment one last time. With the benefit of a complete set of features, a more comprehensive analysis of the likely impacts of the preferred alternative will be possible. Some applications will be modified because of the greater detail that will be available once the Council makes a final decision. However, the fundamental econometric, mathematical programming, and input/output models underlying the analyses will not be altered and no new economic data will be available to the PDT.



## **Terms of Reference**

The independent experts should answer the following questions related to the DSEIS:

1. Are the economic analyses in the DSEIS scientifically sound, based on the following considerations:
  - appropriateness of the data used;
  - assumptions made in study design, data collection, and analytical methods;
  - overall approach to analyzing the impacts of each alternative and the economic and statistical methods and models employed in each analysis;
  - accuracy, relevance and applicability of findings of impacts on fishing communities; and
  - completeness of analyses given the available data, and as compared to other DSEISs for fishery management actions?
  
2. To what extent do the results in the DSEIS effectively compare economic impacts, overall and on individual communities?
  
3. Give your concise conclusion about the economic impact of the alternatives analyzed in the DSEIS, in terms of gross and net revenues and employment in the short term, long term, and overall:
  - relative to each other;
  - relative to conditions in the year 2002 (the most recent year for which complete economic data are available);
  - relative to economic conditions since 1986 (the first year considered in the analysis); and
  - on specific ports, gear sectors, and communities, including shore side industries.
  
4. Does the DSEIS provide information on the likely economic impacts on communities in absolute terms (as opposed to providing comparative analyses) and on allocative consequences of the alternatives? If so, provide a concise summary of your interpretation of this information. If not, would you expect such information based on your knowledge of other DSEISs for fishery management actions?

## **Process**

Upon selection of the examiner(s), the Social Sciences Branch of the NEFSC and appropriate Council staff will provide the examiners with documents covering the legal mandates and copies of the DSEIS. The examiner(s) will be able to avail themselves of conference calls with the SSB staff while familiarizing themselves with this background material. This process could take up to 2 weeks (weeks 1 & 2).

It is anticipated that the examiner(s) will then find it useful to visit the NEFSC for approximately 1 week (week 3) to avail themselves of an overview of available data and an overview of procedures used in evaluating the alternatives provided by the Social Science Branch. In this period it may prove useful also to meet with members of the Council staff.

An independent draft report from each examiner should be submitted to Dr. William Hogarth at the end of week 4.

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