

# **NOAA, Society, and the Economy:**

**An Assessment of NOAA'S  
Social Science Capability and Needs**

## **APPENDIX**

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## Introduction

This volume contains the appendices to the NOAA Social Science Needs Assessment. These include the following.

*Appendix A: Description of Gaps.* This is a succinct statement and description of NOAA's current social science capacity and gaps. Appendix A includes three tables providing information on current capability, gaps covering immediate risks, and gaps to make social science fully operational. This information is provided for Staff, Staff Funding, and External Funding. A description of what is included in each of these estimates is also provided.

*Appendix B: Social Science in the NOAA Line Offices* is a detailed description, by Line Office, of NOAA social science capacity, needs and gaps. Each LO section includes:

- a description of mandates for social science;
- a quantification of current social science capacity; and
- a statement of need expressed:
  - to cover immediate risks, and
  - in terms of making NOAA social science fully operational.

*Appendix C: NOAA's Federal Social Science Workforce.*

NOAA's social science capacity resides in its federal employees and contractors, as well as its partners in the public and private sectors. Unfortunately, a centralized source of information exists only for NOAA's federal workforce. This Appendix provides a breakdown of the federal workforce, including a set of descriptive figures.

## **Appendix A. Description of Gaps**

Table A1. Staffing Summary (Full Time Equivalents)

	Gaps					
	Current Capability		Covering Immediate Risks		Fully Operational	
	Federal	Contract	Federal	Contract	Federal	Contract
OAR	5	3	-	2	16	5
NOS	20	9	10	4	30	12
NMFS	73	23	10	-	47	9
NWS	2	1	1	-	30	-
NESDIS	5	1	3	2	4	8
PPI	1	2	1		5	-
NOAA HQ	-	1	1	2	1	1
OMAO	-	-	-	-	-	-

Table A2. Staffing Funding Summary (\$000)

	Gaps					
	Current Capability		Covering Immediate Risks		Fully Operational	
	Federal	Contract	Federal	Contract	Federal	Contract
OAR	750	375	-	300	2,400	750
NOS	2,268	952	1,120	448	3,360	1,344
NMFS	10,800	1,100	1,600	-	7,680	1,600
NWS	224	112	112	-	3,360	-
NESDIS	543	151	336	224	470	874
PPI	150	387.50	150	-	750	
NOAA HQ	-	112	112	224	112	112
OMAO	-	-	-	-	-	-

Table A3. External Funding Summary (\$000)

	Current Capability			Covering Immediate Risks			Fully Operational		
	Contract	Grant	Cooperative Agreements	Contract	Grant	Cooperative Agreements	Contract	Grant	Cooperative Agreements
OAR	-	10,600	6,880	-	3,100	5,150	-	17,280	-
NOS	1,450	403	-	2,900	-	-	5,960	-	-
NMFS	4,265	2,415	-	4,265	2,415	-	4,265	2,415	-
NWS	1,104	-	-	250	-	-	2,000	-	-
NESDIS	700	-	-	350	-	-	2,000	-	-
PPI	-	-	-	-	-	-	200	-	200
NOAA HQ	120	-	-	300	-	-	1,000	-	-
OMAO	-	-	-	-	-	-	-	-	-

## Office of Oceanic and Atmospheric Research (OAR) (12/17)

### Staffing:

*Covering Immediate Risks:* There has been an increased demand in recent months on CPO social scientists to participate in NOAA and interagency activities. This demand has put a strain on current capability, almost to the point of not meeting current expectations. Additional support was necessary for an AAAS fellow to work within the decision support realm, lending support to the Climate office as well as the National Climate Assessment. We also needed a social scientist trained in outreach activities to help articulate research findings to various web sources. Finally we needed an intern to help organize some of the research project findings and to write some background papers for use in presentations and on to communicate information on the web. Social scientists have participated in internal NOAA committees (e.g., Climate Engineering), as well as interagency activities through USGCRP, the NAS, etc.

*Fully Operational:* Note that this information was not in an FY11 CPO staffing plan as the Office was working on plans for a Climate Service. The CPO needs additional social scientists that have an interdisciplinary training to meet both current and expected future needs. Knowledge on sectoral issues (e.g., coasts, water, agriculture, health, etc.) and a basic scientific knowledge of climate science along with any experience with local decision making would be among the attributes needed in this office. In addition to the positions outlined in the section on “covering immediate risks” we would need an additional Federal position to work within the RISA program and two half-time FTEs to work in the SARP and COCA programs (or on related tasks) to meet the needs that are arising within each program.

Most lab and program directors indicated that they would like to see social scientists in their labs and programs, so with one per lab and program, excluding those already in CPO, totals 13. The exact distribution of social scientists in the labs and programs was not specified, but not all labs and programs indicated that they would want to house such a person or persons. We also estimate two social scientists in OAR HQ who will oversee and coordinate the social science activities in OAR and coordinate with the other LOs.

### Funding

*Covering immediate risks:* Funds will have to be diverted to meet current needs. CPO assumed that FY12 is the budget reality. Numbers for OWAQ and CIs assume a decrease of about 15%.

Sea Grant projects are typically funded in two-year cycles, so comparing annual investments in social science is probably less useful than comparing the bienniums. FY2012-13 biennial Sea Grant social science investment more than doubled from the FY2010-11 investment. Sea Grant research projects are competitively awarded, so it's hard to estimate future awards, but the commitment to social science remains strong, and we anticipate similar levels of funding in the next biennium.

38 *Fully operational:* For CPO, an additional \$3 million would be needed to fund the highest  
39 ranking 25% of proposals sent to SARP, COCA and RISA. Numbers for OWAQ, Sea Grant,  
40 and CIs assume an increase of about 100%.

41 Both the CI and Sea Grant offices noted that it is hard to develop an estimate of the social  
42 science investment that would maximize return on that investment (an "ideal" funding level). A  
43 larger investment would be well spent, particularly as more social scientists learn about and  
44 begin working with Sea Grant. For example, over the last two bienniums, the number of  
45 programs working with social scientists grew by 50%.

#### 46 Disciplines

47 *Covering immediate risks:* CPO needs 1 decision specialist; .5 science/feature writer; .5  
48 additional help (e.g., PMF, intern).

49 Most of the work Sea Grant does is highly integrated between natural and social sciences. A very  
50 rough estimate of how the social science funds are invested is as follows: thematically, 35% of  
51 social science work is in human dimensions of sustainable coastal development, 30% in socio-  
52 economics work in fisheries and aquaculture, 20% in integrated human and ecological systems,  
53 10% in improving coastal resilience and climate adaptation/mitigation, and 5% in coastal literacy  
54 work.

55 *Fully operational:* In addition to the positions listed in budgetary realities, CPO would need two  
56 half-time (or 1 full) FTE with interdisciplinary training.

57 Needs for labs are less distinct, but could focus on two areas: improving communication of  
58 science and understanding behavior in response to new information. The former means we are  
59 looking at people's access to and comprehension of information, which implies communications  
60 science, cognitive psychology, knowledge management, possibly graphic design (admittedly a  
61 humanity, not a social science). The latter means we are looking at people's actions, choices, and  
62 lifestyles, which implies decision science, economics, ethnographic anthropology, possibly  
63 marketing.

64 The disciplines needed for OAR HQ center on public policy and public administration, program  
65 evaluation, management science, and organizational theory, possibly cybernetics.

67    **National Ocean Service (NOS)**

68    Staffing:

- 69        • *Covering immediate risks:* Sanctuary social science coordinators, economists for regional  
70        branches in OR&R, risk behavior and behavior change expertise for coastal management,  
71        social science expertise for engagement on social science issues in coastal communities,  
72        and economist to understand the societal benefits of coastal and ocean research, a social  
73        science specialist to address coastal management issues.
- 74        • *Fully operational:* Sanctuary social science coordinators, economists for regional  
75        branches in OR&R, staff for coastal social science hub (economists, social science  
76        specialists, social psychologist), risk behavior and behavior change expertise for coastal  
77        management, social science expertise for engagement on social science issues in coastal  
78        communities, and economist to understand the societal benefits of coastal and ocean  
79        research, human geographers, a political scientist, a program evaluation specialist

80    Funding

- 81        • *Covering immediate risks:* To fund staff and contract funds to cover risk behavior studies,  
82        non-market studies on resiliency and hazards, a marine transportation economic study,  
83        engagement with coastal communities on social science information needs, social science  
84        of coastal and ocean science research, coastal research on stakeholder needs, community  
85        values, economic development and resource protection, and socioeconomic issues related  
86        to corals; the economic value of hydrographic surveys and nautical charts, and the value  
87        of geodetic products.
- 88        • *Fully operational:* To fund staff and contract funds to cover sanctuary social science tool  
89        development, economic value of real-time physical oceanographic information, and user  
90        data for physical oceanographic products, a social science hub for coastal management  
91        providing socioeconomic research, data, tools and technical assistance, social science of  
92        coastal and ocean science research, coastal research on stakeholder needs, community  
93        values, economic development and resource protection, and socioeconomic issues related  
94        to corals; research on navigation behavior to develop better navigation products, and  
95        methods development research (valuation and cross disciplinary) and ecosystem service  
96        valuation research.

97    Disciplines

- 98        • *Covering immediate risks:* 10 economists, 1 risk behavior communications specialist, 1  
99        social psychologist, 2 social science specialist
- 100       • *Fully operational:* 27 economists, 9 social science specialists, 1 risk behavior  
101       communications specialist, 1 social psychologist, 2 human geographers, 1 political  
102       scientist, 1 program evaluation specialist

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105 **NOAA Fisheries Services**

106 **Staffing:**

- 107 • *Covering immediate risks:* 10 FTEs, including 3 recreational fisheries economists in the  
108 Northeast, Southeast, and Pacific Islands; 3 spatial econometricians for assessing marine  
109 spatial management / spatial permitting/zoning options in the Northeast, Southeast, and  
110 Pacific Islands; 1 commercial fisheries economist to support the Pacific Groundfish  
111 Trawl Rationalization Program in the Northwest; 1 bioeconomic modeler to support  
112 development of the California Current Integrated Ecosystem Assessment; and two social  
113 scientists, one in Alaska to conduct National Standard 8 and NEPA social impact  
114 assessments and one in Headquarters to support national policy issues and coordinate  
115 regional research and assessments.
- 116 • *Fully operational:* 48 FTEs including 10 FTEs cited above. These positions include a mix  
117 of management and research positions and, with the exception of 4 FTEs, would be  
118 stationed at the regional NMFS Science Centers and Regional Offices. Positions include  
119 the capabilities cited above (spatial modelers, commercial fishing/catch share program  
120 research and assessments, recreational fisheries economists, and social scientists) as well  
121 additional staff to support mandated economic analyses by NEPA, MSA, E.O. 12866,  
122 and Environmental Justice.

123 **Funding**

- 124 • *Covering immediate risks:* Restore \$3.3M in funding that was cut from the Program in  
125 FY12. Funding will support 10 FTEs cited above as well as to support further  
126 development and deployment of three decision support tools that will enable the Agency  
127 to work “smarter”, i.e., more cost-effectively, while improving the overall quality of  
128 information provided to fishery managers and other decision makers. Decision support  
129 tools include: FishSET, a spatial modeling tool for assessing trade-offs of marine spatial  
130 management strategies in a risk framework; BLAST, a dynamic, bioeconomic  
131 recreational fisheries modeling tool for use in management; and a Social Indicators  
132 Toolbox that includes metrics for assessing community resiliency and community  
133 vulnerability.
- 134 • *Fully operational:* An additional \$14.7M, including the \$3.3M cited above, is required to  
135 bring the Program to its 100% requirement. This includes \$7.7M for 48 required FTEs;  
136 \$1.7M for development and deployment of decision support tools cited above; \$2.7M for  
137 a mix of contract capabilities including human geographer, demographer; 3 economists  
138 with expertise in risk assessment, disaster assessment, and markets; 5 social scientists  
139 with expertise in environmental justice and NEPA; and 22 contractors that conduct field  
140 work, compile data, and support other research and assessment functions. The remaining  
141 \$2.6M will fill key gaps in core commercial and recreational fisheries data collection  
142 programs as well as data and research supporting protected species, habitat and  
143 ecosystem services assessments.

144 **Disciplines**

- 145 • *Covering immediate risks:* 8 economists, 2 social scientists
- 146 • *Fully operational:* 29 economists, 13 social scientists, 3 demographers, 3 human
- 147 geographers

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149 **National Weather Service (NWS)**

150 **Staffing:**

- 151 • *Covering immediate risks:* Hire an economist to conduct economic valuation projects  
152 relating to NWS products and services. The economist would work in collaboration with  
153 the existing social science focal point/coordinator and the risk communication specialist  
154 in developing the social science coordinating structure.
- 155 • *Fully operational:* NWS headquarters social science focal point/coordinator (coordinating  
156 role), a risk behavior/risk communication specialist, a social psychologist for behavior  
157 change expertise, a decision theory specialist, a cognitive psychologist and an economist  
158 to supervise the collection of data on the economic impacts of weather events and to  
159 conduct economic valuation studies. NWS Regions and certain NWS National Centers: a  
160 risk behavior/risk communication specialist and an economist to conduct locally based  
161 economic valuation studies and damage assessments.

162 **Funding**

- 163 • *Covering immediate risks:* Maintain current funding of the four, two year social science  
164 projects with OAR.
- 165 • *Fully operational:* “Coordinate and track a specific budget element<sup>1</sup> to address  
166 communication of risk and forecast confidence in its products and services for better  
167 decision-making; comprehensive understanding of how its Core Partners and the public  
168 perceive and use data and services; develop performance measurements relating to  
169 societal outcomes/impacts and decision tools; evaluate and articulate the value and  
170 effectiveness of NWS' products and services; develop operational processes that include  
171 the integration of social science into new skill sets, development of communication and  
172 decision support tools before they are operational; development of format and  
173 presentation considerations of probabilistic/confidence information for customers;  
174 incorporate societal impacts into the forecast process; development of forecaster training  
175 and increased educational requirements in social sciences.

176 **Disciplines**

- 177 • *Covering immediate risks:* 3 FTE social science hires: 1 social science focal  
178 point/coordinator (existing), 1 risk behavior communications specialist (existing), 1  
179 economist
- 180 • *Fully operational:* 30 FTE social science hires:
  - 181 ○ 6 at NWS Headquarters: 1 social science focal point/coordinator (coordinating  
182 role), 1 risk behavior/risk communication specialist, 1 social psychologist for  
183 behavior change expertise, 1 decision theory specialist, 1 cognitive psychologist  
184 and 1 economist.

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<sup>1</sup> Within the current plans to restructure the NWS budget, the budget element would likely fall within one or more of the newly structured PPAs.

- 185                   ○ 12 within the six NWS Regions: 1 risk behavior/risk communication specialist  
186                   and 1 economist to conduct locally based economic valuation studies and damage  
187                   assessments.
- 188                   ○ 12 within and among the NWS National Centers: 1 risk behavior/risk  
189                   communication specialist and 1 economist to help with the integration of social  
190                   science within the Centers

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193    **National Environmental Satellite Data and Information Service (NESDIS)**

194    Staffing:

- 195        • *Covering immediate risks:* With current focus on addressing the satellite data gaps due to  
196            the production challenges for the GOES and POES next generation satellites, the  
197            opportunities to find funding to support social science perspectives will be lower on the  
198            priority list
- 199        • *Fully operational:* The incorporation of economists and social scientist to help connect  
200            the dollars to the people will be important to support the needs of these satellite and  
201            instruments as the cost increase due to time and materials. Providing a comprehensive  
202            perspective of the importance of environmental satellites are to our society, in addition to  
203            the dollars and lives saved because of increased forecasting becomes more and more  
204            important to the successes of the programs. There are many researchers and external  
205            organizations that utilize data from the satellites to provide services, and those stories  
206            also need to be included in justifications for the future.

207    Funding

- 208        • *Covering immediate risks:* With current focus on addressing the satellite data gaps due to  
209            the production challenges for the GOES and POES next generation satellites, the  
210            opportunities to find funding to support social science perspectives will be lower on the  
211            priority list
- 212        • *Fully operational:* To fund staff and contract funds to cover economic value data from  
213            satellite downloads, social science of climate and environmental issues, stakeholder  
214            needs, community values, economic development and resource protection, and  
215            socioeconomic issues.

216    Disciplines

- 217        • *Covering immediate risks:* 3 economists and 2 social science specialist
- 218        • *Fully operational:* 6 regional climate service directors, 3 specialists in the economic  
219            benefits of environmental satellites, and 3 specialists in societal impacts of climate  
220            change topics such as drought sea level rise and extreme weather trends.

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224 **Office of Program Planning and Integration (PPI)**

225 **Staffing:**

- 226 • Covering immediate risks: Chief Economist (currently an IPA); two deputies including  
227 one Sr. Social Science Advisor and one Sr. Social Scientist on contract; one staff level  
228 social scientist.
- 229 • Fully operational: Obtain an SL position for the Chief Economist, convert the Sr. Social  
230 Scientist contract to permanent FTE Sr. Social Science Advisor, add one additional  
231 permanent social scientist staff.

232 **Funding**

- 233 • Covering immediate risks: PPI has increased staff and funding to improve its ability  
234 to develop and implement an innovative, NOAA-wide economic and social science  
235 research agenda that advances the Departments goals.
- 236 • Fully operational: To fund permanent staff as described in the ideal staffing  
237 scenario, and provide modest contract funds to support NOAA's most pressing  
238 valuation and social science needs.

239 **Disciplines**

- 240 • Covering immediate risks: Chief Economist with an advanced degree in Economics,  
241 environmental economics or a similar discipline, PPI's senior social scientist  
242 advisors, and staff can have broader social science, or interdisciplinary  
243 backgrounds.
- 244 • Fully operational: Chief Economist with an advanced degree in Economics,  
245 environmental economics or a similar discipline, PPI's senior social scientist  
246 advisors, and staff can have broader social science, or interdisciplinary  
247 backgrounds.

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249 **NOAA Headquarters**

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251 **Staffing:**

- 252 • *Covering immediate risks:* Communication specialty, particularly for risk assessment and
- 253 risk communication, Social Science for additional education assessments, Economic
- 254 expertise to conduct economic assessment of NOAA's products and services,
- 255 • *Fully operational:* In addition to the above, Economics for economic valuation (value of
- 256 NOAA to the Nation) and Social scientist to evaluate NOAA user behaviors,

257 **Funding**

- 258 • *Covering immediate risks:* To fund staff and contract funds to cover risk assessment and
- 259 risk communication, educational assessments, and economic assessments of NOAA's
- 260 products and services
- 261 • *Fully operational:* To fund staff and contract funds to cover the above plus additional
- 262 economic valuation studies (design, implementation, and analysis) as well as studies
- 263 about NOAA's user behavior

264 **Disciplines**

- 265 • *Covering immediate risks:* 1 full-time Social scientist with expertise in risk evaluation
- 266 and communication, Part-time Additional Social scientist for education research, 1 full-
- 267 time Economist for economic assessment of NOAA's goods and services
- 268 • *Fully operational:* Additional 1 full-time Economist with expertise for economic
- 269 valuation studies and/or Social Scientist to study NOAA product user behaviors

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271     **Office of Marine and Aviation Operations (OMAO)**

272     No needs identified.

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## 278 **Appendix B.**

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## 280 **Social Science in the NOAA Line Offices**

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283 Note: Because each LO is very different in its use of social science research and information, the  
284 line office summaries vary in terms of how the information is organized. However, there is  
285 information common to each line office which were used to develop comparative information on  
286 capability, needs and gaps.

287

288 **Office of Oceanic and Atmospheric Research**  
289 **(OAR)**

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## Social Science in OAR

Social science is needed to directly support research itself, e.g., to set priorities for research and to develop decision support interfaces, and it is also needed to support the NOAA services. One cannot advance from the program outputs to the program outcomes in the various logic models in the implementation plan without the application of social science. In addition, the use of social science allows a bridging function between science and users, allowing NOAA scientists to better understand what users need and also providing decision and policy makers a way to articulate their needs for new and improved science products. The activities of OAR can be divided into the following:

1. Development of decision support tools  
To develop useful decision support systems requires knowledge of how the users of such systems receive and use the information. Communication, cognition, decision science, behavioral psychology (including behavioral economics and decision-making), public policy, risk analysis, and cultural geographical disciplines in social science are needed in this development.
2. Development of new or improved environmental forecasts  
Simply developing a new or improved forecast does not mean that it will improve decision-making. Socioeconomic and value of information assessments should be completed before research and development begins to determine the benefit/cost (monetary and non-monetary) of such improvements or new products.
3. Improving resilience to environmental extremes and perception of uncertainty  
Usually the first step to address resilience, such as resilient coastal communities, is to assess public risk perception. An additional component of education may be required if the perception of risk is not aligned with the actual risk. Critical components of resilience are adaptation and/or mitigation. Through modeling, OAR research supports much of the climate assessment activity performed in NOAA. Evaluation of coastal and ocean resources at risk is a critical step in this decision process. Also involved is the cognitive understanding of uncertainty so that appropriate decisions are made.
4. Understanding the relationship between the environment and human health  
Much research and development is being done in OAR related to forecasting the environmental stressors on human health from short-term forecasts of air quality to long-term climate outlooks of potential viral outbreaks. The public understanding of these sometimes complex and less obvious relationships requires medical experts, communication, and cognition expertise for appropriate public response.
5. Valuing OAR's research and development  
There are two aspects to valuing OAR's research. One is to determine its socioeconomic value in the context of how stakeholders benefit as they rely on research and services for managing risk and identifying adaptation strategies. Is this research contributing effectively to information systems that support cost effective management, operations

and practices under a continually changing environment? Are public funds being well spent on this research? The other reason to determine a socioeconomic value to OAR's research is to help with decisions on planning and priorities within NOAA as well as to other Federal agencies. Both needs require estimates of the potential value of new or improved products and services that will be created. Here, we include the development of new observing systems as well as the adoption of existing observing systems for new uses.

Several laboratories and programs also mentioned the need to integrate social science research with the transition of research and development to applications in which all are involved at varying levels. Social science is needed to maximize the success of most transitions. Many OAR laboratories and programs are involved with test beds of various types and these are convenient facilities for such integration. This integration with research-to-applications can be accomplished with the in-house social scientists located within the laboratories and programs or with social scientists associated with each test bed who may be supported on the operations side of NOAA in many cases.

## **Mission Mandates and Drivers that Require Investment in Social Science**

### **Legal Mandates**

OAR does not have drivers that legally mandate social science. However, many of the legal mandates that drive research and development in OAR require the application of social science to satisfy their requirements. Among them are:

• America Competes Act of 2007

- Clean Water Act Amendments (CWAA) of 1990
- Coastal Zone Management Act (CZMA)
- Coastal Zone Enhancement Grants (Section 309)
- Endangered Species Act (ESA)
- Global Change Research Act of 1990, 15 U.S.C. § 2921 et seq
- Harmful Algal Bloom & Hypoxia Research & Control Act (HABHRCA)
- Inland Flood Forecasting and Warning System Act of 2002
- Integrated Coastal and Ocean Observation System Act of 2009
- Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. § 1801 et seq.
- Marine Debris Research Prevention and Reduction Act (MDRPRA)
- NISA National Invasive Species Act (NISA)
- National Climate Program Act of 1978, 15 U.S.C. § 2901 et seq.
- National Integrated Drought Information System Act of 2006, H.R.5136 et seq. (NIDIS)
- National Marine Sanctuaries Act (NMSA)
- National Ocean Policy (NOP)
- National Sea Grant College Program (NSGCP) Amendments Act of 2008
- Ocean Exploration and Research Acts (OERA)

- Ocean Research Priorities Plan and Implementation Strategy
- Oceans & Human Health Act (OHH)
- Oil Pollution Act (OPA)
- Secure Water Act of 2009
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
- Integrated Ocean Observing System (IOOS) Act

Most of these mandates are for research or services and require economic and risk assessments as well as research to optimize public and other sector understanding of the information resulting from these mandates. As mentioned above, meeting each of the goals and objectives in the Next Generation Strategic Plan (NGSP) requires the application of social science.

## FY2011 Social Science Capability

### In-house capability

Within OAR, social scientists are largely concentrated in the Climate Program Office. Most of the Climate Program Office's Climate and Societal Interactions' (CSI) professional staff (less than 10 FTEs) have interdisciplinary training/experience that include the social, natural, and/or physical sciences; they work on projects that merge these disciplines to direct a set of programs and provide policy and research leadership designed to promote "actionable science" relevant to managing a varying and changing climate. They provide in-house capability to analyze issues pertinent to NOAA in terms of climate including assessments of trends, impacts, and science designed to inform response strategies. CSI staff members also represent NOAA on major efforts such as the National Integrated Drought Information System (NIDIS), National Climate Assessment (NCA), Interagency Climate Change Adaptation Task Force (ICCATF), US Global Change Research Program (USGCRP), and the Intergovernmental Panel on Climate Change (IPCC). Other laboratories and programs in OAR do not have in-house social science capability.

### External capability

There are three offices within OAR that currently have financial investment in the social sciences external to NOAA. They are the National Sea Grant College Program, the Office of Weather and Air Quality (OWAQ), and the Climate Program Office. For Sea Grant, the investment is in 28 of the 32 Sea Grant Colleges, totaling nearly two million dollars per year. The 2012-13 Sea Grant social science projects include research projects in economics (trade-off analysis, ecosystem service value, impact assessment, etc.; 41%), public awareness/perceptions (16%), market research (11%), spatial/geographical analyses (11%), sociology and anthropology (10%), legal analysis (8%), and program evaluation (4%).

The OWAQ invests approximately \$480K per year, including an annual contribution of \$200K from the National Weather Service. This funding supports external research in the U.S. and provides important social science capabilities to improve the communication and development of NOAA's weather products. Other social-science-related weather research is provided by the National Severe Storms Laboratory (NSSL), which invests about \$50K annually.

The Climate Program Office's CSI Division supports external research in the U.S. and abroad that augments current understanding and practices used to meet the climate-related needs of decision makers. CSI research and capacity building activities address several societal challenges articulated in the context of the climate adaptation and mitigation objective of the NOAA NGSP), including: i) water resources; ii) coastal resilience; iii) marine ecosystems; and iv) climate and weather extreme events. In addition, several CSI programs support the Coping with Drought initiative of the National Integrated Drought Information System (NIDIS) by supporting science and policy experiments in regions threatened by drought. Many of these efforts span the physical, natural, and social sciences and apply tools and methodologies to use climate forecasts and information in enhanced and informed decision-making. Social Science represents approximately 40 percent of the total CSI budget (or about \$9 million). CSI funds projects that make science more useful to society. In many cases, these are research projects framed by teams of social and physical/natural scientists together, which results in research that is highly integrative and applied.

NOAA's Cooperative Institutes provide an untapped capability for social science external to OAR. (See the section below.)

## **Partnerships**

With the exception of the Climate Program Office, the partnerships that OAR maintains, aside from those derived from grants or the cooperative institutes, in social science are few and mostly fairly weak, not due to lack of need, but to both a historically stronger connection to earth system science and a lack of funding to support the partnerships. There has been some partnering with the National Science Foundation (NSF) through joint grants focused on the communication of hurricane information.

The Climate Program Office's CSI program has been a national leader for over two decades on climate impact and adaptation science. As a result, staff members are integral to a number of partnerships within and outside of the Federal Government that guide adaptation and mitigation efforts. As mentioned in the section on in-house capability, staff members are involved in international (e.g., IPCC), interagency (e.g., ICCATF and USGCRP), and national efforts that include more than Federal agencies, e.g., NIDIS and NCA. CSI is also involved with other interagency partnerships, such as the NOAA - National Science Foundation, Social, Behavioral, and Economic Directorate Interagency group that oversees connections between the RISAs and the Decision Making Under Uncertainty (DMUU) centers. A similar interagency group that meets on a periodic basis includes representatives from the Department of Interior's Climate Science Centers and the NOAA RISA program to discuss coordination of regional climate-related research activities. CSI is also involved in less formalized partnerships, such as the past two years of interactions between the NOAA SARP, EPA, and two water foundations (i.e., the WaterRF and the Water Environmental Research Foundation) focused on improving understanding and use of adaptation strategies and articulating information needs. Members of CSI also represent NOAA on relevant professional committees through organizations such as the American Meteorological Society. Staff also sponsors American Association for the Advancement of Sciences (AAAS) Science and Technology Policy fellows (scholars with Ph.D.s) and undergraduates through the NOAA Hollings Scholars Program to work at the

interface of science and policy. Finally, this group is instrumental in contributing towards other transboundary NOAA partnerships, such as the recent development of the NOAA-Western Governors Association's MOU.

## **Social Science Disciplines**

Within the Climate Program Office, there are seven staff members with some education/training in the social sciences and/or interdisciplinary studies. Among the disciplinary expertise represented are Economics, Geography, Political Science, Decision Analysis, and International Relations.

As indicated above, the social science disciplines in the remaining sections of OAR have been entirely external. For Sea Grant, the disciplines are difficult to determine in total, since they reside within the 62 grants funded among the 28 programs. The same is true of the CPO external grants. There is little doubt that most of the social science disciplines listed in the NOAA's Science Advisory Board's 2009 Report, "Integrating Social Science into NOAA Planning, Evaluation and Decision Making" are represented among these grants.

For the small external investments of OWAQ and NSSL, the primary disciplines involved have been economics, geography, and anthropology. There is a need for more disciplines as mentioned in the section below on "Social Science Gaps".

## **Interagency Social Science**

As mentioned in the section above on "Partnerships", OAR has worked with NSF on joint grants with joint funding, and also on planning projects with no exchange of funds in a less formalized arrangement. OAR (GLERL) has also worked informally with NASA's Data and Applications Center at Columbia University. Again, without funding or promise of funding, these arrangements remain informal and opportunistic and can be difficult to maintain.

As mentioned previously, CPO staff members are engaged in a number of interagency activities enumerated above. Examples of other interagency activities that would require some social science input include (a) subcommittees of the National Climate Assessment – such as those associated with Indicators, Coasts, Oceans, Urban areas, and Water; (b) subcommittees of the ICCATF such as the water subcommittee that recently completed a National Freshwater Action Plan; (c) the Climate Change and Western Water Group (CCAWG), and (d) the U.S. Global Change Research Program. This is not an exhaustive list, but a representative sample of the types of interagency endeavors staff members pursue.

## **Social Science Needs**

## **Process, Products and Activities that Require Social Science**

OAR provides the research that creates new or improved products and services. In addition, OAR provides and directly supports products and services in research or experimental models. The provision of environmental information, a major result of OAR's research, is also considered a service. The Climate Program Office programs use social science methodologies to better understand the users of climate information, as well as their needs, to determine how and why they use (or don't use) NOAA climate products, how decision makers could better incorporate climate information into their resource management routines, and how NOAA could better convey climate forecasts and information to decision makers. The expected outcomes include, and are not limited to: an increased understanding and application of NOAA's climate products by decision makers, augmented adaptation/coping capacity in the face of higher numbers and intensity of extreme events, expanded applications of climate information (e.g., with farmers and soil moisture indices), and increased abilities to combine climate information with other social and scientific models (e.g., combining climatological, hydrological, and economic models for reservoir operations) for improved resource management and resilience.

Social science research is also required to improve and create NOAA's weather and water products and services and to identify the value of weather information for U.S. commerce and economic growth. As part of a mission agency, OAR's research mission requires an understanding of the society and its behavior in the face of hazardous weather events, such as severe storms and flooding, to improve NOAA's products. This need for social science research to improve weather products has been articulated most recently during the national dialog meetings as part of the Weather Ready Nation initiative.

## **Social Science Gaps**

### **Gaps based on immediate risks**

As mentioned above, OAR supports research and development across a broad spectrum of the environmental sciences. For GLERL, the drivers for research and development are a set of legal mandates (see the "Legal Mandates" section above). For most of OAR, the drivers are strategic priorities such as, overall, the NGSP or the related Administrative Guidance Memorandum (AGM), and external reports, such as those written by the National Academy of Sciences. Most of these drivers require, or would be greatly improved, through appropriate integration of social science research or application to reach their goals. Yet, aside from the Climate Program Office, very little social science is supported by OAR. Therefore, the gaps are significant.

The list of needs in the section above is, for the most part, unmet. Distilling this list, we find specific gaps for all of OAR in:

- Optimum design of environmental decision support systems for optimum understanding and response;
- Societal sector and general public perception of risk for appropriate response for optimum community resiliency;
- Estimating and improving the value of new or improved products, services, and observing systems derived from research and development;



- Modeling and assessing the human dimensions of coastal and ocean natural resources.
- From a communication perspective, OAR's research would also benefit from social science that would provide
  - sufficient public understanding of the impacts of climate change and extreme events and the information available to support preparation, adaptation, management and/or response;
  - public understanding of the health impacts of poor air and water quality and the need to respond;
  - the need for specific information for planning as we understand impacts and requirements differ by sector and region/

Most of the needs identified above address the agency's ability to translate scientific information into usable and actionable results. Filling these gaps requires the expertise of a broad range of social scientists, including sociologists, human geographers, cultural anthropologists, economists, cognitive psychologists, and experts in communication theory.

Sea Grant currently has recently increased its funding for social science activity as mentioned in the "External Capability" section above. However, they do have a gap in identifying and communicating social science research gaps and accomplishments involving social science, hence the need for at least one social scientist in their headquarters.

OWAQ has a current small investment in social science related to weather research, but it is not adequate to address the issues represented in the bullets above.

Within the Climate Program Office, activities have been started on extreme events and living marine resources, topics targeted within the NGSP. However, there are other key research areas related to impacts and responses that should also be started that would directly feed into what is necessary to meet the demands of decision makers or what is critical for adaptation and mitigation efforts such a better understanding of risk management, information systems, and scenario planning (e.g., the impact of climate on societal infrastructure such as the impact of heat waves on health and energy consumption). Given current budgetary realities, the work on extreme events and living marine resources will be at the expense of past and current efforts from this office.

The consensus of the other OAR laboratories and programs is that a granting and/or contracting activity, perhaps much of it with the cooperative institutes, is needed to fill their gaps in social science research and ensure that the Agency benefits from the finding. This would require the addition of a percentage of their total budgets in the range of two percent at minimum to be applied to external social science research and application. Excluding the current Sea Grant, OWAQ and CPO investments, this would amount to about a two million dollar additional annual investment in social science in OAR.

## Fully Operational Social Science

OAR has at its disposal an impressive network of external partners and university affiliations that could provide a wealth of social science capacity. To utilize these external resources, however, requires more social science leadership at the highest levels of OAR.

Currently, the model for research is a passive one within OAR (excluding CPO) – external partners respond to relatively general RFPs and NOAA waits to see what innovative ideas rise to the top. A more active paradigm could be employed in which senior leadership could identify emerging research areas within the line office for which integrated social science methods are needed. A senior social scientist, perhaps at the SL or ST level, could provide such leadership. However, one challenge of having just *one* social scientist is that they are an island with no regular colleagues where as everyone else will have colleagues that speak a similar language of either physical and/or natural sciences. Though it is important to find people to speak multiple languages to successfully build a program, it would be more effective to have a couple of well-conceived concentrated efforts instead of a shot-gun approach to distributing social scientists. Such social scientists do not want to just be translators but to be viewed as equal in their research contributions as their other scientific colleagues.

The use of external capacity provides flexibility as social science needs and resources change over time and also will allow OAR to engage a broad set of social science. Adding approximately 2% of the laboratory or program total budgets may be adequate to support cooperative agreements or grants. In addition, at least one and perhaps up to five to seven, depending on the laboratory or program size, in-house social scientists in each lab and program are needed to work closely with the natural scientists and integrate social science with the natural sciences in the laboratory. The in-house social scientists will also be “receptors” and translators of the results from the external research.

The challenge is that OAR addresses such a broad range of environmental science that a corresponding broad range of in-house social science disciplines will be required. The in-house social scientists integrated among the laboratories and programs will need to coordinate and collaborate. At least one social scientist in OAR Headquarters will be needed to lead the coordination and facilitate the collaboration. In addition, this Headquarters social scientist will help coordinate with other NOAA Line Offices through the NOAA Social Science Committee and translate and brief social science issues, progress, and information to OAR Leadership. This individual will also work within NOAA’s SEE process to ensure that OAR social science activities, accomplishments, milestones, issues, and gaps are included in the SEE documents such as the implementation plans and annual operating plans.

In addition to the cost estimate in the section above for external cooperative agreements or grants (the addition of about two percent of the OAR laboratory and program budgets) and excluding the social scientists directly connected with NOAA test beds which may be support by the operations side of NOAA, the additional in-house social scientists proposed in an ideal structure would be the order of 20 at a cost of about four million dollars. These would be distributed among the labs where there is need and at OAR headquarters.

Within CPO, partnerships and capabilities have already been established though new ones are always being made, and coordination is already strong between the CPO office, the academic community, the Federal science and policy arenas, and other partners. The Climate Program Office is faced with a public that understands that climate has and will continue to become an increasingly more important factor in resource management decision-making. Given the uncertainties they face, they are turning more often and in larger numbers to NOAA to understand and apply climate forecasts and information to plan for their futures. In an ideal world with no budget constraints, additional internal staff members would be needed to oversee the development of new tools, methodologies and activities to help national, state, local and tribal governments and resource managers prepare for, adapt and respond to drought and flooding to more confidently manage water resources; to work with coastal resource managers to incorporate a greater understanding of the risks of sea level rise, changes in Great Lakes hydrology and water levels and other climate impacts to reduce the vulnerability of coastal communities and ecosystems; to work with living marine resource managers to prepare for and respond to ocean acidification and other climate impacts; to aid decision makers as they prepare for and adapt to climate extremes including deviations in temperatures and precipitation patterns; and to provide policy makers with the information and understanding they need to implement and manage options by limiting climate change and its impacts.

#### **Implications for future budget implications for Social Science within OAR**

FY12 reductions overall were substantial in OAR and the impact on social science was meaningful. Among the impacts felt were:

- At the end of the current award, OWAQ stopped funding the Societal Impacts Program at NCAR in FY2012. To help foster collaboration in social science important to both lines, and to mitigate budget cuts, OAR partnered with NWS to fund four projects selected in an external competition in FY2012 that focused on social science supporting severe weather information, forecasts and warnings.
- Within CPO, a number of actions affected social science capacity: The proposal to create a NOAA Climate Service was not approved. During this year, the International Research Institute for Climate and Society (IRI), which was created by NOAA in the mid-1990's and until this year has received several million dollars per year, was not funded. Research funded through the IRI has traditionally encapsulated the physical, natural and social sciences. Finally, the entire office was cut an additional five percent. CSI programs experienced reductions, affecting research dollars available to social scientists.

The one bright spot for FY2012 is that Sea Grant doubled its annual investment in social science grants to nearly four million dollars. OAR will increase its effort to link the emerging social science research in the Sea Grant Program to NOAA's strategic requirements as much as possible to take full advantage of this investment. Sea Grant identified social science as a high programmatic priority and committed substantial resources to expand its role in integrated natural and human dimensions research.

For FY13 and beyond, the small investment by NSSL in the University of Oklahoma cooperative institute continued through FY2012, but future-year investments are uncertain.

675 Within CPO, future budget reductions will result in a noticeable cut in research that would  
676 develop new tools, methodologies, partnerships, and knowledge. It will also diminish  
677 opportunities for collaboration. This comes at a time when new scientific discoveries and  
678 adaptation planning are creating increased demand for the activities traditionally started,  
679 nurtured, funded, and shared by NOAA.

680  
681 In general, although recent studies with decision makers outline their need for a better  
682 understanding and utilization of the natural and physical science models and data, future funding  
683 will most likely not favor funding projects to provide these services. In addition, the application  
684 of social science could be of significant help in making budgetary decisions (e.g., protecting  
685 those with highest social utility) and would provide more efficiency and effectiveness to OAR  
686 research, there is no expectation that financial support of social science will increase in the  
687 foreseeable future as we recognize the challenges associated with increasing capacity in any area  
688 during a declining budget. It is very unlikely that additional financial support for the social  
689 sciences in OAR will come from redirection of support for the natural and physical sciences. In  
690 addition, the informal partnerships between OAR laboratories and the external community  
691 addressed above are expected to continue. However, since no funding from OAR is involved,  
692 the maintenance of such partnerships is challenging and the expectation of significant  
693 accomplishments from these partnerships focused on OAR priorities and expected outcomes is  
694 low.

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700 **NOAA's National Ocean Service**

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## Social Science in NOS

The health of our coasts is intricately connected to the health of our nation's economy and society as a whole. The National Ocean Service (NOS) translates science, tools, and services into action, to address threats to coastal areas such as climate change, population growth, port congestion, and contaminants in the environment, all working towards healthy coasts and healthy economies. All of these goals are inexorably linked to a better understanding of humans and how they behave. In order to plan for, execute and gauge success, it is imperative to meet the following objectives:

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

In order to do this, NOS must develop and apply data, tools and expertise, including<sup>2</sup>:

- Development of data streams for social, behavioral, and economic data and trends;
- Development and application of economic and social valuation methods and approaches;
- Science-based tools and information for assessing hazard risk, vulnerability, and resilience;
- Development and application of economic valuation methods and approaches;
- Understanding the social and economic implications of management strategies.

## Social Science Mandates and Drivers

### Legal Mandates

The National Ocean Service (NOS) is a diverse agency with a broad range of legal mandates that support the portfolio of NOS missions. A subset of NOS mission areas has legal mandates that explicitly call for the conduct and application of social science to support the mandate objectives. There are also several mandates without direct calls for social science that also contain elements that could not be accomplished without social science.

- *Coastal Zone Management Act*: Provides federal grants to states for the development and implementation of coastal zone management programs to "achieve wise use of the land and water resources of the coastal zone, giving full consideration to ecological, cultural,

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<sup>2</sup> These are paraphrased from the requirements of the NGSP Resilient Coastal Communities and Economies Goal, described in more detail below.

historic, and aesthetic values, as well as the needs for compatible economic development.” (OCRM, CSC, MBO, NCCOS)

- *National Marine Sanctuaries Act*: Requires the Office of National Marine Sanctuaries (ONMS) to develop management plans that require social science to design and evaluate the economic and societal impact of management strategies and regulations. (ONMS)
- *National Historic Preservation Act*: Requires that agencies develop a program for identifying historic and cultural resources for listing in the National Register of Historic Places and to take into consideration actions that could adversely affect historic properties listed (ONMS)
- *National Environmental Policy Act*: For all management plans and regulations, NOAA must develop environmental impact statements that include socioeconomic impacts. (ONMS)
- *Oil Pollution Act*: NOAA requires economic analysis to quantify environmental damages caused by oil pollution. Quantifying damages includes the economic valuation of lost natural resources and services and, in some cases, valuing the benefits of restoration.(OR&R)
- *The Comprehensive Environmental Response, Compensation, and Liability Act*: NOAA seeks compensation for restoration that is designed to offset the economic consequences of damages to natural resources. Economic analysis/valuation are needed to determine damages. (OR&R)
- *Harmful Algal Bloom and Hypoxia Research and Control Act*: Includes a ”comprehensive and coordinated national research program to develop and demonstrate prevention, control, and mitigation methods to reduce the impacts of HABs on coastal ecosystems (including the Great Lakes), public health, and the economy.” (NCCOS)

## Strategic Documents

NOAA’s Next Generation Strategic Plan (NGSP) charts the path that NOAA will follow to meet its mandates and accomplish its mission. Within this plan there are explicit goals and objectives related to NOS that have social and economic elements. Based on these elements, NOS Program Offices have developed individual strategic plans that call for social science inputs and have contributed to implementation plans for NGSP objectives. Additionally, there are numerous standing Commissions, which have produced reports with implications for NOS, that require social science.

A major driver for NOS social science is the NGSP Resilient Coastal Communities and Economies Goal. The objectives under this goal call for a wide variety of social science data, tools, and analytical expertise, including:

- Development of data streams for social, behavioral, and economic data and trends;
- Science-based tools and information for assessing hazard risk, vulnerability, and resilience;
- Socio-economic benefits studies of products and services;
- Assistance to communities in adapting to, and mitigating climate;
- Assessment of the socioeconomic impacts of moving shipping lanes; and
- Coastal and marine spatial planning, and regional ecosystem conservation approaches.

Another major strategic driver is the NOAA Annual Guidance Memorandum, which includes specific calls for social science expertise, for example, economic analysis to determine natural resource damages, which provides the funds for coastal restoration. Other important strategic drivers for NOS social science include:

- U.S. Commission on Ocean Policy 2004 Report;
- America's Living Oceans: Charting a Course for Sea Change (Pew Oceans Commission);
- OCRM Strategic Plan for 2007-2012;
- NOAA Coastal Services Center Strategic Plan;
- Interagency Oceans and Human Health Research Implementation Plan of 2007;
- Executive Order 13547-Stewardship of the ocean, or coasts and the Great Lakes; and
- NOAA-United Nations Environment Program to implement the Global Program of Action.

## **FY 11 Snapshot of NOS Social Science Capability**

When considering how social science can contribute toward the mission of NOS it is important to first consider where the agency stands now in terms of its capability to conduct and apply social science. This section represents a characterization of the current NOS social science capability including elements such as form, geographic distribution, social science disciplines, and relationships with other agencies.

### **Social science disciplines, training, and job descriptions**

Social science capacity can be described in terms of the discipline in which NOAA employees and contractors are educated, their level of training, and the responsibilities and opportunities afforded by the job description. Even when social science positions have been created at the agency, gaps in capacity may exist if these positions are not filled by adequately qualified staff. Similarly, job requirements may limit the opportunities available for staff with ample social science education to use this education to apply social science methods, even if they bring a degree of social science knowledge to their positions.

### **In-House Capability**

In-house capability includes federal employees in a social science job series, federal employees who are not in a social science job series but who spend some or all of their time conducting and applying social science methods, and contract employees engaged in social science. The following table lists social science staff by NOS Program Office.



**Table 1: National Ocean Service In-House Social Science Capability**

<u>Program Office</u>	<u>FTE's</u>	<u>Contract Staff</u>	<u>Program Office</u>	<u>FTE's</u>	<u>Contract Staff</u>
<b>ONMS</b>	2	0	<b>OCS</b>	2	0
<b>CO-OPS</b>	0.1	0	<b>CSC</b>	5.4	2.25
<b>MBO</b>	2.5	0	<b>NGS</b>	2	1
<b>NCCOS</b>	1	2	<b>OR&amp;R</b>	2	1
<b>OCRM</b>	3.25	2.25			
			<b>Total</b>	<b>20.25</b>	<b>8.5</b>

## **External Capability**

External social science capability is conducted by the awarding of contracts and grants to consulting firms or academic practitioners. This approach is flexible; it can be readily used when the need is present and when funds are available. The use of external expertise varies significantly depending upon the needs of the Program Office, and the table below shows the amount, in thousands of dollars, allocated in FY 11 by Program Office.

**Table 2: National Ocean Service External Social Science Capability**

<u>Program Office</u>	<u>Contracts (\$K)</u>	<u>Grants (\$K)</u>	<u>Program Office</u>	<u>Contracts (\$K)</u>	<u>Grants (\$K)</u>
<b>ONMS</b>	36	0	<b>OCS</b>	113	0
<b>CO-OPS</b>	0	0	<b>CSC</b>	320	0
<b>MBO</b>	1	0	<b>NGS</b>	100	0
<b>NCCOS</b>	505	203	<b>OR&amp;R</b>	100-500	0
<b>OCRM</b>	0	150-200			
			<b>Total</b>	<b>1,050-1,450</b>	<b>353-403</b>

## **Geographic distribution of social science capability**

One important factor to consider is whether NOS social science capability is where it is needed. For certain social science applications, capability based at headquarters may be appropriate. In other cases, the social science need may be regional or local in nature. Although it is important

to assess the geographic distribution of our current capability, this does not address where social science work actually takes place, merely the physical location of the capability. The challenge here is to link social science skills and abilities with knowledge of local, state and regional issues and stakeholders. The distribution of in-house NOS social science expertise is as follows:

**Table 3: Geographic distribution of NOS social science capability**

HQ	53.1%	Great Lakes	0.5%
Northeast	0.5%	Gulf of Mexico	1.4%
Mid-Atlantic	0.5%	West Coast	16.5%
Southeast	27.2%	Pacific	0.5%

## **Social Science Disciplines**

Historically, NOS social science has mainly been represented by economics. The reason for this is that the majority of the NOS mandates calling for social science have been related to economic impacts. As the agency evolved, the need for other social science disciplines became more apparent, and the current social science at the agency includes other disciplines. It is important, as the need for social science is assessed, to understand what disciplines we currently have and what will be needed as the agency moves in to the future. The following table presents the distribution of in-house NOS social science disciplines:

**Table 4: NOS Social Science Disciplines**

Economics	44.4%	Interdisciplinary Social Science	12.1%
Geography	9.5%	Anthropology	6.0%
Demography	3.6%	Marketing	3.2%
Sociology	12.3%	Organizational Development	8.9%

## **Cooperative Institutes and Other Vehicles**

NOS does not utilize Cooperative Institutes for social science at present. However, in FY 11 the ONMS began discussions with different departments at East Carolina University (ECU) - a Cooperative Ecosystems Study Unit (CESU) - that address human dimensions, sustainable tourism, and economics. It is expected that in the future ONMS social sciences will utilize CESUs for social science support.

## **Partnerships**

NOS also conducts social science work through both formal and informal partnerships with other entities by working toward a common goal without the exchange of funds. These entities may be states, non-government organizations (NGOs), other federal agencies, or local governments. The

following is a sample of the kinds of social science work that take place in NOS through partnerships

- *Issue Specific Partnerships:* Several Program Offices participate in the Marine Ecosystem Services Partnership (MESP), a broad partnership to support development and maintenance of an on-line database of studies on the valuation of ecosystem services, and the National Ecosystem Services Partnership (NESP), a partnership of the public and private sector to enhance collaboration within the ecosystem services community and to strengthen coordination of policy and market implementation and research at the national level. (ONMS, CSC, OCRM)
- *Internal Partnerships:* There are several examples of partnerships within NOAA. For example, NOS works closely with NMFS social scientists in National Marine Sanctuary management actions that affect the fisheries. This involves analyzing management strategies and regulations that impact the fisheries. (ONMS)
- *Partnerships for Provision of Social Science Data:* Two offices partner with the Bureau of the Census, Bureau of Labor Statistics, and Bureau of Economic Analysis to generate Economics: Demographic data for the NOAA State of the Coast (SOTC), National Ocean Watch (ENOW) data, and NOAA Spatial Trends in Coastal Socioeconomics (STICS) Web sites. (CSC, MBO)
- *Partnerships with State and Territorial Coastal Programs:* NOS relies on these partners for local knowledge and information on what products and services are needed to achieve our respective missions. (OCRM, CSC, ONMS)
- *Partnerships with Regional and Mission-Related Associations:* Associations based on geography or based on issues have been significant partners in achieving the missions of NOS and these have considerable need for social science input. Examples of this includes the CSC working with Digital Coast partners to provide socioeconomic and other spatial data to customers, ONMS conducting socioeconomic research to support spatial planning, and IOOS Regional Associations conducting social science as outlined in the ICOOS Act.

## **Interagency Social Science**

NOS often conducts and applies social science activities in partnership with other federal agencies. This may be related to a shared responsibility for a mission, or efficiencies found by working together. This varies among Program Offices, but the following are examples of ongoing interagency partnerships:

- *Interagency Working Group on Ocean Social Science:* A working group of the National Ocean Council that was convened to address issues identified in the National Ocean Policy. (CSC)
- *Association of Environmental and Resource Economists:* A professional association for economists working on the environment and natural resources; supported by NOAA, EPA, DOI, and USDA. (ONMS, OR&R)
- *Committee on Marine Transportation Systems (CMTS):* NOAA is working with the CMTS to gather economic information related to the marine transportation system. (CO-OPS, OCS, NGS)

- *Individual interagency Partnerships*: Partnerships with the Bureau of Ocean Energy Management for the characterization of traditional and indigenous resources and beliefs; the National Park Service for a survey and characterization of cultural resources; U.S. Environmental Protection Agency to combine decision science with physical/natural and social sciences in development of decision-support tools. (ONMS)

## Social Science Needs

When considering how social science contributes toward the mission of NOS, another major factor is what level of social science the agency needs and how this compares with existing capabilities. This can be a difficult topic, especially in times of budgetary austerity; however, an honest assessment of social science needs, presented in actionable terms, can make the agency more effective in meeting its mission.

### Process, Products and Activities that Require Social Science

There are many elements of the NOS mission that have a human component. These are difficult to generalize because the missions of the Program Offices are so diverse. However, a good working knowledge of the things NOS does - products, services, processes, or other activities - that require social science can help NOS understand what its needs are and ultimately better integrate the social science expertise that is needed to support those elements. In addition to those elements described below, the NOS social science community publishes articles about its work in scholarly journals as needed. Topics include such issues as ecosystem services, valuation methodology, and coastal and ocean economics and demography.

- ONMS: develops information and tools to assess management strategies and regulations that potentially have significant socioeconomic impacts and .
- CO-OPS: utilizes customer satisfaction surveys to improve products and the delivery of products.
- MBO: provides basic socioeconomic information to the coastal management community, to be used for characterization, assessments, decision-making, and public outreach activities.
- NCCOS: conducts research on social and economic issues that are relevant to coastal and marine resource management in concert with natural and physical research.
- OCRM: maps human uses of the ocean for a wide range of ocean planning applications; conducts economic valuation studies to understand the contributions of coral reefs to local economies and the economic value to jurisdictions with coral reefs; applies social science information for better management of coastal resources.
- OCS: Sets priorities for hydrographic surveys and nautical charts; measures the societal benefit of work in order to support budget requests or defend budget; utilizes customer satisfaction surveys to improve products and the delivery of products and responses to stakeholder and Congressional inquiries; and prepares press releases.

- IPO: assesses economic values of coastal and ocean resources and what economic impacts exploitation and/or conservation will have on these resources.
- CSC: conducts needs assessments to inform the development of products and services; conducts social network analysis; develops social science tools; provides training on social science processes; serves a suite of economic data and viewers to understand the value of ocean and Great Lakes jobs to coastal communities; provides technical assistance to local, state, regional and federal agencies and organizations.
- NGS: informs program evaluation exercises, responds to stakeholder and Congressional inquiries; and prepares press releases.
- OR&R: conducts damage assessment, remediation and restoration.

## **Social Science Gaps**

This section addresses the gap between current NOS social science capabilities and social science needs to support NOS processes, products and activities to support critical NOS outcomes. This is done in two ways. The first is an examination of the marginal changes that would bring us closer to addressing the gaps that we have identified. After that we will look at what the ideal social science structure in NOS would look like if we were not faced with an anomalous budget situation and if institutional inertia were not a factor.

## **Gaps based on immediate risks**

The following Program Office statements represent an assessment of marginal gaps in NOS social science capability.

- ONMS: Social science coordinators for each ONMS region, along with extramural funds to help leverage partnerships to conduct socioeconomic research and monitoring. The estimated costs for the social science coordinators is about \$100k per coordinator or \$400k total and about \$100k in extramural funds per region per year of \$400k.
- OR&R: One FTE economist per regional branch would be the minimum for a total of four FTE economists. While external contractors provide support on specific damage assessment cases, there are issues with institutional knowledge and a dearth of relationships with federal and state partners.
- CSC: In order to support the environmental, social, and economic well-being of the coast, add three positions: a risk behavior/risk communication specialist, a social psychologist for behavior change expertise, and an economist to conduct non market valuation studies for ecosystem services; along with contract funds (\$500K) to conduct related studies.
- CO-OPS has a need for an accurate understanding of the economics of marine transportation down to the individual port level.
- MBO: A new or shared position to increase engagement with coastal communities to fully understand social science information needs for enhanced coastal management.
- NCCOS: NCCOS can currently engage in only a fraction of the work that has been prioritized. The primary impediment to advancing research programs in the social sciences is a lack of budgetary support for research activities. An investment of at least \$100K annually would facilitate the addition of social science research components to many existing and newly developed research projects within NCCOS. The lack of in-house expertise in the area of economics critically limits the office's ability to conduct needed work. Addition of a social scientist at the PhD level would fill a significant gap in

research capacity. A contractor or FTE position might be secured at the cost of \$125K annually.

- OCRM: OCRM would benefit from socio-economic research and analyses to improve the understanding of stakeholder needs, community values, and perceptions that drive economic development and resource protection in our nation's oceans and coasts; information on best practices to federal and state MPA programs on a range of MPA management issues; monitoring socioeconomic conditions for long-term tracking of coral reef status and trends; field based staff in the coral jurisdictions, particularly the U.S. territories of American Samoa, Guam, CNMI, US Virgin Islands, and Puerto Rico; increase partnering within NOAA and share resources within OCRM on social science issues; and a dedicated social scientist.
- OCS: A sound methodology for determining the economic value of hydrographic surveys and nautical charts plus the data to exercise that methodology.
- IPO: Assistance and guidance in implementing partnerships, particularly under the UNEP MOA, in researching and summarizing the social benefits of improved water quality for small island nations (e.g., on impacts to health and tourism revenues).
- NGS: \$200K/year. NGS has had the funding in the past to conduct social economic scoping studies, which can be initiated for between \$50K and \$100K. There is a need for more detailed follow-on studies which would cost several hundred thousand dollars per year. Additionally, some studies (such as those conducted through NAS/NRC) typically require commitments of several hundred thousand dollars per year.

## **Gaps based on immediate risks**

The following Program Office statements, based on assessments by the individual Program Offices, represent a vision for social science in NOS that utilizes a variety of social science disciplines, takes advantage of partnerships and funding vehicles that have not necessarily historically existed, crosses organizational boundaries in order to most efficiently utilize existing and new social science expertise, and addresses all appropriate aspects of NOS missions.

- ONMS: Four social science coordinators, one for each region (\$400k) with \$100k per region to leverage partnerships (\$400k). The latter would also be used for tool development using HQ and regional social science coordinators in partnerships with other NOAA social scientists or social scientists from other federal and state agencies and NGOs.
- CO-OPS: \$500K/yr for contracts to determine the economic value of real-time physical oceanographic information to the many potential user groups in the U.S. This would cover the marine transportation users as well as coastal planners, academics, and private industry users. \$250K/yr to gather data on users (e.g. demographics, user needs, future directions). \$250K/yr to develop models of user groups to enable CO-OPS to accurately predict changes to economic parameters due to potential changes in products and services. Develop teaching tools and curriculum for primary and secondary educators for physical oceanography related to CO-OPS areas of expertise. Develop a modeling tool to predict the economic effects on a region from global sea level rise.
- Coastal Management (CSC, MBO, OCRM): Build and enhance a social science hub for coastal management providing socio-economic research and analyses and applications, improving the understanding of stakeholder needs, community values, and perceptions

that drive economic development and resource protection in our nation's oceans. This capability would provide cutting edge expertise in the form of valuation of NOS products and services; provision of foundational social science data to support enhance coastal management decisions; economic impact analysis/cost-benefit analysis; training & technical assistance in social science techniques, and ecosystem services valuation and non-market valuation studies (10 FTE). Establish corresponding regional social science expertise, including and interdisciplinary social scientist in each region (8 FTE); provide technical assistance for the use of the economic data (1 FTE); conduct cost benefit analysis of climate adaptation measures (1 FTE); provide non-market valuation studies to inform ecosystem services valuation efforts (3 FTE); training/technical assistance for integrating market and non market economic data with natural data in decision-making (1 FTE); understanding values of coastal decision makers and how they incorporate that into their decisions in a regional context (2 FTE); integration of social, natural and physical data and processes to inform coastal managers (2 FTE); expertise in social psychology (1FTE).

- NCCOS: In addition to those gaps mentioned in the section above, scientists trained and experienced in economics, human geography, political science and program evaluation research would contribute significantly to meeting research needs in NCCOS. The total cost of adding these research scientist would be approximately \$500K annually. Increased opportunities to host student researchers at the graduate level and post-docs would be extremely helpful at closing capacity gaps at a lower cost. Post-docs could be hosted at a cost of \$40K to \$80K per post-doc, depending upon the discipline. Greater financial and administrative flexibility to forge and sustain ongoing, collaborative partnerships with other research institutions are needed. Having even a small amount of internal funding for research (\$5K to \$50K annually) could facilitate leveraged opportunities with other research institutions.
- OCS: Most maritime accidents are caused by bad mariner decisions. Important work could be done on human behavior to better design navigation products so as to cause better decisions to be made.
- IPO: An ideal structure would allow IPO access to staff in other NOS offices who could assist, when required, in implementing international projects/partnerships that call for social science assessment, and analyzing qualitative data that demonstrates impact and benefits of NOS international engagement.
- NGS: Utilize or share with the other Nav Services Offices (NGS, CO-OPS and OCS) one full-time economist (\$150K/year).
- OR&R: Capability and capacity for methods development research (valuation and cross disciplinary) and ecosystem service valuation research (for example, the relative services provided by a restored marsh versus the injured marsh, or "environmental equivalency"), work ongoing regardless of the extent of damage assessment case work. These elements would make the damage assessment work more efficient and effective.

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1084 **NOAA Fisheries Service**

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# Social Science Mandates and Drivers

## Legal Mandates

In 2011, the Department of Commerce issued 327 Final Rules (Rules). Notably, NOAA Fisheries accounted for 282 (86%) of these Rules, with other DOC sub-agencies (Bureau of Industry & Security, 32 Rules; Patent Office, 8 Rules; International Trade Administration, 3 Rules; Bureau of Economic Analysis, 2 Rules) comprising the remainder.<sup>3</sup> Accordingly, key drivers for NOAA Fisheries Economics & Human Dimensions Program (Program) are those Executive and legislative mandates governing the economic and socio-cultural analyses required for rulemakings including:

- *Magnuson-Stevens Fishery Conservation & Management Act (MSA, 2007)* –requires extensive economic and social data collections and assessments be conducted (additional details below);
- *Executive Order 12866*: conducting cost-benefits analyses of each management option proposed under every regulatory action;
- *Regulatory Flexibility Act*: assessing the economic impact of the Proposed and Final Rule on small entities and identifying steps the Agency has taken to minimize impacts on these entities;
- *National Environmental Policy Act*: assessing direct and cumulative economic and social impacts of regulatory options;
- *Executive Order 12898*: Agencies must make Environmental Justice part of its mission by identifying and addressing regulations that disproportionately impact minority or low income populations
- *Endangered Species Act*: requires economic assessment of critical habitat designations.

The MSA places extensive economic and social data collection and assessment requirements on NOAA Fisheries. A key MSA driver is National Standard 8, which requires NMFS to take into account the importance of fishery resources to fishing communities by utilizing economic and social data to both provide for the sustained participation of fishing communities and to minimize to the extent practicable adverse economic impacts on these communities. In addition, for each of the 47 federal fishery management plans (FMPs) and associated amendments, NMFS must assess, specify, and analyze the likely *cumulative* economic, and social effects of the conservation and management measures on, and possible mitigation measures for, participants in the fisheries and fishing communities; participants in the fisheries conducted in adjacent areas; and the safety of human life at sea. Further, NMFS must also collect economic data on commercial harvest fleets, processors and for-hire operations; conduct economic impact assessments on recreational anglers, harvest and for-hire operations; and assess the economic impacts of rebuilding plans on fishery participants.

Implementation of limited access privilege programs, now commonly referred to as catch share programs, also have substantial socioeconomic requirements. For example, participation criteria must consider the cultural and social framework relevant to the fishery; economic barriers to access to fishery; and the social and economic impacts on harvesters, captains, crew, processors, and other firms substantially dependent upon the fishery in the region or sub-region. More generally, NMFS must monitor and assess that limited access privilege programs do not result in excessive market share, are mindful of potential harmful effects on fishing communities, and ensure fair and equitable initial allocations of harvest privileges.

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<sup>3</sup> Only the Department of Homeland Security (1,233 Rules), Department of Transportation (563 Rules), and the Environmental Protection Agency (457 Rules) issued more Rules than NOAA Fisheries or DOC.

1127

1128 The Endangered Species Act places additional requirements on the federal trust agencies. Marine  
1129 protected species do not only interact with fisheries but with other human uses, as well. Some of these  
1130 interactions are positive (e.g., whale watching) while others are negative (e.g., ship strikes on whales,  
1131 pinnipeds ‘occupying’ private property such as pleasure boats and docks). The economic analyses  
1132 underpinning regulations to protect and rebuild these stocks must take into account the full suite of  
1133 benefits (use and non-use) as well as the potential costs to private businesses and households, which  
1134 results in a very different suite of data requirements and analyses. Similarly, the effects of habitat  
1135 restoration activities extend well beyond fisheries. For instance, salmon habitat restoration activities can  
1136 affect activities such as farming, mining, non-fishing recreation, hydropower, and municipal water use.  
1137 The economic analyses underpinning salmon restoration decisions must often address multiple user  
1138 groups and almost always require coordination with multiple agencies.  
1139 Taken in their entirety, the high number of regulatory actions coupled with economic and socio-cultural  
1140 data collection program design and management duties, modeling activities, and decision support tool  
1141 development responsibilities results in a heavy workload for the NMFS economists and social scientists.

## 1142 **Strategic Documents**

1143 NOAA Fisheries need for an economic and social sciences capability is strongly reflected in a number of  
1144 key Agency documents. In particular, the Next Generation Strategic Plan (NGSP) and the Annual  
1145 Guidance Memorandum (AGM), which establishes the priorities for implementing the NGSP, clearly  
1146 identify the need for a strong economic and social sciences capability to inform resource management  
1147 decisions. The AGM, for example, provides clear links between the NMFS’ stewardship mission to  
1148 improved economic opportunities, “*NOAA will sustain efforts to end overfishing and rebuild and*  
1149 *maintain fish stocks at sustainable levels to optimize fishing opportunities, jobs, and ecosystem services.*”  
1150 Accordingly, the AGM identifies NOAA Fisheries’ top deliverable as “*Complete implementation of*  
1151 *annual catch limits and continue to assess economic and community impacts of these new management*  
1152 *regimes.*” In the out years, FY14-FY18, NMFS is directed to “*Incorporate socio-economic information*  
1153 *into EBM to provide LMR managers with information on the impacts, trade-offs, and distributional*  
1154 *effects of management actions for the sustainability of marine resources and the coastal communities that*  
1155 *depend on them.*” In addition, NOAA Fisheries leadership is relying upon its Economics &  
1156 Human Dimensions Program to implement new comprehensive performance measures to evaluate the  
1157 success of catch share programs, a major initiative for the Program that was initiated in FY11.  
1158

# 1159 **FY11 Snapshot of NMFS Social Science** 1160 **Capability**

## 1161 **In-house capability & its Geographic Distribution**

1162 In addition to designing and managing over two dozen economic and socio-cultural surveys and data  
1163 collection programs each year and conducting assessments in support of almost 300 Rules, NMFS  
1164 economists and social scientists conduct world class research in support of living marine resource  
1165 management. On average, staff publish roughly 1.5 peer reviewed scholarly journal articles each year in  
1166 leading resource economics, fisheries, ecology, human dimensions and general science journals. These  
1167 articles demonstrate the depth of the NMFS Economics and Human Dimensions Program, with journal  
1168 articles covering such diverse research topics as catch share program analyses and evaluation; marine  
1169 spatial planning / fishing ground closures; recreational fishing valuation; adaptive management; effects

of climate change on fisheries; protected species valuation and valuation of actions to improve protection for threatened and endangered species; evaluation of habitat restoration strategies; regional economic impact analysis, seafood markets and trade; ecolabeling; aquaculture economics; integrated ecosystem modeling; disaster assessments; and ethnographic studies and socio-cultural research. Further, the journal publication process provides transparency and external peer review to the Agency's economic and socio-cultural research, ensuring that the "best available science" required under MSA for fisheries management is, indeed, the best science available anywhere.

NMFS has taken a phased and distributed growth approach to building its Economics & Human Dimensions Program. Since NMFS began to ramp up its social science capability in 2001, the number of positions in the Headquarters Offices have increased from eight FTEs in 2000 to 13 FTEs but filled positions have returned to 2000 levels at eight FTEs (see Table 5). In contrast, the number of economists and social scientists in NMFS' regional offices has more than doubled (increasing from 29 FTEs in 2000 to 64 FTEs onboard and eight vacancies). In FY11, NMFS had 86 economist and social scientist FTE positions, including 14 vacant positions. Due to the decrease in funding for this program in FY12, those positions will remain vacant indefinitely.

Internal partnerships are also critical to running a cost-effective but high impact economic research and data collection program. Economic data collection costs are held down by adding economic questions to logbook programs, observer programs, permit programs and the Marine Recreational Information Program angler intercept survey. Integrated, interdisciplinary research conducted by the program relies upon other NMFS scientists and managers, especially those in stock assessment, protected resources, and habitat. The program also directly supports the NMFS National Environmental Policy Act Program Office and the Aquaculture Office. NMFS also partners with OAR Sea Grant on the NMFS-Sea Grant Marine Resource Economics Fellowships, workshops (e.g., upcoming National Community Supported Fisheries Workshop) and research (recent examples include oral histories in fishing communities at risk to sea level rise as well as industry research, e.g., for-hire economic data collection and assessment, a seafood dealer survey, and seafood market research.

**Table 5: In-house NMFS capability & its Geographic Distribution<sup>4</sup>**

	HQ <sup>5</sup>	NEC	SEC	AFSC	NWC	SWC	PIC	SERO	AKR	NWR	SWR	PIRO	Sub-Total
<b>STAFF (84 positions; 72 FTEs)</b>													
Economists	11	10	8	8	8	9	5	5	3	1		1	
Vacancy	(3)	(2)	(2)		(1)	(1)	(2)				(1)		
Social Scientists	2	5	1	2	2		2	2					
Vacancy	(2)												
<i>Total Positions</i>	13	15	9	10	10	9	7	7	3	1	1	1	86
<i>Staff On-board</i>	8	13	7	10	9	8	5	7	3	1	0	1	72
<b>TERM FTEs</b>													
Economists				1									

<sup>4</sup> HQ: Headquarters, NEC: Northeast Fisheries Science Center, SEC: Southeast Fisheries Science Center, AFSC: Alaska Fisheries Science Center, NWC: Northwest Fisheries Science Center, SWC: Southwest Fisheries Science Center, PIC: Pacific Islands Fisheries Science Center, SERO: Southeast Regional Office, AKR: Alaska Regional Office, NWR: Northwest Regional Office, SWR: Southwest Regional Office, PIRO: Pacific Islands Regional Office

<sup>5</sup> In FY11, Headquarters (HQ) economists and social scientists worked for the Office of Science & Technology, the Office of Sustainable Fisheries, the Office of Habitat Conservation and the Office of Protected Resources.

Social Scientists													
<b>Total</b>				1									1
<b>CONTRACTORS</b>													
Economists	1	1	1	1		.25	2				1		
Social Scientists		1		3	2.5	.25	3						
Data Management		2	1	2		0.5							
<b>Total</b>	1	4	2	6	2.5	1.0	5				1		22.5

**External Capability.** The NMFS Economics & Human Dimensions Program primarily contracts for data collection, economic and socio-cultural research, IT support services for data management and data access tools, GIS support, and academic services (see Table 6). Some of these services are also conducted under grants or cooperative agreements with the Marine Fishing Commissions, to which NMFS can issue sole source grants, or through Sea Grant. Headquarters and field offices both award contracts and grants, with Headquarters providing additional contract support to the field offices through an IDIQ contract that is centrally managed by the Office of Science & Technology.

In FY11, the majority of NMFS economic and social science funds were obligated under contracts, with the balance (approximately 35%) obligated under grants (see Table 7). The majority of the grants were to Marine Fisheries Commissions, regional bodies that include state and federal fisheries partners.

**Table 6: National Marine Fisheries Service FY11 Contracts & Grants**

<b>NOAA Fisheries Economics &amp; Human Dimensions Program Contracts &amp; Grants</b>	<b>Funding (\$1,000s of dollars)</b>
Grants	\$2,415
Contracts	\$4,265
<b>Total</b>	<b>\$6,680</b>

FY11 contracts and grants issued by the NMFS Economics & Human Dimensions Program by focus area is shown below in Table 8.<sup>6</sup>

**Table 7: National Marine Fisheries Service External Social Science Capability**

<b>Program Area</b>	<b>FY11 Funding (\$1,000s of Dollars)</b>
Commercial Fisheries Economic Data & Research	1,710
---Catch Share Programs	620
---Marine Spatial Planning (FishSET)	500

<sup>6</sup> Note that due to the hiring delays in Workforce Management that occurred broadly across NMFS in FY10 and FY11, NMFS had considerable “labor lapse” that was directed towards major priorities for the Program including the economic tools being developed recreational fisheries (BLAST) and marine spatial planning (FishSET) and the social indicators and community profiling tool. This funding was not sustainable, i.e., as the programmed hired staff, funding would have declined for these tools. This short burst of funding, however, enabled NMFS to make significant headway on these tools.

Recreational Fisheries Economic Data & Research (BLAST)	1,100
National Standard 8: Communities & Social Impact Assessment	1,200
Protected Species Valuation	740
Habitat Research	280
Other: Seafood Markets (includes Aquaculture)	140
-----Software Licenses, including Econ Lit (NOAA-wide)	130
-----IT support	260
<b>Total</b>	<b>6,680</b>

## Partnerships

The NMFS Economics & Human Dimensions Program regularly partners with the state marine fisheries agencies, generally under the auspices of the regional Marine Fisheries Commissions but also through direct collaborations, particularly for data collection and data sharing. Academic partnerships occur beyond contractual relationships, with research collaborations evolving from serving on Fishery Management Council committees, Marine Fisheries Commission committees as well as through professional organizations and conferences. The co-location of many of the NMFS Science Centers with universities or research centers also facilitates collaborative research.

NMFS economists and social scientists participate on a number of fisheries committees sponsored by NMFS' federal partners:

*Fishery Management Councils* –Committees include the Scientific Statistical Committees, which provides scientific review of studies; Plan Development Teams and Fishery Management Action Teams, similar committees that develop fishery management alternatives and assess the effects of these options on stewardship objectives as well as their socioeconomic implications; and socioeconomic committees, which address data and modeling issues.

*Marine Fishery Commissions* – Committees include socioeconomic committees, recreational fishing committees, and data management committees.

Staff professional service includes serving on editorial boards of several journals including Marine Resource Economics, Coastal Management, and the Australian Journal of Agricultural and Resource Economics and are also regular reviewers for dozens of natural resource, resource economic and socio-cultural journals. In addition, staff are also active in the leadership of international professional organizations including serving leadership roles on the North American Association of Fisheries Economics and the International Institute for Fisheries Economics & Trade; Society for Human Ecology; and ICES. Staff also serves as mentors to doctoral students selected under the NMFS-Sea Grant Marine Resource Economics Fellowship Program, awarded annually to two students, and also routinely serve on thesis committees at local universities.

NMFS also collaborates with academics and other Agencies and NOAA Line Offices on several NMFS-led national efforts. FishSET is a spatial econometric modeling toolbox that provides analysts with the data and modeling tools necessary to rigorously analyze the costs imposed on fishermen from spatial management actions that restrict access to fishing grounds. Over a dozen leading spatial econometricians have contributed their regional knowledge and modeling skills to FishSET. NMFS is also collaborating with academics, other NOAA Line Office and other federal agencies to develop its Social Indicators

1261 Decisions Support Tool. This project will provide key information on coastal communities socioeconomic  
1262 status and trends, including community resiliency and vulnerability.  
1263

## 1264 Interagency Social Science

1265 Like the other NOAA line offices, NMFS often conducts and applies social science activities in  
1266 partnership with other federal agencies. For example, staff participate in or lead a number of interagency  
1267 working groups, including the National Science and Technology Council's Joint Subcommittee on Ocean  
1268 Science and Technology (JSOST), the National Climate Assessment, the Inter-Agency Task Force for  
1269 Development of a National Fish, Plant and Wildlife Climate Adaptation Strategy; and the Klamath River  
1270 Economic Assessment Team. Other notable collaborations includes work with the Puget Sound  
1271 Partnership and The Natural Capital Project.

## 1272 Social Science Needs

1273 The need is plain – NOAA Fisheries cannot meet legal mandates requiring economic and social impact  
1274 assessments with current resources. The fisheries management workload for the NMFS economists and  
1275 social scientists is daunting. For example, the range of management options that may be considered for a  
1276 *single* amendment affecting the commercial harvest sector may include area closures, seasonal closures,  
1277 reduced harvest, reduced bycatch allowances, gear restrictions, and capacity reduction. The range of  
1278 management options virtually ensures that more than one type of economic model must be used. Further,  
1279 different types of economic analyses are required for each management option. That is, for each  
1280 management option, NMFS must assess the cost and benefits to the regulated entities, the direct and  
1281 cumulative economic and social impacts, consider the impacts on the “affected human environment”  
1282 (e.g., shoreside processors, wholesalers, marinas, bait and tackle shops, marine suppliers, marine repair  
1283 and dockyards, etc.), and the financial effects (e.g., profitability and cash flow) on small businesses. A  
1284 similar suite of analyses must be conducted for Rules affecting recreational fisheries. In addition, and as  
1285 outlined above, the economic analyses underpinning regulations to protect and rebuild marine protected  
1286 species and restore habitat must take into account the full suite of benefits (use and non-use) as well as the  
1287 potential costs to private businesses and households, which results in a very different suite of data  
1288 requirements and analyses. Finally, mandated economic assessments of catastrophic disasters such as  
1289 Sandy strain already limited resources.

1290 In sum, with almost 300 Rules implemented in 2011, at least one amendment and sometimes multiple  
1291 amendments were implemented in almost all of the 47 highly diverse FMPs managed by NMFS.<sup>7</sup> Given  
1292 the economic and social data collection, modeling and assessment requirements for supporting  
1293 Rulemaking, it is clear that current staff is stretched too far and cannot keep pace with these demands.  
1294

1295 Further, as the Agency shifts towards ecosystem-based management of fisheries, two truths are quite  
1296 evident: 1) most ecosystem models are not integrated with economic models or even adequately grounded  
1297 on economic assumptions; and 2) the Agency needs to invest more in economics and socio-cultural data  
1298 and modeling if it wants to use these models to value ecosystem services and assess the trade-offs from

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<sup>7</sup> The diversity of federal fisheries (e.g., single vs. multispecies; shellfish vs. finfish; sedentary stocks vs. highly migratory; small boat vs. industrialized fleets; geographically concentrated vs. geographically expansive, with a high number of active ports; etc. ) is an added challenge, often limiting the applicability of a model to a small number of fisheries or even a single fishery.

1299 alternative management decisions, including management of major drivers of ecosystem condition such  
1300 as energy uses (oil, liquid natural gas, renewable energy) and land use decisions.

## 1301 **Process, Products and Activities that Require Social Science**

1302 NMFS economic and social science capability is responsible for assessing the economic and social  
1303 impacts of all management options of every regulatory action proposed in each of the Nation's federally-  
1304 managed fisheries. The goal of this capability is to identify management options that maximize benefits  
1305 to society while still achieving conservation goals, thereby resulting in a resource management strategy  
1306 that is consistent with both the long-term sustainability of the Nation's fisheries as well as the fishing  
1307 communities that depend upon this resource for a livelihood and a way of life.

1308  
1309 Underpinning this capability are the economic and socio-cultural data collection programs and surveys  
1310 that provide the information base for meeting statutory mandates for cost-benefit analysis of regulatory  
1311 actions, small business impacts, and social impact assessments. To meet these mandates, NMFS must  
1312 collect economic data from commercial fishermen, processors, for-hire operations and must conduct  
1313 economic assessments of commercial, for-hire and anglers, and fishing communities. Assessments  
1314 include (but are not limited to) monitoring the economic performance of catch share fisheries and non-  
1315 catch share fisheries; evaluating quota allocation strategies; analyzing the cost and benefits as well as  
1316 distributional effects of rebuilding plans; predicting catch and effort; assessing the short- and long-run  
1317 economic effects of marine protected areas; and estimating the economic contribution of fishing to the  
1318 local, state and national economies; and assessing the economic and socio-cultural impacts of regulations  
1319 on shoreside industry and fishing-dependent communities.

1320  
1321 Protected species and habitat are also part of NMFS' mandate. NMFS has established a rigorous, state-of-  
1322 the-art non-market valuation program for assessing the public's value for recovering threatened and  
1323 endangered marine protected species and protecting or restoring marine habitats. These values can and  
1324 should be included in NMFS' cost-benefit analyses, which tend to be more focused on the "cost"  
1325 implications of conservation measures.<sup>8</sup> These values may also be used to assess the benefits obtained  
1326 from NOAA's conservation and recovery efforts, thus providing a useful benchmark for valuing stock  
1327 rebuilding programs, protected species recovery efforts and habitat restoration and recovery efforts.

1328

## 1329 **Social Science Gaps based on immediate risks**

1330 In FY12, the NMFS Economics & Social Science Research budget line was cut 30% from \$10.7M in  
1331 FY11 to \$7.4M in FY12. This decrease was roughly equivalent to the Program's increase in FY10.  
1332 Accordingly, the Program's budget priorities identified below and the rationale behind them are much the  
1333 same as those identified in the FY10 President's Request: 10 FTEs and funding for data collection and the  
1334 development of social and economic decision support tools. While the funding went away, the need for  
1335 these resources did not; in particular, the number of Rules issued by NMFS has not declined and the  
1336 number of catch share programs, a market-based approach to management that requires substantially  
1337 more economic assessments, increased.

1338  
1339 **Decision Support Tools:** NMFS currently has two economic decision support tools available in all NMFS  
1340 regions – a commercial fisheries economic impact tool and a recreational fisheries economic impact tool,  
1341 both of which can be used to assess the effect of a fishing regulation on the local and state economy.  
1342 Increased development of decision support tools will enable the Agency to work "smarter", i.e., more

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<sup>8</sup> NOAA General Counsel has directed NMFS to provide broader societal benefit estimates in its economic analyses of management options.

cost-effectively. The three national-in-scope decision support tools NMFS currently has underway support marine spatial planning or, more specifically, fishing ground closures (FishSET); a recreational fisheries economic decision support tool for evaluating management options (BLAST); and a social indicator / community profiling web-based tool that support social impact assessments. These three tools are described briefly below:

FishSET –this ecosystem modeling tool uniquely includes both data management tools and predictive behavioral models that are needed to rigorously assess the trade-offs from marine spatial management strategies that restrict fishermen’s access to fishing grounds. The model includes predicting the fishermen’s response to fishing ground closures and does so in a risk framework. NMFS is currently piloting FishSET in Alaska; none of the other regions have this capability.

BLAST – NMFS recreational fisheries economic decision support tool is underpinned by an integrated, dynamic bioeconomic model that may be used to analyze the effects of size and possession limits in a recreational fishery as well as the economic benefit streams associated with alternative rebuilding scenarios. BLAST will also provide essential information for making allocation decisions. Importantly, not only will BLAST improve assessment quality, it reduces the time required to run an assessment 20- fold, dramatically reducing labor costs. NMFS is currently piloting BLAST in the Northeast. The model will be reviewed by the New England Fishery Management Councils and Mid-Atlantic Fishery Management Council in September 2012 and is anticipated to be fully operationalized in these regions for selected fisheries by December 2012. No other regions, including the South Atlantic and Gulf of Mexico where recreational fishing is greatest, have a comparable capability.

Social Indicators / Community Profiling Tools – this tool will provide analysts with key demographic and community economic and socio-cultural data necessary to assess the potential social impacts of a regulatory action. Beyond data, the Toolbox will provide metrics for community resiliency, community vulnerability, gentrification, as well as a mapping tool, which will make it easier to identify agglomeration effects, i.e., groups of less resilient or vulnerable communities, which may compound the initial impacts on any individual community. NMFS has provided seed funding to this project for the Atlantic Coast and Gulf of Mexico. Prior to the FY12 funding cut, NMFS anticipated delivering a fully-operational decision support tool for fishery managers in New England, the Mid-Atlantic, South Atlantic and Gulf in FY13. Depending upon FY13 funding decisions, it may be possible to implement the Gulf Toolbox; the other three regions will not be ready until FY14, at the earliest. The other NMFS regions and their associated Fishery Management Councils do not have this capability.

**Data:** Currently, the Agency is only meeting 55% of its commercial fisheries economic data collection requirements and roughly 30% of its recreational fisheries economic data collection requirements. Closing these gaps is a priority for the Program.

**Staff:** The FY10 President’s Request included 10 FTEs for this Program. The distribution of these 10 FTEs by region and focus area is provided below:

- 2 FTEs, Southeast Fisheries Science Center (recreational economist, spatial econometrician);
- 2 FTEs, Northeast Fisheries Science Center (recreational economist, spatial econometrician);
- 2 FTEs, Pacific Islands Fisheries Science Center (recreational economist, spatial econometrician);
- 1 FTE, Alaska Fisheries Science Center (social scientist)
- 1 FTE, Northwest Fisheries Science Center (commercial fisheries /catch shares economist)
- 1 FTE, Southwest Fisheries Science Center (bioeconomic modeler)
- 1 FTE, HQ Office of Science & Technology (social scientist)



Recreational Economists: One recreational economist is needed in the Southeast because currently there is only one recreational economist at this Center despite the large number of recreational fisheries in this region. Northeast and Pacific Island also each need a recreational economist. Neither Center has a dedicated recreational economist nor staff with expertise in designing stated preference choice experiments, the state of the art survey method for assessing the costs and benefits of proposed management options.

Spatial Econometricians: One spatial econometrician is needed in the Northeast because the previous spatial model was built prior to catch shares and ACLs and different modeling skills are now required. The Southeast and Pacific Islands Centers entirely lack this capability.

Social Scientists – one social scientist (anthropologist or sociologist) is needed in Alaska, which has a significant Native American population as well as a high number of fishing communities with poverty rates and unemployment rates well above the national average. One social scientist is needed in the NMFS HQ Office of Science & Technology to oversee the national social science program and to support the NMFS HQ Office of Sustainable Fisheries and the NMFS HQ NEPA Office, neither which have a social scientist on staff.

Commercial Fisheries / Catch Shares Economist: the Northwest Center requires an economist to support its recently implemented catch shares program in the Pacific trawl fishery. This program was implemented with significant mandatory economic data reporting requirements, which were originally intended to be supported by the position funded originally in FY10 but no longer exists due to the budget cut in FY12.

Bioeconomic Modeler: the Southwest Center intends to implement the recreational fisheries decision support tool and then apply the same approach to a commercial fishery.

## **Ideal structure of the NMFS Economics & Human Dimensions Program**

NMFS' ideal structure for its economics and social science program was identified in FY07 budget documents as 140 FTEs. As the nascent program grew and began to develop increased tools for meeting management needs, the projected number of FTEs required to fully meet NMFS' economic and socio-cultural assessment requirement was adjusted downward in FY09 budget documents to 120 FTEs and a budget of \$27.2 million (inclusive of FTEs).

**Table 8: NMFS Ideal Structure of Social Science Capability**

<b>Program Area</b>	<b>Average Annual Funding</b>
120 FTEs	\$18,000
Commercial Fisheries Economic Data & Research	2,300
---Catch Share Programs	1,200
---Marine Spatial Planning (FishSET)	600
Recreational Fisheries Economic Data & Research	900
--Recreational fisheries economic evaluation tool (BLAST)	1,100
National Standard 8: Communities & Social Impact Assessment	1,200
Protected Species Valuation	600
Habitat Research	700

Other: Climate Impacts on Fisheries / Fishing Communities; Seafood Markets, Software Licenses; Trade;	600
<b>Total</b>	<b>\$27,200</b>

## Implications in FY 13 and Beyond

The budget was cut 30% in FY12. There were no budget offsets for these cuts. This has precluded the program from backfilling vacancies (20% of the Program's FTEs). In addition, without additional funding in FY13, NMFS will have to let go an estimated 50-70% of the 23 contractors currently employed by the Economics & Human Dimensions Program. Additional implications for this cut include cutting funding for FishSET, an economic spatial modeling decision support tool that predicts fishers response to management strategies and assesses the cost-benefits of those options in a risk framework, by 60%, delaying the roll out of this tool in the Alaska region one year and two years (2015) in the Gulf of Mexico and will not be expanded to any other region. In addition, all funding for BLAST, the Agency's new integrated recreational economic model currently being piloted in the Northeast and planned for expansion on the West Coast, Mid Atlantic and Gulf was eliminated. **In fact, funding for recreational fisheries economic data collection program will be at a near 20 year low despite the Agency's priority for improving the science and management of recreational fisheries.**<sup>9</sup> Funding for NMFS Social Indicator Toolbox, which was intended to fulfill the Agency's NEPA Social Impact Assessment requirement, was also cut 50%.

Restoring the funding to FY10 levels would generate major returns to the Agency. The once nascent Economics Program was poised to deliver major decision support tools for both commercial and recreational fisheries. The integrated recreational economics decision support tool is already operational on a pilot basis in the Northeast and is poised for expansion in three other regions, with remaining regions to follow shortly after. This tool will allow NMFS to assess a range of management strategies, including allocation, rebuilding plans, and bag limits, literally at the push of a button. Likewise, FishSET could provide this same operational capability – modeling the cost-benefits from fishing ground closures, the creation of MPAs, or other coastal and marine spatial management strategies driven by the needs of other user groups (energy, aquaculture, etc.) – at the push of a button.

At current funding levels, these capabilities will not be achieved. Further, not only do these cuts place the Agency at risk for increased court challenges from both stakeholders and environmental organizations, at these reduced funding levels, NMFS may actually lose these lawsuits.

<sup>9</sup> See "Recreational Saltwater Fisheries Action Agenda" p. 6. Department of Commerce, NOAA, NOAA Fisheries. October 2010. <http://www.nmfs.noaa.gov/sfa/PartnershipsCommunications/recfish/2010RecfishActionAgenda.pdf>

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1464 **National Weather Service**

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# National Weather Service (NWS) Social Science Mandates and Drivers

## Legal Mandates

NWS does not have any specific legal mandates with direct calls for social science, however, the below legal mandates cannot be effectively accomplished without social science.

- Organic Act of 1890: Established a United States Weather Research Program to (1) increase benefits to the Nation from the substantial investment in modernizing the public weather warning and forecast system in the United States; (2) improve local and regional weather forecasts and warnings; (3) address critical weather-related scientific issues; and (4) coordinate governmental, university, and private-sector efforts.
- 49 USC 44720 stipulates provision of meteorological services for the safe and efficient movement of aircraft in air commerce
- Public Law 107-253, the Inland Flood Forecasting and Warning System Act of 2002, authorizes NOAA to conduct research and development, training, and outreach activities related to inland flooding
- 15 USC 1532 authorizes NWS space weather activity
- 33 USC 3201, authorizes NWS tsunami warning program; among others.
- Presidential Policy Directive/PPD-8 – National Preparedness:

## Strategic Documents

NOAA's Next Generation Strategic Plan (NGSP) establishes a long-term goal of a Weather-Ready Nation (WRN), as part of NOAA's broader vision of resilient ecosystems, communities, and economies. NWS has elaborated on this NGSP goal in its Strategic Plan – Building a Weather-Ready Nation – and in its Weather-Ready Nation Roadmap which describes transformational concepts and activities in the near term (1-2 years), mid-term (3-5 years), and long term (5+ years) to further three high-level outcomes:

- America is a Weather-Ready Nation through superior Impact-Based Decision Support Services (IDSS).
- In an environment of continuous improvement, NWS and the entire Weather Enterprise provides state-of-the-art service delivery that saves more lives, protects more livelihoods, and further enhances the U.S. economy.
- Federal, state, and local governments depend on NWS as their trusted, reliable source of weather, water, and climate information – from the global scale to the community level.

Further, as part of the WRN initiative, NWS has established a series of six (6) pilots to test the principles of WRN, including impact-based decision support services and social science into its operations.

Another major strategic driver is the NOAA Annual Guidance Memorandum, which includes specific calls for social science expertise, for example, improving high impact weather and water forecasts. Priorities include continued support for NOAA’s Hurricane Forecast Improvement Project; timely and accurate water forecasts; improved fire weather research and services; and improvements in forecasts and preparations for low-frequency, high-impact events such as solar weather events and tsunamis. *“Across each of these areas, targeted social science research and analysis could be used to create more effective decision support capabilities and to better convey forecast risk and uncertainty.”*

Another important strategic driver for NWS social science is the NOAA Research Council, Research in NOAA: Toward Understanding and Predicting Earth’s Environment, A Five-Year Plan: Fiscal Years 2008-2012, which articulates that *“...social science is explicitly tied to NOAA’s mission: how the agency affects people and how people effect their environment. Research toward these ends is programmatic; it is an essential part of normal operations of any NOAA program to achieve its stated outcomes.”*

## **Current Snapshot of NWS Social Science Capability**

When considering how social science can contribute toward the mission of NWS it is important to first consider where the agency stands now in terms of its capability to conduct and apply social science. This section represents a characterization of the current NWS social science capability.

### **In-House Capability**

Since NWS is largely comprised of physical scientists, and at this time has very few social scientists in its employ, the current modus operandi has been to hire contractors to conduct needed research versus conducting research in house. While the research conducted by these contractors is good, the piecemeal approach leaves the potential for research to be disjointed with no guarantee of follow-up research or continuity. Further, NWS has attempted to avoid duplication by leveraging existing capabilities at OAR and NOS/CSC and began the process for long time social science capacity building within NWS.

### **Internal Partnerships**

NWS conducts most of its social science work through both formal and informal partnerships with other entities by working toward a common goal. These entities include other NOAA line offices, federal and state agencies, or local governments. The following is a sample of the kinds of social science work that take place in NWS through partnerships.

**Office of Program, Policy and Integration (PPI):** Under the direction of the NOAA Chief Economist, NWS recently completed the first installment of NOAA’s updated economic statistics titled “Value of a Weather-Ready Nation.” Individuals from the NWS Strategic

Planning and Policy Office participated in the development of a white paper entitled “Identifying Methods for Quantifying the Societal Impacts of NOAA,” as an outcome from a June 2011 NOAA Science Challenge workshop. The Workshop brought together social science leaders from inside and outside the Agency convened to explore methods for better quantifying the ways in which NOAA affects society. The June 2011 Workshop was the first phase of a multi-phase process for conducting the NOAA Needs Assessment to help NOAA further identify its social science capacity as well as its social science needs.

**Office of Oceanic & Atmospheric Research (OAR):** NWS has worked with OAR to leverage research funded by the US Weather Research Program (USWRP). In 2004, through funding received by USWRP, the National Center for Atmospheric Research (NCAR) established the Collaborative Program on the Societal Impacts and Economic Benefits of Weather Information (aka Societal Impacts Program, or SIP) to create a dedicated focal point for assembling, coordinating, developing, and synthesizing research and information on the societal impacts and economic benefits of weather information for the benefit of the weather research and forecast community and the public as a whole.

NWS utilized information coming out of current research, namely the Hurricane Forecast Improvement Project (HFIP) Socio-Economic Impacts Assessment (SEIA) and the jointly NOAA-NSF funded Communicating Hurricane Information, as a compliment or starting point for additional research based on communicating risk and uncertainty, specifically as it relates to communicating tropical and storm surge information, in an attempt to avoid duplicative research and to build upon research findings.

In addition, economic valuation information stemming from three papers funded under USWRP: Assessment of Total Household Benefits of Improved Hurricane Forecasting, 300 Billion Served: Sources, Perceptions, Uses, and Values of Weather Forecasts and Sensitivity of the U.S. Economy to Weather Variability, were highlighted in NOAA’s economic statistics “Value of a Weather-Ready Nation, various Congressional testimony and included in the NWS Roadmap as justification for the value of weather information.

NWS leveraged the ongoing relationship with the National Center for Atmospheric Research’s Societal Impact Program (NCAR SIP) to conduct additional research relating to the NWS public forecast web pages to determine how NWS information could more effectively convey its weather information, specifically how to better communicate warning information. NWS has also been a supporter of the SIP Weather and Society\*Integrated Studies (WAS\*IS), a self-articulated grassroots movement, intent on changing the weather enterprise by integrating social science into meteorological research by participating in and supporting a couple of summer workshops.

Finally, NWS and OAR worked together to provide funding and support for a joint research-to-operations competition entitled “Social Science Research to Build a Weather Ready Nation,” intended to foster social science research towards better understanding human behavior and positively affecting decision-making during weather-related events. The FY 12 award(s), totaling about \$879,000 for four, two-year projects, are for work conducted by the Cooperative Institute for Mesoscale. Meteorological Studies, the University of Oklahoma, Arizona State

University, East Carolina University, the University of North Carolina, and the Nurture Nature Center in Easton, Penn.

**National Ocean Service Coastal Service Center:** As with OAR, NWS continues to coordinate extensively with NOS' Coastal Service Center on social science research and activities. CSC and NWS have worked together to coordinate joint concerns on storm surge and coastal inundation relating to tropical and extra-tropical events. Specifically, CSC has helped fund the Assessing Current Storm Surge Information from the Public Perspective and the Storm Surge Information Needs Assessment research intending to utilize the findings from the research into storm surge inundation graphics and clearer warnings. Further, CSC helped facilitate the utilization of its Indefinite Duration Indefinite Quantity (IDIQ) funding vehicle with Eastern Research Group to assist with the HFIP Socio-Economic Research and provided funding to help with the prototyping, testing and retesting of storm surge and tropical graphical forecasts resulting from the social science research.

Finally, discussion and activity is underway for CSC to assist NWS in the facilitation of surveys and focus groups and NWS to work closely with CSC on the communication of risk and vulnerability.

**Office of the Federal Coordinator for Meteorology (OFCM):** In May 2010, OFCM created an interagency Exploratory Social Science Working Group on the social science aspects of meteorological services and supporting research to facilitate the exchange of ideas and information. NWS participated on the Working Group and helped develop a report entitled Framing the Questions – Addressing the Needs Moving to Incorporate Social Science Results into Meteorological Operations/Services.

**NOAA's Science Advisory Board (SAB):** The SAB has been a vocal advocate for the integration of social science and created the *ad hoc* Social Science Working Group. The Working Group developed two Reports, one in 2003 and 2009, both of which articulated that "*social sciences continue to be underrepresented in NOAA's research, operations, and decision making,*" and was the impetus for the NOAA Social Science Needs Assessment. Further, the SAB's Environmental Information Services Working Group (EISWG) has as part of its charge to provide advice on incorporating scientific and technical capabilities to enhance NOAA products and services, which includes the integration of social science. The EISWG members have been strong advocates for social science research to operations.

**External Partnerships:** NWS has developed partnerships and worked extensively with the American Meteorological Society (AMS) and the National Research Council (NRC) in expanding support and assistance in integrating social science into NWS operations and services.

### **External Capability**

External social science capability is conducted by awarding contracts and grants to cooperative institutes, universities or consulting firms. This approach is flexible and can be readily used when the need is present and funds are available. While current fiscal limitations restrict the amount awarded, utilizing external expertise is one way to expand the breadth of social science expertise.

**Cooperative Institutes and Other Vehicles.** In the past, NWS has utilized Cooperative Institutes for conducting social science. For example, social science research through the investigation of socioeconomic impacts of mesoscale weather systems and regional-scale climate variations has been undertaken at the Cooperative Institute for Mesoscale Meteorological Studies (CIMMS) at the University of Oklahoma. In addition, through the Cooperative Institute for Climate and Satellite (CICS) and the NWS Office of Science and Technology, NWS Office of Climate Weather and Water Services, the Office of Atmospheric Research and the Renaissance Computing Institute (RENCI) together funded the Weather and Emergency Management Decision Support (WxEM) project to explore ways to make NWS information easier to find, easier to understand, and easier to apply in operations by the Emergency Management community. WxEM deliverables include infusion of weather and climate information into decision processes for risk and crisis management and the development of prototypes that enable effective weather translation. The project's value is best represented in the capturing of its iterative process for determining communication needs and requirements of the emergency management community, which in turn will be beneficial to the NWS Central Region Demonstration Project

**Interagency Social Science.** NWS often conducts and applies social science activities in partnership with other federal agencies. This may be related to a shared responsibility for a mission, or efficiencies found by working together. This varies among Program Offices, but the following are examples of ongoing interagency partnerships:

- Department of Homeland Security (DHS)
- Federal Emergency Management Administration (FEMA)
- United States Geological Survey (USGS)
- Natural Resources Conservation Service (NRCS)
- U.S. Army Corps of Engineers (USACE)
- Center for Disease Control (CDC)

As an example, NWS hydrologic services require extensive collaboration and partnerships with other federal agencies, including (but not limited to) the USGS, USACE, US Bureau of Reclamation, FEMA and NRCS with the Integrated Water Resource Science and Services (IWRSS) program. Through this collaboration, NWS can improve coordination both in the forecast process and subsequent product dissemination. The outcome of these activities includes:

- Clearer conveyance of hazards to emergency managers, and the general public
- Better risk management through communication of flood risk
- Dissemination of multi-agency hydrologic information through a single, integrated federal web portal.



# Social Science Needs

When considering how social science contributes toward the mission of NWS, it is important to determine what level of social science the agency needs and how this compares with existing capabilities.

## Process, Products and Activities that Require Social Science

NWS has made strides toward integrating social science into its long-term planning and guidance including the NWS Strategic Plan, NWS Roadmap and its associated pilot projects, where NWS tests IDSS concepts and the integration of social science into forecast operations. Further the campaign to become a more “Weather-Ready Nation,” fancies a nation that is ready, resilient and responsive to severe weather and other environmental hazards. Social science, integrated into NOAA’s physical science, effectively communicates NOAA information and best prepares the nation to respond to the impacts of a particular weather hazard.

The inclusion of the social sciences into the delivery of meteorological operations and services within NWS dates back to the early 1970s, where social scientists were engaged by the NWS to fine tune and reword its warnings and messages. However, the need still exists to further use, disseminate and communicate meteorological and hydrological information in ways that the public understands and its partners can use.

While social science covers many disciplines, the two main areas where NWS has identified social science need and gaps are in the areas of Risk Communication and Economic Valuation

The following, by NWS Program Office, represent an assessment of some of the marginal gaps in NWS social science capability:

### OCWWS/OHD:

- Effective communication of risk and forecast confidence in its products and services for better decision-making;
- Comprehensive understanding of how Core Partners and the public perceive and use data and services;
- Performance measurements relating to societal outcomes/impacts and decision tools;
- Evaluation and articulation of the value and effectiveness of NWS’ products and services;
- Estimation and demonstration of the benefits of programs and efficient use of resources;
- Economic valuation studies relating to new and improved existing services / products / models;
- Developing and evaluating approaches for education and communication.

### OST:

- Operational processes that include the integration of social science into new skill sets, communication tools and decision support tools before they are operational;

- 1714 • Comprehensive understanding of user decision processes and risk tolerances leading to
- 1715 identification of needs for forecast confidence / probabilistic products;
- 1716 • Development of format and presentation considerations of probabilistic/confidence
- 1717 information for customers;
- 1718 • Incorporation of societal impacts into the forecast process;
- 1719 • Tools that generate forecast confidence information and services based on social science
- 1720 outcomes;
- 1721 • Forecaster training and increased educational requirements in social sciences;
- 1722 • Cost-benefit and cost-effectiveness analysis to determine payoffs to programs.

#### 1723 OOS:

- 1724 • Public understanding and behavioral response to warnings and alerts
- 1725 • Geographic and demographic analysis that would influence the operation and
- 1726 maintenance of warning systems over time
- 1727 • Identification of data users and assessment of their needs (e.g. most effective data
- 1728 dissemination methods)
- 1729 • Incorporation of social science applied research into the infrastructure on which it
- 1730 depends
- 1731 • Economic cost-benefit analysis to aid in decision-making when budgetary resources are
- 1732 inadequate to maintain fully all systems and equipment
- 1733 • Performance metrics to evaluate outcome effectiveness
- 1734 • Non-market valuation of OOS' systems and services
- 1735
- 1736

## 1737 Social Science Gaps

1738 Some of the challenges in the effective integration of social science into NWS operations relate  
1739 to 1) culture, 2) current fiscal realities, 3) the research to operations gap, 4) performance metrics  
1740 based on societal outcomes and 5) personnel needed to conduct effective social science.

1741  
1742 **Culture:** While NWS has made strides in the past few years toward better integrating social  
1743 science methodologies and principles into its products, information and services, a culture and a  
1744 mindset of “we produce physical science here and social science is something done elsewhere,”  
1745 still exists. In many instances, NWS continues to incorporate social science as an afterthought to  
1746 its products or services versus inclusion at the beginning of a product’s development. Utilization  
1747 of social science in this manner fails to take into account a user’s understanding of or need for a  
1748 particular product or service and results in the development of products or services that may not  
1749 be as effective in communicating information. Thus resulting in miscommunication of  
1750 information and an inefficient use of government funds and manpower.

1751  
1752 **Fiscal:** Current fiscal restraint has made the possibility of set aside, line-item social science  
1753 funding difficult to secure. Currently, most social science research activities are funded on an ad  
1754 hoc, piecemeal basis.

**Research to Operations Gap:** The infusion of social science research into operations has been challenging. The disjointed and piecemeal approach to conducting social science research has provided NWS with good information, but no organized manner with which to test the information and put research findings into operation. There has been some discussion as to whether social science should be included as a component of each of the NOAA Testbeds or whether there should be a standalone social science testbed, however, an argument can be made that a standalone social science testbed may further stovepipe the integration of social science. The Hazardous Weather Testbed located in Norman, Oklahoma, shows some promise as it is designed to accelerate the transition of promising new meteorological insights and technologies into advances in forecasting and warning for hazardous mesoscale weather events, including innovative applications of social science techniques in order to make the transition to operations even more socially relevant.

**Performance Measurements/Metrics:** To fully integrate social science, NWS must move forward in establishing performance metrics on progress toward achieving societal outcomes and impacts. GPRA measures for NWS focus on the quality of the forecasts and warnings; in addition, NWS should develop metrics to monitor its progress in how these forecasts and warnings affect the human dimension and the economic well-being of the nation.

**Personnel:** NWS is largely comprised of physical scientists with only a few social scientists. For successful integration to occur, NWS should look to hire individuals with scholastic degrees in the social sciences, but with expertise or knowledge in the climate, weather and water arena, but also train their employees to understand social science concepts and approaches. The intent of training NWS physical scientists is not to transform the NWS workforce into social scientists; but rather, to provide the NWS workforce with adequate tools and understanding for the integration of relevant social science with decision support. For the foreseeable future, given current budget realities and leveraging the current function and social science personnel in place within NWS and NOAA, it is recommended NWS hire an economist to assist with and direct economic valuation projects. The economist would work in collaboration with the risk communication specialist in developing the social science coordinating structure discussed in the below section on ideal social science structure.

## **Fully Operational Social Science**

The following represents a vision for social science in NWS that utilizes a variety of social science disciplines, takes advantage of partnerships and funding vehicles that have not previously existed, crosses NOAA and NWS organizational boundaries in order to efficiently utilize existing and new social science expertise, and addresses all appropriate aspects of NWS missions.

In order to maintain a well-coordinated, functioning organization towards the integration of social science across NWS, there needs to be a coordinating role maintained at NWS Headquarters to seamlessly integrate science and service throughout NWS and be able to raise critical issues to senior NWS leadership. Such a position would be well poised to 1) coordinate and plug into the broader NOAA social science efforts and ensure programmatic coordination and alignment with the NOAA Strategic Plan, Annual Guidance Memorandum, NOAA Strategy

Execution and Evaluation (SEE) Process, the NWS Strategic Plan, and the Weather-Ready Nation efforts and its associated pilot projects. Further, this coordinating role would help with the training and education portion of the OCWS Training Branch and the NWS Operational Proving Ground (OPG) in its development of social science training modules and educational materials to help familiarize NWS physical scientists with the capabilities of the social sciences and the intricacies of impact-based decision support services.

As previously stated, to handle the workload and provide the expertise needed, NWS should hire individuals with scholastic degrees in the social sciences, but with expertise or knowledge in the climate, weather and water arena. To address some of the social science gaps listed above, some of the potential hires should include: a risk behavior/risk communication specialist, a social psychologist for behavior change expertise, a decision theory specialist, a cognitive psychologist and an economist to supervise the collection of data on the economic impacts of weather events and to conduct economic valuation studies. Any proposed workforce changes would be done in accordance with Labor Management Relations regulations.

The intent is for these individuals to interface with NWS programs and provide social science analyses, develop supporting data, conduct applied studies and oversee consultant studies in coordinating social science across the agency, integrating it where appropriate in research, programmatic, and planning functions. To effectively integrate social science, and form a solid foundation of social science expertise, NWS must commit to hiring social science expertise in specific and diverse social science disciplines. It is recommended NWS begin with small steps, hiring a limited number of social scientists and assessing and adjusting as is deemed effective. Movement toward an effective social science capability by starting with a small percentage of the workforce dedicated to social science is the most expedient way to success.

In addition to the coordinating function/office maintained at NWS Headquarters, full coordination and integration of social science should also include social scientists within its NWS Regions and Centers. Below is a recommendation for future inclusion of social scientists into NWS Regional Offices, NWS National Specialized Centers and the National Water Center. Due to current budgetary constraints, this is meant to be viewed as a vision for fully integrating social science into NWS operations and not a current mandate for new FTEs.

**Regional Offices:** Currently, assessments focus on the need for social science disciplines focused on economic valuation, risk communication and human behavioral specialists; however this may change as NWS and NOAA advance their social science capabilities and capacity. A total of 12 FTE positions (2 per Region) are recommended: 1) One FTE risk behavior/risk communication specialist per regional branch, and 2) one FTE economist to conduct locally based economic valuation studies and damage assessments within their Region. One of the Regional hires should also fill the role of a social science coordinator for each NWS Region coordinating any social science work conducted within their respective area, coordinating extramural funds to leverage external and internal partnerships conducting socioeconomic research and monitoring the training of impact-based decision support and social science training within their Region and coordinate with NWS Headquarters.

**National Centers:** There is also value in having social scientists work at certain NWS National Centers (e.g., National Hurricane Center, Storm Prediction Center, and Space Weather Prediction Center). Based on evaluation of need and requirements for each Center, it would be beneficial to have a similar structure as the Regions in having a risk behavior/risk communication specialist and an economist to help with the integration of social science within the Centers. Again, one of the two hires should also fill the role of a social science coordinator able to coordinate any social science work conducted at their respective Center and coordinate with NWS Headquarters.

**National Water Center (NWC):** The NWC construction will be complete in 2013, and will begin operations in 2014. The center will provide a suite of new, high-resolution, summit-to-sea water resource products. A 2011 report for the NWS Corporate Board specifically addresses the need for social scientists at the Center: *“Development of decision support tools for water resources management would require the addition of a new range of expertise. Social science personnel would provide decision support skills, including social science, communications, water law, economics and education.”*

**External Capability:** NWS should continue to support and develop additional external institutional arrangements and relationships with partners who have social science expertise in the private sector, academic and research sectors, regional, state and local communities, NGOs and cooperative institutes. As social science capacity within NWS continues to develop, NWS should continue to support and utilize social science research conducted outside NOAA by collaborating with external research and professional organizations (i.e. Cooperative Institutes, NCAR SIP, SSWIM, etc.)

The external community is quite supportive towards the integration of social science into meteorological products and services. Leveraging off their support and ability to provide expertise and guidance relating to social science will further help NWS integrate social science.

## **Implications for Social Science FY 12 (and beyond)**

Current fiscal restraint has made the possibility of set aside, line-item social science funding difficult to secure. As noted previously, to date, most social science research activities are funded on an *ad hoc*, piecemeal basis.

More troubling are the budgetary challenges for FY13 and FY14 that will likely stymie forward movement on Weather-Ready Nation initiatives and erode NWS’ ability to nurture its social science capacity. NWS is at a point where its current *ad hoc*, piecemeal approach to integrating social science will not enable it to fully achieve the goals of a Weather-Ready Nation. The current approach will not enable NWS to effectively carry out its mission as it cannot be certain it is designing and delivering products, information and services that best match the needs of its constituents, provide the best value to the Nation, or be certain its resources are allocated optimally across programs and objectives. Without continued and expanded investment in social science in terms of funding and personnel through the SEE and budgeting processes, NWS commitments toward “initiating a national conversation/dialogue...on how to improve the nation’s resiliency against severe weather”, including remarks made to the broader Weather and Climate Enterprise Community by NOAA and NWS Leadership regarding their intent to fully

1890 integrate social science into its products, information and services, will not be executed and the  
 1891 resulting benefits will not be realized.

1892 For the various social science research and projects currently underway, the current fiscal  
 1893 environment does not guarantee follow-up research beyond existing commitments or the ability  
 1894 to integrate the research into operations. Examples of fiscal concerns within the portfolio of  
 1895 NWS social science project are highlighted below:

1896 **OCWWS:** There are no additional funds to conduct social science in the areas of hazard  
 1897 messaging (watch, warning, advisory), address the social science gaps noted in the NWS Service  
 1898 Assessments, nor funds to develop and conduct social science training modules needed to train  
 1899 the NWS workforce in social science concepts and approaches, and decision support services.

1900

1901 **OST:** A reduction in funding for OST limits the amount of funds available for social science  
 1902 research. Of specific concern, is funding for the Hurricane Forecast Improvement Project  
 1903 (HFIP). As it stands, HFIP is scheduled to sustain a significant cut in FY14 and the portion  
 1904 allocated to social science research and storm surge risk and prototyping could be in jeopardy.

1905

1906 **OHD:** As with OCWWS and OST, budget cuts have affected OHD. Before FY 12 cuts, OHD  
 1907 was planning to allocate as much as \$200K to partner with the USGS to initiate a multi-year  
 1908 project to complete a socioeconomic assessment of *Integrated Water Resources Science and*  
 1909 *Services (IWRSS)*. IWRSS information will depict the extent and depth of potential floodwaters  
 1910 over time to more effectively visualize, assess, plan for, and mitigate the impacts of floods. This  
 1911 improved information product will enable emergency managers and society to more effectively  
 1912 plan, respond and mitigate flood events which will lead to reduced socioeconomic impacts.

1913 **Office of Operational Systems (OOS):** Operating and maintaining the infrastructure that  
 1914 enables social science initiatives requires resources. Currently, there is no dedicated funding in  
 1915 OOS for social science needs. As NWS implements our strategic plan, we will seek to integrate  
 1916 social science into operations during the program planning and budgeting cycles, specifically in  
 1917 the areas of geographic and demographic analysis to help influence the operation and  
 1918 maintenance of warning systems over time and the identification of data users and assessment of  
 1919 their needs.

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## **National Environmental Satellite and Data Service**

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# Social Science Mandates and Drivers

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## Legal Mandates

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The structure of the NESDIS organization is focused mainly on the creation of environmental hardware – satellites and sensors – that are a major contribution to the overall architecture of the NOAA observing system to provide information to all the NOAA offices to assist them in performing their mission related activities. There does not appear to be any legal mandates that currently guide the social science considerations for NESDIS alone, but there maybe some connection and collaboration with other projects that do require social science considerations, including economic impacts, for reporting within and outside of NOAA.

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## Strategic Documents

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NOAA's Next Generation Strategic Plan (NGSP) charts the path that NOAA will follow to meet its mandates and accomplish its mission.

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The NESDIS vision is to be the world's most comprehensive source and recognized authority for satellite products, environmental information, and official assessments of the environment in support of societal and economic decisions. To achieve the vision, NESDIS does the following:

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- Operate the world's premier environmental satellite system, and the Nation's National Environmental Data Centers, fulfilling customer requirements for quality and timeliness of data.

1944

1945

1946

- Collaborate with other agencies and organizations to describe changes to our climate and the implications of those changes.

1947

1948

- Continue to lead the effort with other agencies and countries in establishing a global observing system to meet the world's information needs for weather, climate, oceans, and disasters.

1949

1950

1951

- Deliver state of the art products and services based on cutting edge operations, science, and applications.

1952

1953

- Partner with industry, academia, and other research and development agencies to facilitate the introduction of new techniques and technologies into our operations.

1954

1955

- Bring robust information and service delivery to our customers and invest in effective relationships with stakeholders and our partners in the media and private sector.

1956

1957

- Develop a skilled, energetic, and dedicated workforce through training, motivation, and teamwork.

1958

1959

1960

## FY 11 Snapshot of NESDIS Social Science Capability

1961

When considering how social science can contribute toward the mission of NESDIS it is important to first consider where the agency stands now in terms of its capability to conduct and apply social science.

1962

1963

1964

## Form of social science capability

1965

In assessing the need for social science, the form is critical to matching the capability to the specific needs. While certain forms may be used more widely due their relatively lower requirements for funding and personnel, they may not always be ideal from an overall

1966

1967



perspective, when elements such as learning curves, institutional memory and efficiency are considered. NESDIS' responsibility to the production of environmental satellites makes it a unique partner to the other NOAA programs. Its capability for social science focuses on the examination of future satellites and the analysis of the data that is downloaded and used by various NOAA partnerships.

### In-House Capability

In-house capability includes federal employees in a social science job series, federal employees who are not in a social science job series but who spend some or all of their time conducting and applying of social science, and contract employees engaged in social science. Although we have employees with degrees in fields being noted as social science, we do not have any in job series or positions within NESDIS that are specifically dedicated to social science work within the organization. The following table lists social science staff by NESDIS Program Office<sup>10</sup>.

**Table 9 - NESDIS In-house Social Science Capability<sup>11</sup>**

<u>Program Office</u>	<u>FTE's</u>	<u>Contract Staff</u>	<u>Program Office</u>	<u>FTE's</u>	<u>Contract Staff</u>
<b>AA</b>	3	0	<b>OSPO</b>	0	0
<b>NCDC</b>	8	0	<b>OSD (GOES-R/JPSS)</b>	0	1
<b>NODC</b>	0	1	<b>CFO</b>	0	0
<b>NGDC</b>	1	0	<b>IIA</b>	7	0
<b>STAR</b>	0	2			
<b>Total</b>	19	4			

### Geographic distribution of social science capability

One important factor to consider is whether NESDIS social science capability is where it is needed. For some applications having the entire capability at headquarters may be appropriate. Although it is important to assess the geographic distribution of our current capability, this does not address where social science work actually takes place, merely the physical location of the capability. The challenge here is to link social science skills and abilities with a knowledge of local, state and regional issues and stakeholders. The approximate estimates of distribution of in-house NESDIS social science expertise is as follows:

<sup>10</sup> Includes the aggregation of employees who are working on social science part time.

<sup>11</sup> These employees are not engaged in social science activities full time – it is actually less than 10% for each person.

1993

1994

1995

**Table 10 - Geographic Distribution of NESDIS  
Social Science Capability**

HQ	10
Boulder, CO	2
Asheville, NC	3
Stennis, MS	1
Kansas City	1
Fairbanks, AK	1
Fort Worth TX	1
Honolulu HI	1
Taunton, MA	1
College Park, MD	2

1996

1997

## **Social Science Disciplines**

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Historically, NESDIS has had very little social science has mainly been represented by economics. It is important, as the need for social science is assessed, to understand what disciplines we currently have and what will be needed as the agency moves in to the future. The following table presents the distribution of in-house NESDIS social science disciplines no way of knowing our capabilities :

**Table 11 - NESDIS Social Science Disciplines**

Economics	3	Interdisciplinary Social Science	6
Geography	4	Anthropology	0
Demography	0	Marketing	1
Sociology	3	Organizational Development	3

2005

2006

## **Social Science Needs**

## **Social Science Gaps**

This section addresses the gap between current NESDIS social science capabilities and social science needs to support NESDIS processes, products and activities to support critical NESDIS outcomes.

- Improve the understanding of the data use by customers to assist in the articulation of societal benefits of satellite data. Collection of feedback and anecdotal information about how data is being used will help create opportunities to deliver faster, and more directed information if necessary.
- Increase the partnerships between other NOAA line offices and external partners to develop opportunities to incorporate other NESDIS programs that can bridge the connection between satellite products and data and social science requests. As NOAA and NESDIS begin to reach out to those utilizing products for their sectors and industries, the improvement of the collection and dissemination of data improves and allows for end users like utility companies and agricultural producers to make more informed decision that could affect their products and services to communities.
- Build a more comprehensive cost benefit analysis and use of data to assess the needs for the construction of environmental satellites and sensors. This will help to prioritize and focus the design methods on how to better serve the community based on current financial needs and capabilities. Determining what industries and partnerships will benefit most can drive requirements and allow for consideration how to expand outward instead of trying to meet multiple needs upfront and then trying to specify.
- Evaluate the social science capabilities within NESDIS and examine if changes need to be made to the NESDIS succession planning documents for upcoming years. Determine if social science needs should be contracted or brought on staff and examine pros and cons for each of those personnel decision.

## **Implications for Social Science in FY 12**

NOAA's Next Generation Strategic Plan focuses on three areas: Science, Service and Stewardship. It is within each of the aforementioned areas that NESDIS plays a prominent role; yet without the incorporation of social science perspectives, the mission may be overwhelmed with technical solutions that may not convey the necessary benefits to the nation. As noted earlier, NESDIS' mission is to provide data for the other NOAA LO's and external partners, therefore their social science needs and structure will vary from other organizations.

Providing support to internal NOAA partners like the National Weather Service in forecasting extreme weather events, and their economic impacts. There is also justification for supporting societal connections, outside the economic data. It is this expanded focus that will need to continue, looking beyond just the financial considerations, and examining how the society as a whole needs and benefits from the design, production, and launching of weather satellites. NESDIS will continue to work closer with other NOAA Line Offices and external Federal partners to highlight those connections that display the needs and the uses by partners, to ensure their needs are met through the development of hardware to collect required data that assists in the social science needs of their programs. The incorporation of the Regional Climate Service

2050 Directors (RCSDs) has increased the level and cooperation of social science within NOAA  
2051 through their work with the societal challenges and between NOAA and its external partners.  
2052 The increased incorporation of economic analysis for satellite development could benefit not  
2053 only the development of data services within the organization can also benefit from additional  
2054 social science analysis in an effort to better articulate and inform products designed to address  
2055 those requirements.

2056  
2057 Future opportunities are bountiful for the inclusion of the satellite products and services, and  
2058 connecting their benefits within NOAA and to its external partners only enhances the public  
2059 understanding of the financial needs of the programs.

2060

2061

2062

2063

2064 **NOAA's Program Planning and Integration**

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2066

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2068

## 2069 NOAA's Program Planning and Integration

### 2070 PPI Summary

2071

2072 PPI provides corporate management to coordinate NOAA's many lines of service with the  
2073 Nation's many needs for environmental science, service, and stewardship. It ensures that  
2074 investments and actions are guided by a strategic plan; are based on sound social and economic  
2075 analysis; adhere to executive and legislative science, technology, and environmental policy;  
2076 respond to regionally-specific stakeholder needs; and integrate the full breadth of NOAA's  
2077 resources, knowledge, and talent to achieve its mission. (source: PPI Homepage)

2078

2079 The NOAA Chief Economist is located in PPI. The Chief Economist serves as NOAA's Senior  
2080 Economic leader and advisor to the Administrator and all Line Office Assistant Administrators,  
2081 for all aspects of NOAA's economics and social science efforts in support of NOAA's mission,  
2082 goals and priorities. The Chief Economist fosters excellence in the economic and social science  
2083 domain, and provides leadership and influence in the direction of NOAA's policies and resource  
2084 services.

2085

2086 *See PPI's Economics and Social Sciences website for further information:*

2087 <http://www.ppi.noaa.gov/economics/>

2088

## 2089 Social Science Mandates and Drivers

### 2090 Strategic Documents

2091 PPI fulfills a corporate role at the agency and does not draw its authority or *raison d'être* from  
2092 any particular strategic documentation. On behalf of NOAA, PPI produces or leads the  
2093 development of several of strategic documents including The Next Generation Strategic Plan  
2094 (NGSP), Annual Guidance Manual (AGM), and Business Operations Manual (BOM), as well as  
2095 the Corporate Portfolio Analysis (CPA) and the Progress to Plan (P2P) process.

2096

2097 The NGSP and the AGM direct the agency to fulfill its mission to promote the well-being of the  
2098 nation. The NGSP states that "NOAA's vision centers on a holistic understanding of the inter-  
2099 dependencies between human health and prosperity, and the intricacies of the Earth system." (p.  
2100 29)

Language such as this, which exemplifies the agency’s growing focus on integrating the physical and social sciences, can be found throughout NOAA’s strategic documents.

The focus on harnessing a scientific understanding of the Earth system to benefit human health and prosperity shapes PPI’s social science focus, and guides the relationship between the Chief Economist, who reports directly to the PPI Assistant Administrator, with social scientists throughout various NOAA line and program offices. While there is no foundational mandate that guides the activities of the Chief Economist, the position is guided by the NGSP and reflects NOAA priorities. The Department of Commerce has a Chief Economist, but the duties of that Chief Economist are not related directly to NOAA and instead focus on the Economics and Statistics Administration (<http://www.esa.doc.gov/category/offices/office-chief-economist>).

## Current Social Science Capability

### **In-house capability**

In-house capability includes federal employees in a social science job series, federal employees who are not in a social science job series but who spend some or all of their time conducting and applying social science, and contract employees and fellows engaged in social science. In PPI’s case, in-house capability also includes those in the Intergovernmental Personnel Act (IPA) mobility program.

#### **At time of the data call:**

At the time of the data call, PPI’s office of the Chief Economist was in transition. While all of PPI’s social science capabilities have historically been completely in-house, the Chief Economist position has been filled over the course of the last three years by a series of academic postings to the position through the Intergovernmental Personnel Act. At the time of the data call (summer 2011), PPI’s in-house social science capability included one full-time IPA (Chief Economist) who was transitioning to a part-time IPA (25%), one graduate student fellow (20%, working through the Office of Education), and one full-time contractor.

#### ***Other:***

From time to time, PPI analysts may have social science backgrounds. Much of the work of analysts requires some understanding of basic social science constructs and concepts, but none of the analysts are required to have social science training.

### **Geographic distribution of social science capability**

All of PPI’s social scientists are located in Silver Spring, Maryland.

## 2141 **Social Science Disciplines**

2142 Since PPI's inception in 2005, social scientists within PPI have strictly been economists.  
2143 Currently, all of PPI's social scientists are economists, as defined by both academic degree and  
2144 job series.

2145  
2146

## 2147 **Intra-agency Social Science**

2148 The Chief Economist leads the Research Council's Social Science Committee. Additionally, the  
2149 Chief Economist has led a group of lead social scientists from each of the line offices. This  
2150 group consists of the core of the Research Council's Social Science Committee and attempts to  
2151 share information on social science activities occurring within each of the line offices.

2152  
2153 The Chief Economist participates on a number of intra-agency working groups that have a strong  
2154 social science mission. These include the "Blue Carbon Working Group," "MPAs, Ecosystem  
2155 Services, and Climate," "Ecosystem Services Coordination," etc.  
2156

## 2157 **Interagency Social Science**

2158 The Chief Economist (PPI) represents NOAA at certain high-level inter-agency venues. The  
2159 following are examples of recent or ongoing interagency partnerships:

- 2160
- 2161 • Inter-Agency Working Group on Ocean Social Sciences (IWG OSS) (of the National  
2162 Ocean Council), for which the Chief Economist has served as a co-chair; and as a Group  
2163 representative on of the Coastal and Marine Spatial Planning (CMSP) writing team
  - 2164 • National Science and Technology Council's Sub-Committee on Economic, Social and  
2165 Behavioral Sciences;
  - 2166 • National Science Foundation (NSF)-NOAA Social and Behavioral Economics working  
2167 group;
  - 2168 • The National Ecosystem Services Partnership

2169

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2171

2172



# Social Science Needs

## Process, Products and Activities that Require Social Science

Major duties of the Chief Economist include, but are not limited to:

- a. Ensure rigor and consistency of economic activity across agency
- b. Act as a point of contact for social science info
  - i. Headquarters, Science Advisory Board, NSF, Office of Science and Technology Policy, Sub-Committee on Ocean Science and Technology, Friends of NOAA, etc.
- c. Assist Line Offices with limited social science capacity
- d. Provide leadership for Research Council
- e. Create a Community of Practice for Social Scientists

Historically, the Chief Economist has been responsible for compiling an annual report of economic statistics related to the Agency's Work (The Economic Statistics of NOAA, now online). The Chief Economist also has been called upon to review economic statistics used by NOAA headquarters in speeches, press releases, and Congressional Testimony.

Under the leadership of the current IPA Chief Economist, the Office of the Chief Economist has taken a more active role to ensure that economic statistics used internally and presented externally by the Agency meet high standards of rigor. This includes a review of all of the Economic Statistics of NOAA and a repackaging of these statistics in ways that:

- i. Provide better guidance about the use of statistics in communications
- ii. Provide guidance on the use of NOAA-wide economic information (oceans and coasts)
- iii. Develop a framework for communicating and quantifying the value of NOAA

To better distribute data on the Value of NOAA, the Chief Economist supervises the dissemination of data on the PPI website - [www.ppi.noaa.gov/economics](http://www.ppi.noaa.gov/economics). These data include

- iv. The Value of a Weather Ready Nation
- v. The Economic Value of Resilient and Productive Coastal Communities
- vi. Stories / Value Chain Narratives about the Value of NOAA
- vii. Pocket Guide to Ocean and Coastal Economic Data

The Chief Economist respond to requests from Headquarters for fact checking and input.

The Chief Economist could take a larger role in developing performance metrics.

Finally, the Chief Economist provides input into major PPI documents and process including the Strategic Plan, the AGM, and the Strategic Execution and Evaluation process.

## 2215 **Social Science Gaps**

### 2216 **Fully Operational Social Science**

2217 To be effective in the roles described above the Chief Economist needs to have substantial  
2218 academic stature and significant competency in working within a large and diverse bureaucracy.  
2219 The Chief Economist would benefit from a mandated authority to implement standards or to  
2220 require collaboration among the line offices. The Chief Economist also would benefit from a  
2221 dedicated budget to undertake NOAA-wide analysis on social and economic issues. Currently,  
2222 neither a mandated authority nor a dedicated budget for the Chief Economist exist.

2223  
2224 To fulfill the day to day needs for rapid response items (e.g. input into PPI processes or requests  
2225 from headquarters), PPI would benefit from one or more senior economists with significant  
2226 graduate training and work experience. Ideally, two such positions would be maintained  
2227 recognizing that the expertise needed for “climate and weather” matters is often different than  
2228 that for “coasts and fisheries.” Having two senior economists with a depth of subject matter  
2229 knowledge in these areas would greatly improve the ability of the Chief Economist to focus on  
2230 leadership across the whole of NOAA. In the future, PPI anticipates supporting the Chief  
2231 Economist and two economist positions.

2232  
2233 The Chief Economist also needs a full-time assistant to provide direct support in conducting the  
2234 work of the Chief Economist - especially in the maintenance of NOAA economic and social  
2235 science statistics and data. Such an assistant should have substantive training in the social  
2236 sciences.

### 2237 **Gaps based on immediate risks**

2238 The Chief Economist position has not been filled with a permanent fulltime FTE since 2008.  
2239 This gap is due to a combination of budgetary constraints and a general lack of qualified  
2240 applicants for a permanent Chief Economist position. The Chief Economist previously was  
2241 advertised as a Senior Executive Service (SES) position - one that requires a substantial amount  
2242 of administrative experience. In the last call for candidates, many applicants that possessed the  
2243 required academic stature for the position did not have the administrative experience needed to  
2244 qualify for an SES appointment. For this reason, an SL level of appointment is being pursued.

2245  
2246 Since 2008, the position of Chief Economist has been filled by temporary (and now part-time)  
2247 IPA assignments.

2248  
2249 During this time, the use of social science at the agency and the desire to better coordinate social  
2250 science across the agency has grown tremendously. Failure to fill the Chief Economist with a  
2251 permanent hire could seriously jeopardize this momentum. The current staffing (25% IPA Chief  
2252 Economist, two detailees, one contractor, and a 20% graduate fellow) are insufficient to meet the  
2253 current demands on the office.

2254  
2255 **GAPS – 3 FEDERAL FTE (Chief Economist and two senior social scientist positions to**  
2256 **support the Chief Economist)**

2257

## Implications into the Future

2258

PPI does not have a specified budget line or allotment of funds for the social sciences. As with most Federal agency offices, the expectation is that budgets will remain constant or decrease in the foreseeable future. PPI has some flexibility in its ability to staff social scientists depending on the current makeup of the office, as the budget is split by position type (i.e. federal employees, contractors, etc.) rather than having a specific budget item for 'social sciences'.

2264

2265

Another mechanism PPI utilizes to enhance its social science capability is to create temporary detail positions for social scientists. Details will generally be brought in for short-term work with a very-specific scope, but these sorts of details have been used infrequently and for specific studies or reports. While these details are particularly useful in accomplishing specific projects, they are not appropriate for the bulk of the work required of the Chief Economist - e.g. maintaining data, providing leadership and coordination of social science, acting as a point of contact for NOAA headquarters.

2272

2273

In 2012, the junior economist position at PPI was vacated and currently is empty. The Chief Economist IPA was renewed at 25% through 2013 and a senior social scientist with significant social science background will move to PPI at the end of the year to support the Chief Economist IPA.

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2283 **NOAA's Office of Marine and Aviation**  
2284 **Operations**

2285

## OMAO Summary

As NOAA's operational component, OMAO supports a variety of missions and includes the NOAA Commissioned Corps, one of the Nation's seven uniformed services. OMAO's and the NOAA Corps' roots trace back to 1807 when President Thomas Jefferson ordered the first comprehensive coastal surveys. These early surveys ensured safe passage of ship-born cargo for our growing Nation. The mission of OMAO has grown as well. Today it is the foundation for an expansive set of scientific research and operational objectives, as well as NOAA's emergency response capabilities. OMAO and the NOAA Corps support almost all of NOAA's missions – from hydrographic, ecosystems, and fisheries surveys to weather and atmospheric research. These critical missions help to protect lives and property and support billions of dollars in American commerce each year.

Each year, OMAO supports hydrographic surveys, fisheries surveys, and atmospheric, hydrologic, and climate research missions. In addition, during a normal hurricane season, OMAO pilots conduct "hurricane hunter" missions and the NOAA Corps is ready to support special operations in times of crisis, such as the Deepwater Horizon oil spill response. As the demand for science continues to grow, OMAO will likely need additional data collection and observation assets and innovative solutions to keep up with this growing demand. (source: 2012 – 2016 OMAO Strategic Plan)

*See OMAO's website for further information: <http://www.oma.noaa.gov/>*

## Social Science Mandates and Drivers

### Legislative Authorities or Drivers

NOAA's legislative mandate to construct, maintain, and operate platforms is derived from Title 33 of the U.S. Code. Additionally, the Hydrographic Services Improvement Act (HSIA) updated the authorization for the NOAA Commissioned Corps, originally established by the Act of May 22, 1917.

### Strategic Documents

#### *NOAA's Next Generation Strategic Plan (NGSP):*

NOAA is challenged to provide increasingly accurate and reliable environmental and ecological information and services to meet the demands of society. Under NOAA's Next Generation Strategic Plan (NGSP), OMAO plays a key role in supporting NOAA's Science and Technology Enterprise Objective: Accurate and reliable data from sustained and integrated earth observing systems. This mission, rooted in Earth and space observations, charges OMAO with sustaining and enhancing atmospheric-oceanic-terrestrial-biological and human observing systems,

collecting and maintaining long-term observational data sets, and transitioning new observing technologies to operations.

**2012 – 2016 OMAO Strategic Plan:**

2012-2016 OMAO Strategic Plan is directly aligned to NOAA’s strategy as outlined in the NOAA Next Generation Strategic Plan (NGSP), and reflects the culmination of broad involvement, leadership dedication, and a wealth of balanced input and feedback.

The OMAO Strategic Plan offers a clear path forward over the next five years and is supported by a framework for measurable, incremental progress towards five long-term goals:

1. Mission-Ready Assets
2. Highly-Skilled, Adaptive, and Flexible Workforce
3. Strong Partnerships
4. Innovative Processes, Technologies, and Solutions
5. Best-Value Stewardship of Resources and Investments

In order to execute NOAA’s mission, OMAO procures, operates, manages, maintains, and properly dispose of a portfolio of assets, leverages new and emerging technologies, invests in personnel expertise, and proactively works with NOAA’s scientists to understand their research and science requirements.

## **FY 11 Snapshot of OMAO Social Science Capability**

### **In-house capability**

For the purposes of this assessment, in-house capability includes federal employees in a social science job series, federal employees who are not in a social science job series but who spend some or all of their time conducting and applying social science methods, and contract employees engaged in social science. OMAO does not have an in-house social science capability but, as part of their core mission, it does support programs and activities that support social science needs. Additionally, OMAO’s workforce includes officers of the NOAA Commissioned Corps. These officers, trained in science, technology, engineering and math, may have applied their technical knowledge, operational expertise and knowledge of platform capabilities to social science efforts within their assigned positions across NOAA and its Line Offices.

### **Social Science Disciplines (at time of the 2011 data call)**

As stated above, OMAO does not have an in-house social science capability. However, some of their workforce may have been educated in social science disciplines. In 2011, OMAO’s workforce consisted of 627 civilian/wage mariner positions and 318 NOAA Corps Officers. Decomposing the social science advanced education within OMAO’s workforce, the tables below depict: Table 13 - the discipline and number of degrees held by the civilian/wage mariner

2366 workforce and Table 14 - the discipline, number and type of degrees held by NOAA Corps  
 2367 Officers.

2368  
 2369 **Table 12 - OMAO Civilian/Wage Mariner Social Science Degrees**

Academic Discipline Descriptions	Total
Applied and Resource Economics	1
Conservation and Natural Resources	1
Criminology	1
Economics, General	1
Geography	1
Parks, Recreation and Leisure Studies	1
Social Sciences and History, Other	1
Sociology	2
<b>Grand Total</b>	<b>9</b>

2370  
 2371  
 2372 **Table 13 - NOAA Corps Officers Social Science Degrees (Sept. 2011)**

Academic Discipline Description	Associates	Bachelor	JD	Masters	MBA	PHD	Total
Administration				1			1
Anthropology		3					3
Business Administration	1	1		3	3		8
Coastal Zone Management				1			1
Economics		3					3
English		1					1
Geography		5		2		1	8
History		4					4
Juris Doctor						1	1
Kinesiology		1					1
Law			1				1
LLM in Mineral Law and Policy				1			1
Marine Affairs				1			1
Political Science		4					4
Psychology		1					1
Public Administration				3			3
Public Health				1			1
Public Policy				1			1
Social Science	1						1
<b>Grand Total</b>	<b>2</b>	<b>23</b>	<b>1</b>	<b>14</b>	<b>3</b>	<b>2</b>	<b>45</b>

2373  
 2374 Although the tables above show a number of OMAO personnel with social science educational  
 2375 backgrounds, these employees are not employed within social science positions, and may not  
 2376 necessarily engaged in or support social science research or activities. Additionally, due to

2377 civilian job series work restrictions, NOAA Corps assignment agreements and organizational  
2378 operational needs, these individuals may not be available to support social science activities.  
2379

## 2380 **External capability/Partnerships**

2381  
2382 OMAO often supports social science efforts, either by providing personnel, infrastructure, or  
2383 products, to support the needs of line offices, federal agencies or other external partners.

2384

## 2385 **Geographic distribution of social science capability**

2386 Most of OMAO positions are located throughout the Continental US, Alaska, and Hawaii.  
2387 However, OMAO does operate a fleet that has global range and has some NOAA Corps  
2388 assignments in remote locations, such as American Samoa and Antarctica.  
2389

## 2390 **Interagency Social Science**

2391 OMAO does not represent NOAA at social science venues. OMAO's primary customers are  
2392 NOAA's Mission Goals and Line Offices; however, OMAO also works with external partners;  
2393 such, as the University National Oceanographic Laboratory System (UNOLS), US Coast Guard,  
2394 US Navy, and NASA – and we are active members and play a leadership role with the  
2395 Interagency Coordinating Committee for Airborne Geoscience Research and Applications  
2396 (ICCAGRA) and the Interagency Working Group on Facilities and Infrastructure (IWG-FI) in  
2397 order to meet NOAA's science mission.  
2398

## 2399 **Social Science Needs**

### 2400 **Process, Products and Activities that Require Social Science**

2401  
2402 Most of OMAO's social science activities have come in the form of emergency preparedness and  
2403 response support, technical standards development, as well as educational activities. OMAO, a  
2404 service organization, supports the majority of these activities through partnerships with other  
2405 interagency functions or external partners. Therefore most of the social science needs to fully  
2406 understand the social benefits that arise from processes, products and activities, would be  
2407 captured by social science staff support outside OMAO.  
2408

2409 OMAO distributes resources to social science activities depending on support requirements or  
2410 needs for the defined activity; therefore it is difficult to quantify the annual in-house capability  
2411 support. It is OMAO core mission to support the following activities:  
2412



**Emergency Preparedness and Response Support:** Almost every American community, at some point in their history, has been touched by critical incident or disasters which endangered life, disrupted operations, or cause environmental damage. Any one event has the ability to cripple a community. OMAO, through planning and coordinated federal efforts, employ resources and capabilities to assess damage and hasten recovery. OMAO supports the following are activities related to “Emergency Preparedness and Response Support”:

- Historically, OMAO supports Hurricane awareness tours through personnel and infrastructure support. The NOAA team includes the crew of the NOAA P-3 Hurricane Hunter aircraft and forecasters from the National Hurricane Center. The team is joined at each stop by federal, state and local emergency management officials, non-profit organizations such as the American Red Cross and various local National Weather Service forecast offices. NOAA uses the Hurricane Awareness Tour to get the message out to communities emphasizing preparation, and safety. NOAA has conducted the hurricane awareness tour for almost 30 years, alternating between the Gulf and Atlantic coasts.
- Homeland Security Program Office (HSPO) is a NOAA-wide matrix program, which reports to the NOAA Office of the Chief Information Officer (OCIO). The program is responsible for coordinating the delivery of NOAA’s products, services, and capabilities to Federal, state, and local emergency managers and responders, and strengthening NOAA’s own infrastructure to protect agency personnel, facilities, and information services. HSPO ensures NOAA's continuity of operations to support the nation's mission essential functions, and coordinates all homeland security and response-related plans and policies to provide an integrated effort across NOAA. OMAO provides two NOAA Corps Officer Positions in support of this program: the Director of HSPO and liaison officer supporting United States Northern Command (Northcom). OMAO has deployed ships, aircraft and personnel, to aid in recovery efforts, and requires NOAA Corps officers, OMAO civilian personnel to staff NOAA’s Incident Coordination Center above and beyond normal duties.
- Because of their special capabilities, NOAA ships and aircraft may be called upon to provide immediate response to unpredictable events. NOAA survey ships located the wreckage of EgyptAir Flight 990, TWA Flight 800 and John F. Kennedy Jr.'s aircraft. NOAA ships, aircraft and personnel also conducted damage assessments after major spills from the Exxon Valdez and Deepwater Horizon, September 11, 2001 terrorist attacks, and after major hurricanes—most recently Hurricane Sandy in 2012.
- NOAA Search-and-Rescue Satellite-Aided Tracking (SARSAT) System was developed in a joint effort by the United States, Canada, and France. Once the system was functional, its operation was turned over to NOAA where it remains today. OMAO provides a NOAA Corps Officer, assigned as a SARSAT Operations Support Officer. In addition, NOAA vessels have on many occasions assisted fellow mariners in distress.

**Technical Expertise and Standards Development:** OMAO programs and activities support technological innovations that will ensure NOAA’s continued leadership in science and engineering, and response to both short-term and long-term societal needs.

- NOAA's navigational services provide critical support to our nation's maritime economy and position it for future growth. The Hydrographic Services Improvement Act (HSIA) requires NOAA to maintain hydrographic expertise, to ensure the funds used to conduct surveys and improve methodology in support of nautical charting and scientific application continue to be efficiently utilized. OMAO operates 4 hydrographic survey vessels and almost all hydrographers within NOAA in the past have been commissioned officers that have spent their careers rotating between ships and hydrographic survey related shore assignments. The National Hydrographer, who represents the United States in negotiations with foreign governments on cooperative agreements and standards for hydrographic surveying and nautical charts, is appointed from the members of the NOAA Corps Officers.
- Mississippi River Commission (MRC): MRC was established in 1879 to facilitate improvement of the Mississippi River. The law called for MRC membership to consist of three U.S. Army Corps of Engineers officers, one member of the NOAA (formerly the Coast and Geodetic Survey), and three civilians, two of whom must be civil engineers. For over the past 30 years a member of the NOAA Commissioned Corps has been nominated by the United States President and confirmed by the Senate as a member of the MRC. The MRC is responsible for developing plans to improve the condition of the Mississippi River, foster navigation, promote commerce, and prevent destructive floods.
- NOAA Dive Training: For almost fifty years, the NOAA Diving Program (NDP) and its predecessors have been actively involved in conducting and promoting undersea research. Not surprisingly, many of the lessons learned and technologies developed by the NDP have been adopted by the recreational, scientific, and military diving communities, thus benefiting divers everywhere. Many of the decompression tables and training, operational and safety standards developed by the NDP have become worldwide standards.
- OMAO assists with extensive sensor research and development in close collaboration with other LOs and agencies within the federal government, and ensures the transfer of the new technology into operations. Past projects OMAO supported include sensors that have improved NOAA's understanding of the physical processes that drive intensity change within all stages of a Tropical Cyclone.
- OMAO developed Scientific Computer System (SCS), which integrates data from shipboard and deployed sensors into one central system. The SCS system collects and processes the incoming sensor data; both archiving and making the data available to scientists for real-time manipulation and processing. The ability of the SCS to integrate and display both raw and processed information is vital to safe navigation and other scientific applications that meet NOAA's objectives. OMAO shares this tool, at no charge, with both national and international organizations.

#### ***Educational Activities:***

- Teacher at Sea & Air: Since 1990, the Teacher at Sea program has given teachers, from kindergarten through college, hands-on research experience aboard NOAA hydrographic survey and oceanographic and fisheries research ships. In 2004, a companion program was initiated to enable teacher participants to observe research activities and interact with scientists while on board NOAA aircraft. Since its inception the program has enabled more than 600 teachers to gain first-hand experience of science and life at sea and in the air. NOAA's Teacher at Sea & Air program's goals support NOAA's environmental literacy, outreach, and education goals and also support NOAA's workforce goals to recruit and retain a highly adaptable, technically competent and diverse workforce.
- Ship/Aircraft Tours: NOAA Corps Officers and crew offer opportunities for public and youth education, engagement, and outreach through ship and aircraft tours.

## Social Science Gaps

OMAO does not have any social science gaps, outside an existing gap for socioeconomic analysis support. Currently, NOAA's program requirements far exceed the ability of new technology or the current NOAA fleet capacity to meet burgeoning needs. The lack of resources compounded with an increased emphasis on government efficiency requires agencies to demonstrate that resources are spent in the most effective and efficient way. Conducting socioeconomic studies on the Fleet would:

- Improve the understanding of OMAO and its relationship to their stakeholder and their requirements,
- Inform decisions regarding the optimal allocation of resources among programs, and
- Advance recognition of the contributions of OMAO.

OMAO does not have an in-house economist and does not have the workload to establish a fulltime position (FTE). In the past, socioeconomic studies relating to OMAO were either contracted or supported by a NOAA program with economist staff support. Most recently, OMAO participated in a socioeconomics study to value "Ocean Infrastructure". The lead economist for this study was provided by the NOAA Line Office, Program, Planning and Integration (PPI).

During FY13, OMAO plans to revise this study, incorporating all OMAO activities, to understand its role within the agency and its value to NOAA programs and the nation. In order to complete this study without the requisite in-house staff, OMAO would need to leverage in-house capacity from another line office or fund contract to bridge the resource gap.

Many of OMAO core activities could benefit by social science methods. For example, social science methods and information could be used to improve emergency response-related products, services and capabilities, or to inform homeland security and emergency response-related plans and activities in terms of fully understanding community's security and response-related needs. However, due to OMAO's business model as a service organization, any gap associated with the

2547 social science need would be articulated by the LO or external organization (ie: DHS) with the  
2548 legislatively mandated mission requirement.  
2549

### 2550 **Fully Operational Social Science**

2551 OMAO supports the development of a Chief Economist within NOAA. A Chief Economist at  
2552 the agency level is essential to undertake NOAA-wide analysis to understand holistically how  
2553 NOAA's products and services affect society.  
2554

## 2555 **Implications for Social Science**

2556  
2557 OMAO does not have a social science position or workload to support a full time Economist. As  
2558 an organization that derives its operational requirements from the requirements of the agency, it  
2559 is critical that OMAO's and NOAA's socio-economic impacts are derived aggregated economic  
2560 impact estimates across the various NOAA programs. In order to facilitate a study with this  
2561 enterprise level view, it is recommended that an economist reside within corporate NOAA, or  
2562 PPI, to conduct the requisite analysis on agency wide socio-economic issues.

2563

2564

2565

2566 **NOAA Headquarters**

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The following offices in Headquarters had the opportunity to review and comment on this document: Policy, Education, Legal Affairs, External Affairs, Communications, Department of the Undersecretary, and International Affairs. Two offices responded with specific comments to the requested questions; this document represents primarily input from the Offices of Policy and Education.

## Headquarters Summary

There are a variety of offices within NOAA Headquarters that all are driven to fulfill different mandates and therefore have different social science needs. This joint response gives examples of how different offices downtown use and need social science to fulfill their missions. The key points from this Headquarters Social Science Needs Assessment are the following:

## Capabilities

There is currently minimal social science capacity (as defined by the NOAA SAB) in-house at Headquarters, however, some offices do have money to contract out some social science via grants or contracts. But many offices are dependent on the social science coming from Line Offices to support their needs at Headquarters.

### Needs

Better data to assess the societal benefits of NOAA's work will benefit many offices at Headquarters facilitating (1) better planning, (2) improved communication with partners, Congress, and the public, (3) augmented outreach and education, and (4) enhanced alignment of NOAA's programs with White House priorities.

### Gaps

The main gaps in current social science at NOAA that would better support Headquarters include:

- Improved understanding of the relationship between education, educational tools, and stewardship.
- Better comprehension of the users of NOAA products (behaviors and vulnerabilities) and improved valuation of NOAA products and services (economic benefits generated from the use of NOAA products) which would help NOAA prioritize resource expenditures and ensure that the products and services provided are the ones that are most useful to users.
- Additional assessment of the value of NOAA's contribution to the nation's economic, social, and environmental needs.

2606

## 2607 **Ideal Scenario**

2608 Headquarters would find it useful to have a NOAA “Social Science Center of Excellence” which  
2609 would include individuals with scholastic degrees in the social sciences, but with expertise or  
2610 knowledge in the climate, weather and water arena. This Center would interface with NOAA  
2611 programs and provide social science analyses, develop supporting data, conduct applied studies  
2612 and oversee consultant studies. This Center would have, at a minimum, a Risk Communication  
2613 Specialist to be able to help NOAA more effectively articulate risk, vulnerability and uncertainty  
2614 in its products, information and services, and an Economist to help direct and undertake  
2615 economic valuation studies.

# 2616 **Social Science Mandates and Drivers**

## 2617 **Education**

### 2618 **Legal Mandates**

- 2619 • America COMPETES Act:
  - 2620 ○ (b) Educational Program Goals- The education programs developed by NOAA
  - 2621 shall, to the extent applicable--
    - 2622 ▪ (1) carry out and support research based programs and activities designed
    - 2623 to increase student interest and participation in STEM;
    - 2624

## 2625 **Policy Office**

2626 The NOAA Policy Office does not have any particular organizational mandates that require  
2627 social science inputs; however, we are often tasked with analyses to support information for the  
2628 Office of the Secretary and the White House that would benefit from social science information.  
2629 For example, it would be extremely helpful to have information about the economic and  
2630 sociological impacts of NOAA’s work to help make the case for how our programs support  
2631 current priorities on job creation and economic development.  
2632

### 2633 **Strategic Documents**

- 2634 • The NOAA Education Strategic Plan, 2009 – 2029
  - 2635 ○ Outcome 1: NOAA education programs are developed and refined using the best
  - 2636 available research on the effectiveness of environmental and science education.
  - 2637
  - 2638

2639

## Current Social Science Capability

### Education

#### In-house capability

- The Office of Education budget for evaluation is about \$130 - 150k per year. This supports one full time evaluator and a second evaluator that we work with part time, both on contract.

#### External capability

- \$1.49 million in grant awards to *The Ocean Project* to conduct and analyze public opinion polls on ocean issues.
- Grants totaling \$517k to a team for a National Environmental Literacy Assessment of middle school students in the U.S.
- Contract with Institute for Learning Innovation to evaluate learning associated with the Science on a Sphere network.

### Policy Office

While some employees in the Policy Office have some social science training, no one is exclusively focused on social science as part of their scope of work. The Policy Office does not have a budget to contract out for external expertise.

#### Partnerships

The Policy Office relies primarily on the Line Offices for social science. While we do not proactively work with external partners to fulfill social science needs, we often find the products of external partners, such as universities and NGOs, extremely useful in terms of providing social science data and statistics to support our work.

#### Interagency Social Science



## 2672 **Education**

- 2673 • National Environmental Literacy Assessment was jointly funded by EPA and NOAA.  
2674

## 2675 **Policy Office**

2676 The Policy Office is involved in numerous interagency working groups. While not all of them  
2677 are focused on social science exclusively, many could benefit from more social science analyses.  
2678

## 2679 **Social Science Needs**

### 2680 **Process, Products and Activities that Require Social Science**

2681

## 2682 **Education**

2683  
2684 Education Council is using social sciences to assess current state of knowledge, evaluate  
2685 program effectiveness, design programs, and develop performance metrics.  
2686

## 2687 **Policy Office**

2688  
2689 For the Policy Office, social science helps to better understand and quantify the societal and  
2690 economic benefits that environmental information brings to the Nation. Clearly articulating and  
2691 justifying the societal benefits will allow NOAA to:

- 2692
- 2693 • Plan better programs
- 2694 • Communicate the return on investment to Congress, partners, and the general public
- 2695 • Measure outcomes and improve performance within the organization
- 2696 • Set targets for future accomplishments
- 2697 • Prioritize investments to improve products and services
- 2698 • Better align NOAA programs with DOC and White House priorities  
2699

2700 Specifically, information collected from social science research informs messages, talking  
2701 points, briefing papers, etc. that are written by the Policy Office. This information may also be  
2702 used to consider areas to encourage more agency/ leadership focus, help advocate for additional  
2703 resources (working with the budget office), or encourage partnerships with other agencies or  
2704 external groups.  
2705

## 2706 **Gaps based on immediate risks**

2707

### 2708 **Education**

- 2709 - Develop and validate environmental literacy assessment tools.
- 2710 - Research on link between education and stewardship.

### 2711 **Policy Office**

2712 The lack of social science available throughout the agency limits the Policy Office's ability to:

2713

- 2714 • Articulate the value of products and services delivered or ability to ensure its resources are
- 2715 allocated optimally across programs and objectives.
- 2716 • Articulate NOAA's contribution to the nation's economic, social, and environmental needs.
- 2717 • Understand the vulnerabilities and behavior (adaptation, risk perception) of the users of NOAA
- 2718 products/information, and the economic risks mitigated and value generated by these uses.
- 2719 • Ascertain whether NOAA is designing and delivering products and services to best match the
- 2720 needs of its constituents.

2721

2722 Succinct summary information of key findings, statistics, etc from social science research  
2723 (compiled in an easy to use location) is extremely helpful. There is some useful information on  
2724 the [www.ppi.noaa.gov/economics/](http://www.ppi.noaa.gov/economics/) site and the NOAA Economic Statistics report, but additional  
2725 information would be useful, in particular on the ocean and coastal side (ecosystem services of  
2726 protected areas, recreation benefits, benefits of coastal management, etc).

## 2727 **Fully Operational Social Science**

2728

### 2729 **Education**

2730

2731 Given the limited ability to hire in the current fiscal climate, NOAA should contract with outside  
2732 experts to conduct studies and develop useful products.

2733

2734

2735

### 2736 **Policy Office**

2737  
2738 Cadre of Social Scientists/Center of Excellence: A long term goal for successful integration of  
2739 social science into NOAA products and services should include the development, over time, of a  
2740 connected “center of excellence” populated by individuals with scholastic degrees in the social  
2741 sciences, but with expertise or knowledge in the climate, weather and water arena. The intent is  
2742 for these individuals to interface with NOAA programs and provide social science analyses,  
2743 develop supporting data, conduct applied studies and oversee consultant studies. At a minimum,  
2744 NOAA should have a Risk Communication Specialist to be able to help NOAA more effectively  
2745 articulate risk, vulnerability and uncertainty in its products, information and service and an  
2746 Economist to help direct and undertake economic valuation studies. This Center of Excellence  
2747 would be invaluable for NOAA Policy to rely on for our information needs.

2748

2749

2750 **Appendix C**  
2751 **NOAA's Federal Social Science Workforce**  
2752

2753

## 2754 **NOAA's Social Science Federal Workforce.**

2755 NOAA's social science capacity resides in its federal employees and contractors, as well as its  
2756 partners in the public and private sectors. Unfortunately, a centralized source of information  
2757 exists only for NOAA's federal workforce. For the purposes of this assessment, Fiscal Year 2011  
2758 data was obtained from NOAA's Workforce Management Office in an attempt to better  
2759 understand, in general terms, how the federal workforce contributes to social science capacity  
2760 and to a culture of understanding the dynamic between NOAA's work and society. There are two  
2761 categories available for these data that one can consider when examining this aspect of social  
2762 science capacity: those in social science job series, and those who have social science  
2763 educational backgrounds. A third category is also pertinent, those who are not in social science  
2764 job series but who contribute to social science projects or issues, and while these persons could  
2765 not be identified in the workforce management data, they are included in the discussion of in-  
2766 house capacity (above). Finally, it is also important to note that although someone is in a social  
2767 science job series, this does not necessarily mean that they are working on social science projects  
2768 or issues.

2769  
2770 For the reasons described above, the workforce data alone do not provide a complete picture of  
2771 NOAA's social science capacity; however they do provide a starting point for discussion. For a  
2772 more complete, if qualitative, assessment of social science capacity in each LO the reader should  
2773 refer to the individual LO sections in Appendix B. The following is a snapshot of how the federal  
2774 workforce contributes in general terms.

### 2775 **Social Science Job Series**

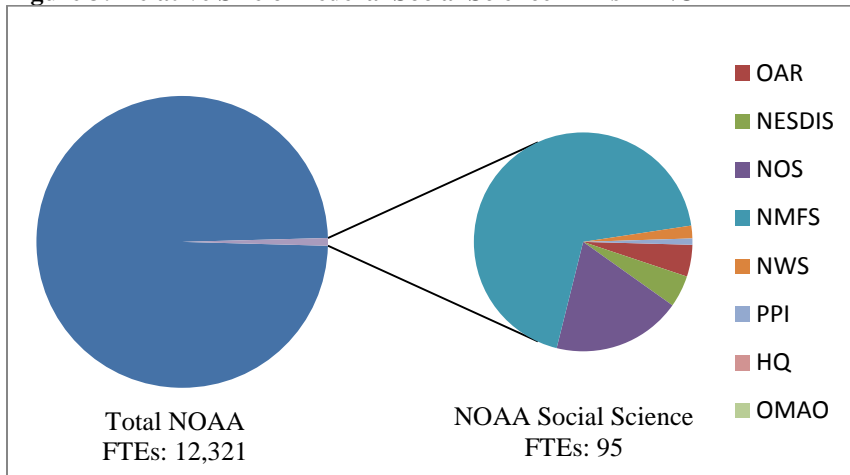
2776 NOAA had 95 federal employees (less than one percent of NOAA's federal workforce) in social  
2777 science job series in Fiscal Year 2011 (see Figure 4). These include jobs in the "Social Science,  
2778 Psychology and Welfare Group" in the Position Classification for White Collar Occupational  
2779 Groups and Series<sup>12</sup>. This group also includes job series related to psychology and welfare that  
2780 were not included in these data. These positions were dominated by economists who comprised  
2781 69 percent of the employees in this series (66 employees). Economists were followed by social  
2782 science specialists at 20 percent (19 employees), geographers at six percent (six employees), and  
2783 historians at three percent (three employees). There is also one archeologist.

2784  
2785

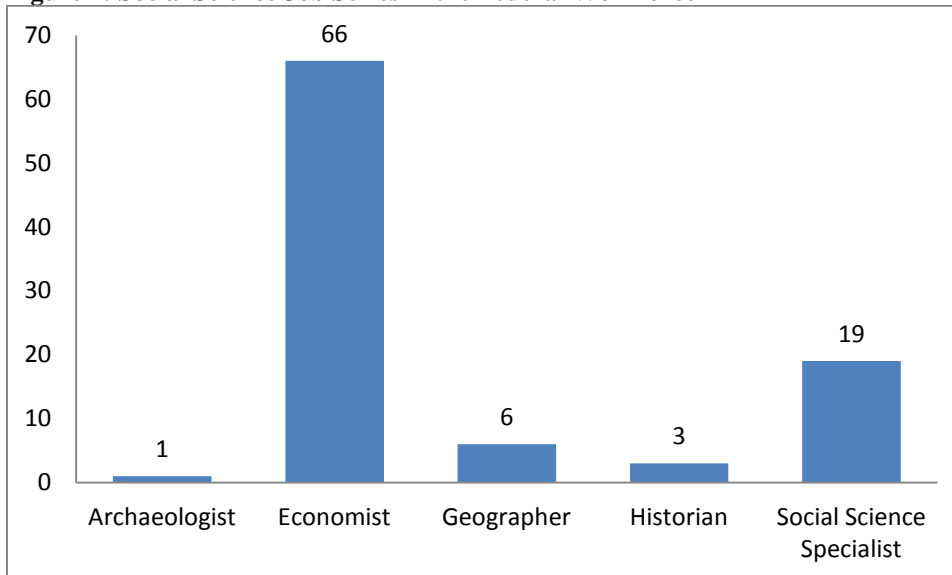
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<sup>12</sup> For more information, see the Handbook of Occupational Groups and Families from the U.S. Office of Personnel Management, which can be found at <http://www.opm.gov/fedclass/gshbkocc.pdf>

**Figure 3: Relative Size of Federal Social Science FTEs in NOAA**

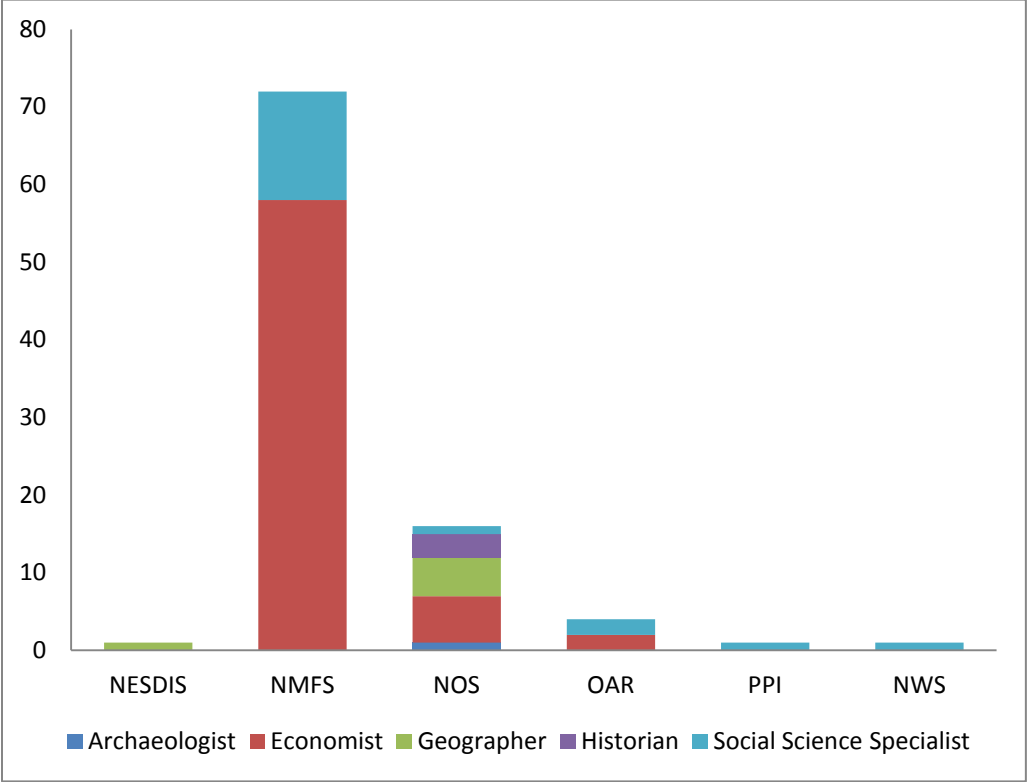


**Figure 4: Social Science Job Series in the Federal Workforce**



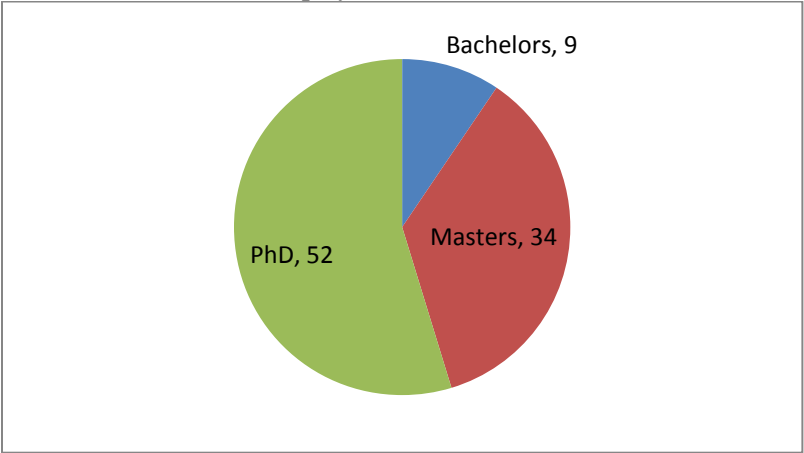
*Line Office.* During Fiscal Year 2011, 72 of the federal employees in social science job series, were employed by NMFS, including 58 economists, and 14 social science specialists. Of the 16 federal employees in social science job series in NOS, there was one archeologist, six economists, five geographers, three historians, and one social science specialist. OAR has four federal employees in social science job series, including two economists and two social science specialists. NESDIS, NWS and PPI each have one federal employee in a social science job series. NESDIS has one geographer, NWS has one social science specialist, and PPI has one social science specialist (although PPI traditionally has a position for Chief Economist, which is currently unfilled and not included here). See Figure 5 for details.

2806 **Figure 5: Social Science Job Series broken out by Line Office FY2011**



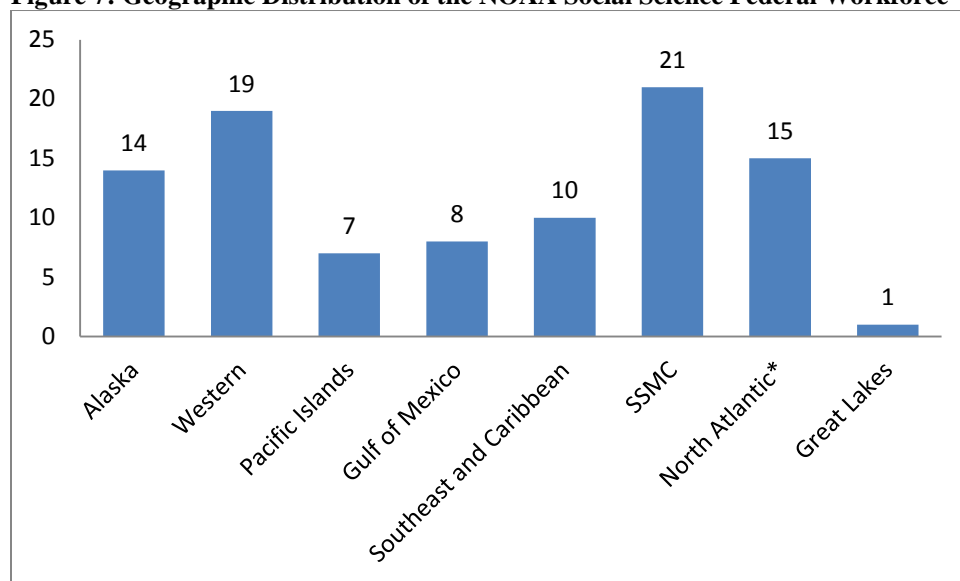
2807  
2808  
2809  
2810 *Education Level.* In order to work as a social scientist, there is an assumption that an advanced  
2811 degree is required. The workforce management data confirms this assumption. Of the federal  
2812 employees in social science job series in FY 11, over half (55%) had a PhD (52 employees),  
2813 thirty six percent (34 employees) had a masters degree, and nine percent (nine employees) had a  
2814 bachelors degree.

2815  
2816  
2817 **Figure 6: Education Level of the NOAA Social Science Federal**  
2818 **Workforce (number of employees)**



*Geographic Distribution.* Historically, a challenge to organizing social science at the agency has been due to the fact that social scientists are distributed across the country, with many serving NMFS needs at regional fisheries science centers; or in NOS's Coastal Services Center or National Centers for Coastal Ocean Science. The use of the internet and email has made it easier for these widely distributed social scientists to work together. The geographic distribution of the federal workforce can be seen below (Figure 7). Note that those employees in the Silver Spring Metro Center (SSMC) have been taken out of the North Atlantic Region. Aside from those employees, the greatest concentration of federal employees in a social science job series is in the Western Region, followed by the North Atlantic (minus SSMC), the Alaska Region, the Southeast and Caribbean. The remainder of the regions had less than 10 employees in social science job series.

**Figure 7: Geographic Distribution of the NOAA Social Science Federal Workforce**



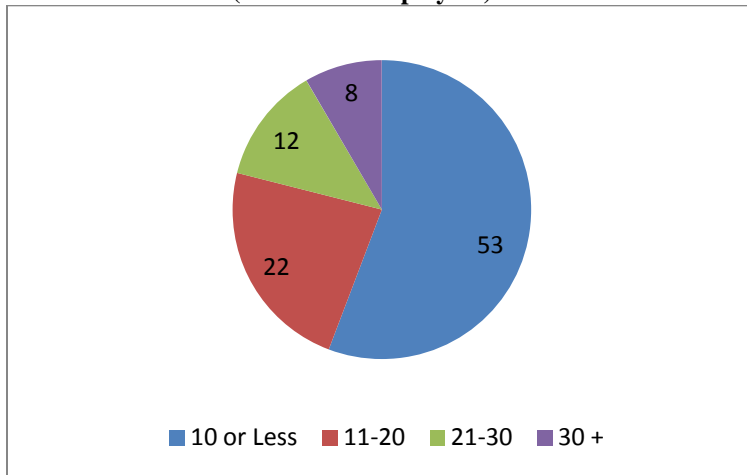
\* North Atlantic without SSMC, which is represented as a separate category.

*Experience.* Social science experience has grown over the last decade. As can be seen in Figure 8 (below), the federal social science workforce in NOAA had more employees with 10 years of experience<sup>13</sup> or less than in any other range of experience. Of the ninety-five federal employees in social science job series, over half (53 employees) have 10 years or less on the job. From here the percentage goes down for each 10 year range of experience; to 22 (23 percent) for those with 11-20 years of experience, 12 (13 percent) for those with 21-30 years of experience, and 8 (eight percent) for those with over 30 years of experience.

<sup>13</sup> In this context, experience refers to years of working as a social scientist in NOAA.



**Figure 8: Experience (in years of service) of the Social Science Federal Workforce (number of employees)**



## Social Science Educational Background<sup>14</sup>

A focus solely on social science job series underestimates the role that social science thinking has at the agency. While NOAA often is rightly perceived as an agency of scientists and engineers, many managerial and leadership positions are held by those with social science training. In FY 2011, there were 603 federal employees at NOAA (about five percent of the NOAA federal workforce) who had degrees in social science disciplines (see Table 2 for disciplines considered). As was noted above, employees with social science educational backgrounds are not necessarily engaged in, or supporting social science research or activities. However, there are a large number of federal employees who have been trained in a social science discipline, and who may contribute toward a “social science culture” in NOAA. These employees were identified through a review of the “academic discipline description” data element in the NOAA Workforce Management database. In the identification of these employees, a fairly inclusive discipline list was used to better determine the breadth of those with social science in their educational background. The academic disciplines used included those in Table 2.

**Table 2: Academic Disciplines included in the Criteria for Social Science Educational Background**

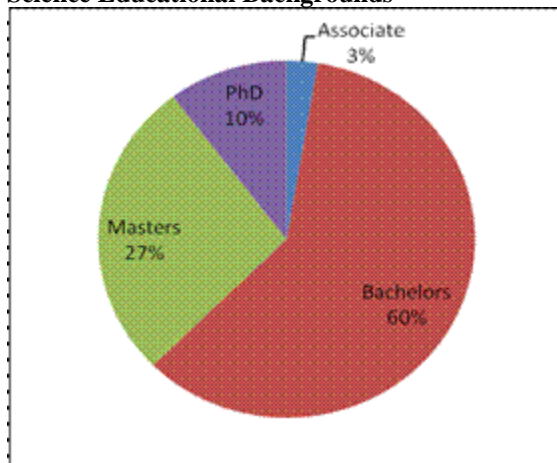
Agricultural Business and Mgmt, General	International Economics
Agricultural Economics	International Relations and Affairs
American Government and Politics	Multi/Interdisciplinary Studies, Other
Anthropology	Organizational Behavior Studies
Applied and Resource Economics	Parks, Recreation and Leisure Stud, Oth
Archeology	Parks, Recreation and Leisure Studies
Business Quantitative Methods and Mgmt	Political Science, General

<sup>14</sup> This information only pertains to federal employees. This does not represent the other categories of social science capability in NOAA.

Business/Managerial Economics	Psychology, General
City/Urban, Comm and Regional Planning	Psychology, Other
Criminology	Social Psychology
Demography/Population Studies	Social Science Teacher Education
Devel Economics and Internatl Devel	Social Sciences and History, Other
Econometrics and Quantitative Economics	Social Sciences, General
Economics, General	Social Studies Teacher Education
Economics, Other	Sociology
Geography	Travel-Tourism Management
History and Phil. of Science and Tech	Urban Affairs/Studies
History, General	Wildlife and Wildlands Management
International Business	

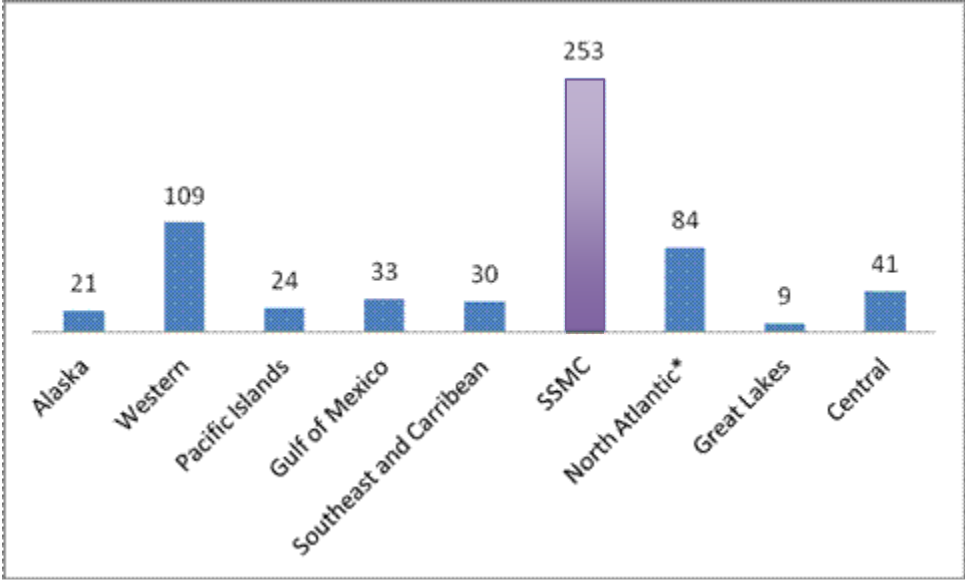
*Education Level.* Of the 603 federal employees who had degrees in social science disciplines, 16 (three percent) had associates degrees, 361 (sixty percent) had bachelors degrees, 164 (27 percent) had masters degrees and 62 (10 percent) had PhDs. From this you can see there were significantly more employees with masters degrees and higher in social science job *series* as compared with those that had *educational backgrounds* in social science (91 percent versus 37 percent, respectively). This does make sense, as advance degrees are more necessary for those conducting social science research and providing technical assistance, than for those who are in non-scientific job series.

**Figure 9: Education levels of those with Social Science Educational Backgrounds**



*Geographic Distribution.* Of the NOAA federal employees who have an education background in social science (Figure 10), the greatest number (253) work at the NOAA Silver Spring, MD Metro Campus (SSMC) (42 percent). (Further evidence that those with social science degrees are active in management at the agency.) After SSMC, the next NOAA region with the largest number of employees is the Western region (109 employees or 18 percent), followed by the North Atlantic Region (minus SSMC) with 84 employees (14 percent), and the Central Region with 41 employees (seven percent). The remaining regions each had five percent or less of the total.

**Figure 10: Geographic Distribution of federal Employees with Social Science Educational Backgrounds.**



\* This is the North Atlantic Region with the Silver Spring Metro Campus removed.