

**Chair's Summary of Program Review of Economics and  
Human Dimensions Program**

**September 25-27, 2017**

**Economics and Human Dimensions Review Panel Members**

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**Background and Overview of Meeting**

The review meeting was conducted during September 25 – 27 in Silver Spring, MD. The Review Panel met over three days and heard presentations focusing on an overview of the NMFS Office of Science and Technology's (OST) Economics and Human Dimensions Program (hereafter, ST5), commercial and recreational fisheries economics, human dimensions program, ecosystem services valuation and communications. The Review Panel also heard presentations focusing on specific research programs in each of these areas. The third day was devoted to reporting.

The objective for this review was to evaluate the current programs of ST5. The review assessed the extent to which ST5 effectively directs the research program and provides the information required for fisheries management (including habitat protection and social impacts).

The role of ST5 is to coordinate economic and human dimensions work across NMFS and provide research leadership through priority setting and funding. ST5 makes a positive and significant contribution to the mission of the National Marine Fisheries Service, which is to provide sound science for management actions that serve the goal of fishery resources and ecosystem stewardship. The work involves data collection, data management and research. This work is organized in four major areas: commercial fishing, recreational fishing, human dimensions and ecosystem services valuation. The research supported by ST and conducted by ST5 is of high quality, resulting in peer-reviewed journal articles and NMFS technical memoranda. The ST5 research activities also include a number of publications that benefit important stakeholders, from fact sheets to the annual *Fisheries Economics of the United States*.

The panel recognizes that barriers to further improving upon this body of work are not unique to ST5: limited budgets; legislative mandates; dependency on traditional approaches; limited examples of proof of concept in management; data and model complexities; limited staff time; opposing incentive structures at the program and staff levels.

## **Goals and objectives**

### Observations

The NMFS Economics and Human Dimensions Program operates under mandates to estimate the benefits and costs to determine the efficiency of management actions (including changes in allocation), estimate the distributional effects of these actions (with equity constraints in the background) and understand other social and community impacts of management actions. Under the Magnuson-Stevens Act, NMFS works with the regional fishery management councils to better understand the economics and human dimensions of fishery regulations. Fishery Management Plans include a multitude of alternatives including quotas, protected areas, seasons and gear restrictions. Another part of the NMFS mission is to protect species and habitat under the Endangered Species Act and the Marine Mammal Protection Act. Understanding the impacts of regulations requires sophisticated and flexible economic and social models.

The Economics program has well developed goals and objectives, although they are not necessarily obvious to the broader set of users within NMFS and the Councils. The human dimensions and ecosystems services valuation program has well developed objectives, but it is not as clear how the program is advancing understanding of how to use human dimensions information in decision making. The efforts seem to be more focused on specific analyses and profiles that provide useful information for a point in time. The spatial models and vulnerability indicators work are excellent examples of this type of investment. The vulnerability indicators

are national in scope and can be used by regional staff to conduct impact assessments or other analysis.

The ST5 has made positive and significant contributions with tight and uncertain budgets and a depleted staff. These contributions to the NMFS mission are made possible by the flexible and entrepreneurial nature of the Program and the high quality of the staff. However, given the workload that this suggests, ST5 does not have the resources to meet the needs of NMFS that then must meet the needs of the Councils and other users. Many fishery management decisions are being made without adequate economic and human dimensions research support. This is a budgetary issue that can be filed in the category of unfunded mandate.

ST5's working model is to maximize the economics and human dimension research programs, primarily at the Science Centers. This model has resulted in a small entrepreneurial staff that has been able to fulfill their mission. The benefit of the working model has been the significant growth in the regional programs and their success, and the flexibility of the model to address emerging issues at the national level and in the regions. The potential cost of the model is the ability to coordinate research across the regions in a forward-looking, strategic vision and address gaps in the research agenda (e.g., aquaculture and market dynamics, modeling to integrate commercial and recreational fisheries). The model of a small nimble staff that sends most of the resources out to the regions has led to a creative, but temporary, solution for addressing the lack of a permanent in-house human dimension scientist.

The Science Center leads are unanimous in their support for ST5 and for the working model of having "a light touch", for their support in contracting and for the flexibility that ST5 provides to their programs that enables the programs to flourish within the different cultures and needs of the regions.

#### Recommendations to address issue

ST5 needs a human dimensions researcher. The regional capacities within social sciences are asymmetrical, and ST5 should consider strategies to mitigate the capacity shortfall in social sciences to ensure effective integration of human dimensions across the enterprise.

ST5 and the regional program leads would benefit from more systematic planning with respect to research prioritization. A planning review could allow ST5 to coordinate improved planning and provide strategic direction. ST5 should provide a leadership and coordinating role as the Center programs undertake their own strategic visioning exercise.

#### **Address priority needs**

#### Observations

The research mission of ST5 might be thought of in terms of assuring that broad, background research is available for each of the NMFS mandates: providing information about benefits and costs (for efficiency and allocation analysis), distributional impacts and social and community

impacts. The ST5 currently provides this broad analysis for the latter two mandates. With the *Fisheries Economics of the United States* publication ST5's commercial and recreational groups provide information on fisheries economic activity with spatial and regional trends. With the Social Indicators project the human dimensions group provides information on social and community impacts. Each of these activities have online tools that allow users to understand issues quickly and in-depth.

ST5 leadership and scientists play critical integration, facilitation, and supporting roles with regards to the NMFS economics and human dimension research programs at the Science Centers. ST5 supports and coordinates data-collection and research across a complex regional model complicated by regional differences in capacities and practices. Overall, ST5 has been highly effective at advancing the agency's scientific work and research needs with limited resources.

An information gap is research that supports in-depth efficiency and allocation of fishery management decisions. Data collection programs are funded and in place to collect the necessary data for these analyses. In both the commercial and recreational sectors there has been significant research activity at the regional level (e.g., FishSET and BLAST models for commercial and recreational sectors, respectively). But, there does not appear to be an ST5 directive or funding for developing high level models at the national level to support analysis for commercial and recreational fishery efficiency and allocation at the Council level.

#### Recommendations to address issue

In order to provide high level (i.e., macro) information benefits and costs of fisheries management (for efficiency and allocation analysis), the ST5 should engage in a strategic planning process that identifies resources in the commercial and recreational fishing programs that would allow investigation of this sort of initiative. Commercial and recreational fishing sector internal working groups could be established to discuss methods and steps towards implementation. The long-term strategy would be the current one, to expand the use of the FishSET and BLAST models to other regions (South Atlantic and Gulf of Mexico BLAST models are especially needed).

A short-term strategy would use the existing commercial and recreational fishing economic literature to develop estimates and rules of thumb that could be used at the management level to have some understanding of the economic effects of actions (at present, there is often no information). Meta-analyses could be developed on the impacts of fisheries regulations on net revenues in the commercial and for hire sectors. The next step would be development of economic performance measures on routine regulations similar to those developed for catch-shares. Meta-analyses could be developed on the impacts of fisheries regulations on the value of recreational trips and catch. The next step would be development of annual recreation demand models to update the meta-analysis. Information could be disseminated through publicly available online information tools similar to those currently available for economic and community impacts.

ST5 can improve the national uptake of regional research innovations, including analytical developments and decision-support tools, by holding periodic workshops, conference calls and webinars for center scientists and council analysts. Regular meetings of all economists and social scientists to exchange information would be helpful.

ST5 should develop best practices and support efforts to fill the “gap” between research and operations with respect to decision-support tools. Plans on how to maintain and update the tools and train stakeholders to use them should be developed at the time decisions are made to support the development of the tools.

Sociological work focused on understanding human relationships with key threatened, endangered and protected species would be useful from a management and enforcement perspective. Management and enforcement actions relative to marine mammals, for example, can be socially controversial. Social research to identify key points of disagreement and, important areas of possible compromise, would be useful for resource managers.

ST5 should explore the disconnect between its role in developing ecosystem service methods and values and their application in management. Efforts should be made to effectively incorporate these in the policy process.

### **Emerging Needs (e.g, IEAs, EBFM, climate)**

#### Observations

ST5 is making important progress to understand the biological, social, and economic vulnerabilities of U.S. fisheries to climate change. The agency is on a solid and proactive path to provide the necessary information to prepare for the effects of climate change on U.S. fisheries and coastal fishing communities. The effort began with a risk-assessment of the biological and ecological vulnerability of species in the northeast region to the effects of climate change. ST5 has now added a community vulnerability model that includes an interactive display for managers and the public to understand specific community vulnerabilities.

MRIP effort estimation methodology will change to a dual frame sample. Preliminary estimates indicate that this may significantly change recreational catch estimates for a number of important mixed use fisheries. This may pose a nearly simultaneous demand for multiple new benchmark stock assessments for recreationally important species and a review of allocations between sectors. The allocation review policy adopted by the agency in 2016 will also likely lead to future reviews of allocations within mixed fisheries. Allocation among user groups, and consideration of trophic interactions and forage fish management strategies, will also increase demands for economic research to support decision making under EBFM.

Model complexity and data limitations has slowed progress on ecosystem management in some regions. As the regions advance ecosystem-based fisheries management (EBFM), and as the

MRIP catch is re-estimated under the new sample frames, the agency can also anticipate that research will be needed to support evaluations of allocation decisions.

The current ST5 ecosystem service valuation (ESV) research appears to be a collection of individual projects that have been packaged together under the ESV theme. Nonmarket valuation is a very important component of ESV and one that should remain part of the portfolio but it is not the only ESV method. Habitat valuation methods can use market values to infer the value habitats provide as inputs into marketable commodities. The focus on NMVs might in fact make it harder to make initial progress on incorporating ESV into decision-making, as NMVs are more controversial (but still very important). The exploration of a habitat economics program could be a place to incorporate different valuation methods into the ESV efforts. It is not clear however whether the current visioning for the habitat economics program will encompass these kinds of analysis.

One aspect that is not clear is the operational linkages between IEAs, ESV, EBFM, and MSEs. MSE is a framework by which you can assess trade-offs associated with EBFM policies (and more traditional single fishery policies) and these analyses could incorporate ESV. How MSE relates to the development and use of IEAs is not clear.

#### Recommendations to address issue

ST5 should consider workshops or other capacity building efforts to evaluate allocations in anticipation of the new MRIP catch estimation implementation, and should develop research strategies to evaluate tradeoffs associated with harvest strategies for important forage fisheries.

ST5 should continue to integrate the social vulnerability assessments of coastal fishing communities with the regional biological vulnerability assessments as they are developed for other regions.

As ST5 develops community vulnerability models, it should also consider ways to leverage existing resources within the agency. For example, community vulnerability maps could include layers with links to Voices from the Fishery to let the public see some of the people behind the statistics. In communities where fishing interest constitute a small proportion of the overall population, their individual vulnerability may otherwise be overlooked.

As stocks shift in response to climate change, managers will also have increased needs for spatially explicit biological and economic data and analysis to support adaptive management.

As the agency moves forward with its EBFM roadmap, ST5 should consider research strategies that develop model pathways that will facilitate interim strategies for evolutionary progress towards EBFM implementation.

Continue to provide leadership on the incorporation of economics and human dimension data and research into IEAs and in the development of MSE decision-support tools.

Consider how the burgeoning habitat economics program and the nonmarket program can be combined in a meaningful way to develop a coherent and path-breaking research program on ecosystem service valuation.

## **Integration with relevant programs**

### Observations

ST5 has built an impressive economics and human dimension research agenda over time but for the most part these research programs have operated in parallel. That might well have been the optimal strategy at the outset but an emerging area in natural resource management is thinking about how these two fields of research are intertwined. ST5 and the Science Centers have an opportunity to lead the development of new interdisciplinary partnerships across the social sciences (including economics).

There is strong evidence of integration between ST5 with the Science Centers and the Office of Sustainable Fisheries, and to a lesser extent with the Regional Offices and other Headquarters Program Offices. Connection with the Fishery Management Councils occurs indirectly through the Science Centers and Regional Offices. The panel heard from the regional leads that there is a strong desire and willingness to participate in regional lead meetings and in getting the economics and human dimension researchers together to present the research and efforts underway at each of the centers.

### Recommendations to address issue

Explore low-cost methods (e.g., virtual meetings, webinars) along with traditional in-person workshops to bring together the regional leads and science center staff on a regular basis to help facilitate coordination and learning across the different programs.

Develop incentives to increase the integration of economic and human dimension research in the Centers (e.g., economics and anthropology, anthropology and sociology, etc).

## **Communication of status and accomplishments**

### Observations

ST5 has a skilled and well-rounded communications team. This team has done a nice job with packaging information for service to many audiences. The example products were nice.

ST5's communication program has evolved substantially, reflecting investment in effective communication strategies. ST5 communication materials flow through a robust vetting process that produces reliable and accurate information for the public. Information on fisheries statistics is widely and easily accessed by the public.

ST5 is supporting the development of significant research products but their utility is not optimized under the current communications system. The communication of breakthroughs in research such as analytical techniques or decision support tools by regional centers or council technical staff is complex and warrants consideration.

Better communication may be needed between ST5 and the Office of Protected Resources, as well as managers on the ground.

#### Recommendations to address issue

A more explicit process of reaching out to users within NMFS and to the Councils, about work to identify priorities and needs would help further strengthen the program. ST5 should work with the communications and outreach team to develop strategies to communicate with managers and end users about data, models and information tools and how to appropriately and most effectively use and apply these products.

Consider developing communications products that summarize how economic information is used in fishery management?

Center scientists and council analysts would benefit from periodic workshops and conference calls to leverage innovations as they come online through a regional research project. This is a significant, latent opportunity within the system to improve synergies across the enterprise and broaden the potential uptake of research products by practitioners across the U.S. management system.

Significant research innovations supported by ST5 could also be further amplified through presentations at the annual meetings of AFS and ICES, as appropriate, to facilitate consideration by state and international fisheries professionals.

#### **Conclusions**

ST5 has organically evolved into a flexible, entrepreneurial research and management office for economics and human dimension research. The ST5 approach has led to tremendous growth in the Science Centers and to a world-renown research program that is pushing the frontier in fishery economics, recreational economics, nonmarket valuation, and human dimensions research.

## **Reviewer Report on Program Review of the Economics and Social Analysis Division**

NMFS Office of Science and Technology  
Silver Spring, MD  
September 28, 2017

### Background

The Economics and Social Analysis Division (ST5) of the NMFS Office of Science and Technology, situated in the headquarters office in Silver Spring, MD, has several key functions: conduct of routine data analysis, conduct of novel research, coordination and support of national research/development, support to Fisheries Sciences Centers (FSCs), and communications. All of these functions provide scientific support for national and regional fisheries management needs.

The division itself conducts analysis and research in four areas: commercial fisheries economics, recreational fisheries economics, human dimensions, and ecosystem research. In terms of staff, ST5 currently has seven economists, including the NMFS Chief Economist and the Division Chief. The division does not presently have full-time, FTE non-economist social science staff for the Human Dimensions research area. The budget of ST5 declined sharply in about 2011 and has remained relatively static at approximately \$10M, with only minor increases. The Division has maintained high productivity despite budgetary challenges by making tactical investments in programming and leveraging resources both inside and outside of NMFS.

The science produced and supported by ST5 is highly relevant to national fisheries management objectives, as well as regional priorities. The commercial and recreational fisheries programs are mature, but continue to evolve, with excellent informational products related. The human dimensions program lags somewhat, having legacy products, such as community profiles, snapshots, oral histories, but the highlight is the vulnerability indicator work, which is cutting-edge and highly useful in a management context. The ecosystem service program area is also developing, with excellent advances in non-market valuation of jurisdictional resources for NMFS.

### General Observations and Recommendations

1. Does NMFS have clear goals and objectives for its economic and sociocultural science program? Are the ST economic and human dimensions focus areas appropriate (i.e., appropriate topics, program structure, mechanisms and prioritizations procedures) to advance economic and sociocultural research that will meet NMFS's needs?

Programmatic activities within the Division are clearly driven by legislative mandates (predominately MSA, but also NEPA, ESA and MMPA) and strategic objectives within OST, NMFS and NOAA. Investments in these data collection and research areas are appropriate to the role and mission of ST5, as a nationally oriented division. Additionally, ST5 leverages research in the FSCs to meet informational needs at the national level.

Presently, ST5 does not operate under a formal strategic plan. Rather, programmatic priorities are identified organically by working closely with leadership both in headquarters (OST and beyond) and in the field at the FSCs. It is clear that ST5 invests in research that can be exported and diffused to meet common informational needs across the nation. The spatial models and vulnerability indicators work are excellent examples of this type of investment. The vulnerability indicators are now national in scope and can be used by regional staff to conduct impact assessments or other analysis.

Of the focal research areas, each appear to be at differing degrees of maturity, but advancing in novel and creative ways. The Ecosystem Service area appears to be the newest program of research, but much progress has been made on the topic of Protected Resources. However, it appears that better communication is needed between ST5 and the Office of Protected Resources, as well as managers on the ground. This was noted in the presentation relative to ecosystem service valuation and endangered species. It will be great to watch this body of work mature.

Topically, this reviewer noted one possible programmatic weakness in research programming in the area of Protected Resources. In addition to conducting valuation studies on threatened, endangered and protected species, sociological work focused on understanding human relationships with key species would be highly useful from a management and enforcement perspective, in Hawaii or on the West Coast, especially. Management and enforcement actions relative to marine mammals, for example, can be socially controversial. Social research to identify key points of disagreement and, important, areas of possible compromise, would be extremely useful for resource managers. Additionally, studies to evaluate compliance with laws/regulations and the effectiveness of enforcement would be valuable as well, I suspect.

#### Recommendations

- Consider undertaking a formal strategic planning process, but only after careful evaluation of what approaches and processes for currently identifying areas of strategic investments work well. Do not attempt to fix what is currently working well.
- Engage in conversations with the Office of Protected Resources in HQ, as well as across the regions to exchange ideas on what type of research is possible and may best inform policy and management activities.
- Engage in conversations with the Office of Habitat Conservation to understand how ecosystem service valuation work can be best approached by ST5 given the informational need of that office.

2. Is ST focused on the priority information needs required to fulfill the NMFS mission?

- a. Are commercial fisheries, recreational fisheries, fishing participants, and community data collections adequate to fulfill economic and sociocultural science research and

management needs? Has ST developed strategies to obtain, manage, and make data accessible and/or facilitated these activities? Are there barriers that impede data collection?

ST5 has done an outstanding job of sustaining and expanding data collections to meet informational needs relative to commercial and recreational fisheries. Much of this success has been achieved through collaborations with FSCs and other OST offices (e.g., MRIP). While coverage of all regions is not even and collections may not be conducted as frequently as desired, this could be improved upon with budgetary increases or additional leveraging into the future.

ST5 does a great job of preparing and serving data/information for use by managers, FMCs and the public. Some of this work on tool development they undertake themselves and some they do in partnership with FSCs. The tools discussed and demonstrated for visualizing and serving data (e.g., BLAST, FishSet, vulnerability map, etc.) were impressive.

As with all federal programs, budget and bureaucratic requirements (e.g., OMB, contracting, etc.) are impediments to research and data collections, as well as use of the findings in the case of non-market studies. However, it appears that ST5 is doing everything it can to manage these impediments to move the program forward. For example, developing a national clearance package to streamline OMB PRA clearance.

- b. Is ST facilitating the development of appropriate models and research tools to analyze data and provide management advice?
- c. Is ST working to ensure that information provided to managers is used and used appropriately? Are there barriers to the uptake of science provided by the Center and what steps can be taken to overcome these?

ST5 has done an excellent job in its role of supporting, coordinating and facilitating research and tool development for national application. Some effort might be needed in communicating with stakeholders and end users about these models and tools, providing guidance on how to best apply them, however. This is a common need in such cases of transfer of technology to operation.

#### Recommendations

- Undertake an exercise to determine where gaps in data coverage across the nation/regions is most pressing from a national standpoint. Part of this exercise might be deciding which informational needs are most pressing, and by which ST5 research program (i.e., commercial or recreational fisheries economics). Consider reducing the number of collections to only the most used or needed from a policy/regulatory standpoint, then develop a schedule for more frequent, routine collection. Special collections could certainly still occur to answer immediate, short term questions.

- Continue collaborations with the FSCs and other partner offices. Expand partnerships across NOAA to conduct data collections, where it makes sense and is appropriate, to leverage resources further.
  - Work with your communications and outreach team to develop strategies to communicate with managers and end users about data/models/information/tools, how to appropriately and most effectively use and apply these products.
  - Evaluate the usefulness and effectiveness of the models and tools produced, for managers and end users, specifically. Gathering this type of feedback does not have to be done formally, although it could be. This could be accomplished by soliciting feedback from key end users during tool development and then on a periodic basis, thereafter.
3. Are the methods and models being developed contributing to (or will they contribute to) the advancement of conservation and management approaches such as integrated ecosystem assessments (IEAs), ecosystem based fisheries management, and other emerging issues? Is ST facilitating the development of these models? Are there barriers to addressing emerging issues?

Yes, the methods and models covered during the review all appear to be useful for advancing more ecosystem-based approaches to conservation and management. In particular, the work related to climate change. ST5 has facilitated progress on integrated research as well, meaning work that integrates the economic, ecological, biological, and physical sciences.

The barriers to further growing this body of work are not unique to ST5: limited budgets; legislative mandates; dependency on traditional approaches; limited examples of proof of concept in management; data/model complexities, limitations and uncertainties; limited staff time; opposing incentive structures at the program and staff levels, etc.

## Recommendations

- Continue investing in ecosystem and integrated research activities.
  - Strategize to shift management structures, or even regulatory structures, to align better to ecosystem-based approaches, as opposed to species-based approaches, for example.
  - Encourage leads at the FSCs to incentivize staff to undertake this kind of research, such as inclusion in employee performance plans and rewarding integrated work.
  - Develop communication strategies to engage regulators and FMCs about IEA, EBFM, etc. Create demand by decision-makers, in others words.
4. Are ST economic and sociocultural programs appropriately integrated with other relevant programs? Are research efforts integrated, where relevant, with efforts at the Centers, regional offices and headquarters offices?

ST5 is most certainly integrated with other relevant programs in OST, NMFS (generally), and with the FSCs. The relationship ST5 has with programs at the FSCs is highly collegial,

collaborative, and reciprocal. They have developed a highly functioning community of practice to leverage extremely limited resources, mutually.

Recommendations:

- None.

5. Does ST use the best tools to communicate appropriately research results to various managers, partners, stakeholders and the public?

It is fantastic that ST5 has within their own program such a skilled and well-rounded communications team. They are very lucky. This team has done a nice job with packaging information for service to many audiences. The example products were nice.

Recommendations:

- Given comments from Mike Leonard, American Sportfishing Association, about when economic information is used in the policy-making and management processes, perhaps consider communications products that summarize how economic information is used in fishery management, at a broad level? That is, if this type of product does not already exist. This type of basic product might be useful to fishermen or other stakeholders also?

## General Observations and Recommendation

ST5 has done a remarkable job of achieving great successes with extremely limited resources. This has been done through strategic investment of human and fiscal resources, both at the ST5 and FSCs levels, as well as through leveraging partnerships to increase capacity. Growth of their ST5 programs will be challenging if additional staff are not added, which would require new fiscal resources. However, their organizational model of operation appears to be extremely well adapted to their current fiscal and resource constrained environment. It is difficult to suggest areas to increase effectiveness or efficiency.

Recommendations:

- If fiscal resources become available, consider adding a sociologist or anthropologist to ST5 to coordinate the Human Dimensions program. This would create a permanent leadership presence for the programmatic area, possibly broadening the vision for this portfolio of research and certainly helping to further national goals. This would also relieve the Division Chief of leadership responsibilities in this programmatic area, as she has many responsibilities already.
- Many of the FSC leads suggested that having an annual meeting or gathering would be useful to learn what each other are doing and to calibrate national priorities. This type of coordination seems like a good role for ST5. I would urge ST5, however, to use such forums to advance also its own national visions and priorities with the FSC leads, such as increased resourcing of ecosystem-based activities, for example.

- It would be great if ST5 could focus additional energies on its Protected Resources work. I believe there are substantial gaps in social and economic research at NOAA to meet informational needs related to protected, endangered, and threatened species. Expansion of intentional dialogue and engagement with NOAA PR and other relevant agencies (e.g., FWS, MMC) on management issues, informational needs, and regulatory challenges would be a good start.
- The focus on habitat is nice to see. I believe this type of research will be an effective bridge to IEAs, etc. This area of work should be continued in collaboration with the Office of Habitat Conservation and perhaps the Coral Program. This would also be a good bridge to leverage research with programs in NOS.
- Engage in contingency planning for how to address best changes in workload related to adjustments to MRIP, forthcoming.

## **Reviewer Report on Program Review of Economics and Human Dimensions Program**

**Science Center**     ST5

**Address**

**Dates**                    9/26/17-9/28/17

**Background**

### **General Observations and Recommendation**

NMFS Office of Science and Technology's (OST) economic and human dimensions program (ST5) facilitates and coordinates social and economic data collection and research across the agency. The division plays an important liaison role between the regional science centers and headquarters. The structure and function of ST5 is complex, centered in headquarters with field scientists spanning 5 regional science centers and others contracted through RFPs nationally and regionally. Research needs and plans are informed by layered demands of national statutory mandates, policies, initiatives and regional demands. ST5 leadership describes the organizational structure as a "distributed" model. ST's budgetary support is essential to the operation of the agency's collection and analysis of socio-economic data in every region, accounting for the large majority of funding for each center's data collection programs.

The regional model has evolved heterogeneously and includes different structures, functions, relationships, practices, and capacities with respect to economics and social sciences at individual centers. ST5's distributed model embraces these differences and coordinates the program effectively across the regions with limited resources.

The regional variability in social science capacity in human dimensions impacts the ability to provide adequate and consistent support for consideration of social impacts associated with management actions, and may limit the full integration of human dimensions in Integrated Ecosystem Assessments in some regions. ST5 should consider strategies to mitigate capacity constraints in social sciences to ensure that human dimensions are effectively integrated across the enterprise in the future. The organization also has opportunities to better leverage regional research innovations to advance science and management nationally.

The agency is making important progress to understand the vulnerabilities of U.S. fisheries and coastal fishing communities to climate change. ST5 is well engaged

on this front and has also made important progress on research to support EBFM. ST5 can anticipate future research needs to support the evaluation of mixed fisheries and allocations in the context of EBFM and changes in MRIP catch estimation methodology.

### **Key (Specific) Findings and Recommendations (as reviewer has comments on)**

- **Goals and objectives**

- o Observations

The Office of Science and Technology's (OST) mission is described in its strategic plan "To sustain and enhance NOAA Fisheries science programs to enhance sound conservation and management of the Nation's living marine resources and their ecosystem." The overall goals for OST derive from the agency's Next Generation Strategic Plan, and include healthy oceans, climate adaptation and mitigation, and resilient coastal communities and economies.

Reference: [http://www.st.nmfs.noaa.gov/Assets/science\\_program/ecosystem-program-review/Ned/Cyr\\_1\\_ST%20Strategic%20Science%20Plan%20%202013.pdf](http://www.st.nmfs.noaa.gov/Assets/science_program/ecosystem-program-review/Ned/Cyr_1_ST%20Strategic%20Science%20Plan%20%202013.pdf)

At an organizational level, this mission statement is consistent with the agency's statutory role and responsibility to sustainably manage living marine resources. Current year operational goals and objectives specific to OST's economic and human dimensions program (ST5) are not clearly delineated in the office's annual guidance memoranda.

Reference: [http://www.st.nmfs.noaa.gov/Assets/science\\_program/ecosystem-program-review/Ned/Cyr\\_1\\_FY16%20ST%20AGM.pdf](http://www.st.nmfs.noaa.gov/Assets/science_program/ecosystem-program-review/Ned/Cyr_1_FY16%20ST%20AGM.pdf)

The roles of ST5 are more fully reflected in the ST strategic plan, particularly with respect to its important role in collecting socio-economic data for commercial and recreational fisheries. The foci within the ST strategic plan are appropriately aligned with the program's important functions of socio-economic data collection and analysis, coordinating the agency's social science enterprise across five diverse science centers and eight regional offices, and liaising between the centers and headquarters.

The regional evolution of the system is complex but allows the centers to be responsive to the research needs of each region. The regional variations in practice and capacity also create challenges for the effective administration of ST5. Procedures for identifying research priorities varies significantly regionally. Prioritizing research at the regional level requires considering national initiatives (e.g. EBFM roadmap), large regional projects (e.g. IEA's)

that require coordination with other centers, regionally specific research priorities, and the ongoing demands to support regional management programs and regulatory actions.

The last MSA reauthorization required regional fishery management councils to develop 5-year regional research priorities. To the extent that these plans include socio-economic research, they have not been effectively considered in the planning process in some regions. In other regions, the council research priorities were considered to be at levels of resolution that were either too vague or too detailed to implement.

- o Recommendations to address issue

A review of prioritization processes by ST5 and the regional program leads would facilitate improved planning and prioritization procedures. ST should encourage the development of feedback mechanisms from the regional science centers to the councils to ensure that the councils' required 5-year research priorities are effectively incorporated in the overall prioritization processes across the regions.

- **Address priority needs**

- Data Collection & Management

- o Observations

ST5 has highly capable scientists around the country working to support the agency's scientific objectives and advancing the agency's work through highly innovative research. ST5 has been responsive to the persistent requests from constituents for expanded socio-economic data on recreational fisheries and the development of coastal community vulnerability indices will enable the public to better understand the susceptibility of coastal fishing communities to the effects of climate change.

ST5 has made measurable progress to scale economic data collection on costs and revenue within commercial fisheries. The need for improved economic data on the value of recreational fisheries was also highlighted as a top priority at the 2014 recreational workshop hosted by the agency. ST5 has since supported several important initiatives to collect and communicate economic data on recreational fisheries, including surveys on bait and tackle industries and HMS tournaments. The agency subsequently hosted an economic workshop and roundtables for recreational fisheries and supported the development of recreational preference models to inform management decisions.

- Models & Research

- o Observations

The enterprise has developed highly innovative models to evaluate important economic and human dimensions of commercial fisheries, recreational fisheries, and address important ecosystem level considerations, including the vulnerability of fishing communities to climate change. Integrated modeling approaches have also been developed to address complex spatial and behavioral aspects of commercial fisheries (e.g. FishSet). These innovations confirm the capabilities of the individuals and effectiveness of the current organization and its ability to develop effective modeling strategies to address research priorities.

- Councils use information correctly

- o Observations

ST5 has made significant efforts through its ESV working group to evaluate methods for ecosystem valuations. Effective economic analysis of ecosystem benefits will inform regional consideration of tradeoffs within an EBFM context as regions transition to ecosystem approaches. Non-market valuation methodologies are expected to be controversial.

- o Recommendations to address issue

ST5 should continue to pursue its working group strategy to evaluate valuation methodologies. Contextually, EBFM should position managers to more effectively and comprehensively consider tradeoffs within large marine ecosystems and among user groups. Valuations are an essential contextual component for EBFM and methods that advance and support the evaluation of resource management tradeoffs should continue to be developed.

- **Emerging Needs (e.g, EBFM, climate)**

- o Observations

MRIP effort estimation methodology will change to a dual frame sample. Preliminary estimates indicate that this may significantly change recreational catch estimates for a number of important mixed use fisheries. This may pose a nearly simultaneous demand for multiple new benchmark stock assessments for recreationally important species and a review of allocations between sectors. The allocation review policy adopted by the agency in 2016 will also likely lead to future reviews of allocations within mixed fisheries. Allocation among user

groups, and consideration of trophic interactions and forage fish management strategies will also increase demands for economic research to support decision making under EBFM.

- o Recommendations to address issue

ST5 should consider workshops or other capacity building efforts to evaluate allocations in anticipation of the new MRIP catch estimation implementation, and should develop research strategies to evaluate tradeoffs associated with harvest strategies for important forage fisheries.

- o Observations

The agency is on a solid and proactive path to provide the necessary information to prepare for the effects of climate change on U.S. fisheries and coastal fishing communities. The effort began with a risk-assessment of the biological and ecological vulnerability of species in the northeast region to the effects of climate change. ST5 has now added a community vulnerability model that includes an interactive display for managers and the public to understand specific community vulnerabilities.

Reference: [https://www.st.nmfs.noaa.gov/ecosystems/climate/northeast-fish-and-shellfish-climate-vulnerability/NEVA\\_Overview](https://www.st.nmfs.noaa.gov/ecosystems/climate/northeast-fish-and-shellfish-climate-vulnerability/NEVA_Overview)

- o Recommendations to address issue

ST should continue to integrate the social vulnerability assessments of coastal fishing communities with the regional biological vulnerability assessments as they are developed for other regions.

As ST5 develops community vulnerability models, it should also consider ways to leverage existing resources within the agency. For example, community vulnerability maps could include layers with links to Voices from the Fishery to let the public see some of the people behind the statistics. In communities where fishing interest constitute a small proportion of the overall population, their individual vulnerability may otherwise be overlooked.

Reference: <https://www.st.nmfs.noaa.gov/humandimensions/voices-from-the-fisheries/index>

As stocks shift in response to climate change, managers will also have increased needs for spatially explicit biological and economic data and analysis to support adaptive management.

- o Observations

Model complexity and data limitations, *inter alia*, have previously precluded progress on ecosystem management in some regions.

- o Recommendations to address issue

As the agency moves forward with its EBFM roadmap, ST should consider research strategies that develop model pathways that will facilitate interim strategies for evolutionary progress towards EBFM implementation.

### **Integration with relevant programs**

- o Observations

ST5 plays an important role in coordination across regions and between programs. As the agency moves forward with Integrated Ecosystem Assessments (IEAs), integration of economic and human dimensions capacity will be particularly critical. Social science capacity varies regionally, particularly with respect to human dimensions, and this may be limiting on IEA development in some regions.

- o Recommendations to address issue

ST5 should develop strategies to mitigate the capacity issue with respect to human dimensions, including adding capacity at the headquarters level.

- o Observations

Siting of offshore wind energy areas (WEAs) will create new demands for spatially-specific fisheries economic data. Most U.S. fisheries datasets are not designed to support fine-scale spatial decision making. Additionally, significant gaps exist for this data in non-VMS fisheries and fisheries that are not subject to federal management.

- o Recommendations to address issue

ST5 should explore opportunities to leverage BOEM resources to develop research strategies to address data gaps to support decision making. The Crown Estate provides a relevant case study from U.K. for mapping data-limited fisheries.

Reference: <https://www.bitc.org.uk/our-resources/case-studies/crown-estate-uk-fishermans-information-mapping-project>

- **Communication of status and accomplishments**

- o Observations

ST's communication program has evolved substantially, reflecting investment in effective communication strategies. ST communication materials flow through a robust vetting process that produces reliable and accurate information for the public. Information on fisheries statistics is widely and easily accessed by the public.

The uptake of breakthroughs in research such as analytical techniques or decision support tools by regional center or council technical staff is more complex and warrants consideration. ST generally and ST5 specifically is supporting the development of significant research products but their utility is not optimized under the current system.

- o Recommendations to address issue

Center scientists and council analysts would benefit from periodic workshops and conference calls to leverage innovations as they come online through a regional research project. This is a significant, latent opportunity within the system to improve synergies across the enterprise and broaden the potential uptake of research products by practitioners across the U.S. management system.

Significant research innovations supported by ST5 could also be further amplified through presentations at the annual meetings of AFS and ICES, as appropriate, to facilitate consideration by state and international fisheries professionals.

## **Reviewer Report on Program Review of Economics and Human Dimensions Program**

### **Science and Technology 5: Economics and Human Dimensions program**

**NOAA Offices Silver Spring**

**September 26-28, 2017**

#### **Background**

The ST Economics & Human Dimensions Science Program is an asset to the National Marine Fisheries Service and NOAA more broadly. The Program's important and critical roles are funding top priority research projects, engaging in use-inspired research, funding and providing leadership on data collection efforts, capacity building, and developing mechanisms for diffusion of ideas and decision-support tools across the regions.

All of these efforts are high quality, connected to stakeholders, and relevant to management issues facing the nation and regions. The program has been able to achieve so much with relatively minimal staffing (7 FTE), a small budget, and federal budgeting realities that lead to funding uncertainty from year to year. These achievements are made possible by the flexible and entrepreneurial nature of the Program and the high quality of the staff.

#### **General Observations**

The Science Center leads are unanimous in their support for ST, for the working model of having "a light touch", for ST5's support in contracting, and for the flexibility that ST5 provides to their programs that enables the programs to flourish within the different cultures and needs of the regions.

ST5 has been very successful in addressing budget issues by developing partnerships across NOAA (e.g., Sustainable Fisheries, IEA program, etc) and these efforts have been very important for buffering the programs against budget cuts in the regions (to the best of their ability). Budget issues, however, are going to remain a challenge as the Centers increase taxation of ST funds.

#### **Key Findings and Recommendations**

##### **1. Goals and objectives**

- 1.1. *Does NMFS have clear goals and objectives for its economic and sociocultural science program?*

NMFS Economics and Human Dimension goals and objectives are intimately tied to external Executive and Legislative mandates (e.g., Executive Orders on cost-benefit analysis, environmental justice, Marine Mammal Protection Act, Endangered Species Act, Fishery Conservation and Management Act) and internal planning and guidance documents (e.g., Next Generation Strategic Plan and Annual Guidance Memorandum). For example, internally NMFS leadership directed ST5 and the Science Centers Economics and Human Dimension programs to “(I)ncorporate socio-economic information into EBM to provide LMR managers with information on the impacts, trade-offs, and distributional effects of management actions for the sustainability of marine resources and the coastal communities that depend on them.” Furthermore, according to an internal report on social science at NOAA, ST5 and the Science Centers were directed “to implement new comprehensive performance measures to evaluate the success of catch share programs.” In addition, each region has their own set of annual guidance documents and needs that formally and informally set priorities.

It is clear that the NMFS Economics and Human Dimensions Program, including ST5 and the Science Centers, have internal and external drivers that provide goals and objectives. How ST5 and the staff at the Centers compile all of these drivers into a set of workable goals and objectives and priorities given the realities of staff time and funding, however, is not very clear. Often, staff are being asked to do more with less.

*1.2 Are the ST economic and human dimensions focus areas appropriate (i.e., appropriate topics, program structure, mechanisms and prioritizations procedures) to advance economic and sociocultural research that will meet NMFS's needs?*

ST5 leadership and scientists play critical integration, facilitation, and supporting roles with regards to the NMFS economics and human dimension research programs at the Science Centers. At the same time, ST5 maintains important use-inspired research activities on catch share performance, recreational fisheries, economic impact analysis, nonmarket valuation, and social indicators.

ST5's working operational goal is to support first and foremost the economics and human dimension research programs at the Science Centers. Accomplishing this goal, especially in times of declining budgets, has resulted in a small entrepreneurial staff that has been able to fulfill their mission critical roles. The benefit of this operational model has been the tremendous growth in the regional programs and their success, and the flexibility of the model to address emerging issues both at the national level and in the regions. A potential cost of the model is the ability to coordinate research across the regions in a forward-looking, strategic vision and the ability to address gaps in the research agenda (e.g., aquaculture and market dynamics, modeling to integrate commercial and recreational fisheries, allocation economics). The model of a small nimble staff that sends most of the resources out to the regions has also led to temporary (creative) solutions for addressing the lack of a permanent in house human dimension scientist.

ST5 also play an important role in essential capacity building including their sponsorship of the QUEST program, the MRE Fellowship, and supporting workshops on emerging issues (e.g., SES workshop in BREST, France).

## **Recommendations**

- Maintain the current nimble and flexible model of ST5 but at the same time develop mechanisms for providing more strategic direction for a national program of economics and human dimension research.
- Provide a leadership and coordinating role as the Center programs undertake their own strategic visioning exercise and integrate ST5's strategic planning into these efforts.
- Continue to support the scientific activities of ST5 FTEs and to protect the scientific staffs time from becoming consumed with program coordination activities.

## **2. Address priority needs**

*2.1 Are commercial fisheries, recreational fisheries, fishing participants, and community data collections adequate to fulfill economic and sociocultural science research and management needs?*

ST5 supports data collection efforts on commercial fisheries, recreational fisheries, and social and community indicators. Overall, the scope of the data collected is impressive. In some cases, these data are important ends in of themselves and in other cases they are necessary inputs into cutting edge science that is needed to address the mission of the Agency (e.g., FishSET and BLAST). Besides supporting efforts financially in the regions, ST5 often provides a leadership role in data collection and processing.

Under ST5 leadership, data collection efforts have improved both in terms of quality and scope. Examples include the increased coverage of cost data across the regions, new data sets on processors, and community vulnerability. As more fisheries convert to catch shares, hopefully ST can leverage the cost recovery fees to offset the costs of data collection and to expand coverage.

*2.2 Has ST developed strategies to obtain, manage, and make data accessible and/or facilitated these activities?*

Historically, the data sharing protocols across the regions and with researchers outside of NOAA have created barriers to entry that potentially led to less utilization of the data and therefore less societal return on the data collection activities. This is not due to ST5 per se but rather due to rules regarding access to confidential data that require active contracts with Center staff.

There appears to be recent progress with internal data sharing within regions with password protected portals. Stakeholders are also commenting on the value of online data portals, such as FISHEyE and CSVi.

### *2.3 Are there barriers that impede data collection?*

The barriers are not unique to ST5 but include funding, staff time, and willingness of the participants to provide data (e.g., survey fatigue, objections to sharing proprietary information).

### *2.4 Is ST facilitating the development of appropriate models and research tools to analyze data and provide management advice?*

ST5 supports and promotes diffusion of decision-support tools across the regions (e.g., FishSET, BLAST, Social Indicators) that utilize the data streams. ST5 also supports the development of working groups on cutting edge topics in resource management (e.g., economic performance indicators for catch shares, diversification, safety at sea). These working groups are developing new ways and methods to utilize the data streams. All of these activities are driven by the desire to improve the management and conservation of resources for the Nation.

### *2.5 Is ST working to ensure that information provided to managers is used and used appropriately?*

ST5 works closely with Science Center economists and human dimension researchers to fund top priority research projects from the different regions that are well-connected to stakeholder needs. A value of this approach is that the scientists in the regions are more directly connected to the end user of the science and data – this is especially true when the regional staff engage directly in the FMC process. Because of their proximity to the end user, regional leads are in a better position to prioritize their Center research each year based on whether it addresses a current or future critical need of the region.

ST5 staff are also very responsiveness to stakeholder needs as demonstrated by the data collection efforts on processors, the study on bait and tackle shops, and the focus on sportfishing in the San Diego region. All of these efforts derived from stakeholder consultations.

### *2.6 Are there barriers to the uptake of science provided by the Center and what steps can be taken to overcome these?*

The panel heard from stakeholders that there appears to be a disconnect between the end use (e.g., Council) and the research. There are many reasons for this disconnect including failure of the communication products successfully reaching intended audiences, research questions not aligning with questions currently being asked, interests of the researchers to complete the transition from research to operations, and staff resources available to make this transition.

## Recommendations

- Develop best practices and support financially efforts to fill the “gap” between research and operations with respect to decision-support tools. Plans on how to maintain and update the tools and train stakeholders to use them should be developed at the time decisions are made to support the development of the tools.
- Work with the Science Centers to reduce barriers to entry for researchers across regions and outside NOAA to getting access to the trove of data that are supported by their funding.
- Continue to support working groups to provide guidance on how to reduce possible differences across regions in data quality and analysis. As these differences could prohibit cross-region analysis (e.g., national comparisons). Past examples include commercial fishing returns working group and social impact assessment and a future one could be processing and classification of vessel monitoring system data.
- Continue to play a convening role for the scientific community (NOAA scientists, academics, and end users of information) to develop best practice manuals and NMFS guidance documents, especially with respect to the inclusion of economics and human dimension analysis into emerging tools (e.g., SES, IEAs, MSEs).

### 3. Emerging Needs (e.g. EBFM, climate)

3.1 Are the methods and models being developed contributing to (or will they contribute to) the advancement of conservation and management approaches such as integrated ecosystem assessments (IEAs), ecosystem based fisheries management, and other emerging issues?

ST5 and the Science Centers are engaged in important research. Topics include but are not limited to nonmarket valuation, economic performance indicators, social and community indicators, coupled natural-human models, FishSET, and BLAST. The E&HD enterprise has made considerable effort, for example, moving Tier 3 indicators to Tier 1. Social indicators are also being incorporated in IEAs. Excellent examples of research addressing emerging needs in the climate-fishery realm are the ACLIM research project in the Alaska Center and the project on the dynamics of adaptation to climate-driven variability in California Current fisheries in the Northwest Center.

One aspect that is not clear is the operational linkages between IEAs, ESV, EBFM, and MSEs. MSE is a framework by which you can assess trade-offs associated with EBFM policies (and more traditional single fishery policies) and these analyses could incorporate ESV. How MSE relates to the development and use of IEAs is not clear.

The current ST5 ecosystem service valuation research appears to be a collection of individual projects that have been packaged together under the ESV theme. Nonmarket valuation is a very important component of ESV and one that should remain part of the portfolio but it is not the only ESV method. Habitat valuation methods can use market values to infer the value habitats provide as inputs into marketable commodities. The focus on NMVs might in fact make it harder to make initial progress on incorporating ESV into decision-making, as NMVs are more controversial (but still very important). The exploration of a habitat economics program could be a place to incorporate different valuation methods into the ESV efforts. It is not clear however whether the current visioning for the habitat economics program will encompass these kinds of analysis.

### 3.2 Is ST facilitating the development of these models?

Yes, ST5 is facilitating the development of these models in many different ways. With FishSET and BLAST, ST5 provided critical resources to develop the models and expand them to other regions, and with respect to BLAST, the model was conceived by a ST5 scientist. With respect to the climate work cited above, ST5 might not be directly facilitating the work but ST5 is providing the environment for the scientists in these centers to pursue this research (providing in-kind resources). ST5 has also supported workshops on emerging areas, such as the one on social-ecological systems and incorporation of human values into IEAs.

### 3.3 Are there barriers to addressing emerging issues?

The barriers stem from resource limits including staff time, necessary expertise in the regions on the natural science side, and regulatory processes that are not yet equipped to incorporate this information in management actions.

## **Recommendations**

- Continue to support working groups to provide guidance on best practices as a means to reduce possible differences across regions that prohibit national comparisons. A future one could be processing and classification of vessel monitoring system (VMS) data, as almost all of the regions are utilizing VMS or similar data.
- Continue to provide leadership on the incorporation of economics and human dimension data and research into IEAs and in the development of MSE decision-support tools
- Consider how the burgeoning habitat economics program and the nonmarket program can be combined in a meaningful way to develop a coherent and path-breaking research program on ecosystem service valuation.

#### **4. Integration with relevant programs**

4.1. Are ST economic and sociocultural programs appropriately integrated with other relevant programs?

ST5 has built an impressive economics and human dimension research agenda over time but for the most part these research programs have operated in parallel. That might well have been the optimal strategy at the outset but an emerging area in natural resource management is thinking about how these two fields of research are intertwined. ST5 and the Science Centers have an opportunity to lead the development of new interdisciplinary partnerships across the social sciences (including economics).

The panel also heard from the regional leads that there is a strong desire and willingness to participate in regional lead meetings and in getting the economics and human dimension researchers together to present the research and efforts underway at each of the centers.

4.2 Are research efforts integrated, where relevant, with efforts at the Centers, regional offices and headquarters offices?

There is strong evidence of integration between ST5 with the Science Centers, Regional Offices, and Fishery Management Councils. This is a strength of the program as a whole.

The ST5 program has also developed meaningful partnerships at HQ with Sustainable Fisheries, and Office of Protected Resources. There are also important linkages across OST.

#### **Recommendations**

- Explore low-cost methods (e.g., virtual meetings, webinars) along with traditional in-person workshops to bring together the regional leads and science center staff on a regular basis to help facilitate coordination and learning across the different programs.
- Develop incentives to increase the integration of economic and human dimension research in the Centers (e.g., economics and anthropology, anthropology and sociology, etc).

#### **5. Communication of status and accomplishments**

5.1 Does ST use the best tools to appropriately communicate research results to various managers, partners, stakeholders and the public?

ST5 communication strategy is flexible and tailored to the wide-variety of information developed both in-house and in the Centers, including fact sheets, FEUS, and the more recent move to provide online data query tools (e.g, FEUS, CSVI). The current focus on the use of infographics seems like an appropriate strategy, especially when visualizing data summaries. Having an in-house communications office is a wonderful opportunity for ST5 and the broader program to

increase the coverage on their science and the importance of the social science to NOAA's mission.

### **Recommendation**

- Communication staff should consider investing in means to assess how current tools/messages are being interpreted by the different user communities.

### **Conclusions**

ST5 has organically evolved into a flexible, entrepreneurial research and management office for economics and human dimension research. The ST5 approach has led to tremendous growth in the Science Centers and to a world-renown research program that is pushing the frontier in fishery economics, recreational economics, nonmarket valuation,

## **ST Econ/Human Dimensions Program Review – September 26-27, 2017**

- 1. Does NMFS have clear goals and objectives for its economic and sociocultural science program? Are the ST economic and human dimensions focus areas appropriate (i.e., appropriate topics, program structure, mechanisms and prioritizations procedures) to advance economic and sociocultural research that will meet NMFS's needs?**

### Observations

- The Economics program has strong goals and objectives, although they have developed more “organically” due to strong internal working relationships and collaborations across the economists within NMFS. However, the goals, objectives, and priorities may not be clearly articulated or accessible to the broader set of users of economics information within NMFS and the Councils.
- The Economics program is doing very good work that advances both the analytical capability of the program as well as decision-making tools.
- The Human Dimensions program has strong objectives, but it is not as clear how the program is advancing understanding of how to use human dimension information in decision making. Due to staffing limitations, efforts are more focused on specific analyses/profiles that are static in nature.
- The S&T Communications program is focused on day-to-day communication about S&T and other NMFS science publications. While this work also supports the economics/human dimensions products (since they are part of S&T), there is not a clear mission reason for the placement of this program within the Economics and Human Dimensions group.

### Recommendations

- Develop a strategic plan for Economics/Human Dimension work within NMFS that balances both operational/analytical needs, decision-making tools, and capability to address emerging needs.
  - Work on additional tools and resources to provide more dynamic Human Dimensions information and provide tools to support decision-making.
  - Clarify goals, objectives, and role of Communications program and make efforts to ensure that current placement with the Economics/Human Dimensions program area does not diminish resources for Economics/Human Dimensions work within the agency.
- 2. Is ST focused on the priority information needs required to fulfill the NMFS mission?**

- a) **Are commercial fisheries, recreational fisheries, fishing participants, and community data collections adequate to fulfill economic and sociocultural science research and management needs? Has ST developed strategies to obtain, manage, and make data accessible and/or facilitated these activities? Are there barriers that impede data collection?**
- b) **Is ST facilitating the development of appropriate models and research tools to analyze data and provide management advice?**
- c) **Is ST working to ensure that information provided to managers is used and used appropriately? Are there barriers to the uptake of science provided by the Center and what steps can be taken to overcome these?**

### Observations

- The Economics work is well connected with the information needed for NMFS mission due to the strong working relationships between S&T economists and field economists.
- There is clearly a strong linkage with Center Economists and with the Office of Sustainable Fisheries. There may be additional opportunity to strengthen coordination with regional and Council economists, as well as with the Protected Resources and Habitat programs within NMFS.
- As the biological status of fisheries continues to improve, additional information and tools will be needed to support more demands for allocation/distributional issues.
- The recreational fishing community (including at this review) regularly calls for better information to ensure management is responsive to the recreational community. Some of the reason for this is the lack of comparable economic and human dimensions data (and data collection programs) for recreational fisheries as exists for commercial fisheries. One way to address that problem is to work with the Councils and recreational community to develop ways to have equivalent data collection/reporting on recreational fisheries.
- The valuation work is really beneficial, but often viewed/perceived as just for the benefit of the species (and is only a cost to economic growth). The “systems thinking” approach discussed by some of the speakers may help connect the non-market information with economic benefit/costs in a way that is more understandable.

### Recommendations

- A more explicit process of reaching out to users within NMFS and to the Councils, about NMFS Economics and Human Dimensions work to identify priorities and needs would help further strengthen the program. The development of the S&T

Annual Guidance Memorandum may be an appropriate mechanism to do this (and could apply more broadly to S&T's work) on an annual basis, but a strategic plan for economics and human dimensions work would also be beneficial.

- Regular meetings of all economics and social science staff would be helpful at promoting cross-regional exchange of information and identify opportunities for exporting tools/methods developed in one region to other regions.
  - Consider attending other NMFS internal meetings (e.g., Sustainable Fisheries Assistant Regional Administrator meetings) to make connections with the management community and obtain input on how the economics products from the regions/centers are used and how the national program can facilitate improvements and economics/human dimensions investments both regionally and nationally.
  - In terms of commercial vs. recreational sector information, it is often challenging to have equivalent comparisons of the information across sectors. Consider tools or data collection that could put recreational and commercial data on more of an equal footing.
  - Providing information about the type of analysis and decision-tools that could be made available to managers and the regulated community if more recreational data were available may help people understand the benefits of investing in additional recreational economics data.
  - The national performance metric/index approach to commercial fishery data is very helpful. Continued development of social indicators should be supported, and similar metrics/indices to articulate current information on recreational fisheries should be developed.
  - For valuation work, consider expanding the articulation of benefits to how conservation of resources/ecosystem services can also have economic benefit (not just economic cost).
  - The current focus on regulatory reform/flexibility could benefit from work on how to incentivize fishermen so that their personal objectives align better with conservation and management objectives.
3. **Are the methods and models being developed contributing to (or will they contribute to) the advancement of conservation and management approaches such as integrated ecosystem assessments (IEAs), ecosystem based fisheries management, and other emerging issues? Is ST facilitating the development of these models? Are there barriers to addressing emerging issues?**

#### Observations

- With the resources available, the Economics and Human Dimensions program is investing appropriately in developing new models and methods for addressing emerging issues.

## Recommendations

- Efforts to ensure other programs/center/regions know of work done elsewhere would be helpful.
  - Set aside resources to help operationalize models that show promise and make them transferrable to other regions.
  - The program would benefit from additional resources for both economics and human dimensions work. Work with the management programs to identify what additional information/tools would be most useful and how that information would be used to answer critical questions to build support and documentation for the benefit and need of additional resources. Incorporate the information into an economics/human dimensions strategic plan.
4. **Are ST economic and sociocultural programs appropriately integrated with other relevant programs? Are research efforts integrated, where relevant, with efforts at the Centers, regional offices and headquarters offices?**

## Observations

- Yes! Both the Economics and Human Dimensions programs produce a substantial amount of work for the agency relative to the resources that are available to support that work.
- Due to the limited number of Economics and Human Dimensions staff across the agency, the integration among that community is very strong. Additional coordination more broadly with the management community would be beneficial.

## Recommendations

- Further connection and integration with the management programs and Councils would be helpful to understand how products and services are being used and how they can be improved.
5. **Does ST use the best tools to appropriately communicate research results to various managers, partners, stakeholders and the public?**

## Observations

- Even though a number of the major communications products (e.g., FEUS) come out of the Economics and Human Dimensions program, the primary purpose of the communications group is to more generally support S&T and science communication
- Most of the focus seems to be on the day-to-day work of developing roll out plans, talking points, and web stories for specific products rather than more strategically engaging with other NMFS programs and the Communications office on how to best communicate research results and how those results apply or affect management.

## Recommendations

- Consider if another organizational placement is appropriate for the communications group to maximize strategic communication engagement within S&T and NMFS.
- Coordinate communications efforts more actively with other parts of NMFS. Scientific information has broader implications to management and the agency needs to be better poised to communicate on what the broader implications of scientific results may be.
- It would be interesting to consider whether the economics and human dimensions work should expand to include the science of communication. Communication is a branch of social science, and understanding how people receive, process, and use scientific information could help the agency more effectively communicate about what we do and why we do it.