

**DRAFT**

**INTEGRATING SOCIAL SCIENCE INTO NOAA  
PLANNING, EVALUATION AND DECISION-MAKING**

**A REVIEW OF IMPLEMENTATION TO DATE AND  
RECOMMENDATIONS FOR IMPROVING EFFECTIVENESS**

**Report of the Social Science Working Group  
to the NOAA Science Advisory Board**

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# TABLE OF CONTENTS

Executive Summary .....	3
Acknowledgements.....	8
<b>BACKGROUND</b>	
Section 1 – Introduction: NOAA Social Science Review.....	8
1.1 Previous Review Findings.....	8
1.2 Terms of Reference for the Social Science Working Group .....	9
<b>CONTEXT</b>	
Section 2 – Social Science and the NOAA Mission .....	10
Section 3 – NOAA Progress in Social Science.....	13
3.1 SAB Actions Supporting Social Science .....	13
3.1.1 Cooperative Institute Evaluation Matrix	
3.1.2 Hurricane Intensity Working Group	
3.1.3 Research Review Team	
3.1.4 Ecosystems Working Group	
3.2 NOAA Social Science Reorganization and Present Capabilities.....	14
3.2.1 Social Science Budget	
3.2.2. Social Science Staffing	
3.3 Planning and Funding Social Science within the PPBES.....	20
3.4 Social Science in NOAA Strategic Plans.....	22
3.5 Progress on 2003 Report Recommendations for Social Science within NOAA ..	23
<b>IMPROVING EFFECTIVENESS</b>	
Section 4 – A Vision for Social Science within NOAA.....	24
4.1 How can NOAA better identify and measure (qualify and quantify) its Programmatic outcomes?.....	24
4.2 How can social science help NOAA and its partners effectively integrate natural science into decision-making?.....	25
4.3 How can social science itself be integrated into decision-making of NOAA and its partners?.....	25

4.4 How can social science capabilities at NOAA be strengthened where currently they are weak?.....	26
<b>Section 5 - A Path for Achieving the Social Science Vision.....</b>	<b>27</b>
5.1 Staffing Models.....	27
5.1.1 Internal Staffing	
5.1.2 External Staffing	
5.1.3 Staffing Incentives	
5.1.4 Social Science Budgets	
5.2 Transition to a Social Science Research Agenda Within NOAA.....	30
5.2.1 Climate	
5.2.2 Coasts and Oceans	
5.2.3 Weather and Water	
5.2.4 Ecosystems	
5.2.5. Weather, Climate and Transportation	
5.3 Next Generation Performance Matrix .....	37
 <b>CONCLUSIONS</b>	
<b>Section 6 – Findings and Recommendations .....</b>	<b>38</b>
6.1 General Findings and Recommendations.....	38
6.2 Institutionalizing Social Science at NOAA.....	38
6.3 Contributions of the Social Sciences to Programmatic Outcomes.....	40
References .....	41
Appendix A – Written Materials Reviewed by the SSWG.....	43
Appendix B – Presentations to the SSWG.....	46
Appendix C – 2003 SSRP Findings and Recommendations.....	49

## EXECUTIVE SUMMARY

The review of the Social Science Working Group took place against the background of the 2003 Social Science Review Panel Report and the subsequent implementation of its recommendations. The fundamental finding of the 2003 report was that the capacity of National Oceanic and Atmospheric Administration (NOAA) to meet its mandates and mission is diminished by the under-representation and under-utilization of social science. This finding remains true in 2008. Social science accounts for a very small proportion of the total NOAA budget, amounting to 0.6% in FY08, and that proportion has declined 0.1% since FY05.

The Social Science Working Group (SSWG) reviewed the progress NOAA has made in strengthening social science since 2003 in five areas:

*Actions taken by the Science Advisory Board (SAB):* The SAB has taken actions that support social science in the areas of cooperative institutes, hurricane intensity research, the organization of NOAA research, and ecosystem science.

*Social science budget and staffing:* NOAA has made organizational changes intended to support and strengthen its social science capabilities. However, FY08 data indicate that the budget and staffing capabilities of NOAA social science have weakened. Between FY05 and FY08, a period of increase in the NOAA budget, expenditures on social science decreased by slightly less than 10%, and numbers of social science staff decreased by 8%.

*Planning and funding social science within the Planning, Programming, Budgeting and Execution System:* PPBES has become a central focus for the allocation of NOAA funds to programs that cross line offices. How effective the relatively recently implemented matrix organizational structure will be in the development and integration of social sciences remains an open question.

*The position of social science in NOAA strategic plans:* Social science is increasingly finding its way into the language of the goals and programs, and in some cases, is becoming a key element of the program.

*Implementation of the 2003 SSRP recommendations:* Implementation has been uneven. The overall consensus is that although the need for social science is now more widely recognized throughout NOAA, progress in strengthening social science is slow and, in the case of social science budgets and staffing, has actually eroded.

A central issue for social science within NOAA's new management structure is integration. NOAA asked the SSWG to address four questions:

1. How can NOAA better identify and measure (qualify and quantify) its programmatic outcomes?

1 The most appropriate way to describe programmatic outcomes is with reference to NOAA's  
2 mission and to the societal value generated by NOAA's products and services. When social  
3 science capabilities are fully and appropriately integrated into NOAA activities, NOAA will be  
4 able to identify and measure the contribution of its products and services to the economic value  
5 of: (1) the nation's stock of coastal and marine resources; (2) commercial and non-market  
6 economic activities; (3) changes in the health and safety of the nation's citizens.

- 7  
8 2. How can social science help NOAA and its partners effectively integrate natural science  
9 into decision-making?

10  
11 Social science provides the base for understanding how NOAA products and services affect  
12 decisions and outcomes related to human safety and health and to the economy. Natural science  
13 can be better integrated into NOAA decision-making if consideration is first given to the users of  
14 information, the processes by which information is used to make decisions, and the level at  
15 which decisions will be made; e.g. policy, emergency response, or households.

- 16  
17 3. How can social science itself be integrated into decision-making of NOAA and its  
18 partners?

19  
20 Key to building and integrating effective social science capability in NOAA goal teams and line  
21 offices is a top-down commitment to allocating NOAA resources based, at least in part, on social  
22 benefits and economic returns. This commitment will make real the need for each line office,  
23 goal team and program to understand and quantify the contribution its products and services  
24 make to social and economic goals. It will also encourage efficient internal allocations of  
25 resources within programs and projects.

- 26  
27 4. How can social science capabilities at NOAA be strengthened where currently they are  
28 weak?

29  
30 Achieving the vision for strengthened social science within NOAA requires advocates within  
31 NOAA leadership, support of the Assistant Administrators (AA), and a commitment to change  
32 the culture of NOAA. Social science capabilities can be strengthened in part by providing the  
33 right incentives to line office and program managers to incorporate decision-making metrics that  
34 are relevant to society. This in turn necessitates developing social science capacity to guide,  
35 inform, and support the application of social science for corporate planning and program  
36 development. In particular, NOAA can create a leadership role for social science coordination,  
37 integration, and implementation by establishing an Office of Societal Impacts that reports  
38 directly to the Deputy Undersecretary for Oceans and Atmosphere.

39  
40 NOAA has a number of options for staffing, funding, and performance measurement of social  
41 science, and it is clear that no single model that will be optimal across all line offices and goal  
42 teams. The organizational support required for social sciences will likely change over time as  
43 needs and capacity develop and with the evolving roles of the line offices and mission goal  
44 teams.

1 A social science research agenda is well articulated within the National Marine and Fisheries  
2 Service (NMFS) and National Ocean Service (NOS) line offices. Looking across all line offices,  
3 the SSWG sees rich opportunities for social science research investments in the thematic areas of  
4 climate, coasts and oceans, weather and water, and ecosystems, and commerce and  
5 transportation.  
6

7 In addition to addressing the four questions laid out in the terms of reference, the SSWG has a  
8 number of overarching findings and recommendations to NOAA.  
9

## 10 **General Findings and Recommendations**

11  
12 **Finding 1:** The SSWG endorses the overall findings of the 2003 SSRP report and finds that the  
13 social sciences continue to be underrepresented in NOAA’s research, operations, and decision  
14 making. The SSWG also finds that if NOAA is to serve society and fulfill its mission, it must  
15 integrate the social sciences into the full range of its scientific and programmatic activities.  
16

17 **Finding 2:** A wide range of social science research is needed to achieve NOAA’s mission and  
18 objectives. Social science is critical to understanding the vulnerabilities and behavior  
19 (adaptation, risk perception) of the users of NOAA products/information, and the economic risks  
20 mitigated and value generated by these uses. Social science can also assist in prioritizing NOAA  
21 investments by estimating the economic return from programs, products, and improvements  
22 thereto. Social science is needed to support improved product design, communications with  
23 users, and education.  
24

25 **Recommendation 2.1** NOAA should draw on the full range of excellent science (physical,  
26 biological, and social) to meet its mission in both line offices and mission goals.  
27

28 **Recommendation 2.2** NOAA should recognize and facilitate the contributions of the social  
29 sciences to both the major challenges in its research and development and to its operational  
30 responsibilities, as several other agencies, organizations, and scientific programs have done.  
31 NOAA should use social science to understand decision making frameworks at all levels so as to  
32 provide information that meets user needs.  
33

34 **Recommendation 2.3** NOAA should use social science analysis to demonstrate and calibrate its  
35 accomplishments and to implement and evaluate its planning activities.  
36

## 37 **Institutionalizing Social Science at NOAA**

38  
39 **Finding 3:** Social science literacy throughout NOAA has improved marginally since the 2003  
40 report, but it is still weak in many areas. NOAA leadership is now more aware of the value of  
41 the social sciences, but in most cases still does not assign a significant priority to their role in the  
42 agency.  
43

44 **Finding 4:** NOAA lacks sufficient social science expertise to meet its Mission and Objectives.  
45 Social science capabilities declined between 2005 and 2008. In that time period the NOAA  
46 budget increased by 13% and the social science share of the budget decreased by almost 10%.

1 Through much of NOAA, social science work is carried out through an *ad hoc* combination of  
2 in-house and contract resources.

3  
4 **Recommendation 4.1** NOAA administration should explicitly address the weakening position  
5 of social sciences by aggressively developing and implementing a plan to strengthen and  
6 integrate social sciences throughout NOAA line offices, programs and mission goals.

7  
8 **Finding 5:** Social science activities are mostly *ad hoc* and segregated and are not sustained,  
9 coordinated, or comprehensive. (An exception to this is NMFS, which has significantly  
10 expanded its emphasis on the use of the social sciences and has a strategic plan with specific  
11 social science FTE objectives). In addition, there is little representation of social science  
12 expertise among the higher levels of NOAA leadership. Overall, there is inadequate high level  
13 commitment among NOAA administrators to strengthening NOAA's use of social science.

14  
15 **Recommendation 5.1** NOAA leadership should articulate a commitment to strengthen social  
16 sciences within NOAA and develop incentive structures to ensure that this commitment is  
17 implemented at the line office, mission goal and programmatic level.

18  
19 **Recommendation 5.2** Until NOAA can develop and support adequate social science capacity  
20 throughout the agency, the SSWG feels that a strong centralized social science presence will be  
21 necessary for undertaking and supporting both corporate and programmatic social science  
22 efforts. NOAA leadership should put appropriate social science expertise in place to guide,  
23 inform, and support the use of social science within NOAA by creating an Office of Societal  
24 Impacts. This office would serve a leadership role in coordinating social science across the  
25 agency, integrating it where appropriate in research, programmatic, and planning functions. To  
26 ensure that the office has sufficient support to accomplish this, it should report directly to the  
27 Deputy Undersecretary for Oceans and Atmosphere.

28  
29 **Recommendation 5.3** The NOAA Science Advisory Board should establish a standing Social  
30 Science Working Group to provide oversight and quality control over the integration of social  
31 science into the agency.

32  
33 **Recommendation 5.4** NOAA should provide appropriate budgetary support to accomplish  
34 these recommendations through special assessments and reprogramming. Line offices should  
35 establish budget targets for investments in social science capacity over the next three to five  
36 years. Determination of the proportion of staff resources to be met by social scientists should be  
37 outcome driven, but until a basic threshold capacity is developed so that the benefits of social  
38 science can be felt, the SSWG recommends that a minimum 5% of all line office budgets should  
39 be allocated to the social sciences. This will require reallocation of existing staffing budgets.

40  
41 **Recommendation 5.5** Over the long term, NOAA should integrate the social and natural  
42 sciences in all its research committees, rather than creating parallel structures. In the short term,  
43 it may be necessary to create special purpose social science groups to strengthen the social  
44 sciences in NOAA. In addition, NOAA should seek ways to coordinate its activities with social  
45 science research activities outside of NOAA, such as those at National Science Foundation  
46 (NSF).

1 **Recommendation 5.6** The SSWG endorses several recommendations of the NOAA Social  
2 Science Committee:

- 3
- 4 • Conduct formal needs assessments for social science work at the program level.
- 5 • Combine in-house and external staff, as appropriate to each program, to carry out the
- 6 work.
- 7 • Use “test beds” and demonstration projects to illustrate the value of social science to
- 8 NOAA activities and educate NOAA managers about the benefits of the social sciences.
- 9 • Leverage the growing focus on ecosystem-based management and climate services, two
- 10 areas where integration of social science should be unquestioned and obviously critical.

### 11 **Contributions of the Social Sciences to Programmatic Outcomes**

12  
13  
14 **Finding 6:** The social sciences are essential for quantifying the monetary and human values of  
15 NOAA products and services. The social sciences can improve the design of NOAA products  
16 and services in light of user needs, adaptation, response, and utilization, and they can help  
17 NOAA prioritize future investments. This will require that the social sciences be used to: (1)  
18 measure outcomes; (2) achieve socially beneficial outcomes; (3) improve performance within the  
19 organization; and (4) set targets for future accomplishments.

20  
21 **Recommendation 6.1:** NOAA should use the social sciences to: (1) measure outcomes; (2)  
22 achieve socially beneficial outcomes; (3) improve performance within the organization; and (4)  
23 set targets for future accomplishments.  
24

1 **Acknowledgements**

2  
3 The SSWG acknowledges and thanks the staff of the Science Advisory Board, members of the  
4 Research Council and its Social Science Committee, Assistant Administrators, Line Office staff  
5 and representatives of other federal agencies for the time and effort they spent providing  
6 information and data, and for their insightful and candid conversations with the Working Group.

7 **BACKGROUND**

8 **Section 1 – Introduction: NOAA Social Science Review**

9 1.1 Previous Review Findings

10 In 2001 the NOAA Science Advisory Board (SAB) requested that a review panel be formed to  
11 evaluate the adequacy of NOAA’s social science research, staffing and data. The Social Science  
12 Review Panel (hereafter SSRP) conducted its review over a period of 18 months, submitting its  
13 report to the SAB in March 2003 (SSRP 2003).

14  
15 The 2003 report’s fundamental finding was that the capacity of NOAA to meet its mandates and  
16 mission is diminished by the under-representation and under-utilization of social science. This  
17 finding remains true in 2008. Taken together, the major findings of the 2003 report provide  
18 background and context to the present review of the status of social science within NOAA. They  
19 describe the secondary and weak position of NOAA social sciences.

20  
21 *Social Science Literacy:* Throughout NOAA, there is a lack of formal understanding of what  
22 social science is and what its contributions can be, leading to an organizational culture that is not  
23 conducive to social science research.

24  
25 *Social Science Research:* NOAA’s social science research effort is small and unbalanced across  
26 disciplines.

27  
28 *Social Science Data:* The lack of appropriate data limits the contribution of social science to  
29 NOAA.

30  
31 *Social Science Staffing and Senior Representation:* Social science staffing is insufficient to meet  
32 the mission of each of the line offices, a problem that is exacerbated by the lack of social science  
33 representation in line office directorates.

34  
35 *Education and Outreach:* The lack of expertise in social science survey methodology and other  
36 social science methods limits the ability of NOAA Assistant Administrators to understand and  
37 communicate with their constituents.

38  
39 *Strategic Planning:* There is almost no long-term strategic planning for social science at NOAA

1 (Office of Global Programs (OGP) and NMFS are exceptions). NMFS is the only line office in  
2 which social science objectives in the strategic plan track into a long-term social science research  
3 agenda.

4  
5 *Performance Evaluation:* The application of social science is a necessary component of program  
6 effectiveness measurement and monitoring.

7  
8 *Economic Valuation:* NOAA has immediate needs for data and research directed at  
9 environmental assessment and stewardship.

10  
11 The current review takes place against the background of these findings and the five-year history  
12 of NOAA's implementation of their accompanying recommendations. A more detailed list of  
13 the 2003 findings and recommendations is included in Appendix C. NOAA's implementation of  
14 the recommendations is described in Section 3.

## 15 16 1.2 Terms of Reference for the Social Science Working Group

17  
18 In 2007, the SAB was asked to assemble a working group of external experts to assist NOAA in  
19 the development of a strategy to strengthen and integrate social science into corporate- and  
20 Program-level planning, analysis and evaluation within the Goal Team structure. The SAB's  
21 prior recommendations for social science were framed within a management structure based on a  
22 Line Office structure (SSRP 2003). NOAA has subsequently instituted a matrix management  
23 structure and has developed a formal Planning Programming Budgeting and Execution System  
24 (PPBES).

25  
26 Although the need for social science has been more widely recognized throughout NOAA since  
27 the 2003 report, the implementation of social science has been uneven. A central issue is the  
28 integration of social science within NOAA's new management structure. NOAA asked the  
29 Working Group (hereafter SSWG) to look in particular at four questions:

- 30  
31
- 32 • How can NOAA better identify and measure (qualify and quantify) its programmatic  
33 outcomes?
  - 34 • How can social science help NOAA and its partners effectively integrate natural science  
35 into decision-making?
  - 36 • How can social science itself be integrated into decision-making of NOAA and its  
37 partners?
  - 38 • How can social science capabilities at NOAA be strengthened where currently they are  
39 weak?

40 The SSWG began its review in Fall 2007, meeting four times between October 2007 and June  
41 2008. The group reviewed a wide range of material, including the 2003 SSRP report, NOAA  
42 Line Office strategic plans, Mission Goal Team plans, and social science research plans. The  
43 SSWG also met with and received written communications from line office Assistant  
44 Administrators (AAs), the NOAA Research Council (RC), the Social Science Committee (SSC)  
45 of the NOAA RC, and other representatives of NOAA line offices, mission goal teams, and

1 corporate planning functions. It also met with staff of other federal agencies: USDA ERS; USDA  
2 CREES; EPA; USFWS; USACE.

3  
4 The report is divided into three major sections representing the integration of science in NOAA  
5 in the past, present and future. This introduction describes the background to the question of  
6 social science within NOAA, including findings of the 2003 SSRP. Sections 2 and 3 discuss the  
7 current context of social science in NOAA by focusing on its role in meeting NOAA’s missions.  
8 In this section, we address both the utility of social science for NOAA operations (as emphasized  
9 in the Terms of Reference) and the strong need for a substantive understanding social science  
10 research to accomplish NOAA’s mission to the nation (as emphasized in the 2003 SSRP).  
11 Sections 4 and 5 present a way forward for improving effectiveness of the social sciences  
12 through staffing, research agendas and performance evaluation. In conclusion, Section 6 presents  
13 findings and recommendations.

## 14 **CONTEXT**

### 15 **Section 2 – Social Science and the NOAA Mission**

16  
17 NOAA plays a diverse and critical role in helping the nation achieve sustainable economic  
18 growth and protection of human life, health, and the environment.

19  
20 NOAA accomplishes this role by providing information to enable other government agencies,  
21 private enterprises and citizens to make better informed decisions—each of which can contribute  
22 to improving society’s well-being. For example, a broad cross-section of the nation’s economic  
23 activity, including agriculture, transportation and energy production, is sensitive to weather and  
24 climate and is dependent on accurate forecasts for economic and physical well being. NOAA  
25 scientists contribute information and advice to the EPA on permitting decisions under section  
26 404 of the Clean Water Act. NOAA provides information on the health of the coastal and  
27 marine environment and also has regulatory responsibilities for commercial and recreational  
28 marine fisheries. NOAA administrators and scientists contribute to the protection and use of  
29 international fish stocks through roles in international fishery commissions. The status and  
30 utilization of all of these natural resources in turn have direct bearing on the wealth and health of  
31 those who participate in coastal recreation and harvest and consume seafood and an indirect  
32 bearing on all current and future citizens.

33  
34 The ultimate rationale for the information and stewardship services NOAA provides is clearly  
35 stated in NOAA’s Vision of “an informed society that uses a comprehensive understanding of  
36 the role of the oceans, coasts, and atmosphere in the global ecosystem to make the best social  
37 and economic decisions.” The wide range of NOAAs contributions to society are represented in  
38 the mission statements of NOAA and each of its line offices. (Figure1)

39

**NOAA's Mission:** to understand and predict changes in Earth's environment and conserve and manage coastal and marine resources **to meet our Nation's economic, social, and environmental needs.**

**NWS Mission:** to provide weather, hydrologic, and climate forecasts and warnings for the United States, its territories, adjacent waters and ocean areas, ***for the protection of life and property and the enhancement of the national economy.***

**NOS Mission:** to provide products, services, and information that ***promote safe navigation, support coastal communities, sustain marine ecosystems, and mitigate coastal hazards.***

**NMFS Mission:** to provide stewardship of living marine resources through science-based conservation and management, and the promotion of healthy ecosystems; and ***to conserve, protect, and manage living marine resources in a way that ensures their continuation as functioning components of marine ecosystems, affords economic opportunities, and enhances the quality of life for the American public.***

**NESDIS Mission:** to provide timely access to global environmental data from satellites and other sources ***to promote, protect, and enhance the Nation's economy, security, environment, and quality of life.***

**OAR Mission:** to provide the research foundation for understanding the complex systems that support our planet; to working in partnership with other organizational units of NOAA to ***provide better forecasts, earlier warnings for natural disasters, and a greater understanding of the Earth;*** and to provide unbiased science ***to better manage the environment,*** nationally and globally.

1  
2 Figure 1: NOAA Mission Statements.

3 *Note. The objectives acknowledging the social impact of NOAA and requiring the use of social*  
4 *science to meet those objectives are highlighted and italicized.*

5  
6 Many other government agencies have similar and compelling missions that bolster their claim  
7 to a share of limited fiscal resources. Inter-agency competition for these resources is strong.  
8 NOAA is therefore in a position of needing to demonstrate how investment in its missions meets  
9 "our Nation's economic, social, and environmental needs". Ideally, it must be able to do this at the

1 aggregate level (the value of all NOAA services) and at the margin (the value of incremental  
2 investment, or additional funding in NOAA services). In addition, NOAA must allocate its  
3 limited resources across and within its major missions to the extent possible within  
4 Congressional earmarks and its current operational requirements.

5  
6 Resource allocations to and within NOAA lead in turn to outcomes that affect our nation's health  
7 and wealth by influencing the economic decisions and activities of individuals, corporations, and  
8 governance entities nationwide. For NOAA to understand how its investments affect health and  
9 wealth it must have knowledge about how information and stewardship activities influence  
10 decisions and affect outcomes.

11  
12 In order to make more informed decisions about its allocation of resources and the design of  
13 products and services, NOAA needs sound information on; (1) the linkages between atmospheric  
14 and marine conditions and resources, human activity, and wealth and health outcomes, and (2)  
15 the effect of NOAA products and services on human activities. Without this information, it is  
16 much more difficult to understand and convincingly articulate NOAA's contribution to the  
17 nation's economic, social, and environmental needs.

18  
19 The disciplines and skills that provide this kind of information are found within the social  
20 sciences. Social science is "the process of describing, explaining and predicting human behavior  
21 and institutional structure in interaction with their environments" (SSRP 2003). The SSRP found  
22 that these skills were underrepresented and underutilized within NOAA, diminishing its capacity  
23 to make informed decisions.

24  
25 NOAA cannot effectively carry out its mission without sound and relevant social science  
26 research, because it cannot be certain that it is designing and delivering products and services to  
27 best match the needs of its constituents. Meeting constituent needs includes understanding who  
28 constituents are, how they interpret and respond to regulations, how they use information to  
29 make decisions, and how these decision map into changes in wealth and health.

30  
31 Similarly, NOAA cannot consistently articulate the value its products and services deliver to the  
32 nation, nor can it be sure that its resources are allocated efficiently across programs and  
33 objectives, without sound and relevant corporate social science. The effective and efficient  
34 allocation of resources across goals and programs within NOAA is a core aspect of corporate  
35 social science.

36  
37 The SSWG believes that when social science capabilities are fully and appropriately integrated  
38 within NOAA, the agency will be able to better demonstrate the contribution of its products and  
39 services to the economic value of the nation's coastal and marine resources, to the value of  
40 commercial and non-market economic activities, and to changes in the health of the nation's  
41 citizens. NOAA will also be able to show that it is achieving these results cost-effectively.

42  
43 The NOAA strategic plan reaches the same conclusion: "a strong economic and social science  
44 capability is needed so that we can analyze and understand evolving user requirements,  
45 priorities, and benefits of our information, services, and products" (NOAA 2005). A member of  
46 the SSC articulated this as "more social science equals better outcomes" in decision-making.

## 1 **Section 3 - NOAA Progress in Social Science**

2  
3 The SSWG reviewed the progress NOAA made in strengthening social science since the 2003  
4 report. We summarize our findings along the following dimensions: (1) actions taken by the  
5 SAB; (2) social science reorganization and present capabilities; (3) planning and funding social  
6 science within the Planning, Programming, Budgeting and Execution System (PPBES); (5) the  
7 position of social science in NOAA strategic plans; and (6) implementation of the 2003 SSRP  
8 recommendations.

### 9 10 3.1 SAB Actions Supporting Social Science

11  
12 Subsequent to the 2003 report, the NOAA Science Advisory Board (SAB) has taken actions that  
13 support social science in the areas of cooperative institutes, hurricane intensity, research review,  
14 and ecosystems.

#### 15 16 3.1.1 Cooperative Institute Evaluation Matrix

17  
18 In 1999 the SAB adopted eight overarching themes that it recommended be woven into all  
19 aspects of NOAA science, considered in SAB reviews of NOAA science, and used to evaluate  
20 proposals for cooperative institutes. The seventh theme is social science integration. The SAB's  
21 intent was to ensure that all eight themes are considered to a sufficient degree when NOAA  
22 science activities are planned, developed, implemented and reviewed. Although the SAB desired  
23 that the themes be espoused and supported by NOAA leadership and form the basis of any SAB  
24 review of NOAA science, it also indicated that they should not be viewed as necessary or  
25 sufficient criteria for the science review of any individual program. Subsequent conversations  
26 with directors of cooperative institutes indicate that social science integration is not an important  
27 consideration in the approval of cooperative institutes and in fact is a missing component in most  
28 cooperative institutes' plans of work.

#### 29 30 3.1.2 Hurricane Intensity Research Working Group

31  
32 At the request of NOAA HQ, the SAB commissioned the external Hurricane Intensity Research  
33 Working Group (HIRWG) to assess the agency's capabilities in forecasting hurricane intensity.  
34 While the agency has made marked progress in forecasting hurricane tracks, it has made little  
35 improvement in forecasting hurricane intensity, particularly changes in intensity. Ocean  
36 warming over the past century has led and will continue to lead to more intense hurricanes, with  
37 serious societal implications. Growth in coastal populations that was linear during the first half  
38 of the 20<sup>th</sup> Century became exponential in the second half. This demographic migration has  
39 meant that over the past 50 years society has increasingly placed itself in harm's way. There is  
40 an immediate need for coastal regions and communities to make plans to adapt to more intense  
41 events, particularly to those that would be at the \$100B dollar level of impact. NOAA's physical  
42 scientists are not equipped to deal with this regional and community issue. In-house social  
43 scientists are needed to work with communities at risk and assist in developing effective  
44 adaptation strategies.

1 3.1.3 Research Review Team

2  
3 The Review of the Organization and Management of Research in NOAA (Moore et al. 2004),  
4 although not explicitly including social science research in its review, noted that the 2003 SSRP  
5 report contained important recommendations for strengthening of social science research. It also  
6 noted that the Office of Global Programs (subsequently much reduced; cf. Figures 6 and 7) had  
7 made a “small but significant investment in extramural social science research that is particularly  
8 vital for the NOAA Climate Goal and the nation’s Climate Change Science Program” (Moore et  
9 al. 2004; 2005).

10  
11 3.1.4 Ecosystems Working Group

12  
13 The SAB adopted the Final Report of the External Ecosystem Task Team (EETT) in 2006  
14 (EETT 2006). The EETT makes two broad recommendations: 1) develop social science  
15 methods for linking ecosystem science to governance; and 2) develop an understanding of  
16 society and its response to changing environmental components. The report argued that to  
17 develop methods for linking ecosystem science to governance, we must analyze government  
18 policies, regulations, and management services and understand the conditions leading to  
19 government successes and failures. Developing an understanding of societal response to  
20 changing ecosystems requires new tools for identifying and predicting the dynamics and spatial  
21 extent of human responses. In response to the report’s recommendations, NOAA requested that  
22 the SAB appoint a standing committee on Ecosystem Science and Management to provide  
23 continuing advice on implementation. The committee’s terms of reference clearly specify  
24 integration of social and natural sciences as an important element of its charge (NOAA SAB  
25 2008).

26  
27 3.2 NOAA Social Science Reorganization and Present Capabilities

28  
29 After accepting the recommendations of the 2003 SSRP report NOAA senior management  
30 tasked the Research Council to oversee their implementation. PPI was asked to coordinate and  
31 lead the implementation effort. In 2007 the Research Council formed the Social Science  
32 Committee (SSC) to promote and advance the implementation of the recommendations. The  
33 SSC, with membership consisting of social scientists and others representing line offices and  
34 mission goals, is charged specifically with identifying corporate social science research  
35 priorities, advising the Research Council on opportunities for social science research,  
36 coordinating social science research across agencies and programs, and evaluating corporate  
37 planning in terms of scale, scope, and consistency of social science research (Weiher 2007).

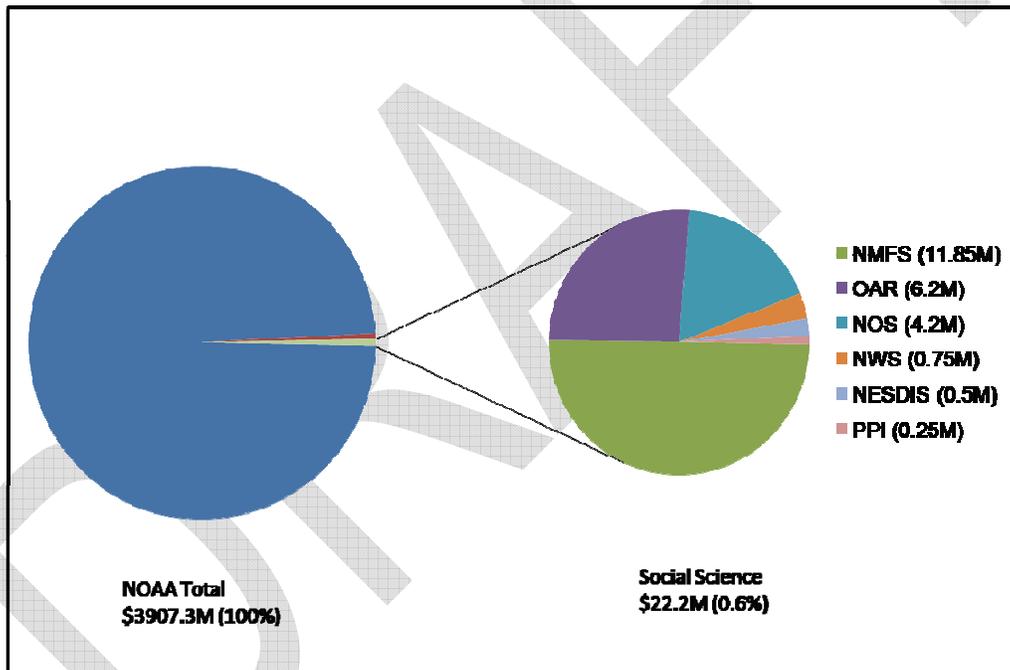
38  
39 These organizational changes were intended to support and strengthen NOAA’s social science  
40 capabilities. However, FY08 data indicate that instead of being strengthened, the capabilities of  
41 NOAA social science are in decline. The decrease exists in both budget and staffing. Between  
42 FY05 and FY 08, despite an increase in the NOAA budget, expenditures on social science  
43 decreased by slightly less than 10%, and numbers of social science staff decreased by 8%.

1 3.2.1 Social Science Budget

2  
3 *Line Offices*

4 Social science accounts for a very small proportion of the total NOAA budget, amounting to  
5 0.6% in FY2008 (Figure 2). This small represents a decline of 0.1% of the NOAA budget since  
6 FY2005 (Figure 3). Comparing the FY08 and FY 05 budgets, we see that while NOAA's budget  
7 increased over this time period, the social science portion decreased both in absolute and  
8 proportional terms. Between FY05 and FY08 the NOAA budget increased by \$475M (13%) and  
9 the social science budget decreased by \$2.2M (slightly less than 10%). These figures are not  
10 adjusted for inflation, which would make these changes somewhat more significant in real terms.  
11

12 By line office, NMFS accounted for the greatest increase (\$1.35M; 13%) in social science budget  
13 in this time period. NWS and NESDIS, both of which have relatively small social science  
14 budgets (\$0.75M and \$0.5M respectively) had a 25% growth in their social science budget.  
15 OAR decreased its social science budget by \$0.4M. NOS decreased its social science budget by  
16 \$1.7M (29%). PPI decreased its social science budget by \$0.35M (60%).  
17



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19  
20 Figure 2. **FY 08** social science budget as a proportion of total NOAA budget and as distributed  
21 across line offices in. Data source Wiley 2008.  
22  
23

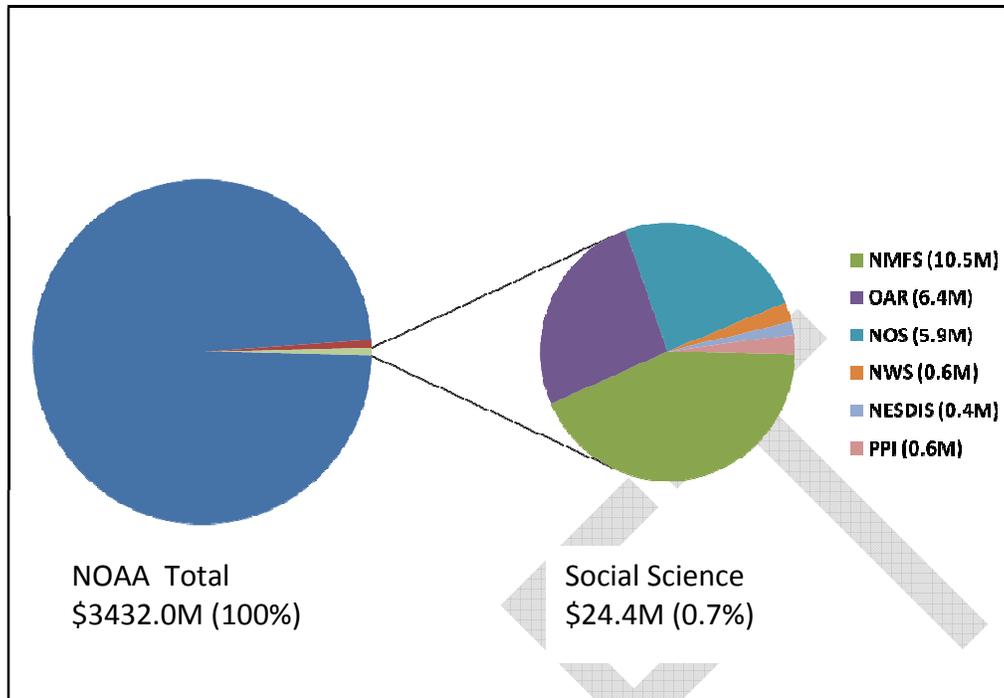


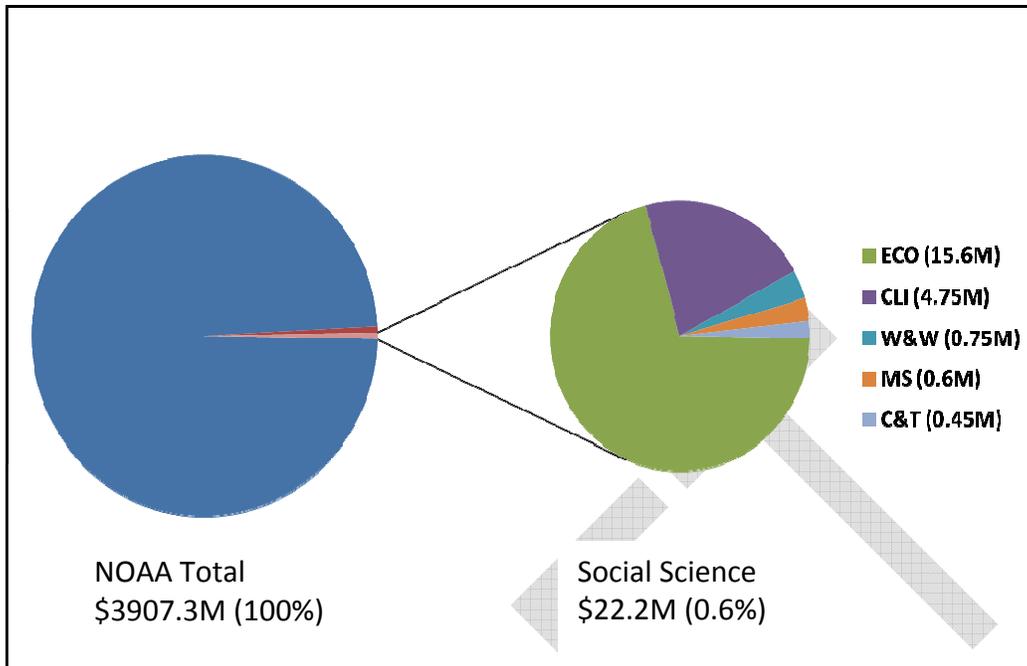
Figure 3. **FY05** social science budget as a proportion of total NOAA budget and as distributed across line offices. Data source: Weiher 2007.

*Mission Goals*

Between FY05 and FY08 the social science budget remained distributed across mission goals in roughly the same proportions, although the budgets for different mission goals changed in this time period (Figures 4 & 5). We are disappointed to find that the social science budget of Ecosystems declined by \$3.1m (16.6%) because ecosystems is an area where a social science research agenda has been adopted and supported by the SAB.

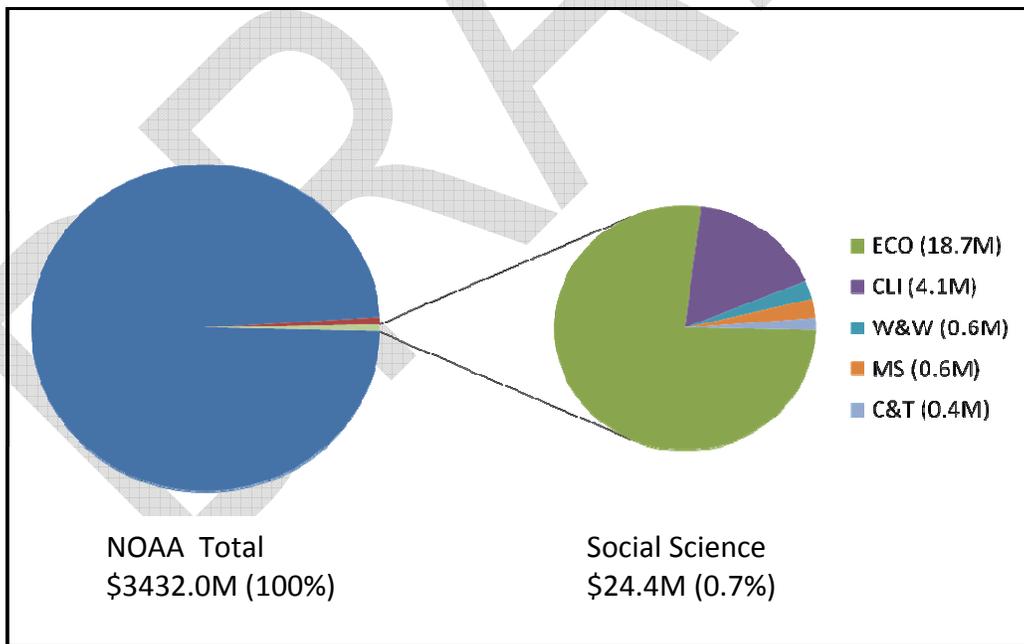
The other mission goals experienced increases in social science budgets, but their overall levels of funding appear to be very low. In particular, Weather and Water increased \$0.15m (25%), Climate increased by \$0.65m (15.9%) and Commerce and Transportation increased \$0.05m (12.5%). The levels appear too low but without an analysis of the contribution that social science can make in improving the goal teams ability to meet their objectives, it is very difficult to say what the appropriate level of funding for social science research is within each mission. Such an analysis is needed and can be carried out via the implementation of corporate social science and scientists.

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Figure 4. **FY08** social science budget as a proportion of total NOAA budget and as distributed across mission goals in. Data source: Wiley 2008. *Note: MS FY08 is assumed equal to FY05.*

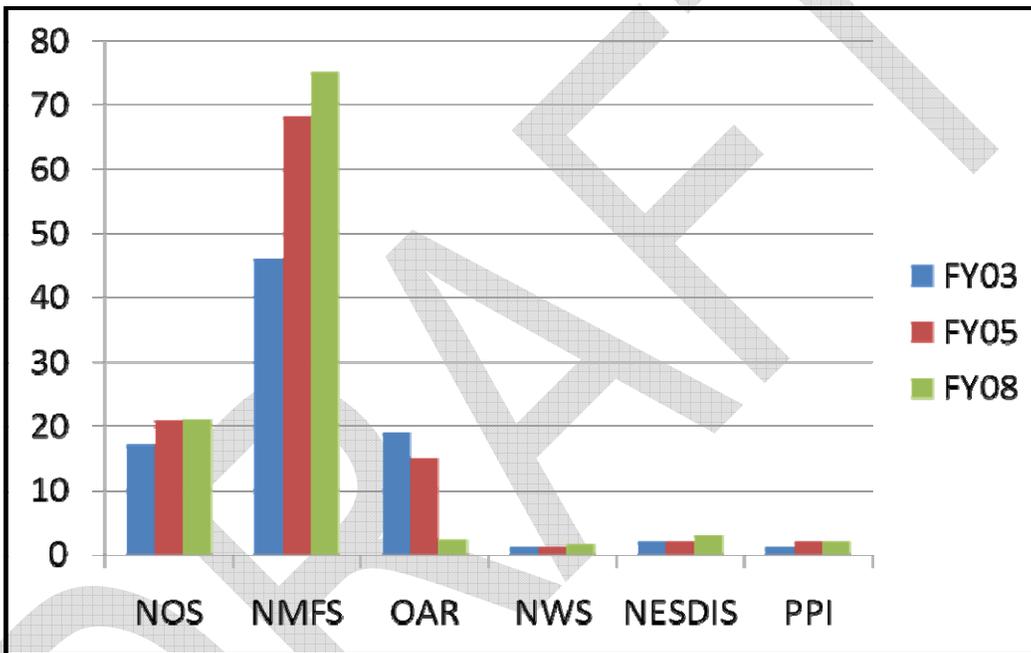


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Figure 5. **FY05** social science budget as a proportion of total NOAA budget and as distributed across mission goals. Data source: Weiher 2007.

1 3.2.2. Social Science Staffing

2  
3 Although social science staffing increased slightly between 2003 and 2005, numbers of social  
4 scientists at NOAA decreased by 8% between FY 05 and FY 08, from 114 to 105. The decline  
5 was not uniform across the agency. Figure 6 shows that between FY05 and FY 08 NMFS was  
6 the only line office that increased its numbers of social science staff by a significant number.  
7 (NESDIS and NWS increased their staff by 1 and 0.5, respectively.) This increase is in line with  
8 NMFS' social science strategic plan that contains specific FTE targets for social scientists. In  
9 2004 NMFS revisited its original FTE targets in the light of new or expanding mandates, and  
10 increased its target to 140 FTEs and a budget of \$30M (Holliday 2008). In contrast, OAR social  
11 science staff declined by 85%. NOS staff numbers remained constant.  
12  
13



14  
15  
16 Figure 6. NOAA Social Science Staffing by Line Office, FY 2003-08. Data source:  
17 Wiley 2008.  
18

19  
20 The functions of social science staff vary by line office and illustrate the diversity of social  
21 science needs within NOAA (Wiley 2008).  
22

23 National Ocean Service (NOS): Damage assessment, database development;  
24 economic and demographic analysis; socioeconomic analysis and monitoring;  
25 spatial analysis.  
26

27 National Marine Fisheries Service (NMFS): Regulatory and management  
28 support, applied research, analytical infrastructure development, survey design  
29 and implementation.  
30

1 Oceanic and Atmospheric Research (OAR): Support human dimensions and  
2 RISA programs; program management and analysis at HQ.

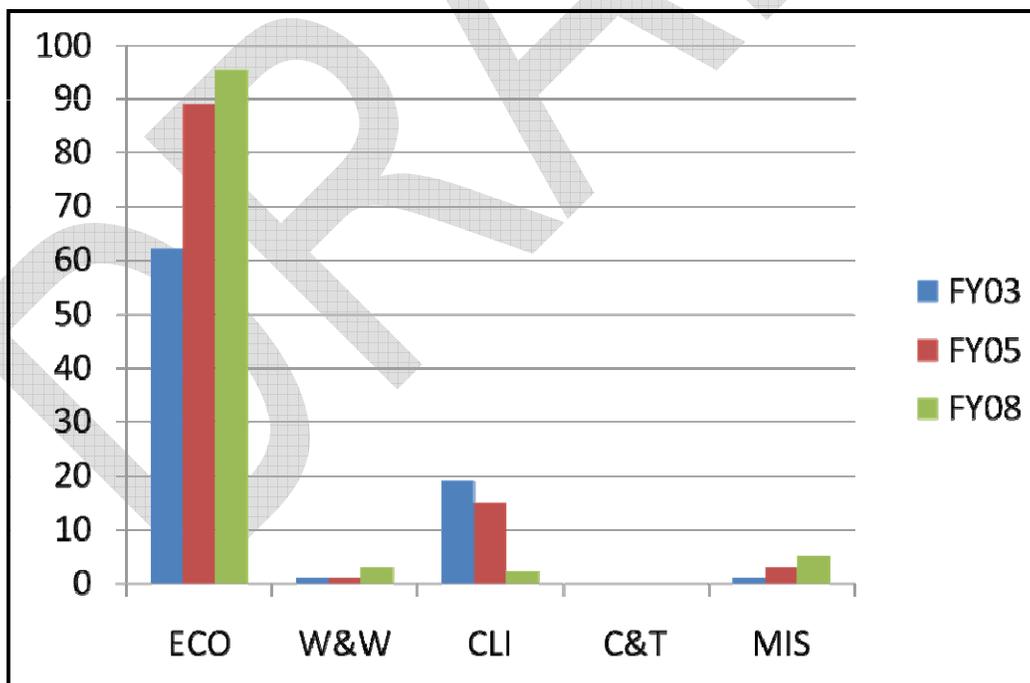
3  
4 National Weather Service (NWS): Support a range of strategic planning and  
5 policy analysis activities.  
6

7 National Environmental Satellite Data and Information Service (NESDIS): GIS  
8 application development supporting social science efforts via visualization  
9 techniques .  
10

11 Looking at social science staffing by mission goal (Figure 7), Ecosystems has shown the greatest  
12 growth in staff, continuing the trend since 2003. This increase was combined with a decrease in  
13 that goal team's social science budget of over 16% between FY05 and FY08. Possible  
14 explanations for this change in staffing are: (1) reprogramming of FTE's to the social sciences;  
15 or (2) a change in the definition of social scientist.  
16

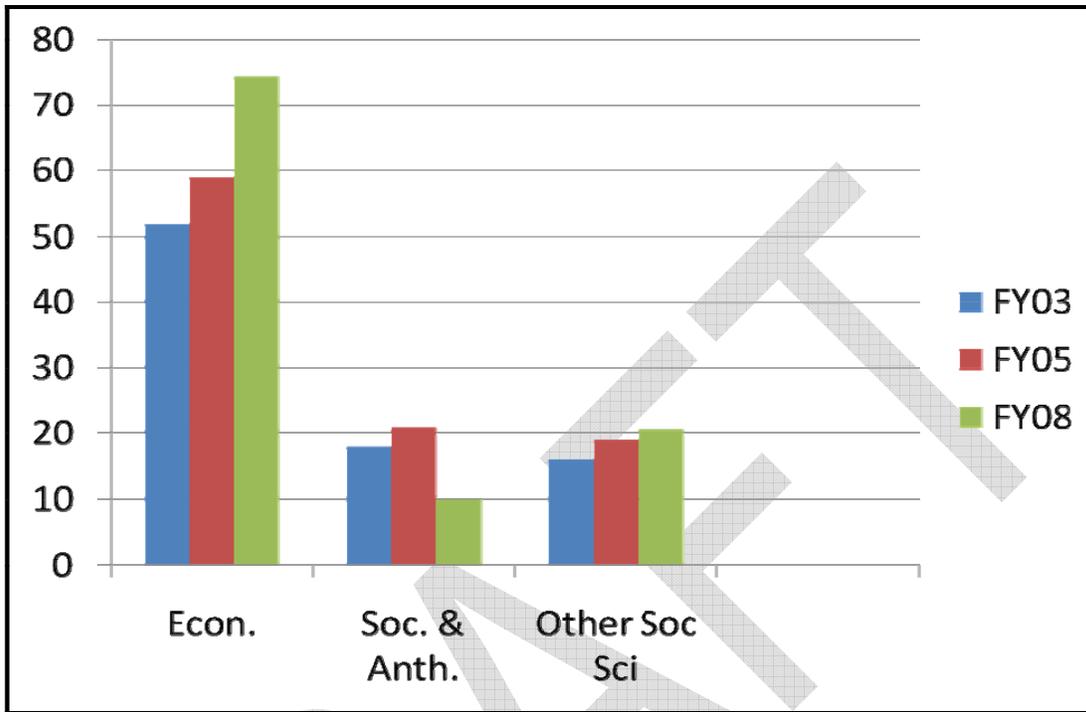
17 Weather and Water and Mission Support have shown slight growth in their social science  
18 staffing component between FY05 and FY08. Over that same period social science staffing in  
19 Climate declined by 85%.  
20

21 With the exception of the Ecosystem Goal Team, in which social science is conducted primarily  
22 in-house, the social science conducted by other Goal Teams is primarily external.  
23



24  
25  
26 Figure 7. NOAA social science staffing by mission goals, FY 2003-08. Data source:  
27 Wiley 2008.  
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Figure 8. NOAA social science staffing by discipline, FY 2003; 05; 08. Data source: Wiley 2008.

10 By discipline, economics continues to dominate the NOAA Social Sciences. Numbers of  
11 sociologists and anthropologists declined between FY05 and FY08, while the numbers of “other”  
12 social scientists increased slightly. These changes in the mix of disciplines would appear to  
13 work against one objective of the ecosystem goal team to increase the representation of non-  
14 economic social sciences over the next 3-5 years (NOAA RC 2008).

15

### 16 3.3 Planning and Funding Social Science within the PPBES

17

18 The Planning Programming Budgeting and Execution System (PPBES) has become a central  
19 focus for the allocation of NOAA funds to programs that cross line offices. A key question for  
20 NOAA is how the relatively recently implemented matrix organizational structure can be used in  
21 the development and integration of social sciences into NOAA’s missions.

22

23 At the programmatic level the PPBES is aimed at improving design and execution of programs  
24 as well as delivery of NOAA services to end users. At the corporate level the PPBES assists in  
25 developing decision support assessments in the investments of funds across the agency (Doremus  
26 2008).

27

1 PPBES is used to assist NOAA in assessing: 1) utility of next generation products and services;  
2 2) impacts of disturbance events; 3) demand for natural resources; 4) perception and  
3 understanding of risk; 5) behavioral incentives; and 6) programmatic outcomes. The extent to  
4 which social science investments are made in each of these applications may vary, but in general,  
5 the social science investment is low.  
6

7 The SSWG heard from various sources that NOAA acknowledges the need to better integrate  
8 social sciences in the PPBES process. The kinds of social science that the PPBES process would  
9 promote would be analysis to provide better decision-support, including analysis of economic  
10 benefits and costs (including the development of preferred methodologies), analytical tools for  
11 tracking and predicting market trends, and consumer behavior.  
12

13 The PPBES is committed first to ensuring the multiple missions of NOAA are met and that  
14 investments in research are more effective across the agency. Significant constraints exist,  
15 however. The PPBES can be costly in terms of time and effort spent to seriously participate in  
16 the process. The lack of NOAA social science expertise means that social sciences are  
17 underrepresented in the process. The underrepresentation is reflected in the absence of standards  
18 for social science integration into the “business case,” a situation that NOAA recognizes  
19 (Doremus 2008a).  
20

21 In addition to these constraints, NOAA has struggled with limited budgets and a relatively high  
22 percentage of funds earmarked for specific projects. This creates a situation where the agency  
23 lacks much discretion in how to allocate its scarce funds across competing needs, including  
24 greater integration of social sciences into programmatic and corporate applications.  
25

26 The SSWG heard in interviews with the AAs that under these conditions social science efforts,  
27 which are seen as a luxury good, are often put aside for better budgetary times. We believe,  
28 however, that tight budgetary environments are the times when social science is most needed.  
29 Corporate social science can assist in analyzing options for allocating scarce resources to their  
30 most valuable uses. With better outcomes, the ability to “sell” NOAA to Congress and its  
31 constituents is enhanced.  
32

33 To NOAA outsiders, the PPBES process is largely opaque and it appears from our interviews,  
34 that the process may not be transparent even for NOAA insiders. We did get indications,  
35 however, that institutional learning is occurring and that this is important in the intra-agency  
36 competition for programs. With each annual cycle the process is said to improve and the results  
37 it generates are demonstrated (Doremus 2008a).  
38

39 The important role of institutional learning makes it all the more critical to examine how and to  
40 what extent the PPBES can be used to advance social science integration. The SSWG  
41 understands that some progress has been made integrating social sciences into NOAA’s missions  
42 during the period when the PPBES has been used in planning. Whether this has been a result of,  
43 or despite, the PPBES is not obvious. Could similar or better results have been achieved in other  
44 ways? Clearly, the PPBES is capable of effecting change in a large organization but significant  
45 organizational inertia remains. Developing strategic plans for social science at the line office  
46 level and assigning them importance at the programmatic level is a key starting point. Creating a

1 demand for social science integration at the corporate level through the PPBES by applying  
2 social science standards for the “business case” can also create incentives. These efforts,  
3 however, have to be seen as having value in the decision-support role across NOAA.

#### 4 5 3.4 Social Science in NOAA Strategic Plans 6

7 After reviewing many documents and discussing the current role of social science and social  
8 scientists throughout NOAA, the SSWG concurs with the comments of SSC members regarding  
9 the trend in understanding the importance of and incorporating social science research into  
10 NOAA’s missions. The SSC conclusion is that social science is increasingly finding its way into  
11 the language of the Goal and Programs, and in some cases, is becoming a key element of the  
12 program.

13  
14 Some prominent examples of the increasing presence of social science within Goal Teams  
15 include: (1) Regional Decision Support in Climate; (2) Ecosystem Observation Program in  
16 Ecosystems; (3) Marine Transportation Systems in Commerce and Transportation; and (4)  
17 Hydrology in Weather and Water. Table 1 includes examples of statements in the Research  
18 Council’s 5-year strategic plan that articulates the importance of social science research (NOAA  
19 Research Council 2008).

20 Table 1: Illustrative statements illustrating the role for and importance of additional social science  
21 research from NOAA’s Research Council 5-year Strategic Plan.  
22

<p><b>Weather and Water</b> (page 43) “NOAA will improve its Advanced Hydrologic Prediction Services (AHPS) to monitor and predict the runoff from snow-melt, forecast snow levels, and monitor soil moisture which can precondition runoff rates... Because of the substantial economic impacts of reservoir operations on power generation, flood control, and potable water and agricultural water use, these research efforts will include social scientists.”</p>
<p><b>Commerce and Transportation</b> (page 55) “NOAA has identified the societal, economic, and cultural consequences of spills and associated response activities on affected communities as a high priority for research. Specific project topics ... for improved understanding and effective response include: subsistence, social impacts, response organization impacts, risk communications, and environmental ethics issues. This area of research has the potential to greatly affect commerce and transportation by revolutionizing the response organization.”</p>
<p><b>Societal Impacts</b> (page 7) “The integrated observing and modeling system will, in large part, be defined by and be responsive to local needs; .... In this context, research and assessments in social science and in the economics of weather, climate, and ecosystems will become increasingly important in expanding our understanding of processes and structures that describe how humans interact with the environment. This research includes understanding the most effective means of communicating NOAA’s science and information to users, determining the needs of users and what is required to meet those needs, and assessing the economic value of this information.”</p>

23 In terms of the corporate social science functions within NOAA, PPI acknowledges in its  
24 strategic plan that it works towards ensuring that “NOAA’s plans, investments, and actions are

1 guided by a strategic plan responsive to societal needs and that its investments are based on  
2 sound socio-economic policy.”

3  
4 The SSWG applauds this trend toward increased visibility for social science in strategic plans,  
5 but at the same time, we concur with the SSC members in their view that that while many  
6 program operating statements (POPS) state there is a societal impact, there is very little research  
7 into measuring the magnitude of the impact and an overall a sustained, coordinated, and  
8 comprehensive social science research agenda has not been developed. In addition, while senior  
9 leaders acknowledge the importance of social science, it has no high level advocate. Social  
10 science is often treated as a rhetorical benefit but is seen as a low priority in resource allocation  
11 decisions. The FY08 data on social science budgets and staffing support this observation.

### 12 13 3.5 Progress on 2003 Report Recommendations for Social Science within NOAA

14  
15 The overall consensus of a number of sources about overall progress in strengthening social  
16 science within NOAA is that some progress is being made in strengthening social science within  
17 NOAA but that progress is slow and mixed, and many challenges remain. However, the FY08  
18 data on budgets and staffing for social science contradicts even this conservative assessment of  
19 progress. The data indicate that the progress in social science made between FY03 and FY05  
20 has eroded, leaving social science in a weaker position in 2008 than in 2005.

21  
22 Despite the overall picture of decline, there are specific examples of progress that are worth  
23 noting. A briefing to the SSWG in 2007 summarized areas of progress and remaining challenges  
24 (Weiher 2007).

#### 25 26 *Areas of progress*

- 27 • NMFS commitment to fully implement its enhanced social science strategic plan.
- 28 • NOS comprehensive social science plan and planning process.
  - 29 ○ NCCOS: social science strategic plan
  - 30 ○ CSC: increasing social science capacity
- 31 • Commerce & Transportation Goal Team: analysis of benefits of navigation products.
- 32 • Weather & Water Goal Team: support for NCAR’s Societal Impacts of Weather  
33 Program.
- 34 • NOAA Strategic and Research Planning and PPBES: increased consideration of social  
35 science
- 36 • NOAA programs: approaches to PPI staff to assist with integration of social science

#### 37 38 *Remaining Challenges*

- 39 • Social science research and analysis does not adequately support “One NOAA”  
40 objectives because it is largely “programmatic” rather than research oriented.
- 41 • Social science is not integrated into Goal Teams’ and Research Council’s analyses for  
42 resource prioritization.
- 43 • Many social science research and analytic capabilities are opportunistic rather than  
44 sustainably integrated into permanent program planning.
- 45 • Social science is still a low budgetary priority in most programs and in NOAA.

- While social science supports certain management actions, NOAA-wide it is still viewed more as a tool to justify NOAA products rather than a tool to improve how products are produced.
- Social science needs to be integrated into climate research in the design and operation of a Climate Service.

## IMPROVING EFFECTIVENESS

### Section 4 – A Vision for Social Science within NOAA

A central issue for NOAA social science is its integration within the new NOAA management structure. In establishing the Terms of Reference for the SSWG, NOAA asked it to address four questions specifically related to outcomes achievable with the integration of social science. The answers to these questions outline critical themes that need to be part of the vision for integrating social science within NOAA over the next 5 years.

#### 4.1 How can NOAA better identify and measure (qualify and quantify) its programmatic outcomes?

The most appropriate way to describe programmatic outcomes is with reference to NOAA's mission and to the societal value generated by NOAA's products and services. When social science capabilities are fully and appropriately integrated into NOAA activities, NOAA will be able to demonstrate the contribution of its products and services to the economic value of: (1) the nation's stock of coastal and marine resources; (2) commercial and non-market economic activities; (3) changes in the health and safety of the nation's citizens. Integration of social science will also enable NOAA to show that it is achieving these results in a cost-effective manner. The value of NOAA's programmatic outcomes is seldom directly observable in market data because NOAA's products and services are not sold in markets. Instead, the value of NOAA's products and services requires estimation and modeling, primarily with the tools of social science.

For example, NOAA has a significant backlog of hydrographic surveys using multi-beam technology to map water depth and navigational hazards. Much of the nation's waters have been surveyed only with widely spaced single-beam technologies. At the present level of investment, this backlog will take decades to eliminate. Prioritizing areas in need of (re-)survey and the appropriate rate at which to carry out these surveys, is best done with analysis. This analysis should consider the physical and economic risks and benefits that follow from either carrying out or deferring a new survey in a given place. At present, NOAA does not have the capability to carry out this analysis.

1 4.2 How can social science help NOAA and its partners effectively integrate natural science into  
2 decision-making?  
3

4 Social science provides the base for understanding human behavior, specifically, for how NOAA  
5 products and services affect decisions and outcomes related to human safety and health and to  
6 the economy. Natural science can be better integrated into NOAA decision-making if  
7 consideration is first given to the users of information, the processes by which information is  
8 used to make decisions, and the level at which decisions will be made; e.g. policy, emergency  
9 response, or households.

10  
11 For example, in designing natural science research and products to support the nation in its  
12 response to climate change, it will be useful for NOAA to begin with a clear understanding of the  
13 political and economic constraints of alternative responses. By first considering the range of  
14 decisions that organizations and individuals will make in response to potential future climate  
15 change, NOAA will be able to design and target its natural science efforts to best support those  
16 decisions.  
17

18 4.3 How can social science itself be integrated into decision-making of NOAA and its partners?  
19

20 One of the keys to building and integrating effective social science capability in NOAA goal  
21 teams and line offices is a top-down commitment to allocating resources within NOAA based, at  
22 least in part, on social benefits and economic returns. This commitment will make real the need  
23 for each line office, goal team and program to understand and quantify the contribution its  
24 products and services make to social and economic goals. It will also encourage efficient  
25 internal allocations of resources within programs and projects. Each of these aspects requires  
26 social science. When line offices, goal teams and programs are expected to produce information  
27 on their contribution to social and economic goals, they will have the incentive to invest in social  
28 science capabilities. NOAA decision-making that is focused on social benefits, value-added, and  
29 efficient use of resources will necessarily have social science at its base.  
30

31 Because it will take time for the incentives that stem from these commitments to change the  
32 culture at NOAA, the SSWG believes that NOAA should invest simultaneously in social science  
33 research in ongoing projects. We believe that these efforts should be larger than just one project,  
34 in order to demonstrate the capacity of social science to enhance the value of natural science  
35 research across a broad spectrum of topics. NOAA should also consider using social science  
36 research to analyze the benefits and costs of using in-house social science capacity and/or  
37 contractors.  
38

39 For example, an important feature of weather and climate forecasts is the uncertainty they  
40 embody. Public and private users of these forecasts must consider this uncertainty, the range of  
41 risks it represents, and their own risk perception and tolerance when using these forecasts to  
42 inform short-term and long-term decisions. The way NOAA communicates the uncertainty  
43 contained in its weather and climate forecasts therefore has the potential to make a large  
44 difference in the way forecasts are used and the outcomes they affect. Recent responses to  
45 Hurricane Ike, such as the refusal of large numbers of people to obey evacuation orders, are a  
46 case in point. It is important for NOAA to design the delivery of the information it generates

1 with this in mind. Understanding the perception of, tolerance for and aversion to risk among the  
2 users of its products – a field of social science incorporating economics, psychology, and other  
3 disciplines – should therefore be central to NOAA’s decisions about product design and  
4 communication.

5  
6 4.4 How can social science capabilities at NOAA be strengthened where currently they are  
7 weak?

8  
9 Social science capabilities can be strengthened in part by providing the right incentives to line  
10 office and program managers to incorporate decision-making metrics that are relevant to society.  
11 This in turn necessitates developing social science capacity through hiring social science staff or  
12 retaining outside expertise. Corporate social science requirements initiated by the Business Case  
13 approach for FY11+ provide a motivation for programmatic social science (Doremus 2008a).

14  
15 The SSWG supports the business planning approach described in the 2008 Attachment to  
16 Planning Guidance Memorandum III (Doremus 2008b) and recommends that NOAA leadership  
17 use this process to motivate and incentivize all NOAA managers to include the social sciences in  
18 program planning, design, execution, and evaluation. To accomplish this, NOAA senior  
19 leadership should commit in concrete terms to strengthening over the next five years the  
20 requirement for economic and other societal impact information in the intra-NOAA planning and  
21 resource allocation process. This would be a way of using corporate social science information  
22 to drive integration of social science. In addition, this commitment should be reinforced by  
23 incorporating specific indicators incorporated into annual work plans and used in the annual  
24 performance evaluation of administrators.

25  
26 NOAA can strengthen social science capabilities by putting in place appropriate social science  
27 expertise to guide, inform, and support the application of social science for corporate planning  
28 and program development. In particular, NOAA can create a leadership role for social science  
29 coordination, integration, and implementation by establishing an Office of Societal Impacts that  
30 reports directly to the Deputy Undersecretary for Oceans and Atmosphere.

31  
32 The Office of Societal Impacts would provide a centralized social science capacity to address  
33 needs for knowledgeable and sustained social science input at the upper levels of NOAA  
34 administration. It would also serve as an advocate for NOAA social sciences and a support for  
35 the social sciences across line offices whose needs for social science might be too variable or are  
36 insufficient to develop internal capacity. Even those line offices that are able to increase their  
37 internal social science capacity will continue to need some centralized social science capacity  
38 over the long term.

39  
40 The Office of Societal Impacts would also have the benefit of providing consistency for social  
41 sciences across all of NOAA. It could support a critical mass of social scientists that enables  
42 professional interactions and disciplinary diversity in the agency’s social science portfolio. The  
43 Office of the Chief Economist is the closest NOAA has come to this organizational structure, but  
44 the staffing of the office has never approached levels that would be considered a critical mass,  
45 nor has it embodied the disciplinary diversity that NOAA needs.

1 NOAA will also be assisted in strengthening social science capabilities by establishing a  
2 standing Social Science Working Group of the SAB to provide ongoing advice, oversight and  
3 quality control for NOAA social science, and to contribute to the articulation of the “grand  
4 challenges” facing the social, behavioral and economic sciences within NOAA (NSTC 2007).  
5

## 6 **Section 5 - A Path for Achieving the Social Science Vision**

7

8 Achieving the vision for strengthened social science within NOAA is a path that requires  
9 advocates within NOAA leadership, support of the AAs, and a commitment to change the culture  
10 of NOAA. NOAA has a number of options for staffing, funding, and performance measurement  
11 of social science, and it is clear that no single model that will be optimal across all line offices  
12 and goal teams. The organizational support required for social sciences will likely change over  
13 time as needs and capacity develop and with the evolving roles of the line offices and mission  
14 goal teams.

### 15 5.1 Staffing Models

16

17  
18 The SSWG reviewed a number of staffing models for social science, including those used by the  
19 USDA Economic Research Service (ERS), USDA Cooperative State Research, Education, and  
20 Extension Service (CSREES), USEPA National Center for Environmental Economics (NCEE),  
21 USEPA National Center for Environmental Research (NCER), and USFWS Division of  
22 Economics. These social science programs emphasize economics and represent only a small  
23 portion of the total professional staff of their respective agencies. For example, as of 2001,  
24 NCEE had 112 economists, less than 3% of EPA professional staff (McGartland 2008).  
25

26 The social science programs of these agencies developed over a multi-year period of investment  
27 and commitment to undertake and integrate social sciences. The model adopted by each federal  
28 agency is a result of its mission, mandates, constraints, and opportunities. Much of the social  
29 science research has been driven initially by regulatory requirements, executive orders, or legal  
30 mandates. Some programs were later further enhanced following the identification of issues  
31 requiring focused research efforts, such as environmental valuation at NCEE, land and species  
32 management at USFWS, and food safety issues at USDA.

33  
34 Presenters from several agencies noted that it is difficult to measure the outcomes of their social  
35 science investment in a manner commensurate with natural science outcomes. They identified  
36 staffing and budget issues as key constraints to the development of social science capacity. Some  
37 also noted the advantages of leveraging and cooperating across agencies – such as working with  
38 NSF to develop and implement cross-agency grant programs.

#### 39 5.1.1 Internal Staffing

40

41  
42 In an internal staffing model NOAA would hire social scientists as federal employees. Internal  
43 staffing could involve a centralized or “top down” capacity where a critical mass would be  
44 developed (possibly within HQ) to serve social science needs across NOAA, a “bottom up”  
45 capacity where each line office develops social science capacity to meet its specific needs, or a  
46 combination of top-down and bottom-up approaches.

1  
2 In the short-term, until NOAA can develop and support adequate capacity at all levels  
3 throughout the agency, the SSWG feels that a strong centralized social science capacity, such as  
4 the proposed Office of Societal Impacts (Section 4.4), will be optimal for undertaking and  
5 supporting both corporate and programmatic social science. Longer term, a mixed  
6 centralized/diffused social science model may best meet NOAA's needs once sufficient capacity  
7 is developed agency wide. A centralized social capacity could focus on corporate needs for  
8 social sciences while capacity within the line offices or goal teams could meet programmatic  
9 needs such as those faced by NMFS.

10  
11 The National Ocean Service (NOS) and National Marine Fisheries Service (NMFS) currently  
12 follow an internal staffing model, partly in response to specific regulatory needs. These line  
13 offices represent the largest social science capacity in NOAA. Each employs social scientists  
14 across different offices and programs. Although both have increased capacity since 2003, since  
15 2005 NMFS has continued to increase its internal social science staff but NOS has not. Both line  
16 offices are at sub-optimal levels of social science staffing (Matlock 2008; Holliday 2008). This  
17 is illustrated within NMFS by the fact that although the number of economists and  
18 anthropologists in every science center has more than doubled, NMFS still achieves only about  
19 one-third of identified social science needs (Holliday 2008.)

20  
21 Within the line offices, the optimal allocation of social science capacity between the  
22 headquarters and field offices or programs needs to be considered closely. For example, a  
23 dedicated social science position at the HQ level would help coordinate across program offices,  
24 integrate social science into PPBES alternatives and promote inclusion of critical concepts and  
25 research in outreach products.

#### 26 27 5.1.2 External Staffing

28  
29 The external staffing model obtains social science capacity without hiring social scientists as  
30 federal employees. This approach may provide cost savings, allow flexibility in undertaking  
31 shorter term projects, allow faster response in obtaining analysis if internal capacity is  
32 inadequate, and allow collaboration with external groups such as the private sector and  
33 academia. External models include: (1) outside contracting; (2) virtual centers; (3) cooperative  
34 institutes; and (4) grants programs.

#### 35 36 *Outside Contracting*

37 A growing proportion of the NOAA workforce comprises contractors (Sen 2007). It is an open  
38 question as to whether a contractor produces the same results for NOAA as a federal employee.  
39 Some contractors are largely integrated into the NOAA line office structure but are not federal  
40 employees.

41  
42 Outside contracting can also take the form of contracts to external entities, such as consulting  
43 firms, for specific projects. The NOAA Chief Economist has used this approach over the last  
44 several years to support a series of economic studies. Reports from these contracts are the base  
45 of much of the current knowledge about economic benefits and costs of NOAA products and  
46 services. If contracting is used to provide access to social science expertise, however, it will be

1 important to work with a variety of contractors who have training in a broad range of social  
2 science disciplines.

### 3 4 *Virtual Centers*

5 The virtual center approach allows for flexible integration with external entities such as the  
6 American Meteorological Society (AMS), National Center for Atmospheric research (NCAR),  
7 World Meteorological Organization (WMO), and private sector weather interests. It also helps  
8 build a broader community and capacity beyond NOAA, and promotes the development of a  
9 research agenda that ranges from basic research to applications development. As non-Federal  
10 employees outside of headquarters, virtual center employees may not be as connected internally  
11 to the NOAA workforce, but the Centers have the advantage of greater administrative and  
12 funding flexibility.

13  
14 A good example of the virtual center approach is the Societal Impacts Program (SIP) at NCAR  
15 that has been supported in part since 2003 by the NOAA's US Weather Research Program  
16 (USWRP). In recognition of NOAA's lack of internal capacity in this area, the SIP was funded  
17 to achieve a number of objectives: (1) develop social science capacity focused on valuation and  
18 communication of weather information; (2) support and develop the *Weather and Society* \*  
19 *Integrated Studies (WAS\*IS)* program; (3) develop a set of information resources including an  
20 online database of weather impacts and a societal impacts newsletter; and (4) be integrally  
21 involved in developing weather related social science capacity at national and international  
22 scales. NOAA, in cooperation with the University of Oklahoma, is also supporting a small social  
23 science effort to support research, outreach, and collaboration largely related to severe weather.

### 24 25 *Joint and Cooperative Institutes*

26 The SSWG met with the directors of the Joint and Cooperative Institutes to discuss their use of  
27 social science research and followed up this discussion with a questionnaire. Although a few of  
28 the CI's are topically focused outside the realm of the social sciences, most of the directors of the  
29 Cooperative Institutes indicated a strong interest in incorporating social science research into  
30 their programs. Directors felt they were limited by what they perceive to be a lack of  
31 encouragement and financial support from NOAA for placing greater emphasis on social science  
32 research within their institutes despite the recommendation from the NOAA SAB that social  
33 sciences be considered in the renewal or "recomplete" process for Joint and Cooperative  
34 Institutes.

### 35 36 *Grants*

37 Social science capacity could be enhanced through external grants. This approach would be  
38 similar to external contracting, with the primary difference being that grants provide less direct  
39 control on the content and conduct of the research effort. While the general focus for a grant  
40 program can be defined by NOAA, the exact topics and methods of grants are generally defined  
41 by the researchers. This approach has the advantage of letting those with expertise in a particular  
42 area identify the basic research needs. Such an approach is more amenable to primary research  
43 as than to developing specific products or applications. For example, EPA coordinated a grants  
44 program with NSF to address primary research issues on environmental economics with a focus  
45 on valuation methods. As an example of a grant program to meet NOAA needs, NOAA  
46 cooperated with NSF in 2008 on a grant solicitation on Communicating Hurricane Information

1 (CHI – Program Solicitation NSF 08-551) to support primary research on societal aspects of the  
2 communication of hurricane forecast information. It should be noted that the grant approach still  
3 requires an internal capacity at NOAA to appropriately identify issues, oversee the scientific  
4 components of the grant process, and incorporate grant results.

### 5 6 5.1.3 Staffing Incentives 7

8 The SSWG feels that the best way to ensure sustainable long term results in integrating social  
9 sciences into NOAA is to make sure the correct incentives are implemented in NOAA to support  
10 social science activities. As NOAA is defined as a mission agency this would involve  
11 adequately judging NOAA outcomes in terms of stated objectives of societal impacts – this  
12 requires social science to: (1) measure outcomes; (2) achieve outcomes beneficial to society; and  
13 (3) improve performance within the organization. When performance metrics relevant to society  
14 are in place, line offices and mission goal teams will have the incentive to build and fully  
15 integrate social science capacity.  
16

### 17 5.1.4 Social Science Budgets 18

19 The SSWG concludes that in the long term a blanket requirement that a specific portion of  
20 NOAA budgets be allocated to social sciences is inappropriate. Our reasoning is that in the long  
21 term, once social sciences are fully integrated into NOAA and their value and capabilities fully  
22 recognized by NOAA decision makers, the appropriate level of social science funding will be  
23 balanced against funding other activities based on the relative benefits of different activities.  
24

25 However, in the short term there is inadequate incentive to fund social sciences and an  
26 inadequate understanding on the part of decision makers as to why they need to do so. The  
27 SSWG therefore recommends that in the short run 5% of all line-office funds be allocated to  
28 social sciences in order to begin fully integrating social sciences into NOAA activities. The  
29 SSWG also strongly feels that “waiting until more money is available” is not a valid excuse for  
30 not increasing social science capacity in the short term. Given that budgets are likely to remain  
31 tight in the near term; funding social science at the 5% level will necessitate reallocation of some  
32 resources from other activities.  
33

## 34 5.2 Transition to a Social Science Research Agenda Within NOAA 35

36 A social science research agenda is well articulated within the NMFS (NMFS 2004) and NOS  
37 (NOS 2007) line offices. Looking across all line offices, the SSWG sees rich opportunities for  
38 social science research investments in the thematic areas of climate, coasts and oceans, weather  
39 and water, ecosystems, and weather, commerce and transportation.  
40

### 41 5.2.1 Climate 42

43 The goal of a social science strategic plan for climate would be to create a coordinated social  
44 science capability that is integrated with programs and decision support systems related to  
45 climate.  
46

1 Climate as an organized activity is in its literal infancy and thus is not yet well conceived. Even  
2 the definition of “climate” as it relates to or contrasts with “weather” is still a source of debate.  
3 That definition, be it temporal or spatial or both, may seem purely academic but not so in the  
4 federal division of responsibilities; even within an agency, between agencies and organizations.

5  
6 Ultimately the value of climate as an enterprise is not in knowledge per se but in the provision of  
7 climate information as a decision support tool. As in NOAA’s other research areas, scientific  
8 information alone is not sufficient for decision-making. The user of the information must be a  
9 part of identifying what information is needed and how it is provided. Social scientists are  
10 skilled in analyzing the societal interface. Yet despite the importance of social science in  
11 addressing critical questions related to what users of climate information do, and therefore what  
12 they need, the use of social science in climate has not been well defined nor formally established,  
13 nor has it even gained core acceptance. Thus social science has not yet carved a niche within  
14 NOAA’s climate mission goal.

15  
16 NOAA’s social science objectives for climate can be accomplished through the incorporation of  
17 social science as a core element in the ongoing discussion of the definition and development of a  
18 national climate service capability within NOAA. The social science component would have  
19 several components: (1) long-term capacity building; (2) developing methods, analyses and data  
20 for decision support; (3) infusing results of analyses into decisions and programs to improve  
21 products and services; (4) improving the use of social science; and (5) assuring an appropriate  
22 level of effort for climate social science to meet growing needs.

23  
24 There are several short-term opportunities for social science to contribute to NOAA decisions  
25 and operations by conducting and building capabilities for studies in priority areas. External  
26 research can be more fully examined to ensure that available studies are utilized without  
27 duplication. Analyses can assist in setting priorities in the FY 2012- 2016 and subsequent  
28 Program Operation Plans (POPS), including coordination with test bed programs. Coordination  
29 can be increased through the NOAA RC SSC. Cooperative grant relationships can be developed  
30 with organizations such as the National Science Foundation and its Social, Behavioral, and  
31 Economic Sciences Directorate. NOAA’s support for and relationship with the NSF sponsored  
32 Societal Impacts Program at NCAR can be strengthened.

33  
34 Analytic priorities include assessing user needs, understanding perceptions of and responses to  
35 climate information, analyzing demand for services and distribution methods, communication of  
36 forecast uncertainty and complex information more generally, understanding the societal effects  
37 of climate conditions, addressing interrelated needs of communities and regions, valuation of  
38 program benefits and other decision support services, and developing tools for communicating  
39 with and educating stakeholders.

40  
41 To further these efforts, a Social Science Strategic Plan for Climate should be formally  
42 integrated as a core element of national climate services and as such into the R&D portfolio of  
43 the Climate Goal Team. The Climate Social Science Strategic Plan should be coordinated with  
44 present and future versions of the social science plans of other mission goals as well as the  
45 NOAA Strategic Plan and NOAA Research Plan as part of the development of a national climate

1 service. Delaying these plans will result in a lost and valuable opportunity to integrate social  
2 sciences.

3  
4 A complement and supplement to the social science strategic plan for climate is a social science  
5 strategic plan for climate and national security. NOAA's and other agencies' geospatial  
6 technologies are capable of globally assessing climate change and its impacts. Recent imagery  
7 has clearly shown a strong connection between emerging climate-induced changes and national  
8 security through climate effects such as extremes in water availability, more frequent and  
9 extensive inundation of coastal areas, agricultural zone migration, desertification, loss of  
10 habitats, frequent disease outbreaks, and the creation of climate refugees. These effects could  
11 lead to destabilization of both developing and developed countries, including the United States.  
12 Dealing with this emerging challenge requires the engagement of social scientists. An in-house  
13 NOAA social scientist capability could bring the agency to the fore, allowing NOAA to use its  
14 technology to under-gird a strategy for national security as it relates to the potential  
15 destabilization of societies by climate impacts.

### 16 17 5.2.2 Coasts and Oceans

18  
19 The National Ocean Service (NOS) published a Social Science Plan in 2005 (NOS 2005). The  
20 stated purpose of the plan is "to initiate a coordinated effort to build social science capacity in  
21 NOS, in order to help NOAA NOS achieve its Mission Goals."

22  
23 The Plan's vision is to: "Strengthen program planning and management, decision making, and  
24 performance measures throughout the agency to improve NOAA integration of physical and  
25 social sciences within NOS, across NOAA, and with outside organizations."

26  
27 The Plan has four goals, all of which engage the social sciences:

- 28 • Enhance NOAA's ability to monitor, understand, evaluate, and communicate  
29 socioeconomic benefits of NOAA/NOS information, services, and products.
- 30 • Provide more accurate and comprehensive decision-support tools for ecosystem  
31 management by integrating social science, natural science, and monitoring results.
- 32 • Improve models and methods for assessing the impact of human and natural  
33 disturbances to coastal and ocean resources and infrastructure.
- 34 • Increase the relevancy of NOAA efforts by improving understanding of the needs,  
35 knowledge, perceptions, and values of NOAA partners and constituents.

36  
37 The Plan identifies priority social science topics and themes, existing (FY04/05) social science  
38 capacity and efforts, needs and issues related to social science, a strategy to achieve social  
39 science goals, and a list of ongoing and potential future projects for eight NOAA PPBES  
40 thematic areas: (1) Coastal and Marine Resources, (2) Corals, (3) Ecosystem Research, and (4)  
41 Habitat Restoration in the Ecosystem Mission Goal; (5) Geodesy, (6) Emergency Response, and  
42 (7) Marine Transportation Systems in the Commerce and Transportation Mission Goal; and (8)  
43 Coasts, Estuaries and Oceans in the Weather and Water Mission Goal.

44  
45 The goals and objectives articulated in the Plan are consistent with the intentions of the 2003  
46 SSRR report and with the present SSWG report, but there appears to have been no high-level

1 commitment within NOS to carry forward the process described in the Plan for integrating social  
2 science work across NOS activities. The social science projects in the Plan are a largely  
3 programmatic in nature, linked to overarching goals only in general terms, and were assembled  
4 in a bottom-up process of discussions with program managers rather than a top-down, goal-  
5 driven process designed to ensure information useful for NOAA corporate purposes. The Plan  
6 acknowledges that it does not present a fully developed, consistent, and sufficient social science  
7 agenda, but rather a starting point to which NOS would have to make continuous adjustments as  
8 circumstances, and the understanding of social science needs across NOS, evolve. That has not  
9 happened to date, although economists and others within NOS continue to advocate for this  
10 work.

11  
12 Following the NOS Social Science Strategic Plan, the NOS National Centers for Coastal Ocean  
13 Science developed a Human Dimensions Strategic plan for FY2009-2014 (NCCOS 2007). The  
14 mission of the NCCOS is to “provide coastal resource managers and other decision-makers and  
15 stakeholders with scientific information and tools needed to balance society’s environmental,  
16 social and economic goals” (NCCOS 2004). The Human Dimensions plan is intended to expand  
17 NCCOS’ science program to include a focus on people. It provides the basis for the  
18 implementation plan currently in development (Matlock 2008).

19  
20 The Human Dimensions Strategic Plan contains four goals critical to support an ecosystem  
21 approach to management (NCCOS 2007):

- 22 • Provide human dimensions understanding: coastal decision-making, human causes and  
23 socioeconomic drivers of ecosystem stress, societal consequences of policy and  
24 management, traditional and local ecological knowledge, institutional strategies,  
25 evaluation of products and services, and socially responsible science.
- 26 • Provide integrative ecosystem understanding: integrative ecosystem models and decision  
27 support tools and integrated ecosystem assessments.
- 28 • Promote ecosystem resilience: risk and vulnerability assessments and risk  
29 communication
- 30 • Provide critical support for human dimensions research: organizational capabilities and  
31 communications, outreach and education.

### 32 33 5.2.3 Weather and Water

34  
35 A Social Science Strategic Plan for Weather and Water is near completion (NOAA 2008). The  
36 stated goal of the plan is to create “a stronger, more distributed, and coordinated social science  
37 capability that is integrated with programs and decision systems in support of improved decision-  
38 making.” Noting that the Weather and Water Mission Goal lags behind other NOAA mission  
39 goals in the use of social science, the plan advocates: (1) long term capacity building; (2)  
40 developing methods, analyses and data for decision support including improving user-needs  
41 assessment; (3) infusing results of analyses into decisions and programs to improve NOAA  
42 products and services; (4) improving the use of social science through a broader mix of social  
43 sciences, integration with physical and biological sciences, and collaborations with social science  
44 capacity outside of NOAA; and (5) assuring an appropriate level of effort for social science in  
45 Weather and Water to meet growing needs.

1 There are a number of short-term strategies in the Plan, including conducting and building  
2 capabilities for studies in priority areas, more fully examining existing external research,  
3 developing analyses to assist Program Operation Plans (POPS) and FY 2012- 2016 priority  
4 setting, coordination with test bed programs, coordination with NOAA Research Council Social  
5 Science Committee, cooperative grant relationships with external organizations, and  
6 strengthening NOAA’s support for and relationship with the NCAR’s Societal Impacts Program.

7 The Plan identifies analytic priorities as user needs assessment, communication of forecast  
8 uncertainty, use and impacts of localized forecasts and warnings, understanding societal effects  
9 of high impact weather, addressing interrelated needs of communities and regions, valuation of  
10 program benefits and other decision support services., and communicating with and educating  
11 stakeholders.

12 A good example of the need for such analysis is seen in the human behavior that complicates  
13 rescue efforts and restoration in extreme weather conditions. Given an increase in the ability to  
14 predict the severity and geographic distribution of impacts from abrupt events like the Hurricane  
15 Ike storm surge on coastal Texas, why do some people ignore warnings and others do not? To  
16 save lives does NOAA invest in better predictions or in understanding how people respond?

#### 17 5.2.4 Ecosystems

18  
19 The SSWG applauds the Ecosystem Goal Team for leading the integration of social science  
20 within NOAA. At the same time we are concerned about the \$3.1M reduction in the social  
21 science budget for this goal team between FY05 and FY08. The ecosystem mission goal  
22 represents a fruitful place for future social science expansion because of NOAA’s definition of  
23 ecosystem management:

24  
25 “Sound ecosystem management requires scientifically-based information on  
26 ecosystem condition, the causes and consequences of that condition, forecasts of  
27 their future condition, and the costs and benefits of different management actions  
28 to respond to that condition”. (NOAA Research Council 2008)

29  
30 To a social scientist, this statement lays out an ambitious social science research agenda that if  
31 pursued would go a long way toward weaving social science into these efforts. For example,  
32 developing scientifically-based information on the “causes and consequences” of ecosystem  
33 degradation requires understanding the everyday decisions of households and firms and mapping  
34 them to past and current ecosystem conditions. Forecasting future ecosystem conditions entails  
35 not just measuring and monitoring decision outcomes but also understanding the multiple facets  
36 of the decision-making process such that behavioral responses are integrated into these  
37 forecasting tools. Ignoring behavioral responses and changing attitudes leads to unintended  
38 consequences that will considerably reduce the quality of forecast information.

39  
40 The ecosystem management definition can also be interpreted as illustrating a lack of current  
41 understanding of the important role social science can play in ecosystem-based management,  
42 because it seems to limit the role of social science to an assessment of the costs and benefits of  
43 management actions that will respond to the ecosystem condition. In contrast, social scientists  
44 can significantly contribute to all aspects of measuring, designing, monitoring, and assessing  
45 scientifically-sound ecosystem management.

1  
2 The SSWG would not want to judge the ecosystem management enterprise solely on a single  
3 statement. The discussions of scenario development in the NOAA 5-year research plan clearly  
4 highlight the broader social science dialogue. The social science research questions articulated  
5 are important ones. However, the research milestones in the research plan do not represent the  
6 scenario development discussions. The milestones focus on making scientific advances, with  
7 humans relegated to exogenous anthropogenic stressors. As an example, the 3-5 year milestone  
8 for the performance objective of “increasing the number of regional coastal and marine  
9 ecosystems delineated with approved indicators of ecological health and socioeconomic benefits  
10 that are monitored and understood” is: “Produce at least two integrated ecosystem assessments  
11 that evaluate the ecological response to various anthropogenic stressors.” This milestone does  
12 not map into research that will generate understanding of the socioeconomic-political landscape  
13 that will determine the “right” set of ecological indicators to consider in management *and* the  
14 measurement of the socioeconomic benefits.

15  
16 Part of the reason for the milestones not including social science research questions may be that  
17 social science is emphasized in its own milestone. The last 3-5 year milestone says: “at least a  
18 25% increase in NOAA’s applied, non-economics social science research capacity to support  
19 increased research focus on social, cultural, and policy aspects of ecosystem-based approaches to  
20 management.”

21  
22 The External Ecosystem Task Team (EETT) makes a case for NOAA taking the lead to develop  
23 social science methods needed for the preparation of regional Integrated Ecosystem Assessments  
24 (IEA) (EETT 2006). The EETT makes two broad recommendations: 1) develop social science  
25 methods for linking ecosystem science to governance; and 2) develop an understanding of  
26 society and its response to changing environmental components.

27  
28 To develop methods for linking ecosystem science to governance the EETT recommends that  
29 government policies, regulations, and management services be analyzed to understand the  
30 conditions that lead to government successes and failures. With such analysis and  
31 understanding, it is possible to prescribe ways to correct the obstacles in the public sector that  
32 lead to failures of government processes and policies. These obstacles are expected to be  
33 common when governments are faced with the complex trade-offs inherent in ecosystem  
34 approaches to integrated management (EETT 2006).

35  
36 The EETT also recommends that capacity to obtain useful information on public priorities and  
37 preferences be increased through greater use of opinion polls and general attitude surveys on  
38 ecosystem resource issues, and that more ethnographic fieldwork be done to provide in-depth  
39 assessment of values and the degree to which they are strongly or weakly held (EETT 2006).

40  
41 Understanding societal response to changing ecosystem components requires new tools for  
42 identifying and predicting the dynamics and spatial extent of human responses to ecosystem  
43 change. An example is provided by the complex governance decisions in the impasse between  
44 upstream land and water use practices in the Mississippi watershed and their downstream  
45 deleterious impacts on coastal ecosystems.

46

1 The EETT recommendations cannot be easily incorporated into line offices in NOAA.  
2 Understanding this, the EETT recommended that NOAA develop centers of specialized expertise  
3 for the social sciences where new methods could be developed, tested and distributed across the  
4 agency with specific application to regional IEAs. Alternatively, NOAA could partner with  
5 extramural groups with the capacity to advance social science methods for ecosystem based  
6 management.  
7  
8 NOAA agreed with the thrust of the EETT recommendations, that increased attention to  
9 development of methods is a critical need for regional IEAs. It is seeking to implement those  
10 concepts in the context of ongoing pilot regional IEAs (Levin et al. n.d.). Stakeholders and  
11 public involvement are key elements of IEAs because the issues and interests cross ecological,  
12 social and political boundaries, have multiple uses, users and objectives, have unclear property  
13 rights, and contain multiple ecosystem services (EETT 2006).

#### 14 5.2.5. Weather, Climate and Transportation

15  
16 Transportation in the U.S. involves three principal venues. The first is land surface  
17 transportation which includes cars, trucks, commuter rail, long-haul rail, and pipelines. The  
18 second is marine transportation, incorporating the Pacific and Atlantic Ocean, Gulf of Mexico  
19 and Great Lakes, St. Lawrence Seaway, Panama Canal and, in the likely future, the Northwest  
20 Passage. Marine transportation includes cargo, coastal and inland ferries, barge and recreational  
21 boating. The third venue is aviation, which involves not only in-transit, airport and in-flight  
22 systems, but also supporting ground transportation.  
23

24 All three venues are sensitive to weather, especially to extreme weather conditions. Climate  
25 variability also affects transportation through changes in extreme conditions. Two important  
26 long-term weather and climate conditions that will affect transportation are drought, adversely  
27 affecting river barge traffic through low water, and Arctic sea ice melt, opening the Northwest  
28 Passage. The US transportation system was built for typical regional weather and climate, rather  
29 than extremes. Moderate changes in the mean climate may have little impact on transportation,  
30 but extreme changes in weather and climate may have considerable impact on transportation.  
31

32 Extremes in temperature, precipitation and storms have changed over the past several decades  
33 and are projected to continue to change with both positive and negative impacts on  
34 transportation. As the climate warms, cold temperature extremes are projected to decrease,  
35 creating milder winter conditions that would likely improve the safety of rail, air and ships.  
36 Conversely, warm temperature extremes are projected to increase, leading to more buckling of  
37 roadbeds and railroad tracks, adversely affecting maintenance work.  
38

39 As the cold season decreases and the warm season increases, northern transportation dependent  
40 upon ice roads and permanently frozen soil would be adversely affected while marine  
41 transportation would be positively affected through the commercial opening of the Northwest  
42 Passage. Warming would also benefit transportation by shifting more precipitation from snow to  
43 rain. However, not all precipitation changes are likely to be beneficial. Heavy precipitation  
44 events are projected to increase, causing local flooding. At the same time, summer drying in the  
45 interior will contribute to low water levels in inland waterways.

1  
2 Strong storms, including hurricanes, are projected to increase, leaving coastal transportation  
3 infrastructure vulnerable to the combined effects of storm surge and global sea-level rise.  
4

5 In accommodating these projected changes, it is important to recognize that transportation  
6 planning takes place several different time scales. Road planners typically use a 25-year  
7 planning horizon, while railroad planners use 50 years. Bridges and underpasses are generally  
8 designed for a 100-year horizon. In all cases, it will be important that planning incorporates the  
9 anticipated changes in weather and climate. The social sciences have a key role to play in  
10 providing research to understand transportation policy, organizational performance,  
11 transportation markets, demographic change and human behavioral response.  
12

### 13 5.3 Next Generation Performance Matrix

14  
15 Performance metrics are a useful way to set targets for and evaluate progress toward improved  
16 social science capability within NOAA. Table 2 suggests a simple set of performance metrics,  
17 summarized in “report card” format, that measure progress toward achieving the desired level of  
18 social science capability and integration within NOAA. The standing SAB Social Science  
19 Working Group as proposed in Section 4.4 might be an appropriate body to administer this kind  
20 of tracking system in collaboration with senior NOAA leadership, to gauge progress toward  
21 achieving stronger social science.  
22

23 Table 2: Indicators of performance toward social science capacity building and integration in  
24 NOAA  
25

	NOAA corporate	Line office 1	Line office 2	Line office 3
Knowledge of user behavior and influence of NOAA info on decisions				
Understanding of outcomes at stake, risks, exposures, etc.				
Understanding of link between user decisions and physical outcomes				
Understanding of link between physical outcomes and economic outcomes				
Understanding of coastal and marine resource stock values				
Use of outcomes data to allocate resources across lines, within lines				
Articulation of aggregate NOAA outcome to Congress				
Social science research priorities defined, plan, execution				
Staffing/funding: operational social science				
Staffing/funding: social science research				
Social science literacy				

26

# 1 CONCLUSIONS

## 2 3 Section 6 – Findings and Recommendations

4  
5 In addition to addressing the four Terms of Reference (TOR) questions (Section 4), the SSWG  
6 has a number of overarching findings and recommendations to NOAA. These are discussed in  
7 the following paragraphs. SSWG answers to the TOR contain several recommendations that  
8 provide a more complete roadmap for how to address these findings.  
9

### 10 6.1 General Findings and Recommendations

11  
12 **Finding 1:** The SSWG endorses the overall findings of the 2003 SSRP report and finds that the  
13 social sciences continue to be underrepresented in NOAA’s research, operations, and decision  
14 making. The SSWG also finds that if NOAA is to serve society and fulfill its mission, it must  
15 integrate the social sciences into the full range of its scientific and programmatic activities.  
16

17 **Finding 2:** A wide range of social science research is needed to achieve NOAA’s mission and  
18 objectives. Social science is critical to understanding the vulnerabilities and behavior  
19 (adaptation, risk perception) of the users of NOAA products/information, and the economic risks  
20 mitigated and value generated by these uses. Social science can also assist in prioritizing NOAA  
21 investments by estimating the economic return from programs, products, and improvements  
22 thereto. Social science is needed to support improved product design, communications with  
23 users, and education.  
24

25 **Recommendation 2.1** NOAA should draw on the full range of excellent science (physical,  
26 biological, and social) to meet its mission in both line offices and mission goals.  
27

28 **Recommendation 2.2** NOAA should recognize and facilitate the contributions of the social  
29 sciences to both the major challenges in its research and development and to its operational  
30 responsibilities, as several other agencies, organizations, and scientific programs have done.  
31 NOAA should use social science to understand decision making frameworks at all levels so as to  
32 provide information that meets user needs.  
33

34 **Recommendation 2.3** NOAA should use social science analysis to demonstrate and calibrate its  
35 accomplishments and to implement and evaluate its planning activities.  
36

### 37 6.2 Institutionalizing Social Science at NOAA

38  
39 **Finding 3:** Social science literacy throughout NOAA has improved marginally since the 2003  
40 report, but it is still weak in many areas. NOAA leadership is now more aware of the value of  
41 the social sciences, but in most cases still does not assign a significant priority to their role in the  
42 agency.  
43

44 **Finding 4:** NOAA lacks sufficient social science expertise to meet its Mission and Objectives.  
45 Social science capabilities declined between 2005 and 2008. In that time period the NOAA  
46 budget increased by 13% and the social science share of the budget decreased by almost 10%.

1 Through much of NOAA, social science work is carried out through an *ad hoc* combination of  
2 in-house and contract resources.

3  
4 **Recommendation 4.1** NOAA administration should explicitly address the weakening position  
5 of social sciences by aggressively developing and implementing a plan to strengthen and  
6 integrate social sciences throughout NOAA line offices, programs and mission goals.

7  
8 **Finding 5:** Social science activities are mostly ad hoc and segregated and are not sustained,  
9 coordinated, or comprehensive. (An exception to this is NMFS, which has significantly  
10 expanded its emphasis on the use of the social sciences and has a strategic plan with specific  
11 social science FTE objectives). In addition, there is little representation of social science  
12 expertise among the higher levels of NOAA leadership. Overall, there is inadequate high level  
13 commitment among NOAA administrators to strengthening NOAA's use of social science.

14  
15 **Recommendation 5.1** NOAA leadership should articulate a commitment to strengthen social  
16 sciences within NOAA and develop incentive structures to ensure that this commitment is  
17 implemented at the line office, mission goal and programmatic level.

18  
19 **Recommendation 5.2** Until NOAA can develop and support adequate social science capacity  
20 throughout the agency, the SSWG feels that a strong centralized social science presence will be  
21 necessary for undertaking and supporting both corporate and programmatic social science  
22 efforts. NOAA leadership should put appropriate social science expertise in place to guide,  
23 inform, and support the use of social science within NOAA by creating an Office of Societal  
24 Impacts. This office would serve a leadership role in coordinating social science across the  
25 agency, integrating it where appropriate in research, programmatic, and planning functions. To  
26 ensure that the office has sufficient support to accomplish this, it should report directly to the  
27 Deputy Undersecretary for Oceans and Atmosphere.

28  
29 **Recommendation 5.3** The NOAA Science Advisory Board should establish a standing Social  
30 Science Working Group to provide oversight and quality control over the integration of social  
31 science into the agency.

32  
33 **Recommendation 5.4** NOAA should provide appropriate budgetary support to accomplish these  
34 recommendations through special assessments and reprogramming. Line offices should establish  
35 budget targets for investments in social science capacity over the next three to five years.  
36 Determination of the proportion of staff resources to be met by social scientists should be  
37 outcome driven, but until a basic threshold capacity is developed so that the benefits of social  
38 science can be felt, the SSWG recommends that a minimum 5% of all line office budgets should  
39 be allocated to the social sciences. This will require reallocation of existing staffing budgets.

40  
41 **Recommendation 5.5** Over the long term, NOAA should integrate the social and natural  
42 sciences in all its research committees, rather than creating parallel structures. In the short term,  
43 it may be necessary to create special purpose social science groups to strengthen the social  
44 sciences in NOAA. In addition, NOAA should seek ways to coordinate its activities with social  
45 science research activities outside of NOAA, such as those at NSF.

1 **Recommendation 5.6** The SSWG endorses several recommendations of the NOAA Social  
2 Science Committee:

- 3
- 4 • Conduct formal needs assessments for social science work at the program level.
- 5 • Combine in-house and external staff, as appropriate to each program, to carry out the
- 6 work.
- 7 • Use “testbeds” and demonstration projects to illustrate the value of social science to
- 8 NOAA activities and educate NOAA managers about the benefits of the social sciences.
- 9 • Leverage the growing focus on ecosystem-based management and climate services, two
- 10 areas where integration of social science should be unquestioned and obviously critical.
- 11

### 12 6.3 Contributions of the Social Sciences to Programmatic Outcomes

13  
14 **Finding 6:** The social sciences are essential for quantifying the monetary and human values of  
15 NOAA products and services. The social sciences can improve the design of NOAA products  
16 and services in light of user needs, adaptation, response, and utilization, and they can help  
17 NOAA prioritize future investments. This will require that the social sciences be used to: (1)  
18 measure outcomes; (2) achieve socially beneficial outcomes; (3) improve performance within the  
19 organization; and (4) set targets for future accomplishments.

20  
21 **Recommendation 6.1:** NOAA should use the social sciences to: (1) measure outcomes; (2)  
22 achieve socially beneficial outcomes; (3) improve performance within the organization; and (4)  
23 set targets for future accomplishments.  
24

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38 Challenges and Opportunities facing the Research Council Social Science Committee.  
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40

## Appendix A

### Written Materials Reviewed by the SSWG

#### NOAA Cooperative and Joint Institute responses to SSWG request for information

NGI	D. Shaw
CICAR	Y. Kushnir
CICOR	B. Weller
CICS-UMD	P. Arkin
CICS-Princeton	J.L. Sarmiento, G.K. Vallis
CIFAR	S. Sugai
CILER	E. S. Rutherford
CIMAS	P. Ortner
CIMMS	
CIRA	S. Miller, M. McInnes-Efaw, H. Cochrane, T. Vonder Haar
CIRES	W. Lewis
JIMAR	T. Schroeder

#### NOAA Research Council response to SSWG request for information

**Spinrad, R.**

#### NOAA Research Council Social Science Committee responses to SSWG request for information

Bauer, M.B.	NOS	Ecosystems
Beller-Simms, N.	OAR	Climate
Carey, C.D.	NWS	Weather and Water
Curtis, R.	NMFS	Ecosystems
Fowke, M.	NWS	Weather and Health
Gaynor, J.	OAR	Weather and Water
Leveson, I.	PPI	
Ryan, T.	NOS	
Shea, E. & A. Smith	NESDIS/NCDC	
Wiley, P.	NOS	Commerce and Transportation

## Line Office Responses to SSWG request for information

NWS  
NESDIS  
OAR  
NMFS

- NMFS Economics & Social Sciences Program
- NMFS Economics Data Holdings
- NMFS Economics & Social Science Research Budget (FY01-08)

## Other Documents

CIMAS Project Summary. 2007. Climate Information System for Agriculture and Water Resources Management in Southeastern USA G. P. Podestá et al.

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CIMMS Project Proposal Summary. 2008. Proposal to Develop the National Weather Service's Social Science Initiative "Weaving Social Science into the National Weather Center Fabric" as Part of the Larger Effort at the University of Oklahoma to Develop Social Science Initiatives in Hazard and Risk Management. E. Gruntfest, P.I.

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## **Appendix B**

### **Presentations to the SSWG**

**Oct 4-5, 2007**

Welcoming Remarks

Paul Doremus, Acting Assistant Administrator, Program Planning and Integration

Review of the SSWG Terms of Reference, the preceding SSWG's work and Committee timelines

Susan Hanna, Chair, SSWG

Main Findings and Recommendations

Susan Hanna with Len Pietrafesa and Lee Anderson, current SSWG members and members of the original Social Science Review Panel

Changes in NOAA Organizational Structure since 2003 (PPBES) and its Effects on Social Science and the 2003 Panel's Recommendations

Paul Doremus, Acting Assistant Administrator, Program Planning and Integration

NOAA Organizational Response to the Social Science Report: Challenges and Opportunities facing the Research Council Social Science Committee

Rodney Weiher, NOAA Chief Economist and others on the Research Council Social Science Committee

Ecosystems

Rita Curtis, Economics and Social Analysis Division Chief, NMFS Office of Science and Technology, and Member, Research Council Social Science Committee

Climate

Nancy Beller-Simms, Program Manager, Sectoral Applications Research Program, NOAA Climate Program Office, and Member, Research Council Social Science Committee

Weather and Water

John Gaynor, Director, OAR Office of Weather and Air Quality, and Member, Research Council Social Science Committee

Commerce and Transportation

Mary Erickson, Chief, Coast Survey Development Lab, Office of Coast Survey, NOS, and Member, Research Council

Mission Support

Michael Crison, Lead, Satellite Sub-Goal

The Future of NOAA Social Science: Emerging Challenges, Opportunities, and Constraints

Mark Holliday, Director, NMFS Office of Policy

Measuring Programmatic Outcomes

Presentation

Example

Matt Hildebrandt, NOAA Program Analysis and Evaluation

Integrating Social Science into Decision-Making of NOAA and its partners

Avery Sen, NOAA Program Planning and Integration

Integrating Social and Natural Science into Decision-making

Margaret Davidson, Director, NOAA Coastal Services Centers (Presentation/Discussion by phone) Pete Wiley, NOAA's Coastal and Ocean Resource Economics Program, NOS, and Member, Research Council Social Science Committee (Discussion segment)

**Feb 12-13, 2008**

Opening Statement of the Chair and Review of the SSWG Terms of Reference, the preceding SSWG's work and Committee timelines

Susan Hanna, Chair, SSWG

Other Federal Agency Models for Integrating Social Science

USDA Economic Research Service (ERS)

Robbin Shoemaker, Acting Associate Administrator for ERS

USDA Cooperative State Research, Education, and Extension Service (CSREES)

Siva Sureshwaran, National Program Leader, SBIR Program

USEPA National Center for Environmental Economics (NCEE)

Al McGartland, Director NCEE, and Will Wheeler, Social Science Research Program

USFWS Division of Economics

Ted Maillett, Senior Economist

NOAA Models for Integrating Social Science

Internal Staffing Model: National Ocean Service (NOS)

Gary Matlock, Director, National Centers for Coastal Oceanic Science

Internal Staffing Model: National Marine Fisheries Service (NMFS)

Mark Holliday, Director, Office of Policy, NOAA Fisheries Office of the Assistant

Administrator

Outside Contracting Model: Program Planning and Integration (PPI)

Rodney Weiher, NOAA Chief Economist, PPI, Chair, Research Council Social Science Committee

Virtual Centers Model: NCAR and NSSL/NWC brief overview

Jeff Lazo, Director of Weather and Societal Impacts Group, National Center for Atmospheric Research, Research Applications Laboratory, member SSWG

Integrating Social Science with PPBES

Paul Doremus, Acting Assistant Administrator, PPI

**May 8-9, 2008**

Findings and Recommendations from the 2003 Social Science Review Panel Report

Susan Hanna, Chair, SSWG

Summary review of the SAB Research Review Team Report

Len Pietrafesa, SSWG

Summary review of the USWRP PDT #6 - "Societal Aspects of Weather" May 1997

Len Pietrafesa, SSWG

Summary review of the Prospectus of Grand Challenges for the Social, Behavioral and Economic Sciences NSTC 2007

Len Pietrafesa, SSWG

Summary of SSC Input

Hauke Kite-Powell, SSWG

**June 9-11, 2008**

*Presentations:*

Integrating Social Science with PPBES (From February SSWG Meeting)

Paul Doremus, Acting Assistant Administrator, PPI

## Appendix C

### 2003 Social Science Review Panel Findings and Recommendations

The 2003 report's findings and recommendations related to the adequacy of social science at NOAA are listed in abbreviated form below. The general finding of the 2003 Review Panel is that the capacity of NOAA to meet its mandates and mission is diminished by the under-representation and under-utilization of social science. The Panel found that Assistant Administrators are open to opportunities for enhancing social science within their line offices. It recommended that NOAA dedicate \$100 million to a five-year social science program expansion. Specific budget recommendations were included in each area.

#### 3.1 Social Science Literacy

##### Findings

Throughout NOAA, there is a lack of formal understanding of what social science is and what its contributions can be, leading to an organizational culture that is not conducive to social science research. Two general categories of social science research are critical to the accomplishment of NOAAs mission: programmatic (mission-driven) and organizational (institutional).

##### Recommendations

NOAA leadership should establish goals and objectives for achieving social science literacy within the agency, and a social science workshop should be conducted for NOAA Assistant Administrators and senior management.

#### 3.2 Social Science Research

##### Findings

Overall, NOAAs social science research effort is small and unbalanced across disciplines. Social science staffing is insufficient to meet the mission of each of the line offices. There are few programmatic opportunities targeting internal or external social science research. Cost-benefit analyses of programs may meet short-term political needs, but a longer-term focus on social science would enhance NOAAs processes for prioritizing research and effectively connecting the results of that research with its stakeholders.

##### Recommendations

Line offices and Headquarters should develop social science research plans and strategies. Line offices should establish specific targets for social science research. The National Sea Grant College Program should accept a larger role in supporting social science research. Expenditures on external cost-benefit analyses conducted to justify programs should be documented.

### 3.3 Social Science Data

#### Findings

The lack of appropriate data limits the contribution of social science to NOAA.

#### Recommendations

NOAA should inventory, document and archive its economic data holdings. NOAA Administrators should seek congressional support to rescind the prohibition on collecting economic data under the current MSFCMA Sections 303(b)7 and 402(a).

### 3.4 Social Science Staffing and Senior Representation

#### Findings

Throughout NOAA, social science staffing is inadequate. This problem is exacerbated by the lack of functional representation of social science in line office directorates.

#### Recommendations

Headquarters and line offices evaluate adequacy of social science staffing relative mission and overall organizational needs and jointly develop a plan to build core social science capacity. Headquarters and each line office should investigate opportunities for improving planning, communication and networking among its existing social scientists. Each line office should create a chief social scientist position.

### 3.5 Education and Outreach

#### Findings

NOAA Assistant Administrators recognize the need to better understand their constituents and communicate with them, but the lack of expertise in social science survey methodology and perceived obstacles to conducting surveys limits their ability to do this.

#### Recommendations

Line offices should evaluate their public education and outreach needs. NOAA organize a center of excellence to conduct constituent surveys.

### 3.6 Strategic Planning

#### Findings

There is almost no long-term strategic planning for social science at NOA (OGP and NMFS are exceptions). Except at NMFS, social science objectives in line office strategic plans do not track into a long-term research agenda influenced by the social sciences.

#### Recommendations

Line offices should develop strategic plans and annual operating plans that incorporate explicit social science data, staffing, research objectives and performance measures. Each line office should develop a social science research plan and ensure that it is integrated into the NOAA strategic plan

### 3.7 Performance Evaluation

#### Finding

The application of social science is a necessary component of program effectiveness measurement and monitoring in the FY2003-FY2008 Strategic Plan.

#### Recommendations

NOAA should use social scientists to lead the development of performance metrics. NOAA should invest \$2M in development of performance metrics and strengthening measurement of economic and social benefits and costs associated with program implementation and performance.

### 3.8 Economic Valuation

#### Finding

NOAA has immediate needs for data and research directed at environmental assessment and stewardship.

#### Recommendations

NOAA should invest \$2M in a virtual NOAA Center for Economic Valuation that would coordinate, sponsor and disseminate research, data collection, survey methods, and derive and apply analytical models of the market and non-market values associated with environmental assessment and environmental stewardship policies.