

MAFAC HANDBOOK



2008



**MARINE FISHERIES ADVISORY COMMITTEE
DRAFT HANDBOOK
NOVEMBER 2008**

PLEASE NOTE: Each document below is electronically “linked”: Place your cursor over the document and “click” to go directly to the document.

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MAFAC: A GENERAL DESCRIPTION AND SUMMARY

The **Marine Fisheries Advisory Committee (MAFAC)** was established under a federal charter (see TOC B) by the Secretary of Commerce (Secretary) on February 17, 1971, to advise the Secretary of Commerce on all living marine resource matters that are the responsibility of the Department of Commerce. MAFAC members draw on their expertise and other appropriate sources, such as the National Marine Fisheries Service, to evaluate and recommend priorities and needed changes in national living marine resources policies and programs such as the Magnuson-Stevens Fishery Conservation and Management Act, the Endangered Species Act, and the Marine Mammal Protection Act, legislation and the federal budget, science programs, and other areas of primary interest to the Secretary. The members represent a wide spectrum of commercial and recreational fisheries, environmental, academic, state, tribal, consumer and other related national interests.

MISSION

The MAFAC membership represents a broad cross-section of geographic, cultural, and political views as well as a variety of expertise and experience. Advice is on matters that the Secretary brings to the Committee and on issues that are of growing concern in the view of the Committee. The Committee is available to the Secretary on an ongoing basis as a source of expertise to be consulted in the development of fisheries policy.

STRUCTURE

The committee functions solely as an advisory body (complying fully with the Federal Advisory Committee Act) who reports to the Secretary. The Under Secretary for Oceans and Atmosphere is the designated chair of the Committee, and the Assistant Administrator for Fisheries serves as the Vice-Chair. The Committee elects a Committee Liaison to NMFS, and a NMFS staff person serves as Designated Federal Officer/Executive Director. The Vice Chair and Committee Liaison are responsible for working with the Designated Federal Officer to develop the meeting agenda and meeting logistics. The Vice Chair presides over the meeting, appoints subcommittees and membership to standing subcommittees, and reports to the Secretary of Commerce on the results of MAFAC meetings.

MEMBERS

For over 35 years MAFAC has maintained a group of diverse and expert members in terms of professional and academic expertise and representing regional, national or international perspectives on living marine resources. The current composition of the Committee balances geographic and sectoral representation and includes expertise in aquaculture, seafood and trade, commercial and recreational fishing industries, natural resource management, environmental organizations, and social, economic and biological sciences. All members are recognized leaders in their field and contribute a wide-range of knowledge and experience.

The Secretary of Commerce appoints members to MAFAC. The Assistant Administrator for Fisheries solicits nominations through a Federal Register notice to the public. In developing a list of suggested appointees for the Secretary's consideration, the Assistant Administrator reviews the nominations of highly qualified individuals from a balance of U.S. geographical regions, including Puerto Rico and the Western Pacific and the U.S. Virgin Islands. As a general policy, the Vice Chair will recommend to the Secretary that members seeking re-appointment to a second term be given priority over new appointees. Members who have missed 3 meetings in their first term will be asked to step down. When seeking new members for appointment, the Assistant Administrator for Fisheries will make clear to potential members the expected time and travel commitment involved with service on MAFAC. The Assistant Administrator for Fisheries will make every reasonable effort to ensure a diverse membership, including by geographic representation and occupational interest.

MAFAC CONSULTANTS AND OTHERS

The Executive Directors of the 3 Marine Fisheries Commissions chartered by Congress serve as consultants to MAFAC. Travel and expenses at MAFAC meetings are reimbursed in the same way as non-Federal MAFAC members. Consultants have the same opportunity to participate in MAFAC activities as appointed members but are not entitled to vote. MAFAC is also assisted by federal contract persons for identified NMFS/NOAA issue areas, who work with the Committee substructure throughout the year to ensure effective input and discourse in support of MAFAC's efforts.

MEETINGS

MAFAC meets twice a year with supplementary meetings as determined necessary and approved by the Committee Chair. The proposed time period, location, and agenda topics for the subsequent meeting are included as an agenda item at each MAFAC meeting. The topics for consideration on the agenda are derived from DOC and NOAA current or forthcoming issues suggested by the federal participants, and ideas and topics suggested/requested by MAFAC members. Subcommittees meet during MAFAC meetings. Subject to the approval of the Chair and NMFS and the availability of funds, subcommittee meetings may also be held at times and in locations where MAFAC is not scheduled to meet. The Chair and the Designated Federal Officer will make every effort to ensure that briefing materials for each meeting are provided to MAFAC members at least two weeks prior to the meeting. In general, meetings are held over a period of 3 days, with additional time as needed for travel.

SUBCOMMITTEES AND WORKING GROUPS

MAFAC has 5 standing subcommittees and such *ad-hoc* working groups as necessary. The Subcommittees are: Executive; Strategic Planning, Budget and Program Management; Commerce; Protected Species; and Ecosystem Approach. There is also a Working Group on Recreational Fisheries. The Vice Chair serves as ex-officio member on all subcommittees and may appoint one or more MAFAC consultants as advisors to the subcommittee. In addition, the Assistant Administrator for Fisheries will identify a contact point within NOAA Fisheries for each subcommittee. Members may serve on more than one Subcommittee or working group without term limits and based upon their

interest and request to participate. When appointing members to working groups, preference will be given to members who are not already members of other subcommittees. Subcommittee chairs will be elected by the subcommittee members.

The role of a subcommittee is to "frame the issue" and provide information to MAFAC, which will then decide collectively what kind of advice to give. If no consensus can be achieved, majority /minority views will be presented with an accompanying record of decision.

Subcommittees:

- **Executive Subcommittee** (The Subcommittee Chairs, the Committee Vice Chair, the Committee Liaison, and the Executive Director): Assists with agenda development, assignments and administrative issues for Committee business.
- **Strategic Planning, Budget and Program Subcommittee:** Reviews and advises on strategic planning elements, and reviews and provides input on the status of existing management programs within NOAA, particularly as they relate to the statutory mandates such as the Magnuson-Stevens Fishery Conservation and Management Act.
- **Commerce Subcommittee:** Reviews and advises on emergent industry and socio-economic issues such as off-shore aquaculture, seafood technology and consumer interests.
- **Protected Resources Subcommittee:** Reviews and advises protected species programs under the Marine Mammal Protection Act and the Endangered Species Act.
- **Ecosystem Approach Subcommittee:** Provides a format for reviewing programs and initiatives involved with the development and implementation of ecosystem approaches to fisheries management.

Working Group:

- Working Group on Recreational Fisheries

**U.S. DEPARTMENT OF COMMERCE
CHARTER OF THE
MARINE FISHERIES ADVISORY COMMITTEE**

ESTABLISHMENT

The Secretary of Commerce approved the establishment of the Marine Fisheries Advisory Committee (MAFAC or the “Committee”) on December 28, 1970. The Committee was initially chartered under the Federal Advisory Committee Act, 5 U.S.C. App. 2, on February 17, 1971, with the General Services Administration’s concurrence, and has been renewed periodically. It has been determined the Committee’s continuance is in the public interest in accordance with the duties and the laws imposed on the Department.

OBJECTIVES AND DUTIES

1. The Committee will advise the Secretary of Commerce (the “Secretary”) on all living marine resource matters that are the responsibility of the Department of Commerce.
2. Specifically, the Committee will draw on the expertise of its members and other appropriate sources, such as the National Oceanic and Atmospheric Administration’s (NOAA) National Marine Fisheries Service (NMFS), to evaluate and recommend priorities and needed changes in national program direction. Its objective is to ensure the Nation’s living marine resource policies and programs meet the needs of commercial and recreational fishermen, and of environmental, consumer, academic, tribal, governmental, and other national interests.
3. The Committee will function solely as an advisory body, and will comply fully with the Federal Advisory Committee Act.

MEMBERS AND CHAIRPERSON

1. The Committee shall consist of at least 15 but not more than 21 members to be appointed by the Secretary to ensure balanced representation geographically, ethnically, and on the basis of gender as well as among commercial and recreational fishermen, environmental, consumer, academic, tribal, governmental, and other national interest groups. Criteria for membership is one or more of the following:
 - a. Experience in harvesting, processing, or marketing fish or fish products.
 - b. Experience in promoting fishing for pleasure, relaxation, or consumption. This may include operating a recreational fishing business. Recreational fishing experience by itself is not sufficient experience.
 - c. Experience as a former or current officer or in a leadership role in a national,

state, or regional organization representing marine fisheries interests.

d. Experience in managing and conserving fishery resources or in representing consumers of fish or fish products through active and sustained participation in local, state, or national organizations.

e. Experience in teaching, writing, researching, consulting, or adjudicating matters related to fisheries, fishery management, and fishery resource conservation.

2. The members are appointed for three-year terms and serve at the discretion of the Secretary. Members are designated as “special government employees” who are selected for their expertise in the aforementioned areas of experience to help guide the Department with implementing its stewardship mission over living marine resources in the most effective manner. Terms of appointment are contingent upon the Committee’s continuation and the active participation of the members. An appointment may be terminated if a member misses two consecutive meetings, unless excused for good cause by the Chairperson or the Vice Chair. Members serve until reappointed or replaced; however, no member may serve more than two consecutive terms. No member may serve on both the Committee and a regional fishery management council at the same time. Vacancy appointments may be made for the remainder of the unexpired term of the vacancy. State officials and their designees who serve as voting members of a regional fishery management council may not be appointed as members of the Committee.

3. The Chairperson is the Department’s Under Secretary of Commerce for Oceans and Atmosphere. The Vice Chair is the Department’s Assistant Administrator for Fisheries.

ADMINISTRATIVE PROVISIONS

1. The Committee will report to the Secretary through the Assistant Administrator for Fisheries and the Under Secretary of Commerce for Oceans and Atmosphere.

2. The Designated Federal Officer will be assigned by the Assistant Administrator for Fisheries.

3. The Committee will meet at least twice a year, at the call of the Chairperson or Vice Chair.

4. NOAA’s NMFS will provide staff support for the Committee.

5. The Committee may establish subcommittees or working groups of its members as necessary, subject to the provision of the Department of Commerce Committee Management Handbook (Part Two, Chapter Two, Section F).

6. The Committee may establish task forces consisting of MAFAC members and

outside experts as may be necessary, subject to the provisions of the Department of Commerce Committee Management Handbook.

7. The annual cost of operating the Committee is estimated at \$250,000. This includes one person-year for staff support plus estimated travel costs for two full committee meetings and for one subcommittee or special working group meeting, as necessary.

8. Members of the Committee are not compensated for their services, but will upon request be allowed travel and per diem expenses as authorized by 5 U.S.C. 5701 et. seq.

DURATION

This Charter shall terminate two years from the date of the filing of this charter with the appropriate U.S. Senate and House of Representatives Oversight Committees unless earlier terminated or renewed by proper authority.

Original signed by Otto J. Wolff
U.S. Department of Commerce
Chief Financial Officer and
Assistant Secretary for Administration
Dated: January 22, 2008

**MARINE FISHERIES ADVISORY COMMITTEE MEMBERSHIP
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE**

Revised October 7, 2008

**Chair: Vice Adm. Conrad C. Lautenbacher, Jr., Under Secretary for Oceans
and Atmosphere**

**Vice Chair: Dr. James W. Balsiger, Acting Assistant Administrator for
Fisheries**

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MARINE FISHERIES ADVISORY COMMITTEE

STRUCTURE & SUBCOMMITTEES

LEADERSHIP

Chairman: Under Secretary for Oceans & Atmosphere, Dr. Bill Brennan, Acting

Vice Chair: Assistant Administrator for Fisheries, Dr. James W. Balsiger, Acting
Acting Assistant Administrator for Fisheries

Committee Liaison: Tom J. Billy, MAFAC (2nd Term January 2008 - 2011)

The Committee Liaison assists the Vice Chair and Executive Director in facilitating communication with the Full Committee, tasking members and subcommittees, tracking follow-up items, agenda formulation and provide signatory authority for documents and communications from the Full Committee. The Committee Liaison assists with managing the meetings, particularly during times when the Vice Chair must be absent. The Committee Liaison serves as the Chair of the Executive Subcommittee.

Executive Director: Mark Holliday, Designated Federal Official, NOAA Fisheries Service The Executive Director serves as the primary coordinator and liaison for MAFAC official activities and communications with NOAA and the Department of Commerce.

STRUCTURE

An Executive and four Standing Subcommittees comprise the structure of MAFAC. The purpose of these Subcommittees is to maximize the talents and time of the full Committee members by providing initial research and development of an issue for full Committee consideration, discussion and action.

Executive Subcommittee: The Executive Subcommittee is comprised of the four Subcommittee Chairs and the Committee Liaison who serves as the Executive Subcommittee Chair. The Committee Vice Chair and Executive Director also serve on the Executive Subcommittee. This Committee assists with agenda development, assignments and administrative issues for Committee business.

Strategic Planning, Budget and Program Management: This Subcommittee reviews and advises on strategic planning elements relevant to the agency's mission and performance, budget operations and priorities, and reviews and provide input on the status of existing management programs within NOAA Fisheries Service, particularly as they relate to the implementation of the Magnuson-Stevens Fishery Conservation and Management Act, managing recreational fisheries, and implementing the President's

Ocean Action Plan.

Members:

- Chris Dorsett
- Jim Gilmore (Chair)
- Dorothy Lowman
- Tom Raftican
- Eric Schwaab

Commerce Subcommittee: This Subcommittee is devoted to reviewing and advising on emergent social-economic issues such as off shore aquaculture, seafood technology and consumer interests.

Members:

- Tom Billy (Chair)
- Bill Dewey
- Bob Fletcher
- Steve Joner
- Heather McCarty

Protected Resources Subcommittee: This Subcommittee reviews and advises protected species programs operating under the Marine Mammal Protection Act and the Endangered Species Act.

Members:

- Bob Fletcher (Chair)
- Catherine Foy
- Jim Gilmore

Ecosystem Approach Subcommittee: This Subcommittee is devoted to providing a format for reviewing programs and initiatives involved with the development and implementation of ecosystem approaches to fisheries management.

Members:

- Chris Dorsett - (Chair)
- Catherine Foy
- Steve Joner
- Dorothy Lowman
- Heather McCarty
- Tom Raftican
- Eric Schwaab

Subcommittee Membership Assignments & Rules

Members may serve on more than one Subcommittee or working group without term limits and based upon their interest and request to participate.

MAFAC WEBSITES AND LOG-ON INFORMATION

Two different websites service MAFAC:

(1) PUBLIC website

The public website can be accessed by any person. It contains (1) basic information such as the Charter, membership, and structure etc; and (2) information that is required by the Federal Advisory Committee Act and the MAFAC Charter such as all meeting agendas, meeting summaries, meeting documents and full transcripts of each meeting.

<http://www.nmfs.noaa.gov/ocs/mafac/>

(2) MEMBERS ONLY website

The Members Only website contains more limited information for Members-only use such as financial disclosure, ethics, and travel reimbursement forms.

You can reach the Members Only site through this link:

<https://nurseshark.nmfs.noaa.gov/mafacdocs/>

or you can reach it directly from the Public Site.

Either pathway to the members-only site will requires the following log-on information (case sensitive):

USER NAME: mafac

PASSWORD: FishHeads

NOAA Fisheries
MAFAC

- [MAFAC Home](#)
- [Charter](#)
- [Membership](#)
- [Subcommittees](#)
- [Recreational Fisheries Working Group](#)

Marine Fisheries Advisory Committee

Marine Fisheries Advisory Committee

Next Meeting:

**November 12-14,
2008
New Orleans, LA**

[Members' Area](#)

Meeting Summaries

[July 2008](#)

New York, New York

[December 2007](#)

St. Pete Beach, Florida

[June 2007](#)

Washington, D.C.

[July 2006](#)

Seattle, Washington

[February 2006](#)

Dania Beach, Florida

[June 2005](#)

Washington, DC

[January 2005](#)

Honolulu, Hawaii

[August 2004](#)

Juneau, Alaska

[December 2003](#)

New York, New York

[May 2003](#)

San Diego, California

[January 2003](#)

Washington, D.C.

[May 2002](#)

Portland, Maine

[November 2001](#)

U.S. Virgin Islands

[April 2001](#)

The **Marine Fisheries Advisory Committee (MAFAC)** advises the Secretary of Commerce on all living marine resource matters that are the responsibility of the Department of Commerce. MAFAC members will draw on their expertise and other appropriate sources, such as the National Marine Fisheries Service, to evaluate and recommend priorities and needed changes in national programs which includes the ongoing reauthorization of the Magnuson-Stevens, the Endangered Species and the Marine Mammal Protection Acts. The members represent a wide spectrum of fisheries interests, environmental, academic, state, tribal, consumer and other related national interests.

The committee functions solely as an advisory body (complying fully with the Federal Advisory Committee Act) who reports to the Secretary. The Under Secretary for Oceans and Atmosphere is the designated chair of the Committee.

For more information contact:

[Executive Director, MAFAC](#)

MAFAC Releases [Vision 2020](#)

In response to a request from the Director of NOAA Fisheries, MAFAC has released a report on the desired future state of U.S. marine fisheries. This report describes current trends and their impacts on marine fisheries, gives MAFAC's findings based on those trends, and details recommendations regarding fulfillment of

MAFAC's vision of the future of marine fisheries.

Orange Beach, Alabama

[November 2000](#)

East Elmhurst, New York

[April 2000](#)

Charleston, South Carolina

[October 1999](#)

Washington, D.C

[March 1999](#)

La Jolla, California

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NOAA
logo

Depart
of

NOAA FISHERIES: MAFAC Members Area

MAFAC Meeting

[Charter](#) | [Members](#) | [Subcommittee](#)

Next Meeting
December 18-20, 2007
St. Pete Beach, Florida
Agenda Pending

- [CAMS](#)
- [Financial Disclosure](#)
- [Certification of Status](#)
- [Ethics Summary](#)
- [Agenda](#)
- [Travel Guidelines](#)





TRAVELING FOR THE GOVERNMENT



REGULATIONS

- Travel regulations for NOAA are based primarily upon the Federal Travel Regulations (FTR)

<http://www.gsa.gov/Portal/gsa/ep/channelView.do?pageTypeId=8199&channelPage=%2Fep%2Fchannel%2FgsaOverview.jsp&channelId=-14863>

- Travel regulations and information may also be found at the NOAA Travel website:

<http://www.ofa.noaa.gov/~finance/travel.html>

TRAVEL BASICS part 1

- YOU ARE INVITED
- YOU CONTACT **ADTRAV** at: (301) 713-2407 or Fax: (205) 949-4217 or E-Mail: NOAAOnSite@adtrav.com for your travel needs (common carrier, hotel, rental car if authorized).
- **IMPORTANT: NO other travel or airline agent may be used.**
- ADTRAV FORWARDS YOUR ITINERARY TO THE INVITING OFFICE
- A TRAVEL AUTHORIZATION IS PREPARED AND FAXED TO ADTRAV, WHO ISSUES AN ELECTRONIC TICKET AND NOTIFIES YOU
- YOU ARE NOW READY TO TRAVEL

TRAVEL BASICS part 2

- RETURN FROM TRAVEL; WITHIN 5 DAYS:
- FORWARD A SUMMARY OF YOUR TRAVEL COSTS AND YOUR RECEIPTS TO NMFS HQ
 - Original receipts, keep copy
 - Not needed for food, full or $\frac{3}{4}$ day per diem
- TRAVEL VOUCHER IS PREPARED FOR YOUR SIGNATURE; YOU SIGN THE VOUCHER AND RETURN TO NMFS HQ
- WE FORWARD VOUCHER TO NOAA FINANCE OFFICE
- YOU ARE COMPENSATED BY DIRECT DEPOSIT
- TRAVEL IS COMPLETE

YOUR RESPONSIBILITIES

- KNOW THE REGULATIONS
- MAKE YOUR TRAVEL ARRANGEMENTS **ONLY** THROUGH **ADTRAV**
- **DO NOT USE YOUR CREDIT CARD TO PURCHASE TICKETS!**
- OBTAIN TRAVEL AUTHORIZATION PRIOR TO TRAVELING.
- SUBMIT SIGNED VOUCHERS AND RECEIPTS FOR REIMBURSEMENT OF TRAVEL EXPENSES.
- THE GOVERNMENT WILL **NOT** REIMBURSE FOR EXPENSES OVER THE LIMITS SET BY THE REGULATIONS.

DID YOU KNOW???

- ◆ THE GOVERNMENT IS CHARGED A SERVICE FEE FOR EACH TICKET ISSUED WHETHER IT'S USED OR NOT.
- ◆ THE CURRENT RATE FOR PRIVATELY OWNED VEHICLE (POV) MILES IS 58.5 CENTS PER MILE.
- ◆ RENTAL CAR AND TRAVEL ADVANCES ARE ALLOWED ONLY IF THE INVITING OFFICE AUTHORIZES.

DID YOU KNOW???(CON'T)

- ◆ TO BE FULLY REIMBURSED WITHOUT DELAY, SUBMIT ALL YOUR RECEIPTS WITHIN 5 DAYS.
- ◆ PLEASE REMEMBER TO UPDATE YOUR *DIRECT DEPOSIT* FORM IF YOU CHANGE BANKS

SUMMARY



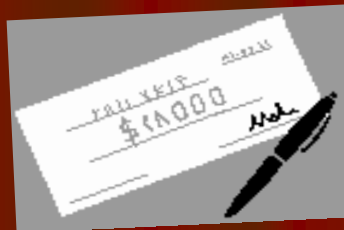
We call you.



You call ADTRAV.



You travel.



We pay.

THE END.....

MAIN POINTS TO REMEMBER

- **ONLY USE ADTRAV**
- ***DIRECT DEPOSIT FORM***: Needs to be kept updated for correct direct deposit.
- **ANY QUESTIONS OR CONCERNS**: Contact Mark Holliday at (301) 713-2239 x-120; Angela Proctor at (301) 713-2239 x-106
- **TRAVEL REGULATIONS AND INFORMATION**:
<http://www.ofa.noaa.gov/~finance/travel.html>

TRAVEL REIMBURSEMENT REQUEST FORM		
National Marine Fisheries Service MAFAC Attn: Angela Proctor 1315 East West Highway, # 14603 Silver Spring, MD 20910	Traveler Name and Mailing Address: (if different than on Authorization.)	Travel Dates:

PRIVATELY OWNED VEHICLE (POV) (\$0.585 per mile)

DATE:	FROM:	TO:	NO.OF MILES

PARKING (Please provide receipt) **AMOUNT:** _____

LOCAL TRANSPORTATION (TAXI, SHUTTLE) (Please provide receipt if available)

DATE:	FROM:	TO:	FARE:

LODGING (PLEASE PROVIDE RECEIPT)

AIRLINE, ETC. (RECEIPT NEEDED)

DATE(S):	AMOUNT:

(ALL ARRANGEMENTS MUST BE MADE THROUGH ADTRAV)

RENTAL CAR (PLEASE PROVIDE RECEIPT)

AMOUNT

NOT AUTHORIZED

PHONE CALLS, TOLLS, MISC. (PLEASE PROVIDE RECEIPTS if available)

DATE(s):	DESCRIPTION:	AMOUNT:

PLEASE ATTACH ADDITION EXPLANATION OF ANY EXPENSES NOT INDICATED ABOVE

I certify that this reimbursement form is true to the best of my knowledge and that I am entitled to the claimed expenses. I also certify that the expenses claimed were essential to carrying out official business and do not include items of a personal nature.
 Traveler Signature: _____ Date: _____

NOTE: The first and last days of travel are automatically charged at ¾ of per diem for meals and incidentals, regardless of departure and arrival times. Personal nature items are rental of movies, room service, personal long distance over \$6.00 per day, and other personal amenities.



SUMMARY OF ETHICS RULES FOR SPECIAL GOVERNMENT EMPLOYEES

**UNITED STATES DEPARTMENT OF COMMERCE
2007**



**ETHICS LAW AND PROGRAMS DIVISION
OFFICE OF THE ASSISTANT GENERAL COUNSEL FOR ADMINISTRATION
UNITED STATES DEPARTMENT OF COMMERCE
202-482-5384 – ethicsdivision@doc.gov – www.ogc.doc.gov/ethics.html**

PUBLIC SERVICE IS A PUBLIC TRUST

The role of consultants and advisors and other limited-service employees is vital to the effective functioning of the Federal Government. All employees are held to a high standard of conduct. As an employee who serves less than 130 days per year, you are considered a “special Government employee” and are subject to many, but not all, of the ethics rules applicable to Government employees who serve for longer periods of time. This document is intended to help familiarize you with those rules.

If you have a question regarding an ethics issue, contact the Ethics Law and Programs Division of the Office of the Assistant General Counsel for Administration at 202-482-5384 or ethicsdivision@doc.gov.

Designated Agency Ethics Official:
John J. Sullivan, General Counsel

Alternate Designated Agency Ethics Official:
Barbara S. Fredericks, Assistant General Counsel for Administration

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FINANCIAL CONFLICTS OF INTEREST

Basic Principle: No Self-Dealing

One of the most basic of the conflict of interest rules concerns self-dealing. To ensure public confidence in the integrity of the Government and its employees, a conflict of interest statute prohibits you from working as a special Government employee on a matter affecting your personal financial interests (or the interests of those close to you). Participating in such a matter would create a conflict of interest between your personal interests and your duty to the Government.

General Rule. You may not participate as a Government official on a matter that will have a direct and predictable effect on your financial interests or those of your spouse, minor children, or general partners; persons with whom you are seeking employment; organizations for which you serve as an officer, director, trustee, general partner, or employee; or, with regard to a matter involving specific parties, a member of your household (unless an exemption applies or you receive a conflict of interest waiver).

Exemptions from the General Rule. Exemptions permit you to participate in matters affecting a financial interest if the financial interest is:

- a holding in a diversified mutual fund;
- a holding in an industry sector-specific mutual fund or geographic sector-specific mutual fund valued at \$50,000 or less (if all interests in sector-specific funds that concentrate investments in the same sector total \$50,000 or less);
- a publicly-traded stock or bond holding of \$15,000 or less in a company if the company is a party to a matter (or \$25,000 or less if the company is not a party to a matter) with regard to a specific-party matter; or
- a publicly-traded stock or bond holding of \$25,000 or less in a company with regard to broad policy matters (if total holdings in the industry or group affected by the matter are \$50,000 or less);
- one for which you have received a conflict of interest waiver; or
- if you are a Federal Advisory Committee member, one arising from your non-Federal employment and the matter at issue is a general policy matter affecting that interest as part of a class.

Conflict of Interest Waivers. The Department often issues waivers for interests reported by members of Federal Advisory Committees on their financial disclosure reports. To obtain a conflict of interest waiver, contact the Ethics Law and Programs Division at 202-482-5384.

APPEARANCES OF BIAS (NON-FINANCIAL CONFLICTS OF INTEREST)

Basic Principle: No Special Favors

Because the public must have confidence in the Government and the impartiality of its employees, it is important that you avoid situations that may give rise to an appearance of a conflict of interest based on your personal relationships. There may be a matter on which you are asked to work that will not create an actual financial conflict of interest, but may, because the matter involves someone with whom you have close ties, create an appearance of favoritism or loss of objectivity.

General Rule. You may not participate in a matter involving specific parties if a person with whom you have close ties (a “covered relationship”) is a party or is representing a party in the matter and if your participation would create an appearance of loss of impartiality (unless you receive specific authorization to participate in the matter). Persons with whom you have a “covered relationship” include:

- persons with whom you have business or financial relationships or are seeking such relationships (other than routine consumer transactions);
- household members;
- close relatives;
- employers and clients of your parents, dependent children, and spouse (and their prospective employers and clients);
- former non-Federal employers and clients (for one or two years depending on the amount of any severance payment); and
- organizations (other than political parties) in which you are an active participant.

Exception to the General Rule. You may be able to work on a matter in which someone with whom you have a covered relationship is a party or represents a party if the interest of the Government in your participation outweighs a concern that someone may question the integrity of the Department’s programs and operations. However, before you participate in such a matter you must receive authorization to do so. Contact the Ethics Law and Programs Division at 202-482-5384 to obtain an authorization if such a situation arises.

BRIBES AND GIFTS

Basic Principle: Avoid Undue Influence

The United States Government, like all governments, recognizes that the acceptance of bribes is one of the most basic forms of corruption. Similarly, gratuities from persons with matters before the Government may create an appearance of undue influence on Government employees.

General Rule concerning Bribes. You may not receive anything of value for taking action or failing to take action in your Government position.

General Rules concerning Personal Gifts. You may not accept gifts from a person or firm that has or is seeking business with the Department of Commerce, that is seeking action by Commerce, or that is regulated by the Department, unless an exception applies. You also may not accept gifts that are given to you because of your Government position, unless an exception applies.

Exceptions to the General Rules concerning Personal Gifts. You may accept:

- gifts of \$20 or less (other than cash) (up to \$50 per year from the same source);
- gifts from relatives and friends (if based on a personal relationship);
- gifts of meals, lodging, and travel based on your outside business or employment relationships or those of your spouse;
- awards and honorary degrees (in specified circumstances);
- invitations to widely-attended events (if from the host (generally) and if your Government supervisor approves your attendance as in the Department's interest);
- business meals overseas, if a foreign citizen or representative of a foreign entity is present (up to the *per diem* of the city); and
- gifts from a foreign government of \$305 or less—gifts of over \$305 may be accepted, but become property of the United States Government.

NON-GOVERNMENT ACTIVITIES

Basic Principle: Avoid Divided Loyalties

As a special Government employee, you are likely to have employment other than your U.S. Government employment. It is important that you consider whether such non-Federal employment, or other personal activities, conflict with your position with the Government.

General Rule regarding Non-Federal Employment. You may not engage in non-Federal employment that conflicts with your Government duties. An activity may create a conflict if it is barred by law (such as employment with a foreign government) or if it requires your disqualification from assignments critical to the performance of your Federal duties.

Working for a Foreign Government. The U.S. Constitution bars you from working for, or accepting any compensation, including salary or travel expenses, from, a foreign government, unless authorized by statute (unless your only position with the Federal Government is as a member of a Federal advisory committee).

General Rule regarding Political Activities. The rules on political activities are intended to allow you to actively participate in the political process, but also to ensure that Government activities and political activities are not intermingled. You may not engage in political activities during Government duty hours or while on Government premises. You are also barred from using Government resources (including your Government affiliation) for a partisan political purpose or to aid a political campaign or organization. You may engage in partisan political activities during non-duty hours, even on days in which you are providing services to the Government.

Service as an Expert Witness. Unless you receive prior authorization, you may not serve as an expert witness in any case involving the United States Government if you participated as a Government employee in the matter that is the subject of the proceeding. Additionally, if you served for more than 60 days during the previous year, or on a commission established by statute, you may not serve as either a fact or an expert witness in a proceeding before a Federal court or Federal agency if the Department of Commerce is a party or has a direct and substantial interest in the matter, unless you receive prior authorization.

LOBBYING THE FEDERAL GOVERNMENT

Basic Principle: Avoid Divided Loyalties

As a Federal employee, you are subject to some restrictions on your dealings with Federal agencies and Federal courts; this is to avoid any appearance that you will have an undue influence on other Federal officials.

General Rules on Lobbying the Government. Because you are considered a Federal official, you are subject to some limitations regarding contacts with other Federal officials to influence Government actions on behalf of others. The restrictions differ depending on how many days you provided services to the Government during the previous year.

If you served for 61-130 days during the previous year, you generally may not serve as an agent or attorney or otherwise represent anyone before a Federal agency or Federal court in any matter involving specific parties in which the United States is a party or has a substantial interest if:

- you participated personally and substantially in the matter as a Government official, or
- the matter is pending before the Department of Commerce.

If you served for 60 days or less, you generally may not serve as an agent or attorney or otherwise represent anyone before a Federal agency or Federal court in any matter involving specific parties in which the United States is a party or has a substantial interest if:

- you participated personally and substantially in the matter as a Government official.

Receipt of Compensation based on the Lobbying Activities of Others. In addition to being restricted from representing others before the Federal Government, you are also barred from accepting compensation for the representational activities of others before the United States Government regarding a matter involving specific parties in which you participated personally and substantially or, if you served for 61-130 days, on a matter pending before the Department during your period of service.

Restrictions on Serving as a Foreign Government Agent or Lobbyist. A Federal official may not perform services on behalf of a foreign government that will require the official to register under the Foreign Agents Registration Act or Lobbying Disclosure Act. If you are required to register under either statute, you should call either the Ethics Law and Programs Division at 202-482-5384 or the General Law Division at 202-482-5393 for advice.

MISUSE OF GOVERNMENT RESOURCES

Basic Principle: Do Not Steal

It is important to limit the use of taxpayer-funded resources to activities that benefit the public rather than the individual employee.

General Rules. You may only use Government equipment, supplies, services, and personnel for authorized Government activities. Furthermore, your Government title may not be used in connection with private, non-Government activities. You must avoid circumstances that may imply that the Government endorses a particular private activity with which you are associated. Therefore, it would be improper for you to refer to your Government title or position when conducting personal business. You may not use nonpublic trade data, economic analyses, private personnel information, protected census data, national security information, or other nonpublic information for your private activities or for the benefit of someone else. You also may not use your Government authority, including business contacts obtained through Federal employment, for personal non-official activities.

Exceptions to the General Rules regarding Use of Your Title and Frequent Flier Benefits. You may use your Government title in connection with personal activities as part of general biographical data if it is given no more prominence than other significant biographical details. Regarding frequent flier benefits, you may use frequent flier miles and other benefits obtained from Government travel for personal purposes, including personal travel or upgrades on Government travel.

RESTRICTIONS AFTER LEAVING FEDERAL EMPLOYMENT

Basic Principle: Avoid Misuse of a Prior Relationship

After leaving Federal service you will continue to be subject to some restrictions on your activities, particularly with regard to lobbying the Government and using nonpublic information.

General Rules. After you leave Federal service you may not represent others before a Federal agency or Federal court concerning a specific-party matter on which you worked personally as a special Government employee. Similarly, for two years after leaving Federal service you may not represent others before a Federal agency or Federal court concerning a specific-party matter that was under your official responsibility as a special Government employee during your last year of Federal service. Furthermore, you may not use or disclose nonpublic information you obtained through your Federal service.

If you served in a senior employee position (are paid the equivalent of \$145,320 or more per year), you will also be subject to a “no-contact” rule that will bar you from making any contacts with the agency in which you served for one year, if the contact is made on behalf of someone else with the intent to influence Government action. If you served in such a senior position you will also be subject to a one-year bar on advising and representing foreign governments and foreign political parties.

Exceptions. There are exceptions to some post-employment rules, including exceptions for contacts made on behalf of a state or local government, educational institution, international organization, or medical institution; as well as for testimony provided under oath. You should seek further advice on the application of such exceptions.

Seeking Non-Federal Employment. Please note that during a period you are in employment negotiations with a non-Federal Government entity you may not participate as a Federal official on any matter in which the prospective employer has a financial interest. This disqualification begins when you first contact a prospective employer or are contacted by one and continues until you or the prospective employer notifies the other of a lack of interest in pursuing the matter.

Contact the Ethics Law and Programs Division of the Office of the General Counsel at 202-482-5384 for a handout and additional guidance regarding post-employment restrictions.

FINANCIAL DISCLOSURE

Basic Principle: Tell the Whole Truth

Basic Guidelines. As a special Government employee you will be required to file a financial disclosure report. Please keep in mind that the information you disclose is used to provide advice to you to help ensure that you do not inadvertently engage in prohibited activities. To provide this advice (and to certify that the report includes all necessary information) it is important that the information you provide be as complete as possible. Specifically, please be sure to include the following information:

- the full name of any mutual fund (not just the generic name of the company managing the fund);
- specific holdings in any IRA, 401(k) account, trust, or investment account;
- a short description of the activities or industry sector of any privately-held company or limited partnership; and
- assets and sources of income of your spouse.

**For more information about any of these rules contact the
Ethics Division of the Office of the General Counsel,
United States Department of Commerce, at 202-482-5384.**

EXAMPLES

NO PROBLEM

1. An advisory committee member who advises on regulations that will affect all domestic telephone companies has \$30,000 worth of stock in a telecommunications company, which is included in a conflict of interest waiver.
2. A 90-day temporary employee who has \$60,000 of holdings in a broadly-diversified mutual fund that has investments in oil and gas companies reviews a proposed oil spill regulation.
3. A consultant works on a grant application from a company for which he worked three years ago.
4. A special Government employee makes telephone calls on behalf of a candidate in a partisan election during non-duty hours from her home on a personal cellular telephone.
5. An advisory committee member (who serves for less than 60 days) contacts a Commerce employee on behalf of a neighbor concerning a grant unrelated to the committee's work.
6. An advisory committee member uses a Commerce-produced publicly-available marketing study to target potential customers for his private business.

PROBLEM

1. An advisory committee member who advises on regulations that will affect all domestic telephone companies has \$30,000 worth of stock in a telecommunications company and no conflict of interest waiver.
2. A 90-day temporary employee who has \$60,000 of holdings in a sector-specific mutual fund that focuses investments in oil and gas companies reviews a proposed oil spill regulation.
3. A consultant works on a grant application from a company for which he worked three months ago.
4. A special Government employee makes telephone calls on behalf of a candidate in a partisan election during non-duty hours from her Government office on a personal cellular telephone.
5. An advisory committee member (who serves for more than 60 days) contacts a Commerce employee on behalf of a neighbor concerning a grant unrelated to the committee's work.
6. An advisory committee member uses a Commerce-produced non-public marketing study to target potential customers for his private business.

CITATIONS TO APPLICABLE LAW

Financial Conflicts of Interest

18 United States Code (U.S.C.) § 208
5 Code of Federal Regulations (C.F.R.) §§ 2635.401-2635.403, 2635.502,
2640.201-2640.202

Appearances of Bias based on Outside Relationships

5 C.F.R. §§ 2635.501-2635.503

Bribes and Gifts

5 U.S.C. §§ 7342, 7351, and 7353
15 U.S.C. § 1522
18 U.S.C. § 201
5 C.F.R. §§ 2635.201-2635.205, 2635.301-2635-304

Non-Government Activities and Lobbying the Federal Government

5 U.S.C. §§ 7321-7326; 18 U.S.C. §§ 203, 205, and 208
5 C.F.R. §§ 734.201-734.702, 2635.801-2635.809

Misuse of Government Position and Resources

18 U.S.C. § 641
5 C.F.R. §§ 2635.701-2635.705

Post-Federal Employment Restrictions

18 U.S.C. § 207
5 C.F.R. Parts 2635, 2637, and 2641
15 C.F.R. §§ 15.11-15.18

Prepared by the Ethics Law and Programs Division, Office of the Assistant General Counsel for Administration, U.S. Department of Commerce – September 12, 2007

CONFIDENTIAL FINANCIAL DISCLOSURE REPORT

Executive Branch

- Why Must I File?** The duties and responsibilities of your position require you to file the Confidential Financial Disclosure Report to avoid involvement in a real or apparent conflict of interest. The purpose of this report is to assist employees and their agencies in avoiding conflicts between official duties and private financial interests or affiliations. The information you provide will only be used for legitimate purposes, and will not be disclosed to any requesting person unless authorized by law. (See the Privacy Act Statement at the bottom of this page.) Please ensure that the information you provide is complete and accurate.
- When Must I File?** **New Entrants:** The report is due within 30 days of your assuming a position designated for filing, unless your agency requests the report earlier or your agency grants you a filing extension. **Annual Filers:** The report is due no later than February 15, unless your agency grants you a filing extension.
- What is the Reporting Period?** **New Entrants:** Report the required information for the 12 months preceding your filing of this form. **Annual Filers:** Report the required information for the preceding calendar year (January 1 – December 31).
- What if I Have Questions?** If you have any questions about how to complete this form, please contact your ethics official or go to the Office of Government Ethics web site at www.usoge.gov and click on **OGE 450 FAQs**.

PENALTIES

Falsification of information or failure to file or report information required to be reported may subject you to disciplinary action by your employing agency or other authority. Knowing and willful falsification of information required to be reported may also subject you to criminal prosecution.

Privacy Act Statement

Title I of the Ethics in Government Act of 1978 (5 U.S.C. App.), Executive Order 12674 (as modified by Executive Order 12731), and 5 CFR Part 2634, Subpart I, of the Office of Government Ethics regulations require the reporting of this information. The primary use of the information on this form is for review by Government officials of your agency, to determine compliance with applicable Federal conflict of interest laws and regulations. Additional disclosures of the information on this report may be made: (1) to a Federal, State, or local law enforcement agency if the disclosing agency becomes aware of a violation or potential violation of law or regulation; (2) to a court or party in a court or Federal administrative proceeding if the Government is a party or in order to comply with a judge-issued subpoena; (3) to a source when necessary to obtain information relevant to a conflict of interest investigation or decision; (4) to the National Archives and Records Administration or the General Services Administration in records management inspections; (5) to the Office of Management and Budget during legislative coordination on private relief legislation; (6) to the Department of Justice or in certain legal proceedings when the disclosing agency, and employee of the disclosing agency, or the United States is a party to litigation or has an interest in the litigation and the use of such records is deemed relevant and necessary to the litigation; (7) to reviewing officials in a new office, department or agency when an employee transfers from one covered position to another, (8) to a Member of Congress or a congressional office in response to an inquiry made on behalf of an individual who is the subject of the record, and (9) to contractors and other non-Government employees working for the Federal Government to accomplish a function related to an OGE Governmentwide system of records. This confidential report will not be disclosed to any requesting person unless authorized by law. See also the OGE/GOVT-2 executive branchwide Privacy Act system of records.

Public Burden Information

It is estimated that completing this form, including reviewing the instructions and gathering the data needed, takes an average of one hour. No person is required to respond to a collection of information unless it displays a currently valid OMB control number as printed in the top right-hand corner of the first page of this form. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to: Deputy Director for Administration and Information Management, U.S. Office of Government Ethics, Suite 500, 1201 New York Avenue, NW, Washington, DC 20005-3917. Do not send your completed OGE Form 450 to this address.

Date Received by Agency

Page Number

CONFIDENTIAL FINANCIAL DISCLOSURE REPORT

Executive Branch

Employee's Name (Print last, first, middle initial)		E-mail Address	
Position/Title			Grade
Agency		Branch/Unit and Address	
Work Phone	Reporting Status New Entrant <input type="checkbox"/> Annual <input type="checkbox"/>	If New Entrant, Date of Appointment to Position (mm/dd/yy)	
Check box if Special Government Employee (SGE) <input type="checkbox"/>	An SGE is an executive branch officer or employee who is retained, designated, appointed, or employed to perform temporary duties either on a full-time or intermittent basis, with or without compensation, for a period not to exceed 130 days during any consecutive 365-day period.		
If an SGE, Mailing Address (Number, Street, City, State, ZIP Code)			

Step 1: Read the instructions for Parts I through V on the following pages.

Step 2: For each statement below, check Yes or No to describe your situation.

I. I have reportable assets or sources of income for myself, my spouse, or my dependent children.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
II. I have reportable liabilities (debts) for myself, my spouse, or my dependent children.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
III. I have reportable outside positions for myself.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
IV. I have reportable agreements or arrangements for myself.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
NOTE: Statement V is for <u>annual</u> filers only. It does not apply to new entrants and SGEs.		
V. I have reportable gifts or travel reimbursements for myself, my spouse, or my dependent children.	Yes <input type="checkbox"/>	No <input type="checkbox"/>

Step 3: If you selected Yes for any statement, you must describe the reportable interests that you have in the corresponding Part (I, II, III, IV, or V) of the form.

Step 4: Sign and date the form.

Step 5: Submit the completed form to your ethics office.

I certify that the statements I have made on this form and all attached statements are true, complete, and correct to the best of my knowledge.

Signature of Employee	Date (mm/dd/yy)
------------------------------	------------------------

FOR REVIEWERS' USE ONLY:

On the basis of information contained in this report, I conclude that the filer is in compliance with applicable laws and regulations, except as noted in the "comments" box below.	
Signature and Title of Supervisor/Other Intermediate Reviewer (if required by the agency)	Date (mm/dd/yy)
E-mail Address	Phone Number
Signature and Title of Agency's Final Reviewing Official	Date (mm/dd/yy)
Comments of Reviewing Officials	
(Check box if continued on additional page <input type="checkbox"/>)	

Employee's Name (Print last, first, middle initial)	Page Number
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Part I: Assets and Income

<p>Report for Yourself, Spouse, and Dependent Child:</p> <ul style="list-style-type: none"> • Assets held for investment with a value greater than \$1,000 at the end of the reporting period OR assets held for investment which produced more than \$200 in income during the reporting period, including but not limited to: <ul style="list-style-type: none"> - Assets such as stocks, bonds, annuities, trust holdings, partnership interests, life insurance, investment real estate, or a privately-held trade or business - Sector mutual funds: those funds invested in a particular industry, business, or location such as ABC Electronics Fund or XYZ Canada Fund (report the <u>full</u> name of the fund, not just the general family fund name) - Holdings of retirement plans, such as 401(k)s or IRAs (list each holding except diversified mutual funds) - Holdings of investment life insurance - Holdings of variable annuities - Defined benefit pension plans provided by a former employer (include the name of the employer) 	<p>Do Not Report:</p> <ul style="list-style-type: none"> • Federal Government retirement benefits • Thrift Savings Plan • Certificates of deposit, savings or checking accounts • Term life insurance • Money market mutual funds and money market accounts • Your personal residence, unless you rent it out • Diversified mutual funds, such as ABC Equity Value Fund or XYZ Large Capital Fund • U.S. Government Treasury bonds, bills, notes, and savings bonds • Money owed to you, your spouse, or dependent child by a spouse, parent, sibling, or child
<p>Also Report:</p> <ul style="list-style-type: none"> • <u>For yourself:</u> (1) all sources of salary, fees, commissions, and other earned income greater than \$200, (2) honoraria greater than \$200, and (3) other non-investment income such as scholarships, prizes, and gambling income greater than \$200 • <u>For your spouse:</u> (1) all sources of salary, fees, commissions, and other earned income greater than \$1,000, and (2) honoraria greater than \$200 	<p>Do Not Report:</p> <ul style="list-style-type: none"> • Dependent child's earned income • Veterans' benefits • Federal Government salary • Social Security benefits

Important Definitions

Diversified Mutual Fund – A mutual fund that does not have a stated policy of concentrating its investments in one industry, business, or single country other than the United States.
Sector Mutual Fund – A mutual fund that concentrates its investments in an industry, business, single country other than the United States, or bonds of a single state within the United States.
Dependent Child – A son, daughter, stepson or stepdaughter who is either unmarried and under age 21 and living in the filer's house, or considered dependent under the U.S. tax code.

Reportable Information – Go to the last page to see examples of how to report assets and income.

Specific stock, bond, sector mutual fund, type/location of real estate, etc. (Indicate the full name of each specific asset or investment. You may add the ticker symbol to the full name.) Name of Employer or Business; Source of Fees, Commissions, or Honoraria (Include brief description.) You may distinguish any entry for a family member by preceding it with S for spouse, DC for dependent child, or J for jointly held.	No longer held
1	<input type="checkbox"/>
2	<input type="checkbox"/>
3	<input type="checkbox"/>
4	<input type="checkbox"/>
5	<input type="checkbox"/>

Employee's Name (<i>Print last, first, middle initial</i>)	Page Number
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Part I: Assets and Income
Continuation Page

Specific stock, bond, sector mutual fund, type/location of real estate, etc. (<i>Indicate the full name of each specific asset or investment. You may add the ticker symbol to the full name.</i>) Name of Employer or Business; Source of Fees, Commissions, or Honoraria (<i>Include brief description.</i>) You may distinguish any entry for a family member by preceding it with S for spouse, DC for dependent child, or J for jointly held.	No longer held
1	<input type="checkbox"/>
2	<input type="checkbox"/>
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19	<input type="checkbox"/>
20	<input type="checkbox"/>

Employee's Name (<i>Print last, first, middle initial</i>)	Page Number
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Part II: Liabilities

Report for Yourself, Spouse, and Dependent Child:	Do Not Report:
<ul style="list-style-type: none"> A liability over \$10,000 owed at any time during the reporting period, other than a loan from a financial institution or business entity granted on terms made available to the general public A loan over \$10,000 from an individual, such as a friend or a business associate 	<ul style="list-style-type: none"> Any liability, such as a mortgage, a student loan, or a credit card account, from a financial institution or business entity granted on terms made available to the general public Loans secured by automobiles, household furniture, or appliances, unless the loan exceeds the purchase price of the item it secures Liabilities that you owe to your spouse or to the parent, sibling, or child of you, your spouse, or your dependent child

Reportable Information – Go to the last page to see examples of how to report liabilities.

Name of creditor (<i>include city and state where creditor is located</i>)	Type of liability (<i>personal loan, margin account, etc.</i>)
1	
2	

Part III: Outside Positions

Report for Yourself:	Do Not Report:
<ul style="list-style-type: none"> All positions outside the U.S. Government held at any time during the reporting period, whether or not you were compensated and whether or not you currently hold that position. Positions include an officer, director, employee, trustee, general partner, proprietor, representative, executor, or consultant of any of the following: <ul style="list-style-type: none"> Corporation, partnership, trust, or other business entity Non-profit or volunteer organization Educational institution 	<ul style="list-style-type: none"> Any position with a <ul style="list-style-type: none"> Religious entity Social entity Fraternal entity Political entity Any position held by your spouse or dependent child Any position that you hold as part of your official duties

Reportable Information – Go to the last page to see examples of how to report outside positions.

Organization (<i>include city and state where organization is located</i>)	Type of organization	Position	No longer held
1			<input type="checkbox"/>
2			<input type="checkbox"/>
3			<input type="checkbox"/>
4			<input type="checkbox"/>
5			<input type="checkbox"/>
6			<input type="checkbox"/>

Employee's Name (Print last, first, middle initial)	Page Number
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Part IV: Agreements or Arrangements

Report Your Agreements or Arrangements for:	Do Not Report:
<ul style="list-style-type: none"> Continuing participation in an employee pension or benefit plan maintained by a former employer A leave of absence Future employment, including date you accepted employment offer Continuation of payment by a former employer (including severance payments) 	<ul style="list-style-type: none"> Any agreement or arrangement related to your employment by the Federal Government Spouse's and dependent child's agreements or arrangements

Reportable Information – Go to the last page to see examples of how to report agreements and arrangements.

Entity with which you have an agreement or arrangement (include city and state where entity is located)	Terms of Agreement or Arrangement
1	
2	
3	
4	

Part V: Gifts and Travel Reimbursements

Fill out this part only if you are filing an Annual Report. If you are a new entrant or an SGE, skip this part.

Report for Yourself, Spouse, and Dependent Child:	Do Not Report:
<ul style="list-style-type: none"> Travel-related reimbursements (items such as lodging, transportation, and food) totaling more than \$305* from any one source during the reporting period; include where you traveled, the purpose, and date(s) of the trip Any other gifts totaling more than \$305* from any one source during the reporting period <p>*If you received more than one gift from one source:</p> <ol style="list-style-type: none"> Determine the value of each item you received from that source Ignore each item valued at \$122 or less Add the value of those items valued at more than \$122; if the total is more than \$305, then you must list those items on this form 	<ul style="list-style-type: none"> Anything received from relatives, the U.S. Government, D.C., state, or local governments Bequests and other forms of inheritance Gifts and travel reimbursements given to your agency in connection with your official travel Gifts of hospitality (food, lodging, entertainment) at the donor's residence or personal premises Anything received by your spouse or dependent child totally independent of their relationship to you

Reportable Information – Go to the last page to see examples of how to report gifts and travel reimbursements.

Source	Description
1	
2	
3	

EXAMPLES

Part I: Assets and Income

Specific stock, bond, sector mutual fund, type/location of real estate, etc. (Indicate the full name of each specific asset or investment. You may add the ticker symbol to the full name.) Name of Employer or Business; Source of Fees, Commissions, or Honoraria (Include brief description.) You may distinguish any entry for a family member by preceding it with S for spouse, DC for dependent child, or J for jointly held.	No longer held
XYZ Japan Fund (Example of sector mutual fund)	<input type="checkbox"/>
OGE Energy (Example of stock that produced more than \$200 in capital gains)	<input checked="" type="checkbox"/>
(S) OGC Communications (Example of stock held in a 401(k) plan)	<input type="checkbox"/>
ABC Healthcare Fund (Example of sector fund held in a variable annuity)	<input type="checkbox"/>
Rental Condo, Anchorage, AK (Example of investment real estate)	<input type="checkbox"/>
Bryggadune University – former employer	<input checked="" type="checkbox"/>
(S) Express Medical Clinic – employer	<input type="checkbox"/>
Association of Accountants – honoraria	<input type="checkbox"/>

Part II: Liabilities

Name of creditor (city and state)	Type of liability (personal loan, margin account, etc.)
John Jones (Denver, CO)	Personal loan from a friend
ANW Investment Company (San Francisco, CA)	Margin account

Part III: Outside Positions

Organization (city and state)	Type of organization	Position	No longer held
Bryggadune University (Memphis, TN)	Educational institution	Professor	<input checked="" type="checkbox"/>
ISK Family Trust (Boynton Beach, FL)	Family Trust	Trustee	<input type="checkbox"/>
Scenic Rivers Association (Nashville, TN)	Non-profit environmental organization	Member, Board of Directors	<input checked="" type="checkbox"/>

Part IV: Agreements or Arrangements

Entity with which you have an agreement or arrangement (include city and state where entity is located)	Terms of Agreement or Arrangement
Dee, Jones & Smith (San Diego, CA)	Will receive pension benefits (defined benefit plan) (Example of continuing participation in an employee pension or benefit plan by a former employer)
Hartford & Brown (San Diego, CA)	Employment agreement with Hartford & Brown. Starting work as attorney in July 2006. Entered into agreement in October 2005. (Example of agreement for future employment)

Part V: Gifts and Travel Reimbursements

Source	Description
Dee, Jones & Smith	Leather briefcase (Example of a gift totaling more than \$305 from one source)
CGH Culinary Institute	Airline ticket, hotel room, and meals incident to culinary seminar in Tokyo, Japan from May 1-5, 2006 (Example of travel reimbursement)

MEMORANDUM FOR: Mark Holliday
Marine Fisheries Advisory Committee

SUBJECT : Certification of Status Statement

I, _____,
(Name)

currently residing at _____
(Street Address)

(City) (State) (Zip)

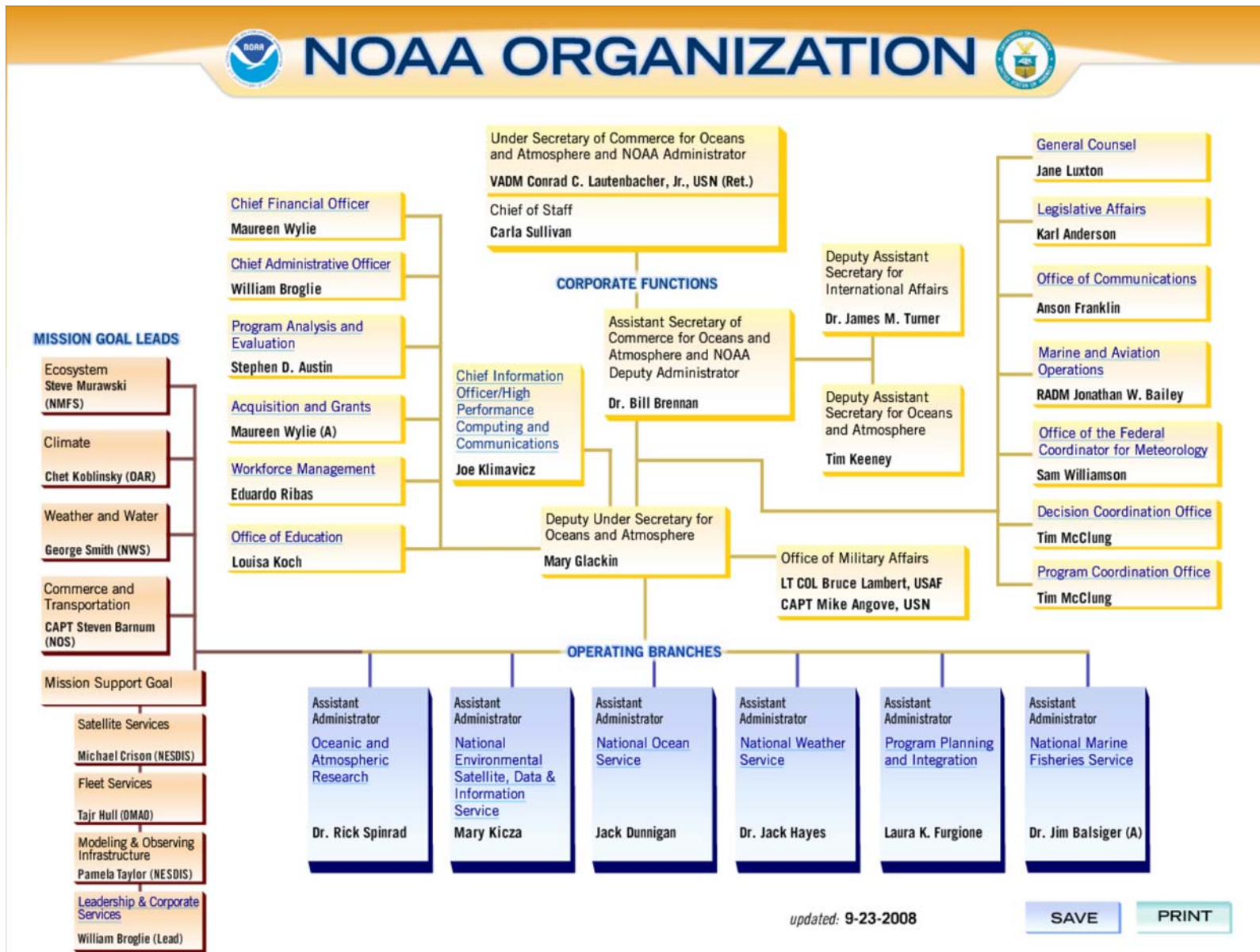
hereby certify the following:

1. I am not currently an agent of a foreign principal required to register pursuant to the Foreign Agents Registration Act of 1938, as amended (at 22 U.S.C. § 611, *et seq*); and
2. I am not currently a lobbyist required to register under the Lobbying Disclosure Act of 1995 in connection with the representation of a foreign entity (as defined in section 3(6) of that Act).

My signature below affirms that the information conveyed on this form is true, complete, and correct to the best of my knowledge and belief, and is made in good faith; and that I understand that knowing and willful false information on this form can be punished by fine or imprisonment or both.

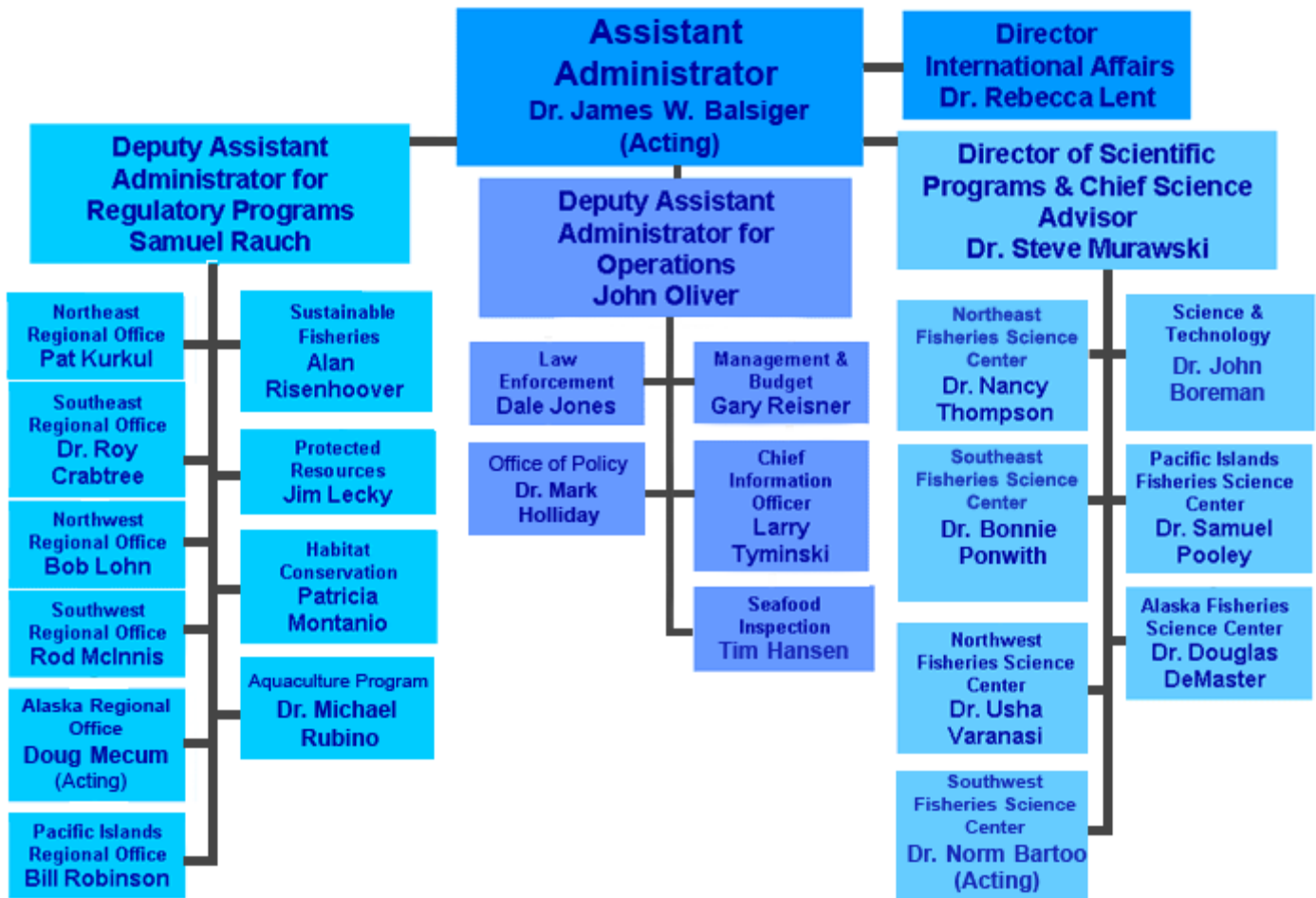
(Date)

(Signature)





NOAA FISHERIES: Organization Chart



Effective November 3rd, 2008



NOAA

National Oceanic & Atmospheric Administration Strategic Plan

FY 2009 – 2014





NOAA MISSION

To understand and predict changes in Earth's environment and conserve and manage coastal and marine resources to meet our nation's economic, social, and environmental needs

NOAA VISION

An informed society that uses a comprehensive understanding of the role of the oceans, coasts, and atmosphere in the global ecosystem to make the best social and economic decisions



*Conrad C Lautenbacher, Jr.
Vice Admiral, U.S. Navy (Ret.)
Under Secretary of Commerce
for Oceans and Atmosphere
U.S. Department of Commerce
Washington, DC*

LETTER FROM THE ADMINISTRATOR

Every day, NOAA supplies the nation with weather forecasts and nautical charts, conserves and manages marine species, restores and enables state and local partners to restore degraded coastal habitats, and conducts the research necessary to improve these and a host of other products and services.

NOAA's environmental information products and resource management services are essential public goods used in households across the nation; in sectors such as agriculture, transportation, and energy; in federal agencies such as EPA and FEMA; in state and local governments; and in science institutions around the world. NOAA strives to meet the needs of its constituents and partners by providing a suite of products and services that continues to improve in scientific and technical quality, economic value, and social relevance.

NOAA comprises the world's leading experts in Earth science, equipped with the world's most advanced technology for environmental observation and prediction, and is supported by a world-class workforce. NOAA employees and team members serve at facilities across the country and aboard ships and aircraft across the globe. Their efforts ensure NOAA's observing and modeling systems provide high-quality information for public use 24 hours a day, 7 days a week. Yet NOAA's success as an agency has always depended upon interaction and integration with other organizations. NOAA capitalizes on the vast expertise of its partners in the private, academic, not-for-profit, and public sectors and partners with government agencies at the federal, state, local, tribal, and international levels.

NOAA has adopted strategies and priorities that allow it to use its capacities as innovatively and effectively as possible, while balancing the immediate pressures to change with the continuing imperatives to maintain NOAA's enduring functions. Strategic planning is central to NOAA in performing its mission and achieving its vision because it defines the agency's long-term path to integrate current requirements with emerging societal needs. Through strategic planning, NOAA directs resources to maximize benefits to the user community and the nation at large.

This Strategic Plan establishes the goals for NOAA and the approaches it takes to ensure accountability for results. The NOAA Strategic Plan is an important link between budget and performance. It is a critical tool for putting the agency on the best course for the future and to help design and create stronger programs, allocate resources more wisely, and perform with better accountability. It is through this plan that NOAA moves forward to achieve its goals and serve society in the best possible way.

Conrad Lautenbacher



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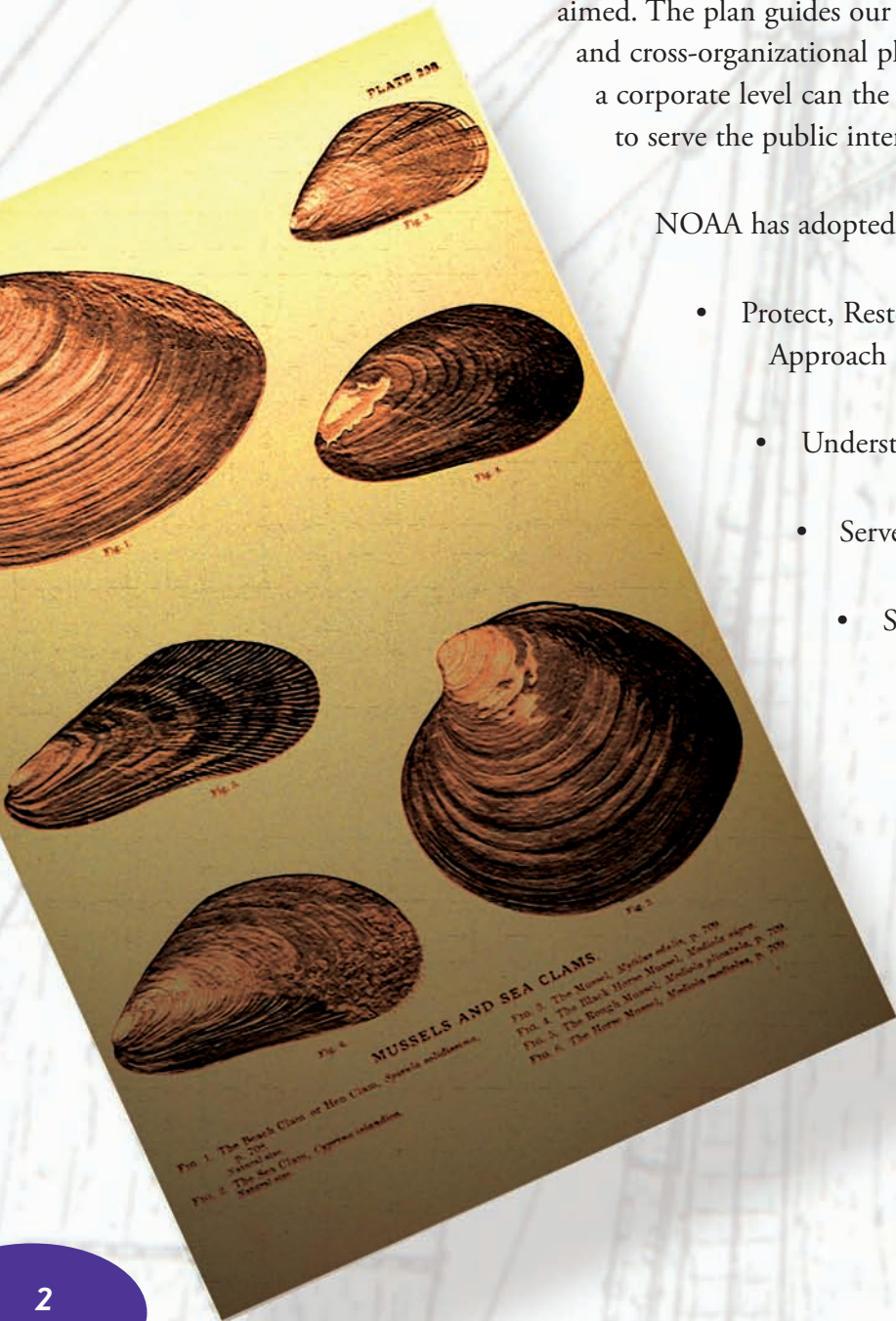
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NOAA'S STRATEGIC ORGANIZATION

This Strategic Plan establishes NOAA's vision, its mission, and the strategic goals toward which all agency functions are aimed. The plan guides our management decisions by providing a consistent framework for Line Office, Staff Office, and cross-organizational plans, initiatives, and performance measures. Only by first establishing the agency's goals at a corporate level can the many lines of NOAA's business work together, as an integrated and accountable whole, to serve the public interest effectively and efficiently.

NOAA has adopted a structure of four Mission Goals and one Mission Support Goal. NOAA's goals are to

- Protect, Restore, and Manage the Use of Coastal and Ocean Resources through an Ecosystem Approach to Management
- Understand Climate Variability and Change to Enhance Society's Ability to Plan and Respond
- Serve Society's Needs for Weather and Water Information
- Support the Nation's Commerce with Information for Safe, Efficient, and Environmentally Sound Transportation
- Provide Critical Support for NOAA's Mission.





All goals are rooted in NOAA's mission and vision statements. Each goal has defined high-level outcomes that detail the intended purpose of all efforts related to that goal. Each outcome is further defined by objectives that provide further detail on how to evaluate the achievement of that outcome. All NOAA work is planned and organized with respect to this hierarchical framework.

NOAA's goals have been derived from stakeholder input and internal assessments of our mandates and mission. Each goal is a key component of the federal government's business structure for the benefit and protection of the nation's general population. NOAA's Line and Staff Offices execute activities required to achieve these goals through NOAA programs. These programs may involve the activities of more than one Line or Staff Office as they endeavor to realize the outcomes and objectives of their respective goals.

Also within this edition of the NOAA Strategic Plan is an account of NOAA's enduring functions, which provides a common understanding of how NOAA works and what it produces. NOAA's functions are the things that the agency does—and will continue to do—irrespective of the organizational structure. It is essential for the agency's planners to think in terms of the enduring, typical functions that are conducted within the agency and how they relate to each other, what tangible outputs they realize, and how they create value for the nation.

NOAA'S MISSION GOALS

As part of the Department of Commerce (DOC), NOAA's work is planned and organized strategically with respect to four Mission Goals and a Mission Support Goal. This strategic structure was adopted based on internal assessments of the agency's mandates and its mission, and was refined with formal stakeholder input. NOAA's goals exist with traditional Line and Staff Offices in a matrix organizational structure. NOAA's strategic planning is done in the framework of the goals described in this plan, while execution of the plan is carried out by NOAA's Line and Staff Offices.

The domains of each goal are distinct yet interrelated, often sharing common science and technology challenges, partners, and stakeholder interest. For example, an ecosystem approach to management requires information on weather, water, and climate and must take into consideration commerce and transportation interests. Each Mission Goal must consider its relationship with the others in developing and implementing plans and programs. Similarly, the Mission Support Goal (and its respective subgoals) provides vital NOAA-wide services in support of all Mission Goals.

NOAA'S ORGANIZATION

Line Offices execute the programs required to achieve the agency's Mission Goals; these programs often involve the execution of activities across NOAA. NOAA's Line Offices are the National Weather Service; the National Marine Fisheries Service; the National Ocean Service; the National Environmental Satellite, Data, and Information Service; the Office of Oceanic and Atmospheric Research; and the Office of Program Planning and Integration.

NOAA's mission is also supported by the activities of NOAA Headquarters and Staff Offices, which provide leadership to NOAA and execute programs required to achieve the agency's mission. These offices direct and conduct the cross-agency functions that are essential to accomplishing that support mission—and that are customary for most large government agencies—such as legislative affairs, international affairs, general counsel, communications, acquisition and grants, financial services, facilities, information technology (IT), and workforce management. Other offices perform functions that uniquely and directly apply to NOAA's mission, such as NOAA's Office of Marine and Aviation Operations and Office of Education.

The leadership of Line and Staff Offices comes together to make corporate-level executive decisions for the agency through a system of councils. These include councils for Oceans, Research, Observing Systems, Project Management, Facilities Investment, Education, Fleet Services, Human Capital, International Affairs, IT, and Finances and Administration. Based on recommendations from these councils, the NOAA Executive Panel and Executive Council make the highest-level executive decisions for the agency.

NOAA's Goals Stem from Its Mission and Cut Across Line Offices

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

NOAA Vision: An informed society that uses a comprehensive understanding of the role of the oceans, coasts, and atmosphere in the global ecosystem to make the best social and economic decisions

Ecosystems Goal: Protect, Restore, and Manage the Use of Coastal and Ocean Resources through an Ecosystem Approach to Management **EC**

Climate Goal: Understand Climate Variability and Change to Enhance Society's Ability to Plan and Respond **CL**

Weather & Water Goal: Serve Society's Needs for Weather and Water Information **WW**

Commerce & Transportation Goal: Support the Nation's Commerce with Information for Safe, Efficient, and Environmentally Sound Transportation **CT**

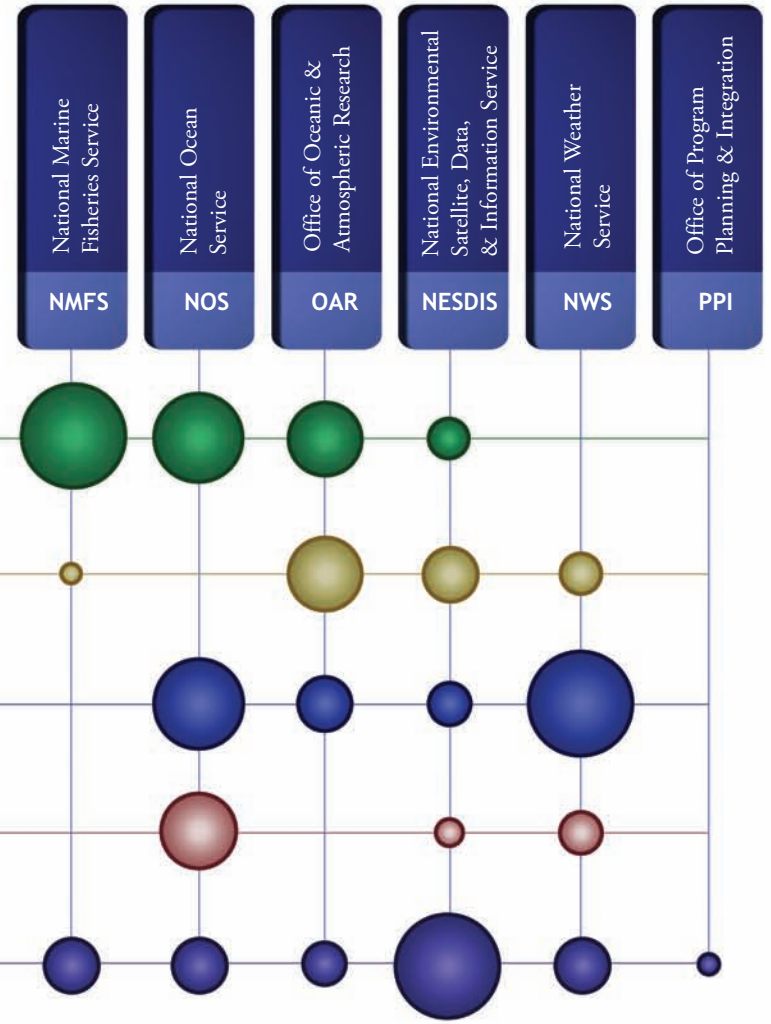
Mission Support Goal: Provide Critical Support for NOAA's Mission **MS**

Satellite Subgoal

Fleet Services Subgoal

Modeling & Observing Infrastructure Subgoal

Leadership & Corporate Services Subgoal



Bubble size indicates the approximate, relative funding of NOAA's Line Offices.

ECOSYSTEMS GOAL

Protect, Restore, and Manage the Use of Coastal and Ocean Resources through an Ecosystem Approach to Management

NOAA's goal to protect, restore, and manage the use of living marine and coastal and ocean resources is critical to public health and the vitality of the U.S. economy. With its Exclusive Economic Zone of 3.4 million square miles, the United States manages the largest marine territory of any nation in the world. The value of the ocean economy to the United States is more than \$138 billion. The value added annually to the national economy by the commercial and recreational fishing industry alone is over \$47 billion. U.S. aquaculture sales total almost \$1 billion annually. To achieve balance among ecological, environmental, and social influences, NOAA has adopted an ecosystem approach to management, a concept that is central to the recommendations of the 2004 report of the U.S. Commission on Ocean Policy and the Administration's response to it, the U.S. Ocean Action Plan. NOAA's Ecosystems Goal responds to a specific mandate from Congress for NOAA to be a lead federal agency in this conservation, management, and restoration effort. Recent statutory revisions (e.g., the Magnuson-Stevens Reauthorization Act and the Marine Debris Research, Prevention and Reduction Act) and emerging legislative changes are broadening this mission for NOAA, opening a new chapter in NOAA's stewardship of the nation's living marine resources and management of the coasts.

PERFORMANCE TO PLAN

Provided national leadership in ocean and coastal management. Among other things, NOAA focused on improving regional governance, rebuilding fisheries, and increasing capacity to improve food security, increase economic benefits, and improve stability of marine ecosystems.

Established the federal portion of the marine reserves and conservation area network within the Channel Islands National Marine Sanctuary. This action will help to maintain the natural biological communities and to protect, restore, and enhance natural habitats, populations, and ecological processes.

Supported a tremendous volunteer effort to identify and remove nearly 100 pieces of marine debris in Calcasieu Lake, La. This lake is a vital shipping channel and significant estuary in the southwestern Louisiana economy.

Completed the first assessment of the status of 207 U.S. Marine Protected Areas (MPAs), which are managed by state and territory governments. NOAA also identified major challenges to effective MPA management and recommended actions that could be taken at the national and local levels to improve MPA success.

PROGRAMS

Aquaculture—promotes environmentally sound aquaculture practices and technologies to increase seafood production and replenish depleted species.

Coastal and Marine Resources—collaboratively manages societal uses of coastal and marine areas to protect ecosystems and to reduce vulnerability of coastal communities.

Coral Reef Conservation—works to reduce the impacts of key threats to coral reef ecosystems and to help implement conservation actions in response to threats.

Ecosystem Observations—monitors and assesses the long-term health, quality, and sustainability of living coastal and marine resource populations and their habitats.

Ecosystem Research—develops the science for ocean and coastal management and transfers technology, assessments, and conservation strategies to resource managers.

Enforcement—ensures compliance with federal laws to manage and provide stewardship of living marine resources.

Fisheries Management—ensures maintenance of fisheries at productive levels for supporting sustainability and the ecosystems to which they contribute.

Habitat—protects and restores coastal, marine, and Great Lakes habitats that support NOAA trust resources and advances supporting science and technology.

Protected Species—protects and works to recover species at risk of extinction through planning, regulation, partnerships, direct action, and outreach and education.

OUTCOMES

Healthy and productive coastal and marine ecosystems that benefit society

A well-informed public that acts as a steward of coastal and marine ecosystems

OBJECTIVES

Increase the number of fish stocks managed at sustainable levels

Increase the number of protected species with stable or increasing populations

Improve ecosystem health through conservation and restoration of habitat

Increase environmentally sound aquaculture production

Advance understanding and characterization of coastal, marine, and Great Lakes ecosystem health and associated socioeconomic benefits, and develop forecasting capabilities to meet management needs

Provide tools, technologies, and information services that are effectively used by NOAA partners and customers to improve ecosystem-based management

Improve public understanding and stewardship so that ecosystem and sustainable development principles are incorporated into planning, management, and use of coastal and marine resources

CLIMATE GOAL

Understand Climate Variability and Change to Enhance Society's Ability to Plan and Respond

Climate variability and change influence the well-being of society, the environment, and the economy. Numerous long-term changes in climate already have been observed. The changes include those in arctic surface temperatures and sea ice, ocean salinity and carbonate chemistry, and frequency and intensity of extreme weather such as heat and cold waves, droughts, and floods. Decision makers are challenged with addressing major climatic events compounded by issues such as population growth, economic growth, public health concerns, changes in geographic distribution of marine species, loss of habitat, and changes in land-use practices. They require a new generation of climate services. Through legislation, executive orders, and international agreements, NOAA has a long-standing commitment to provide reliable and timely climate research and information. To meet the demand for expanded services, the Climate Goal will focus research to improve understanding of complex climate processes and to enhance the predictive capacity of the global climate system. The Climate Goal's priority is to focus on the development and delivery of climate information and services that assist decision makers with national and international policy decision making, and assessing risks to ecosystems and the U.S. economy in sectors and areas that are sensitive to impacts from climate variability and change.

PERFORMANCE TO PLAN

Took a leadership role in the effort of the Intergovernmental Panel on Climate Change to prepare a report on the international state of climate science. NOAA provided observations, data, model simulations, analysis, authors, and review editors.

Unveiled a new U.S. Drought Portal. The new web-based portal provides comprehensive information on U.S. drought conditions, forecasts, effects of drought on local communities, and mitigation measures. The unprecedented access to key operational drought resources will help answer the most pressing questions facing policy-makers, emergency planners, businesses, and the public.

Released *Scientific Assessment of Ozone Depletion: 2006*. This report is prepared every 4 years for more than 190 nations. The ozone assessment also is a key input to another product that focuses on trends in ozone-depleting gases and the ozone layer.

Launched a new tool, CarbonTracker, to monitor changes in atmospheric carbon dioxide and other greenhouse gases by region and source. CarbonTracker enables its users to evaluate the effectiveness of their efforts to reduce or store carbon emissions.

PROGRAMS

Climate Observations and Monitoring—integrates atmospheric, oceanic, and arctic observations and maintains consistent, long-term access to historical climate data.

Climate Research and Modeling—assimilates observation data and runs models to attribute causal forces to climate effects and to make predictions and projections.

Climate Service Development—assesses climate impacts, supports regional adaptation strategies, and develops new products appropriate to evolving user needs.

OUTCOMES

A predictive understanding of the global climate system on time scales of weeks to decades to a century with quantified uncertainties sufficient for making informed and reasoned decisions

Use of NOAA's climate products by climate-sensitive sectors and the climate-literate public to support their plans and decisions

OBJECTIVES

Describe and understand the state of the climate system through integrated observations, monitoring, and data management

Understand and predict climate variability and change from weeks to decades to a century

Improve the ability of society to plan for and respond to climate variability and change

WEATHER AND WATER GOAL

Serve Society's Needs for Weather and Water Information

Floods, droughts, hurricanes, tornadoes, tsunamis, wildfires, and other severe weather events cause \$11.4 billion in damage each year in the United States. Weather is directly linked to public health and safety, and nearly one-third of the U.S. economy (approximately \$4 trillion, in 2005 dollars) is sensitive to weather and climate. With so much at stake, NOAA's role in understanding, observing, forecasting, and warning of environmental events is expanding. NOAA will continue to collect and analyze environmental data and to issue forecasts and warnings that help protect health, life, and property and enhance the U.S. economy. Future needs can be better met by exploring new concepts and applications through robust weather and water research. A commitment to public benefits shapes NOAA's role within the U.S. weather enterprise, including its partners in the private sector, academia, and government. These partners add value to NOAA services and help disseminate critical environmental information. We will work more closely with our partners and will develop new partnerships so that the public understands and is satisfied with our information. Together, NOAA and its partners will continuously improve existing service and expand to support evolving national needs, including space weather, freshwater and coastal ecosystems, and air quality prediction services.

PERFORMANCE TO PLAN

Expanded its sources of observational data, advanced numerical models, and improved the accuracy of its forecasts and warnings. In addition, NOAA responded to society's evolving needs for forecast services by leveraging its partnerships in the public, private, and academic sector.

Completed a 3-year effort to strengthen the U.S. Tsunami Warning System. Now, NOAA is better equipped to detect a tsunami and alert communities of the impending danger.

Added 17 broadcast stations to the Weather Radio All Hazards network and upgraded technology at 62 stations. NOAA now has 100 percent coverage of high-risk areas and significantly improved reliability and availability for the nation's weather and all-hazard warning system.

Made available three databases—Global Historical Tsunami, Significant Earthquake, and Volcano—through the World Wide Web. Eventually, NOAA will provide these data to the Global Earth Observation (GEO) community through the GEO Web Portal

PROGRAMS

Air Quality—produces air quality information, predictions, and decision support tools for the development of policies and emissions management.

Coast, Estuaries, and Oceans—provides information, products, tools, forecasts, and services for coastal and maritime users for risk and vulnerability mitigation.

Hydrology—monitors and analyzes our water resources and issues predictions and warnings of all hydroclimatic conditions from floods to droughts.

Local Forecasts and Warnings—delivers climate, water, and weather information, forecasts, and warnings through a network of field offices and national centers.

Science, Technology, and Infusion—fosters weather and water research and technological advances as they are transitioned into operational service improvements.

Space Weather—delivers alerts, warnings, forecasts, nowcasts, and data to customers worldwide to protect technological systems and human health.

Tsunami—detects and forecasts tsunami events, delivers timely warnings and advisories, and manages and promotes community preparedness and public education.

OUTCOMES

Reduced loss of life, injury, and damage to the economy

Better, quicker, and more valuable weather and water information to support improved decisions

Increased customer satisfaction with weather and water information and services

OBJECTIVES

Increase lead-time and accuracy for weather and water warnings and forecasts

Improve predictability of the onset, duration, and impact of hazardous and severe weather and water events

Increase application and accessibility of weather and water information as the foundation for creating and leveraging public (federal, state, local, tribal), private, and academic partnerships

Increase development, application, and transition of advanced science and technology to operations and services

Integrate local, regional, and global observation systems into NOAA's weather and water services to increase the collaboration between NOAA and external environmental partners

Reduce uncertainty associated with weather and water forecasts and assessments

Enhance environmental literacy and improve understanding, value, and use of weather and water information and services

COMMERCE AND TRANSPORTATION GOAL

Support the Nation's Commerce with Information for Safe, Efficient, and Environmentally Sound Transportation

NOAA responds to the specific demands of air, sea, and surface transportation with consistent, timely, and accurate information to aid sound and routine operational decision making. All modes of transportation are affected by significant challenges as they operate in the elements of nature. The natural environment is, in turn, affected by our transportation systems. Safe, efficient, and environmentally sound transportation systems are crucial to the nation's commerce, and thus to the nation's economy. For example, more than 78 percent of U.S. overseas trade by weight and 38 percent by value comes and goes by ship. Nine million barrels of oil come through U.S. ports daily, and 8,000 foreign vessels make 50,000 port calls annually. Vessel traffic in the U.S. Marine Transportation System, which ships over 95 percent of foreign trade by tonnage, will double by 2020 and contribute roughly \$2 trillion annually to the U.S. economy. NOAA provides information products for transportation systems, including marine and surface weather forecasts, navigational charts, real-time oceanographic information, and Global Positioning System augmentation. NOAA works with the Federal Aviation Administration and industry to improve the weather resilience of aviation systems. NOAA also provides emergency response services to save lives and money and to protect the coastal environment, including hazardous material spill response and search and rescue functions. NOAA works with federal, state, and local partners to ensure the efficient and environmentally sound operation and development of ports.

PERFORMANCE TO PLAN

Marked the 200th anniversary of the U.S. Coast and Geodetic Survey, the nation's first federal science agency. Created in 1807 to implement Thomas Jefferson's vision for a stable maritime economy, the Survey has a long history of service mapping U.S. shores and waterways and establishing the positioning infrastructure across the United States.

Used the Search and Rescue Satellite Aided Tracking System to rescue 353 people in the United States: 235 people were rescued at sea, 30 people were rescued in aviation incidents, and 88 people were rescued in other incidents.

After Hurricanes Katrina and Rita, supported rebuilding and restoration efforts in Louisiana by promoting the integration of observations and providing baseline data. NOAA's work helped researchers differentiate between potential causes of relative sea-level change in coastal areas, including subsidence, accretion, erosion, and local sea level.

Worked with the Port of Mobile, Ala., to install the Physical Oceanographic Real-Time System. This system, developed and operated by NOAA to provide accurate real-time oceanographic and meteorological data to mariners, can significantly reduce the risk of vessel groundings and increase the amount of cargo moved through the port.

Developed a new metric to determine the impact of weather on the nation's air transportation system. The metric will help produce more reliable forecasts of the impact of weather on the National Airspace System.

PROGRAMS

Aviation Weather—provides weather information to the Federal Aviation Administration.

Emergency Response—provides prevention, preparedness, response, and recovery services needed to deal with natural and man-made disasters.

Geodesy—defines, maintains, and provides access to the National Spatial Reference System, the foundation for safe and efficient commerce and transportation.

Marine Transportation System—provides hydrographic and oceanographic information to mariners and facilitates environmentally sound port development.

Marine Weather—monitors and analyzes maritime weather data, issues maritime forecasts and warnings, and provides guidance.

Surface Weather—mitigates the adverse impacts of rain, wind, snow, and ice along the nation's roads and highways with localized weather observations and advisories.

OUTCOMES

Safe, secure, efficient, and seamless movement of goods and people in the U.S. transportation system

Environmentally sound development and use of the U.S. transportation system

OBJECTIVES

Support decisions in aviation, marine, and surface navigation

Research, develop, and deploy more accurate and timely information products

Research, develop, and deploy advanced monitoring and observing systems, new models, prediction techniques, and assessments

Support decisions in coastal resource management

Build public understanding of the scientific, technological, and environmental factors of commerce and transportation

NOAA



MISSION SUPPORT GOAL

Provide Critical Support for NOAA's Mission

Satellite Subgoal

Fleet Services Subgoal

Modeling and Observing Infrastructure (MOI) Subgoal

Leadership and Corporate Services Subgoal

SATELLITE SUBGOAL

Provide a Continuous Stream of Satellite Data and Information with the Quality and Accuracy to Meet Users' Requirements for Spatial and Temporal Sampling and Timeliness of Delivery

Environmental satellites are a major component of NOAA's global efforts to better observe, understand, and predict various environmental phenomena. The backbone of the NOAA satellites includes the Geostationary Operational Environmental Satellite (GOES) and Polar-orbiting Operational Environmental Satellite (POES) programs. GOES and POES are operated to provide critical atmospheric, oceanic, climatic, solar, and space data to protect life and property across the United States. The satellites carry scientific instruments and communications equipment to support the delivery of weather information and aid search and rescue operations. NOAA is acquiring the new generation of each satellite system, including ground processing systems. In concert with the National Aeronautics and Space Administration (NASA), acquisition of the next-generation geostationary satellite (GOES-R) series is underway. The Department of Defense (DoD), NASA, and NOAA are joined with industry partners to build the follow-on series of polar orbiting satellites, the National Polar-orbiting Operational Environmental Satellite System. NOAA's satellite systems support other NOAA offices in the delivery of improved severe storm warnings, weather forecasts, climate predictions, oceanic and ecosystems research and analyses, and satellite-aided search and rescue services.

PERFORMANCE TO PLAN

Deployed the Advanced Very High Resolution Radiometer onboard the European polar-orbiting satellite. The global data collected are used extensively in NOAA's weather and climate prediction numerical models.

Repositioned NOAA's GOES-10 spacecraft, a move intended to improve weather forecasts and, thereby, to lessen the effects of natural disasters in the region.

PROGRAMS

Commercial Space Services—helps develop a competitive U.S. commercial space and remote sensing industry and ensures compliance with federal regulations.

Geostationary Acquisition—develops and acquires geostationary-orbiting satellites, associated sensors, and supporting ground systems.

Polar Acquisition—develops and acquires polar-orbiting satellites, associated sensors, and supporting ground systems.

Satellite Services—researches, develops, and operates satellites to collect, calibrate, and distribute the data necessary to monitor land, sea, atmosphere, and space.

OUTCOMES

A continuous stream of satellite data and information with the quality and accuracy to meet users' requirements for spatial and temporal sampling and timeliness of delivery

OBJECTIVES

Increase the quantity, quality, and accuracy of satellite data that are processed and distributed within targeted time

Increase government procurement of NOAA-licensed remote sensing systems

FLEET SERVICES SUBGOAL

Provide the Number of Ship Operating Days and Aircraft Flight Hours Needed to Meet NOAA's Data Collection Requirements with High Customer Satisfaction

NOAA operates a fleet of 20 ships and 10 aircraft to ensure continuous observation of critical environmental conditions. The Fleet Services Subgoal manages these platforms to increase the number of ship operating days and aircraft flight hours to meet NOAA's data collection requirements. It provides ship and aircraft support for NOAA's four Mission Goals, upgrades NOAA's fleet of ships and aircraft, and partners with the programs to facilitate the development, demonstration, and deployment of new observation platforms, such as Autonomous Underwater Vehicles and Unmanned Aerial Systems.

PERFORMANCE TO PLAN

Deployed its high-altitude Gulfstream-IV jet from a temporary base in Honolulu, Hawaii, in an effort to improve forecasts released 24 to 96 hours before a winter storm. The jet acquired atmospheric data from severe winter storms originating over the Pacific Ocean that affect the continental United States, Hawaii, and Alaska.

PROGRAMS

Aircraft Replacement—manages the equipment, modernization, and operation of the aircraft required to meet NOAA's data collections.

Aircraft Services—operates and maintains a fleet of aircraft to meet the airborne data collection requirements of NOAA's Mission Goals.

Fleet Replacement—develops the requirements, acquisition strategies, funding profiles, and contracts to design, build, equip, deploy, and modernize NOAA ships.

Marine Operations and Maintenance—operates, maintains, and charters ships to collect in situ ocean data.

OUTCOMES

Provision of the number of ship operating days and aircraft flight hours needed to meet NOAA's data collection requirements with high customer satisfaction

OBJECTIVES

Increase the number of ship operating days and aircraft flight hours that safely, reliably, and successfully meet NOAA's data collection requirements with high customer satisfaction.



MODELING AND OBSERVING INFRASTRUCTURE (MOBI) SUBGOAL

Integrate Observing System Architectures, Data Management Architectures, and Computing and Modeling Capabilities to Better Enable NOAA's Mission

The MOBI Subgoal's analyses and operational capabilities provide critical infrastructure and support for the integrated monitoring and improved understanding of the Earth's environment. The subgoal enables NOAA's operational forecast products and services and provides NOAA a strategic investment portfolio recommendation encompassing observing, modeling, and high-performance computing capabilities. NOAA's internal forecasting, assessment, and stewardship capabilities—as well as the capabilities of partners and customers—require integrated oceanic and atmospheric data. Furthermore, NOAA's operations require modeling support, high-performance computing, observing system design and analysis, research and development of improved modeling and data assimilation, and guidance on the architecture of observation and data management systems. MOBI also manages the integration of NOAA's observing systems and associated data with those of other federal agencies and nations under the GEO System of Systems framework.

PERFORMANCE TO PLAN

Implemented the Weather Research and Forecast model and North American Ensemble Forecast System. Both models help to increase lead-time and accuracy for weather and water warnings and forecasts.

Published Global Earth Observation Integrated Data Environment (GEO IDE) Concept of Operations, which contains standards and protocols for all observation and data management activities. The adoption of common standards and protocols will facilitate the worldwide exchange of data on all aspects of the environment.

PROGRAMS

Environmental Modeling—provides high-performance computing, data assimilation, and modeling tools to monitor the Earth's environment and predict future states.

Integrated Ocean Observing System (IOOS)—works closely with public and private partners to process and disseminate data, information, and models on coastal waters, Great Lakes, and oceans.

Technology, Planning, and Integration—designs an integrated observation and data management system and manages DOC radio frequencies.

OUTCOMES

Integration of observing system architectures, data management architectures, and computing and modeling capabilities to better enable NOAA's mission

OBJECTIVES

Ensure a strategic, integrated, and balanced observing system investment portfolio for NOAA through the use of quantitative analysis

Integrate national and regional efforts to optimize ocean observations, data management, and understanding

Provide for research, development, and operational capabilities that improve, maintain, and operate models and provide guidance for environmental forecasts at all temporal and spatial scales

Ensure computational infrastructure and high-performance computing strategies needed to sustain computational workloads of NOAA's research and operational modeling enterprise and support NOAA's data management and stewardship capabilities

LEADERSHIP AND CORPORATE SERVICES SUBGOAL

Support NOAA's Mission through Cost-Effective, Value-Added Solutions to Its Financial, Facilities, Workforce, and Information Technology Needs

The Leadership and Corporate Services Subgoal strives to produce cost-effective, value-added solutions in the cross-cutting areas of Line Office and Headquarters management, workforce management, acquisition and grants, facilities, financial services, homeland security, IT, and administrative services. This is accomplished by effective and strategic leadership at corporate and Line Office levels that optimize agency performance and mission accomplishment through streamlined, results-oriented processes. The development of long-range facility and IT modernization plans provides the investment framework to ensure that NOAA's facility and IT portfolio will continue to support a safe, secure, and state-of-the-art work environment. The development of streamlined acquisition and workforce management processes will enable NOAA to effectively fulfill its research and operational missions with a competent workforce and effective third-party partnerships. The public demand for financial stewardship and accountability requires NOAA to maintain an effective financial and internal control program. The national dependence on NOAA's services and information products compels effective continuity of operations planning and all-hazards incident management.

PERFORMANCE TO PLAN

Opened a new NOAA Satellite Operations Facility. Each day, the facility processes more than 16 billion bytes of environmental satellite data. The National Weather Service uses these data as inputs into models for medium- to long-range weather forecasts and for tracking severe weather and climate change.

Converted three Great Lakes research vessels from petroleum-based fuels and lubricants to bio-based products.

Obtained Google Earth and Google Maps geospatial software. NOAA's programs can now deliver views of related weather, climate, ecosystems, coasts, surveys, and ocean missions and can better assist other federal agencies (e.g., U.S. Forest Service) that require improved situational awareness.

PROGRAMS

Acquisition and Grants—purchases goods and services from external vendors and administers financial assistance awards to qualified recipients.

Administrative Services—oversees NOAA management of logistics, civil rights, competitive sourcing, deemed exports, and other program support activities.

Facilities—manages the construction, renovation, operations, maintenance, and disposition of real property, ensuring both physical security and environmental compliance.

Financial Services—identifies, acquires, defends, and monitors NOAA's budgetary resources and provides accounting services for the agency.

Homeland Security—coordinates and develops all plans, programs, and policies regarding NOAA homeland security and executes emergency response operations.

Information Technology Services—supports IT planning processes and ensures that IT resources are acquired, managed, secured, and used per federal law.

Line Office Headquarters—coordinates the headquarters management functions of NOAA's Line Offices and NOAA's Central Library.

NOAA Headquarters—provides management and support across the agency for the corporate leadership and external liaison functions.

Workforce Management—facilitates the recruitment, development, and retention of NOAA's workforce.

OUTCOMES

One NOAA working together—guided by a clear strategic vision for planning, programming, and execution—to achieve NOAA's goals

Secure, reliable, and robust information flows within NOAA and out to the public

Modern and sustainable facilities providing safe and effective work environment

Efficient and effective financial, administrative, and acquisition management services

Workforce management processes that support a diverse and competent workforce

Integrated Homeland Security and emergency response capabilities

OBJECTIVES

Improve collaborative decision making based on knowledge of corporate goals, programmatic performance, and stakeholder demand

Increase internal and external availability, reliability, security, and use of NOAA IT and services

Increase number of facilities with improved collocation of NOAA services and partners

Improve efficiency and performance of financial, administrative, workforce management, acquisition, and other support transactions and services

Increase the levels of diversity and expertise appropriate to the conduct of NOAA functions

Enhance contribution of NOAA services to all-hazards Homeland Security efforts

NOAA'S CROSS-AGENCY PRIORITIES

Particularly integral to accomplishing NOAA's mission is sound management toward five priorities that cross the agency: a world-class workforce, integrated Earth observations data, state-of-the-art research, an environmentally literate public, and strong national and international relationships. These serve as the fundamental means for performing all work at NOAA.

A World-Class Workforce

People are NOAA's most critical asset. As society evolves, it is imperative that NOAA maintain scientific, technical, and administrative expertise and leadership. Accomplishing NOAA's challenging goals requires an inclusive, diverse, highly skilled, motivated, and effective workforce that reflects the communities it serves. NOAA must keep and promote expertise in skills that support collaboration, communication, and partnerships.

Integrated Earth Observations Data

Earth observations are intrinsic to NOAA's mission. The agency depends on observing systems for virtually every activity—from foundational research, to operational forecasting and warnings of immediate hazards, to regulatory decisions. NOAA is developing an integrated Earth observation and data management system to bring together all aspects of environmental and ecological monitoring and to provide better information, products, and services to the nation. NOAA will integrate its observing systems and associated data with efforts of other nations through participation in the development of the GEO System of Systems.

State-of-the-Art Research

NOAA is a science-based agency with responsibilities to direct and maintain a vigorous and forward-looking research enterprise internally and externally in the academic community. Moreover, continuing and improved success in NOAA's operational services depends on how well it understands the complex behavior of the atmosphere, the oceans, ecosystems, and associated social and economic systems. Short-term research increases the effectiveness of existing activities. Long-term, visionary research is critical to recognizing emerging issues and opportunities; managing future environmental, ecological, and societal needs; and building the foundation for tomorrow's innovative products and services.

A diver in a dark blue wetsuit is seen from the side, breathing through a yellow regulator. The diver is positioned on the right side of the frame. In the background, a large shark is swimming towards the left. The water is a deep blue, and there are some bubbles visible. The overall scene is underwater.

An Environmentally Literate Public

NOAA's mission is dependent upon an informed public that is aware of NOAA's services and understands how scientific observations, forecasts, and regulatory activities affect their personal, business, and community decisions. NOAA's success depends on the ability of our constituents to understand, use, and act upon the information provided. Further, ensuring the world-class workforce of tomorrow requires NOAA to inspire the youth of today to pursue scientific and technical careers. Through the America COMPETES Act, for example, NOAA has been given a mandate "to conduct, develop, support, promote, and coordinate formal and informal education at all levels to increase public awareness about ocean, coastal, Great Lakes and atmospheric science and stewardship." NOAA partners with educational institutions, government agencies at all levels, and private industry to build environmental literacy. The result is a public better able to make informed decisions and take appropriate action on environmental and ecological matters.

Strong National and International Relationships

At home and abroad, NOAA provides leadership, supports policies and programs, and engages with counterparts in support of ecosystem-based management, climate science, Earth observations, water management, weather forecasting, and more. Phenomena of the Earth's oceans and atmosphere naturally extend across political boundaries. Consequently, NOAA recognizes the need to establish strong and lasting relationships with its domestic and international partners, bring international expertise and resources to bear in achieving NOAA's mission, and benefit from the experience of working together on common issues. NOAA leads the development of U.S. policies, engages in international environmental programs, and leverages multilateral and bilateral relationships to maximize the benefits of research, observations, environmental science, and ecosystems management.





PERFORMANCE MANAGEMENT IN NOAA

Performance management is the formal title given to the evaluation of the progress toward and achievement of outcomes and objectives. The use of performance measures for assessment and evaluation supports NOAA's continued success by ensuring that the agency learns from its experience, strategically directs resources, and operates results-oriented programs. NOAA's performance measures, including those required under the Government Performance and Results Act, are published annually in the NOAA Annual Performance Plan and *Performance and Accountability Report*.

Performance measurement is integrated into the implementation of the NOAA Strategic Plan through NOAA's Planning, Programming, Budgeting, and Execution System (PPBES). The PPBES process guides NOAA's Goal Teams, Programs, Line Offices, and Staff Offices toward achieving the outcomes and objectives of NOAA's Mission Goals. PPBES is designed to implement a logical progression from the NOAA Strategic Plan to the NOAA budget formulation, to Line and Staff Office execution. Annual Operating Plans detail the agency's performance from the office and program levels to the individual employee.

NOAA's Strategic Plan is also linked to the Annual Performance Plan of the Department of Commerce. There is a direct relationship between NOAA's goals, outcomes, and objectives and the goals and performance measures included in the annual budget submission to DOC. DOC uses this information for its Annual Performance Plan and *Performance and Accountability Report*, which integrate outcomes and performance measures across DOC.

The NOAA Strategic Plan supports the DOC Strategic Plan Goal—"Observe, protect, and manage the Earth's resources to promote environmental stewardship"—and the two objectives within the goal: "Advance understanding and predict changes in the Earth's environment to meet America's economic, social, and environmental needs" and "Enhance the conservation and management of coastal and marine resources to meet America's economic, social, and environmental needs."

NOAA'S ENDURING FUNCTIONS

The figure at right is a model of NOAA's enduring functions, how they relate to each other, and how they relate to the external realization of NOAA's four Mission Goals. NOAA's enduring functions are those that the agency must perform to fulfill mission mandates. Each function is a link within a value chain; each function employs inputs to yield higher-value outputs.

In the model, internal functions are in color, external functions are gray. Value is added as one moves clockwise through the model. Starting at the bottom, requirements and financial resources are provided (gray) to NOAA by Congress, the White House, and the Department of Commerce. The agency receives additional requirements and feedback from its partners and customers. As a science agency, NOAA also depends on partners in the public, private, and academic sectors for mission-specific resources, such as scientific data, information, knowledge, and expertise.

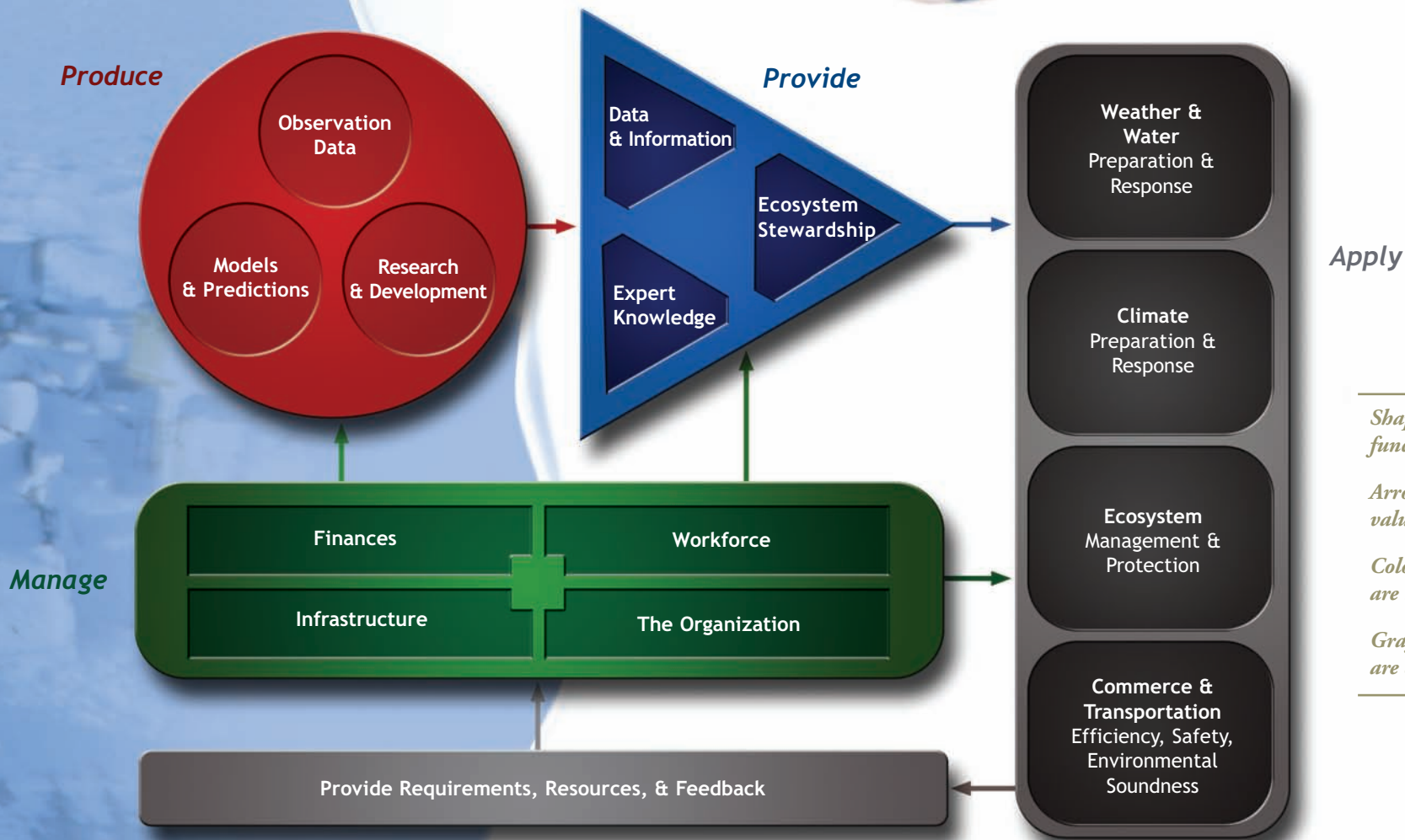
NOAA manages requirements and resources to produce its core scientific content and, ultimately, to provide final delivery of services. The “manage” functions (green) are akin to the management functions of any organization and relate to the majority of programs in NOAA's Mission Support Goal. The “produce” functions (red) are NOAA's core competencies: observing the environment, modeling it, and conducting research and development to improve these capabilities. The “provide” functions (blue) are those that directly serve partners and customers.

Providing environmental data and information (e.g., satellite data, weather forecasts, and nautical charts) informs decisions throughout the economy. Providing knowledge and expertise of the Earth system, its components, and its relation to human society (e.g., models, assessments, and consultations) establishes a coherent structure for the production and use of data and information products. Providing ecosystem stewardship (e.g., regulation, protection, and restoration of species and habitats and enforcement of laws) optimizes the benefits that humans derive from their ecosystem. Investing resources beyond NOAA (e.g., grants for research and coastal zone management) allows the agency and its partners to work more effectively by collaborating.

NOAA's outputs meet the agency's four Mission Goals and benefit the public as they are applied by external partners and customers. In particular, the Federal Emergency Management Administration uses NOAA forecasts to prepare for and respond to hurricanes; state governments use NOAA grant money to manage coastal zones and improve the hazard resilience of coastal communities; and the fishing, recreation, and tourism industries (and their customers) gain the long-term benefits of sustainable fisheries from NOAA's services of fishing quota enforcement and habitat protection.

In broad terms, these NOAA outputs generate benefits for society by ensuring the public health, safety, and security; informing operational decisions throughout the economy; generating new knowledge and understanding of the environment; optimizing the sustainable production of ecosystem services; enabling the productive endeavors of partners; and spawning spinoff technologies with positive externalities.

The NOAA Functional Model



Shapes represent functions.

Arrows represent value added.

Color functions are internal.

Gray functions are external.

BALANCING CONTINUITY AND CHANGE

Although economic and technological developments are integral to the nation's growth and prosperity, they do not occur independent of the forces of nature. No matter how successful the economy or how advanced our technology, society is inseparable from the natural systems of the Earth. Progress as a civilization is marked by improvements in the quality of life, but it is accompanied by increased sensitivity to the natural world and nature's increased sensitivity to us.

Human vulnerability to environmental forces is nothing new. Storms, floods, droughts, and tsunamis have always been with us, inspiring legends and shaping our histories. Modern scientific investigation increases our awareness of these and other phenomena, such as the El Niño Southern Oscillation, solar flares, and the impacts of a changing global climate. Yet learning to cope with these forces of nature is not the only reason to understand, predict, and forecast environmental conditions.

The natural environment provides us with food and medicine, purifies our air and water, mitigates floods and droughts, and partially stabilizes our climate. Ecosystem services (services afforded us by our ecosystem) are essential for human life today and for the lives of our children tomorrow, yet the scientific and economic understanding of the details of these ecosystem services is limited, and it lags greatly behind society's need to support strategic decisions.

What *is* well understood is that cumulative impacts of human activities on natural systems are significant; they present new and urgent challenges for scientists and policymakers alike. Over the coming decade, policymakers in the United States and throughout the world will be faced with very difficult decisions regarding the future of Earth's resources and supporting ecosystems.

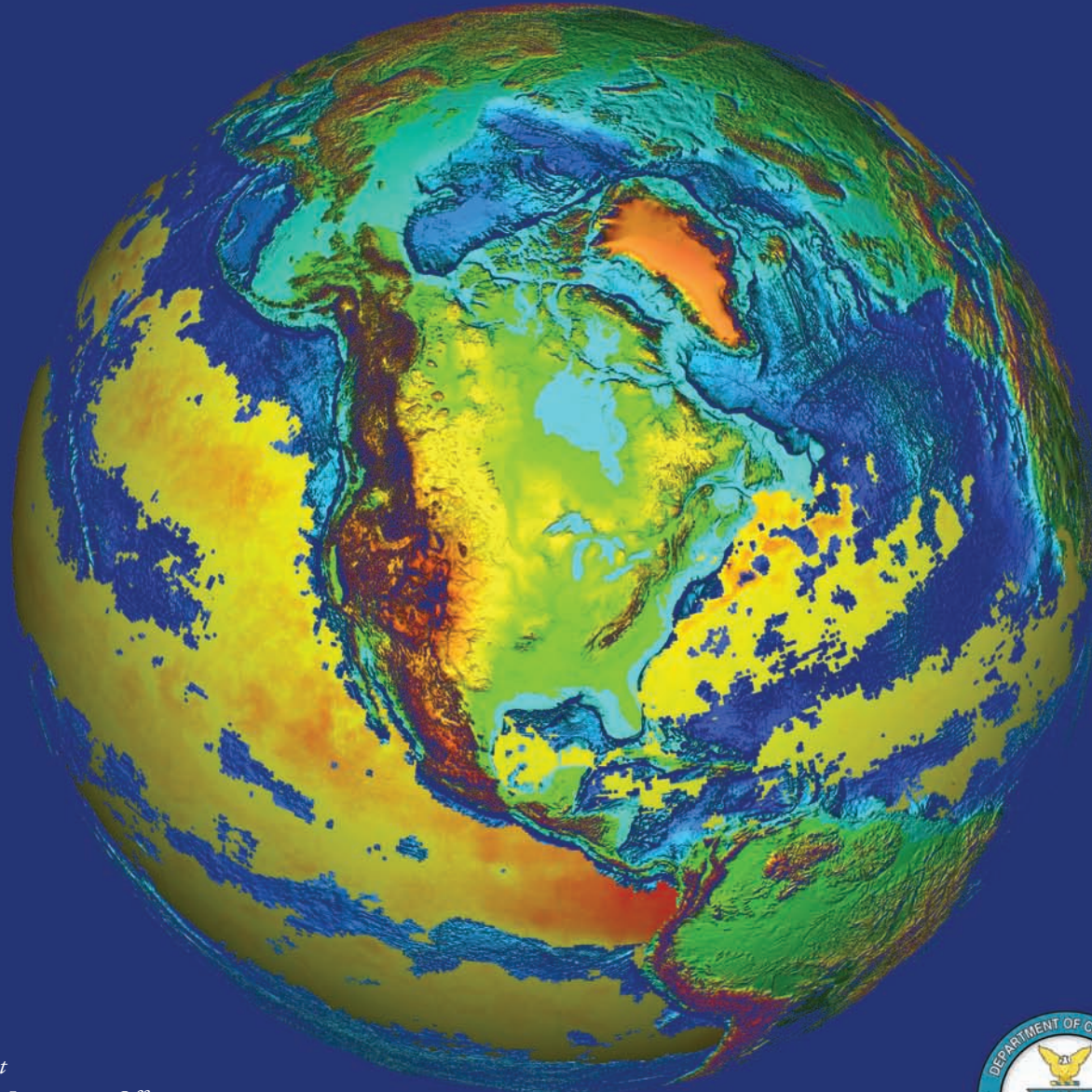
It's clear we need to be evermore mindful to define "progress" as those developments made in accord with the environment, rather than independent of it. The further we advance, the more we have to gain and lose from the environment, the larger our responsibilities are, and thus the greater is the need to base our decisions on a thorough understanding of the environment. The importance of NOAA products and services to the nation continues to grow; NOAA must develop strategies to meet emerging challenges and ensure that its contributions will continue to grow as well.

To this end, NOAA's strategic priorities must balance the immediate pressures to change with the continuing imperatives of maintaining NOAA's enduring functions. These strategic priorities also must offer a balanced response to existing as well as new legislative mandates. Thus, the NOAA Strategic Plan must define a long-term path to integrate existing requirements with emerging societal needs.

Some examples of NOAA's emerging challenges include responding effectively to new statutory requirements (e.g., Magnuson-Stevens Reauthorization Act), new executive directives (e.g., *U.S. Ocean Action Plan*), findings and recommendations of the greater scientific community (e.g., Intergovernmental Panel on Climate Change), internal execution challenges (e.g., continuity of satellite-based Earth observations), and mounting demands from stakeholders (e.g., improved operational forecasts of high-impact events).

The dependence of humans upon their natural environment is the reason why NOAA provides weather, water, climate, and coastal management services; why it manages and protects fisheries and sensitive marine ecosystems; why it conducts atmospheric, oceanic, and ecosystems research; why it enables efficient and environmentally safe commerce and transportation; and why it conducts emergency response and provides vital information in support of public safety. It is difficult to imagine the nation—and the international community—without these vital public services.





*For more information, please visit
the NOAA Program Planning & Integration Office
at www.ppi.noaa.gov*



New Priorities for the 21st Century

National Marine Fisheries Service Strategic Plan

Updated for

FY 2005 – FY 2010

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration

Message from the Assistant Administrator for Fisheries

Americans depend on our Nation's living marine resources for food, jobs, recreation, tourism, medicine, and a myriad of industrial and commercial products. More and more they recognize the importance and value of healthy marine ecosystems to our environment and quality of life. We all have high expectations that public policies will ensure the health and longevity of these resources. However, we are at a crossroads in the care and use of our living marine resources. At no point in history has greater economic, political, and public interest been focused on the use and protection of these resources.

The National Oceanic and Atmospheric Administration (NOAA) has recognized the importance of these circumstances in its Strategic Plan by setting a goal to "protect, restore, and manage the use of coastal and ocean resources through an ecosystem approach to management." The National Marine Fisheries Service (NMFS) has stepped up to this challenge by providing in its Strategic Plan an integrated ecosystem approach to the stewardship of these resources.

The NMFS Strategic Plan provides a look into a future of ecosystem approaches to management, rebuilding and sustaining fishery and protected species stocks to their long-term potential. This will help ensure future performance, productivity, and biological diversity of marine ecosystems for the greatest benefit to the Nation.

The NMFS Strategic Plan is an important link between budget and performance. It is a critical tool to steer us in the direction of ecosystem approaches to management and to help us design and create programs, allocate resources, and perform with better accountability for results.

Over the next five years, NMFS will lead through NOAA's Ecosystem Goal Team the design and development of new programs and approaches to address longstanding barriers to reducing overcapacity and rebuilding overfished fisheries. We will simultaneously improve the quality, scope, and effectiveness of our stewardship activities for protected species and habitat conservation. We propose changes to our management programs to accomplish these objectives in a scientifically credible and integrated manner, taking account of all uses of our living marine resources.

No successful, societal response to environmental or ecological stress, however, has ever been accomplished by a single agency or organization. Success requires the interaction, cooperation, and feedback that come only when all parties involved work together to achieve these goals. The delicate balance of achieving multiple objectives to produce the greatest benefits requires extensive collaboration with our NOAA, Federal, international, state, local, tribal, and non-governmental organization partners, as well as the public. In addition, we will need to develop new partners and relationships as we move toward ecosystem approaches to management.

I am committed to an open and transparent NMFS that will continue to expand existing partnerships and collaboration as well as to welcome our new partners in this endeavor.

William T. Hogarth, Ph.D.
Assistant Administrator for Fisheries
National Oceanic and Atmospheric Administration
U.S. Department of Commerce

VISION

American people enjoying the riches and benefits of healthy and diverse marine ecosystems

MISSION

Stewardship of living marine resources through science-based conservation and management, and the protection and restoration of healthy ecosystems

RESPONSIBILITIES

NOAA's National Marine Fisheries Service (NMFS) is responsible for stewardship of the Nation's living marine resources and their habitats within the United States Exclusive Economic Zone. We work to conserve, protect, and manage these resources to ensure their continuation as functioning components of ecosystems, while also affording economic opportunities and enhancing the quality of life for the American public. Our mandates and authorities are derived from numerous statutes, most significantly the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), the Endangered Species Act (ESA), and the Marine Mammal Protection Act (MMPA). All these activities are encompassed by NOAA's mission "to understand and predict changes in Earth's environment and conserve and manage coastal and marine resources to meet our Nation's economic, social, and environmental needs."

Most of NMFS's programmatic activities support achieving NOAA's strategic goal to "protect, restore, and manage the use of coastal and ocean resources through an ecosystem approach to management." NMFS activities also support NOAA's goal to "understand climate variability and change to enhance society's ability to plan and respond." Finally, NMFS provides agency-wide services to "provide critical support mission for NOAA's mission." NMFS does not participate in any programs under NOAA's other goals to "service society's needs for weather and water information" or to "support the nation's commerce with information for safe, efficient, and environmentally sound transportation."

NMFS employs more than 2,500 people across the country in our six regional offices and science centers as well as in our headquarters in Silver Spring, Maryland. In implementing our stewardship activities, we work closely with our partners in state and other Federal agencies, local and tribal governments, industry, academia, and non-governmental organizations (NGOs). We also work closely with the other NOAA line offices. Of the nine NOAA programs in which we participate, seven involve at least one other line office. We work with the National Ocean Service (NOS) on habitat protection and restoration and coral reef conservation, as well as other activities. We work with Oceanic and Atmospheric Research (OAR) on ecosystem research, coral reef conservation, and understanding climate effects on ecosystems, among other efforts. We also work with the National Environmental Satellite Data Information Service (NESDIS) to provide GIS maps of habitat for trust species and with the National Weather Service (NWS) on using NOAA Weather Radio to publicize fishery closures.

NOAA's Strategic Plan identifies goals and high-level outcomes, strategies, and performance objectives and measures to achieve NOAA's vision of "an informed society that uses a comprehensive understanding of the role of the oceans, coasts, and atmosphere in the global ecosystem to make the best social and economic decisions." This NMFS Strategic Plan describes the programs executed wholly or in part by NMFS as they relate and contribute to NOAA mission goals, outcomes, and strategies. The specific contributions of NMFS activities to the NOAA programs in the ecosystem, climate, and mission support goals are described in the following sections.

NOAA Mission Goal: Protect, Restore, and Manage the Use of Coastal and Ocean Resources Through an Ecosystem Approach to Management

NMFS is the lead federal agency in protecting, restoring, and managing living marine resources and their ecosystems. To balance economic, social, and environmental needs, we take an ecosystem approach to management. This approach strives to integrate all concerns, priorities, and expertise in the management of coastal and marine resources.

NOAA Outcomes	NOAA Strategies	NOAA Programs Executed Wholly or in Part by NMFS
<p>Healthy and productive coastal and marine ecosystems that benefit society</p> <p>A well-informed public that acts as a steward of coastal and marine ecosystems</p>	Engage and collaborate with our partners to achieve regional objectives by delineating regional ecosystems, promoting partnerships at the ecosystem level, and implementing cooperative strategies to improve regional ecosystem health.	<i>Ecosystem Observations</i>
	Manage uses of ecosystems by applying scientifically sound observations, assessments, and research findings to ensure the sustainable use of resources and to balance competing uses of coastal and marine ecosystems.	<i>Ecosystem Research</i>
	Improve resource management by advancing our understanding of ecosystems through better simulation and predictive models. Build and advance the capabilities of an ecological component of the NOAA global environmental observing system to monitor, assess, and predict national and regional ecosystem health, as well as to gather information consistent with established social and economic indicators.	Fisheries Management Protected Species
	Develop coordinated regional and national outreach and education efforts to improve public understanding and involvement in stewardship of coastal and marine ecosystems.	<i>Enforcement</i> <i>Habitat</i>
	Engage in technological and scientific exchange with our domestic and international partners to protect, restore, and manage marine resources within and beyond the Nation's borders.	<i>Coral Reef Conservation</i> <i>Aquaculture</i>

Italics represent programs in which other NOAA line offices participate.

NMFS's stewardship activities under this goal support NOAA performance objectives to

- Increase number of fish stocks managed at sustainable levels
- Increase number of protected species that reach stable or increasing population levels
- Increase number of regional coastal and marine ecosystems delineated with approved indicators of ecological health and socio-economic benefits that are monitored and understood
- Increase number of habitat acres conserved or restored
- Increase portion of population that is knowledgeable of and acting as stewards for coastal and marine ecosystem issues.

Nearly all NMFS activities fall under the Ecosystem Goal and provide over half the resources devoted to it. NMFS's contributions to these programs are described in the following sections.

Ecosystem Observations

Ecosystem Observations (EOP) is a matrix program led by NMFS in partnership with OAR and NOS that collects, manages, stores, and disseminates data on the status of living marine resources and their environment to provide managers with information to make informed decisions. The EOP is an “end-to-end” coastal and oceanic ecological observing system that is a component of the Integrated Ocean Observing System (IOOS). EOP’s activities include routine living marine resource surveys and monitoring, assessments and forecasts (including economic and sociocultural aspects), and research to improve the technical capability of the observation system. The EOP has collaborative linkages within NOAA as well as with non-NOAA stakeholders, including the fishing industry and academic and NGO communities.

Over 95% of EOP budget and activities reside within NMFS. NMFS’s observations provide routine, timely, and scientifically valid information on NOAA’s trust species. There are eight major components:

- Living marine resource surveys
- Ecosystem surveys
- Protected resource surveys
- Observer programs
- Habitat assessments
- Commercial fisheries statistics
- Marine recreational fisheries statistics
- Economic and sociocultural surveys.

We also perform corresponding data management, analysis, education, and outreach.

Over the next five years we will:

- Deliver comprehensive and timely catch information from web-enabled databases
- Provide abundance and biological data for all managed stocks
- Improve major stock assessment precision and minor stock baseline assessments
- Improve and extend model forecasts with environmental and ecosystem data
- Deliver comprehensive and timely stock assessments for all protected species
- Increase survey and assessment efforts for high-priority protected species, such as those with known high levels of interactions with commercial fisheries or those that are endangered and need close monitoring
- Improve monitoring and assessments of ecosystems to provide routine forecasts on the effects of human activities, changes in the physical and chemical environment (e.g., seasonal short-term and long-term climate change), and interactions among biological resource communities and their habitats
- Conduct mandated economic and sociocultural monitoring, assessment, and analysis
- Increase our ability to conduct community profiles, evaluate protected species, and analyze the impacts of marine protected areas.

To attain this full capability, we will invest in advanced technologies and research to elucidate environmental and ecosystem factors that most influence managed stocks. Our data stewardship capabilities will respond to improvements in fishery, protected resource, ecosystem, economic, and sociocultural monitoring and assessments to provide scientifically reliable and timely information to managers, the public, and other NOAA constituents.

Ecosystem Research

Ecosystem Research (ERP) is a matrix program led by OAR and including NOS that provides research results and tools for ecosystem management to NOAA and coastal stakeholders. ERP develops the models, tools, and techniques for ecosystem assessments and forecasts and conducts research to improve understanding of natural and anthropogenic factors that affect ecosystems. ERP is organized into five program components:

- Evaluation and understanding of the state of coastal ecosystems
- Development of ecosystem management support tools
- Technology development for coastal and ocean resources
- Ocean exploration
- Capacity building and effective knowledge transfer.

Approximately 25% of ERP budget and activities reside within NMFS, and all of the NMFS funds within ERP are devoted to protected species research. Currently this research focuses primarily on Steller Sea Lion and Pacific Salmon recovery. However, in the next five years research efforts will be expanded to further develop the next generation of stock assessments for protected species, known in our Stock Assessment Improvement Plan as “Tier III.”

Tier III research will improve capabilities for ecosystem-based assessments, including research, expanded monitoring, and development of new models to better predict spatial and temporal changes in populations and the impact of human activities on protected species. Tier III assessments will incorporate information on

- Behavior and physiology
- Multispecies interactions
- Linkages to oceanographic processes
- Food-web dynamics
- Population effects of sub-lethal natural and human impacts
- Market and non-market valuation
- Economic and sociocultural systems
- Biotoxins, pollutants, disease, and pathogens to address health of protected species and marine mammals as indicator species of environmental and human health.

Tier III assessments will ensure management decisions are based on the best available information, increasing the likelihood of achieving conservation mandates while reducing conflict and litigation and minimizing economic impacts. Their primary focus at this early stage will be on expanding knowledge of marine animal health and the effects of noise on marine mammals. However, they will also include partnering with other agencies and academia to integrate ecosystem considerations into existing research programs, develop future plans and priorities for research, and mine existing data sources to conduct ecosystem-level research.

Fisheries Management

Management of Federal fishery resources is entrusted to NMFS under numerous laws, treaties, and other mandates. We work to ensure that fisheries are maintained at productive levels to support sustainable fisheries and the ecosystems of which they are a part.

We work with the eight Regional Fishery Management Councils to end overfishing, reduce bycatch, conserve essential fish habitat, and rebuild depleted stocks through the development of fishery management plans and associated regulations. The Councils recommend management plans and amendments and we approve these management programs and implement and enforce needed regulations. Toward this end, we:

- Develop analytical documents to support rulemaking in concert with the Councils
- In coordination with the Councils, set new policies and revise existing policy on fishery management and economic and sociocultural issues
- Work with the Councils to set policy regarding the operation and administration of the Councils and appointment of Council members
- Seek improvements in fishing fleet and shoreside processing operations and, with the Councils, reductions in overcapacity in fisheries
- Manage a voluntary seafood inspection service to ensure compliance with all applicable food regulations
- Participate in negotiations of international agreements
- Support U.S. participation in regional fisheries management organizations and bilateral consultations
- Work to secure equitable fishing and trade opportunities for U.S. fishermen
- Manage foreign fishing permitting programs.

To ensure effective management of stocks throughout their range, we maintain cooperative partnerships with three Interstate Marine Fisheries Commissions, all coastal states, and five island territories and/or commonwealths. We also maintain liaisons with other nations on fisheries matters.

To meet our future goals, we will implement a number of strategies in the coming years. Our short- and mid-term strategies to ensure productive fisheries in the future are to

- Implement fully a regulatory quality improvement program
- Strengthen coordination of marine fisheries management and conservation between state and federal levels
- Increase opportunities for industry to improve economic performance
- Following input from the Councils and other stakeholders, issue guidance for ecosystem approaches to management
- Increase public understanding of our stewardship role
- Coordinate with the Councils and other stakeholders to recover all overfished stocks under effective rebuilding plans
- Implement the forthcoming Recreational Fisheries Strategic Plan.

Over the long term, we will seek to ensure that ecosystem approaches to management are applied in the conservation and management of federal, state, and international fisheries; that the public promotes stewardship of marine fisheries; and that fish stocks are maintained at productive levels to support sustainable fisheries and ecosystems.

Protected Species

The Protected Species Program (PSP) protects and recovers species through planning, regulation, partnerships, direct action, and outreach and education both domestically and internationally. NMFS is the lead federal agency for protecting and recovering marine and anadromous species under the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA). As such, the PSP falls entirely under our jurisdiction. Activities include

- Developing conservation actions for species approaching threatened or depleted status
- Listing species in need of protection under the ESA and categorizing stocks of marine mammals for levels of protection that will provide for future recovery
- Developing and implementing recovery and conservation activities
- Responding to stranding events and conducting a marine animal health program
- Developing publications and presentations and interacting in public forums for the purpose of outreach and education
- Preparing U.S. positions on issues and initiatives for international meetings
- Funding international conservation actions
- Transferring technology to international partners.

Over the next five years, our highest priority focus will be to stabilize or increase protected species populations and put ESA-listed species and depleted marine mammal populations on the road to recovery. This effort will require us to

- Complete required recovery, conservation, and take reduction plans
- Carry out recovery and conservation actions through partnerships
- Reduce the interactions of fisheries with protected species
- Achieve efficiencies in ESA section 7 consultations and ESA and MMPA permitting
- Implement proactive conservation efforts before species need to be listed under the ESA
- Improve education efforts.

While the main focus will be on issues that can be addressed domestically, we will expand international efforts to achieve recovery of species that spend a significant portion of their life cycle in international waters.

Over 60% of current funding is directed at funding partnership conservation, recovery, and co-management actions with coastal states, American Indian tribes, Alaska Natives, NGOs, universities, and various private entities. These partnership efforts will continue to leverage additional resources for conservation and are critical to achieving recovery of species.

We will strengthen partnerships internally through

- Development of joint conservation programs with the Coastal and Marine Resource Management program (National Marine Sanctuaries)
- Improvement of protected species data collection through the EOP
- Improvement of protected species research through the ERP.

The data collected, analyzed, and synthesized through the EOP and the research conducted through the ERP provide scientific information necessary for the implementation of sound and successful management strategies. Better information leads to management that is consistent with the nature of the problem and allows us to reach conservation goals while also reducing the risk of costly economic and sociocultural impacts.

Enforcement

Enforcement is a matrix program led by NMFS in partnership with NOS that provides services to ensure compliance with measures enacted to protect, restore, and manage coastal and marine resources. These services are delivered through the NMFS Office for Law Enforcement (OLE), a professional, accredited law enforcement agency. The Enforcement mission includes the provision of services through strategies that include investigations, patrol and inspections, and outreach and education.

Investigations are conducted by over 140 special agents stationed throughout the coastal region of the U.S. states and territories. Agents investigate both civil and criminal violations and may be responsible for up to 30 investigations each annually, depending on the scope, complexity, and disposition of the case. The duration and scope of cases may range from only a few hours to several years.

NMFS also uses extensive patrol and inspection systems. We employ only 17 uniformed enforcement officers, most of whom are assigned to monitor the Individual Fishing Quota (IFQ) system in Alaska. However, we hold cooperative enforcement agreements to provide thousands of hours in patrol and inspections services in nearly every U.S. coastal state and several territories. We now hold such agreements with 21 coastal states and three U.S. territories; they place over 2,000 state resource officers at our potential disposal. In addition to patrol services, automated surveillance is provided through the use of vessel monitoring systems, which currently monitor over 2,200 vessels. These services and systems also contribute to homeland security. Through OLE, NMFS participates in a broad array of homeland security initiatives, including the FBI's Joint Terrorism Task Forces.

We also use outreach and education to elicit voluntary compliance with resource protection measures. We have had great success with voluntary compliance: Most citizens who are familiar with such measures and who understand the potential harm from violating them respect the resources and comply. Outreach and education through classroom sessions, literature distribution, sign placement, discussions with industry, and the facilitation of partnerships with volunteer, governmental, and non-governmental groups are an investment in the future as people learn the importance of conservation.

Over the next five years, we will use the strategies described below to provide the enforcement services that support the expanding level of fisheries management plans, listed and protected species, import/export controls, international conventions and treaties, observer programs, and other responsibilities within our mission.

- Investigations – We will pursue an enhancement of investigative services through the advancement and implementation of computer and financial forensics, the application of advanced computer analysis, and the facilitation of international cooperation.
- Patrol, Monitoring and Inspections – We will pursue the advancement and expansion of strategies that serve as force multipliers in the areas of partnerships and use of technology through our “flagship” programs of State Cooperative Enforcement and Vessel Monitoring.
- Outreach and Education – We will pursue and implement expanded strategies that include non-traditional enforcement measures that facilitate cooperation, problem resolution, and compliance through use of the media, volunteer organizations, schools, industry, and the public.

Habitat

Habitat is a matrix program comprising activities from OAR, NOS, and NMFS that protects and restores coastal, marine, and Great Lakes habitats. The program plans, funds, and implements habitat protection and restoration projects; advances habitat science; provides technical information and conservation recommendations; and involves coastal communities, NGOs, and states in partnerships to protect and restore habitats and encourage stewardship of NOAA trust resources.

NMFS's habitat protection activities seek to avoid and minimize adverse impacts to living marine resource habitats. Many of these activities are implemented in close cooperation with NOS (dredging, natural resource damage claims, energy development implications), OAR (research initiatives), and NESDIS (environmental data layers, GIS products, IT support). They include:

- Reviewing and responding to proposals to develop or otherwise alter key habitats
- Improving diadromous fish access to historic habitats through dam removal and fish passage
- Developing and analyzing measures to reduce adverse fishing effects on essential fish habitat
- Working with stakeholders to develop ecosystem management plans
- Developing policies that improve regulation and management of habitat impacts.

NMFS participates in regional and national habitat restoration programs. We direct restoration planning, implementation, and monitoring for the Community-based Restoration Program, which undertook over 800 projects between 1996 and 2004. We serve as the Commerce Department representative to the Coastal Wetlands Planning, Protection and Restoration Act Task Force, which undertakes large-scale habitat restoration and protection in coastal Louisiana. We also serve as the primary source of restoration expertise for the Damage Assessment and Restoration Program. With NOS and the General Counsel's Office, we address the effects of oil spills, releases of toxic compounds, and ship groundings.

Over the next five years, we aim to expand our capabilities to implement large-scale protection and restoration initiatives through a place-based approach with a specific focus on urban estuaries. We will seek a leadership role among stakeholders and industry sectors, leverage protection and restoration efforts, and provide technical guidance (e.g., economics, bioeconomic modeling, and GIS technologies) to improve decision-making based on a foundation of science.

We will strive to

- Improve the general understanding of habitat functions and threats by assessing and conducting habitat analyses
- Develop models that enhance forecasting capabilities
- Establish priorities for habitat protection and restoration
- Monitor and evaluate restoration techniques
- Develop tools and methods to track success.

NMFS will expand efforts to infuse the best available information into policies, guidelines, models, and decisions that affect trust resources. We will pursue research partnerships to fill priority gaps in management plans and ecosystem approaches. We will implement an ecosystem approach to management that involves partners and stakeholders to protect and restore habitats that contribute to sustaining populations of fishery resources, and that reduces anthropogenic impacts on our Nation's coastal and marine resources.

Coral Reef Conservation

Coral reefs are the most diverse components of marine ecosystems—and among the most threatened. The NOAA Coral Reef Conservation Matrix Program, led by NOS, supports science and management to preserve, sustain, and restore coral reefs. NOAA has management responsibility for coral reefs in Federal waters and National Marine Sanctuaries. Activities include

- Implementing the Coral Reef Conservation Act and leading and coordinating U.S. coral reef conservation efforts, working closely with other Federal agencies, state and territory governments, and NGO partners
- Leading a comprehensive program to map and monitor U.S. coral reefs
- Increasing understanding of the ecological and oceanographic processes that govern the structure and function of coral reef ecosystems and their response to environmental stressors such as overfishing, pollution, climate change, and disease.
- Designing, evaluating, and adapting specific management decisions that sustain and restore coral reef ecosystems
- Conducting outreach and education to increase community knowledge and support for conservation and management actions.

NMFS implements nearly 40% of the NOAA Coral Reef Conservation Program budget and activities, mostly in Hawaii and the U.S. Pacific, and in Florida and the U.S. Caribbean. Coordinated planning and implementation across NOAA has allowed us to build on our strengths—the science capabilities of the Southeast and Pacific Islands Fisheries Science Centers and the management expertise and responsibilities of its Regional Offices—to support national efforts to conserve coral reef ecosystems.

With our partners, we conduct mapping, habitat characterization, and monitoring of coral reefs and associated ecosystems as well as targeted research to provide managers with scientific information and tools. We support a variety of efforts to develop and implement management solutions to address threats to coral reef ecosystems, especially overfishing, in partnership with Regional Fishery Management Councils, state and territory managers, and NGOs.

Over the next five years, our highest priority will be to support an integrated ecosystem management approach to the conservation of coral reef resources. To this end we will

- Support the national capability to monitor coral reefs that is needed to implement an ecosystem approach to management. In particular, NMFS and its partners will conduct coral reef ecosystem monitoring in National Marine Sanctuaries and remote island locations to complement existing state and territory monitoring programs.
- Reduce overfishing of coral reef resources in partnership with states, territories, and Fishery Management Councils
- Complete removal of major accumulations of marine debris in the Northwestern Hawaiian Islands
- Address deficiencies in our mapping, understanding, and protection of deeper tropical reefs and cold-water coral communities.

We will continue to be a key partner in developing an informed public and supporting targeted research and local initiatives to improve coral reef conservation.

Aquaculture

NMFS is the lead for NOAA's Aquaculture Matrix Program, which also includes OAR, NOS, and NESDIS. The program works to advance two long-term outcomes:

- Well-managed and productive marine aquaculture operations in the United States
- Worldwide adoption of environmentally sound marine aquaculture standards.

Achievement of these outcomes will increase seafood production and possibly support the replenishment of depleted stocks in a way that is both environmentally and economically responsible, both in the United States and internationally.

NMFS carries out the legislative and management aspects of the program as well as much of the research. In its execution, we use our legal/administrative capabilities (including rulemaking, permitting, and coordination); our scientific capabilities (including development of aquaculture systems for food production and stock enhancement, engineering of systems for high-energy offshore environment, and development of ecosystem and human health requirements and protocols for marine aquaculture); our education and outreach capabilities; and our capability to transfer technologies for commercial production, enhancement, and recovery of endangered species to the public and private sector (including pilot and demonstration projects).

In addition to working with other NOAA line offices and programs (including Enforcement and General Counsel) through the Aquaculture Matrix to achieve program goals and objectives, we also work with other related Department of Commerce programs and the Joint Subcommittee on Aquaculture.

Over the next five years we will:

- Develop a comprehensive understanding of marine aquaculture economics and environmental issues associated with aquaculture to provide reliable information and analyses for use in decision-making
- Continue to develop new offshore aquaculture legislation for the Exclusive Economic Zone that will establish a fully operational regulatory infrastructure for offshore aquaculture that includes a streamlined permitting process, siting criteria, and pre-approved zones for offshore aquaculture
- Develop and improve marine species culturing systems for commercial and enhancement purposes
- Contribute to a public understanding of NOAA's aquaculture program by providing access to information on aquaculture research and industry issues.

NOAA Mission Goal: Understand Climate Variability and Change to Enhance Society’s Ability to Plan and Respond

Climate shapes the environment, natural resources, economy, and social systems that people depend upon worldwide. Major climatic events can have substantial impacts on marine ecosystems, leading to serious economic, social, and ecological consequences for living marine resources and society. To properly manage its trust resources, NMFS must measure, understand, and predict the impacts of climate variability and change on marine ecosystems. Our efforts and actions are guided toward delivering trusted, timely climate information to those who need and use it.

NOAA Outcomes	NOAA Strategies	NOAA Programs Executed Wholly or in Part by NMFS
A predictive understanding of the global climate system with quantified uncertainties sufficient for making informed and reasoned decisions on time scales of weeks to decades	Improve the quality and quantity of climate observations, analyses, interpretation, and archiving by maintaining a consistent climate record and by improving our ability to determine why changes are taking place.	<i>Climate and Ecosystems</i>
	Develop the ability to predict the consequences of climate change on ecosystems by monitoring changes in coastal and marine ecosystems, conducting research on climate-ecosystem linkages, and incorporating climate information into physical-biological models.	

Italics represent programs in which other NOAA line offices participate.

Our activities under this goal support the following NOAA performance objectives:

- Understand and predict the consequences of climate variability and change on marine ecosystems
- Increase number and use of climate products and services to enhance public and private sector decision-making.

We participate in only one program under this goal.

Climate and Ecosystems

The Climate and Ecosystems Program—a matrix program led by NMFS in partnership with NOS, OAR, and NESDIS—is just now being established. When implemented, it will provide resource managers the knowledge and tools to adapt to the consequences of climate change to marine and coastal ecosystems. Local- and regional-scale place-based demonstration projects will be conducted to link NOAA climate information with NOAA resource management information to predict the status of marine and coastal living resources in future climates.

Currently, all funding for the Climate and Ecosystems Program resides within NMFS, although we anticipate that other line offices ultimately will participate as well. We will

- Focus studies to understand and predict climate-induced changes on marine ecosystems with critically important fishery stocks that are sensitive to climate variability
- Take an ecosystem approach by investigating the physical and biological controls on a system and how these are affected by climate variability and change
- Develop biophysical indicators and models that meet the needs of managers to adapt to predicted climate-induced changes in living marine resources.

To aid in the development and verification of these indicators and models, we will continuously monitor changes in marine ecosystems through a network of in-situ and remote observing systems. We coordinate the planning of the Climate and Ecosystems Program with NOS and NESDIS, the other line offices involved in the program. NMFS studies will be conducted in partnership with OAR scientists and will leverage other NOAA studies.

Over the next five years we will

- Determine variables and indices that characterize climate impacts on ecosystems
- Develop models to forecast ecosystem responses to climate variability
- Provide information to managers and stakeholders to allow them to adapt to climate-induced changes in marine ecosystems
- Expand the Climate and Ecosystems Program to other geographic regions.

Provide Critical Support for NOAA's Mission

Strong, efficient, and effective leadership and support services within NMFS are essential to supporting NOAA's goals and programs. These qualities must also be able to adapt to evolving needs while improving our capability to support mission goals.

We are committed to organizational excellence through executive leadership, resource planning and management, administrative support, information technology, and specialized project support. We will also continue to improve our international affairs coordination and support, education/outreach/public affairs support, and research and technology applications to ensure effective management and communication.

Over the next five years we will

- Improve our annual budget estimate submission and associated documentation
- Continue oversight and management of NMFS Programs
- Work toward error-free annual financial audits
- Make new investments to improve our IT information sharing and storing capabilities
- Improve our IT security
- Continue to invest in maintaining our facilities to ensure a safe environment for our staff
- Implement a comprehensive agency-wide training program.

We must continue to have the scientific, technical, and administrative expertise necessary to maintain our leadership. We will continue our efforts to develop and sustain a high-performing, diverse, and flexible workforce aligned with our requirements in the face of the anticipated retirement of many of our most knowledgeable employees. We will implement approaches to address the knowledge, skills, and competencies that may be lost soon, especially in the areas of stock assessment, economics, and sociocultural research and analysis. Potential approaches include teaming junior staff members with senior ones, developing career paths for entry-level administrative positions, expanding e-learning to all employees, and increasing the recruitment of students interested in future positions with NMFS. We will continue to educate the workforce about diversity while creating an environment that ensures opportunity for all employees. We will also strengthen partnerships with Minority Serving Institutions.

New investments in technology are needed to take advantage of high-speed telecommunications, web-based technologies, and collaborative analysis techniques to streamline implementation of our mission and provide efficient services to the American public. This will enable rapid data analysis, creation of mobile wireless networks for use in the field, high-speed wide-area network accessibility for Internet-based collaboration tools and conferencing on highly secure networks, and upgrades for our six Regional Data Centers to support distributed relational databases and geo-spatial data warehouses. NMFS will also improve its IT security with full implementation of authentication systems.

New ships are needed to replace outdated ships that are costly to run, have limited capabilities, and break down frequently. New vessels are larger, have state-of-the-art technical capabilities, and are engineered to be quieter to improve stock assessments and behavior work. Increased capacity will allow multiple missions during a single cruise. Finally, they will be more reliable, needing little down time for repairs. The ships' expanded capabilities, efficiencies, and reliability will increase survey days at sea by at least 10% over existing capacity. We also support improvements to aviation operations that enhance their involvement in natural resource surveys.

Implementation and Evaluation

In accordance with the Government Performance and Results Act (GPRA), the Performance Assessment Review Tool (PART), and the directives of the President's Management Agenda (PMA), NMFS reports its results annually based on a set of outcome performance measures that reflect the NOAA performance objectives. We believe it is important to evaluate the success of our stewardship activities according to the positive effects they have on the condition of the resources we manage. However, our performance is influenced by many factors that are partially or wholly beyond our control. Examples of such factors include

- Extreme weather and climate events like hurricanes or El Niño events
- Climate change
- Oil and chemical spills and other environmental catastrophes
- Agriculture practices
- National and global economic trends
- Land development
- Fishing practices of other nations.

Of course, our extensive assessment and prediction activities and capabilities, as well as our planning activities, minimize the effects of these factors on meeting our performance objectives. But the ultimate success of our stewardship is determined in large part by the natural environment and human behavior, neither of which can be controlled absolutely.

Nevertheless, we are optimistic about the future, and we believe that, despite the challenges, Americans do and will continue to enjoy the benefits of diverse and healthy marine ecosystems. When we truly have an informed public using an understanding of coasts and oceans to make social and economic decisions, that vision will be fully realized.

NMFS FY 2006 GPRA Performance Measures in the Context of NOAA Outcomes and Performance Objectives

NOAA Outcomes	NOAA Performance Objectives	NMFS FY2006 GPRA Measures¹	FY 2003 Baseline	FY 2010 Estimated Target
Healthy and productive coastal and marine ecosystems that benefit society	Increase number of fish stocks managed at sustainable levels	Number of overfished major stocks of fish	44	To be discontinued in FY07
		Number of major stocks with an "unknown" stock status	94	To be discontinued in FY07
	Increase number of protected species that reach stable or increasing population levels	Number of protected species designated as threatened, endangered or depleted with stable or increasing population levels (proposed)	18	38
		Number of stocks of protected species with adequate population assessments (proposed)	52	110
A well informed public that acts as a steward of coastal and marine ecosystems	Increase number of regional coastal and marine ecosystems delineated with approved indicators of ecological health and socio-economic benefits that are monitored and understood	[See footnote ²]		
	Increase number of habitat acres conserved or restored	Number of habitat acres restored (annual/cumulative)	5,200/ 11,020	4,300/ 40,704
	Increase portion of population that is knowledgeable of and acting as stewards for coastal and marine ecosystem issues	[See footnote ²]		

¹ The current GPRA Measures were submitted with the NOAA FY 2006 budget to the Department of Commerce. We are refining these measures with the goal of creating fewer, higher-level GPRA measures for FY 2007. We have a body of Corporate Performance Measures that includes both the GPRA measures and the performance measures that support GPRA measures.

² These are new objectives therefore performance measures will be developed or selected to represent these objectives. They will not necessarily be GPRA measures.

GLOSSARY

Biodiversity—The variability among living organisms from all sources including, *inter alia*, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems (from the Biodiversity Convention)

Bycatch—Fish which are harvested in a fishery but which are not sold or kept for personal use, and includes economic discards and regulatory discards, but not fish released alive under a recreational catch and release fishery management program (from the MSFCMA)

Capability—The ability to do something with the capacity you have; the capacity to be used, treated, or developed for a specific purpose.

Ecosystem—A geographically specified system of organisms, the environment, and the processes that control its dynamics. Humans are an integral part of an ecosystem.

Ecosystem Approach to Management—Management that is adaptive, is specified geographically, takes into account ecosystem knowledge and uncertainties, considers multiple external influences, and strives to balance diverse social objectives

Endangered Species Act (ESA) —A statute enacted in 1973 to conserve species and the ecosystems on which they depend. Species at risk of extinction are listed as “threatened” or “endangered,” or as “candidates” for listings. Recovery plans are prepared to identify threats to species and the actions necessary to remove the threats.

Environment—The biological, chemical, physical, and social conditions that surround organisms.

Essential Fish Habitat (EFH) —Those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (from the MSFCMA)

Exclusive Economic Zone (EEZ) —An area which extends from the seaward boundaries of the coastal states (3 nautical miles, in most cases) to 200 miles off the coast of the United States. Within this area, the United States claims and exercises sovereign rights and exclusive fishery management authority over all fish and all Continental Shelf fishery resources.

Fishery—One or more stocks of fish which can be treated as a unit for purposes of conservation and management and which are identified on the basis of geographical, scientific, technical, recreational, and economic characteristics; and any fishing for such stocks (from the MSFCMA)

Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) —A statute enacted in 1976 primarily to establish an Exclusive Economic Zone (see definition above) in which foreign fishing could be controlled, and to set up a conservation and management structure for U.S. fisheries. Senator Ted Stevens’ name was appended to the title in 1996.

Marine Mammal Protection Act (MMPA)—A statute enacted in 1972 to protect marine mammals and their habitat. These include whales, dolphins, seals, sea lions, walruses, and many others.

Mission Goal —An elaboration of the mission statement, developing with greater specificity how an agency will focus its mission. The NOAA Strategic Plan states NOAA’s four Mission Goals.

Outcome —An end result, both expected and unexpected, of the customer’s use or application of the organization’s outputs.

Overfishing—A rate or level of fishing mortality that jeopardizes the capacity of a fishery to produce the maximum sustainable yield on a continuing basis (from the MSFCMA)

Performance Measure —A structured statement that describes the means by which actual outcomes and outputs are measured against planned outcomes and outputs. Performance measures consist of four parts: indicator, unit of measure, baseline, and target.

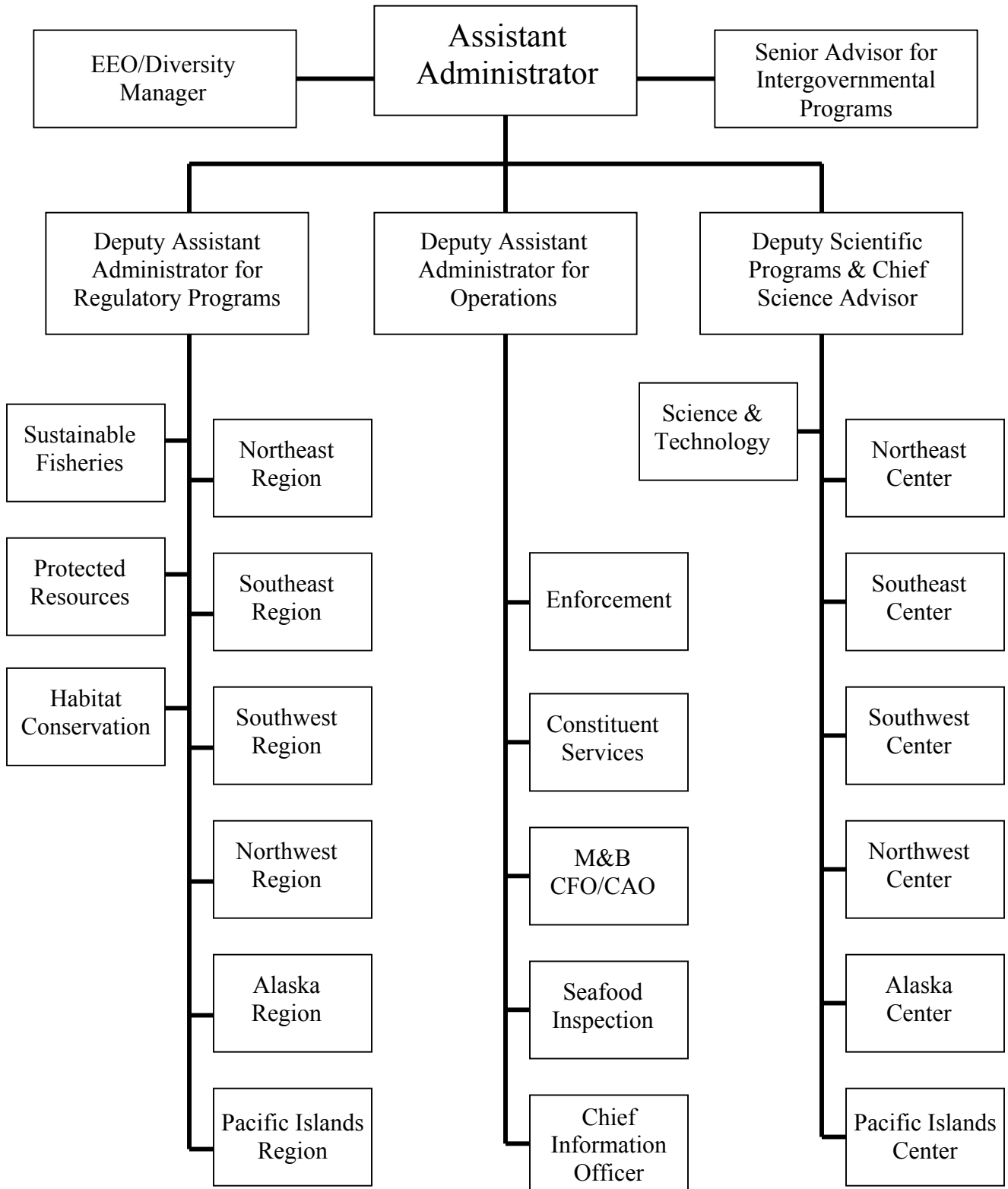
Performance Objective—A further elaboration of an outcome, with greater specificity as to the expected result. Similar to a performance measure but without any indicator, unit of measure, or quantification.

Program—A planned, coordinated set of activities designed to achieve a desired outcome. The defined effort with the purpose of meeting existing requirements or providing a new or improved capability to meet stated requirements. These are officially established by the NOAA Executive Council.

Protected Species—Any species protected by either the ESA or the MMPA, and which is under the jurisdiction of NMFS. This includes all threatened, endangered, and candidate species, as well as all cetaceans and pinnipeds excluding walruses. This term also includes seabirds, which NMFS has a responsibility to protect.

Stock (of fish)—A species, subspecies, geographical grouping, or other category of fish capable of management as a unit (from the MSFCMA)

NMFS Organization Chart



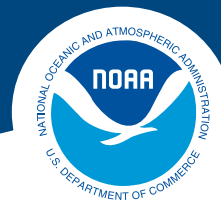
2007 Business Report



NOAA

NOAA FISHERIES SERVICE

Science, Service, Stewardship





NOAA Fisheries Service Mission:
Stewardship of living marine
resources through science-based
conservation and management
and the promotion of healthy
ecosystems.

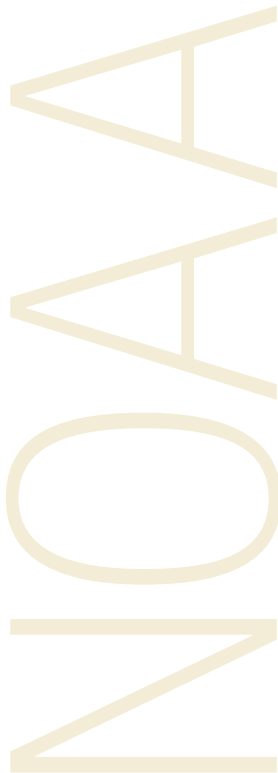
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William T. Hogarth, Ph.D.
Assistant Administrator for Fisheries
National Marine Fisheries Service

January 2001 – December 2007



By the time this 2007 Business Report is released, I will no longer be with NOAA. I retired December 31, 2007 to become the Dean, College of Marine Sciences at the University of South Florida. I did, however, want to provide you with my final thoughts on what I believe was an outstanding year for NOAA Fisheries Service.

The year 2007 began with NOAA Fisheries Service moving forward to implement the broad changes made by the 109th Congress when it reauthorized the Magnuson-Stevens Fishery Conservation and Management Act at the end of 2006. The spirit of teamwork and collaboration that led to its passage has carried forward to implementation, and I believe you will agree that we have made substantial progress toward reaching the many goals the Act has set for us.

Chief among those goals is halting overfishing by 2010 and reducing bycatch mortality. Working with our partners, (regional fishery management councils, the states and the regional fishery commissions, the fishing industries and conservation groups), we have been able to develop and implement quota systems and other plans that will halt overfishing within that timeframe. We also have developed better fishing gear and techniques that are lowering bycatch in many fisheries.

There are some key projects that NOAA Fisheries Service worked hard to complete in 2007, but remain unfinished, such as Congressional passage of legislation to allow offshore aquaculture in the United States, and stronger international conservation measures for Atlantic bluefin tuna. The United States needs to become more self-sufficient in producing seafood, and the only way to do so is through more aquaculture. The U.S. government has an opportunity to become a world leader in sustainable and responsible aquaculture production. We have an obligation to pursue aquaculture as a form of food production and safety for our citizens.

Since I began as the assistant administrator, NOAA Fisheries Service has become a more transparent, open, and accessible agency with more face-to-face meetings with stakeholders and the implementation of an open door policy. The agency also has done a good job in promoting the importance of the domestic seafood industry and related health messages to the public. We were able to help the fishing industry in the wake of the damage inflicted on marine fisheries and habitat caused by Hurricanes Katrina and Wilma. We have forged new partnerships with the Food and Drug Administration and other federal agencies to increase seafood monitoring. We have demonstrated through a study conducted by the National Academy of Sciences that the benefits of seafood outweigh the risks. I'm proud of our investment in sound research that gets to the bottom line on the issue of seafood and health; that seafood is nutritious, and people should eat at least two servings per week.

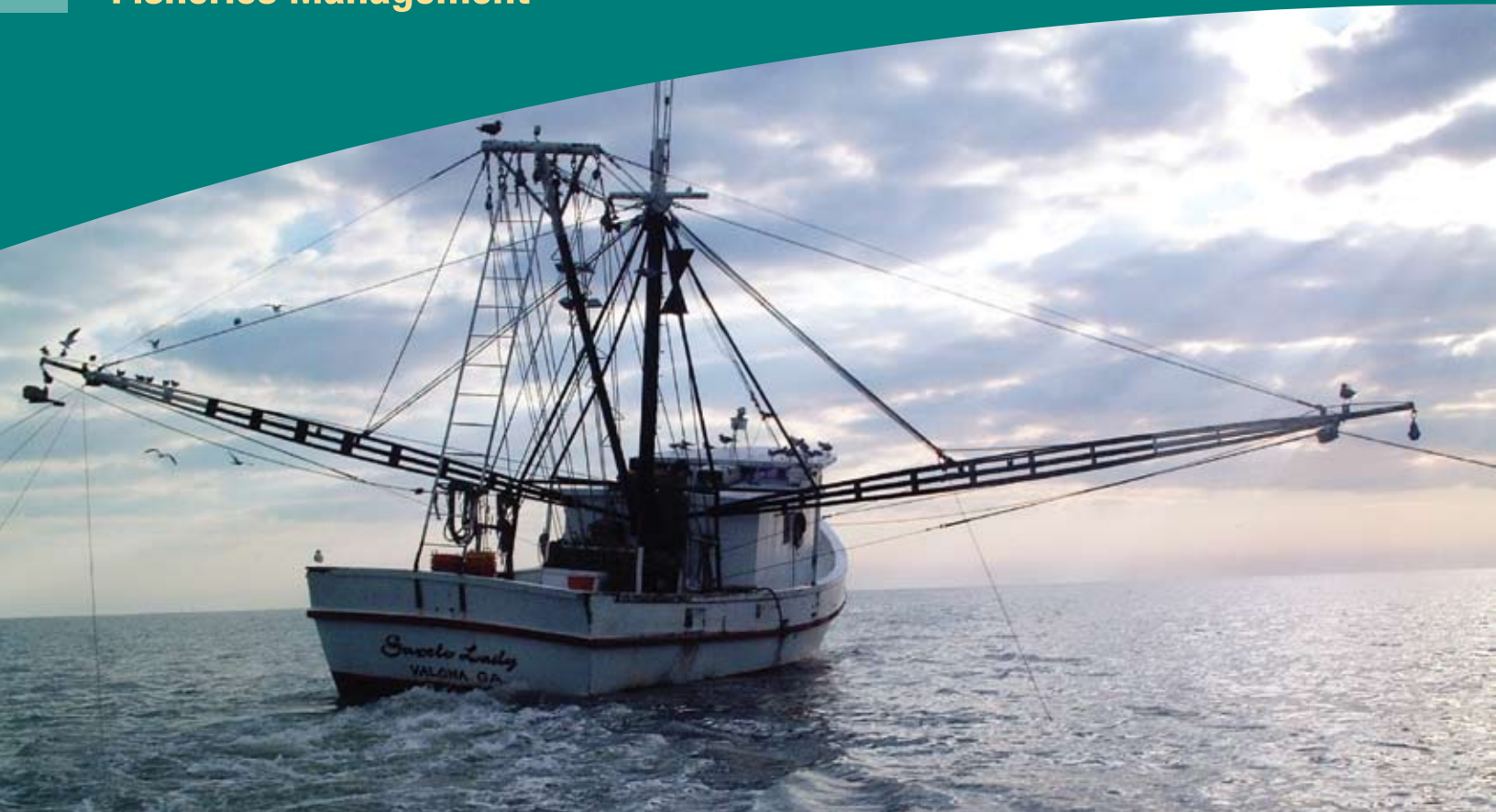
As 2007 closed, so did my tenure here at NOAA Fisheries Service. It's been a great run filled with progress and positive change. Although there are things that I did not complete, I believe I'm leaving U.S. fisheries in better condition than I found them. I'd like to thank the Administration for this once in a lifetime opportunity and for giving me the support to get the job done.

I'd like to say thank you to everyone who has made my seven years as assistant administrator successful. I admit there were times when obstacles seemed insurmountable, but communication and collaboration moved us forward. My inspiration over the years has come from the hard working staff of NOAA Fisheries Service. It is their success and hard work that is reflected in this report. Although I stepped down as the assistant administrator at the end of the year, I will continue to serve as the U.S. Commissioner and Chair of the International Whaling Commission in 2008.

Please take a few minutes to review this report that highlights the many successes of the men and women of NOAA Fisheries Service. If you have any comments or questions about this year's business report, please contact Deputy Assistant Administrator John Oliver.

William T. Hogarth





Ensuring sustainable harvest of U.S. fish stocks benefits the nation by providing a sustainable supply of wild seafood, socially and economically vibrant fishing communities, and healthy marine ecosystems.

Gearing up for Implementation of the Magnuson-Stevens Reauthorization Act

Magnuson-Stevens Act Reauthorized

The Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006 (MSRA) was signed on January 12, 2007. The reauthorized Act contains significant new provisions to end overfishing; promote market-based approaches to fisheries management; improve the science used in fisheries management; improve recreational data collection; enhance international cooperation in fisheries management; and address illegal, unreported, and unregulated fishing as well as bycatch of protected living marine resources. Especially notable is the requirement to establish an annual catch limit (ACL) for each fishery, which for the first time creates a mandate with a timetable to end overfishing. The Act included over

100 requirements for reports, studies, Secretarial determinations, and other activities to be completed by specific dates. Throughout 2007, NOAA has made important progress on many of these, such as meeting with Regional Fishery Management Councils and State Marine Fisheries Directors, holding public meetings on ACL guidelines and the environmental review processes, and holding a roundtable with conservation organizations and a workshop on ACL data needs.

Ending Overfishing with Annual Catch Limits

Ending overfishing is a top priority for NOAA Fisheries Service and the Bush Administration. Overfishing is the one factor influencing the status of U.S. fish stocks which fisheries managers can control, unlike environmental variability and pollution. Ensuring sustainable harvest of U.S. fish stocks benefits the

nation by providing a sustainable supply of wild seafood, socially and economically vibrant fishing communities, and healthy marine ecosystems. In 2006, Congress also made clear that ending overfishing was a national priority when it included requirements in the Magnuson-Stevens Reauthorization Act to end and prevent overfishing through the use of annual catch limits (ACLs) and measures to ensure accountability. These requirements provide fisheries managers with a new management framework for ending overfishing.

ACLs will be based on science and set at levels so that overfishing does not occur and accountability measures will ensure that ACLs are effective at preventing overfishing. In February, NOAA Fisheries Service began developing guidelines for these requirements, which will be added to the National Standard 1 Guidelines. NOAA Fisheries Service solicited public comments between February and March and posted the summary report to the Agency's website in July. The proposed guidelines should be available for public comment in early 2008.

Integrating MSRA and NEPA Compliance: NOAA Fisheries Service Develops Proposal for Improved NEPA Process

In 2007, NOAA Fisheries Service embarked on a congressionally mandated mission to improve and streamline fishery management compliance with the National Environmental Policy Act (NEPA). As required by law, NOAA Fisheries Service has been in consultation with the Council on Environmental Quality (CEQ) and the Fishery Management Councils, and has solicited public input in the development of the revised procedures.

In the spring of 2007, NOAA Fisheries Service and the Councils conducted two separate outreach programs seeking public response. NOAA Fisheries Service posted a series of trigger questions on its website requesting public input on how the process should be revised. At about the same time, the Councils, through their Council Coordination Committee (CCC), developed a separate proposal for revised procedures. Each Council conducted a listening session on the CCC proposal, and the CCC provided those additional comments to NOAA Fisheries Service.

NOAA Fisheries Service staff considered Council and public input, and continue efforts to develop specialized fishery management NEPA regulations based on the existing CEQ NEPA regulations. The proposed guidelines should be available for public comment in 2008.

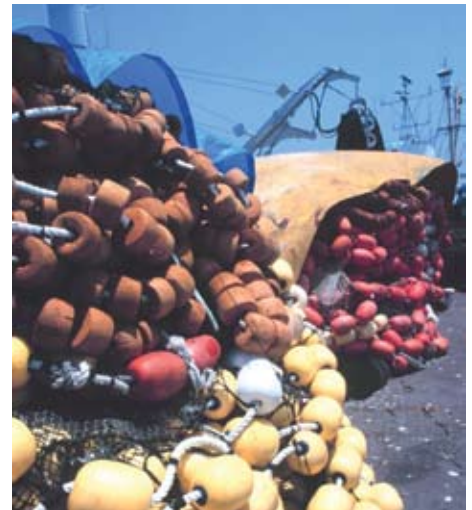
MSRA Workshop Held

On September 25-26, 2007, NOAA Fisheries Service hosted a public workshop on the Magnuson-Stevens Reauthorization Act. The workshop included brief panel presentations, followed by breakout sessions of small facilitated groups. Discussions focused on five issues: Determining Optimum Yield, Ecosystem-Based Management, International Fisheries, Bycatch Management and Aquaculture.

Bycatch Reduction Program to Develop Conservation Engineering Solutions

Section 316 of the MSRA required the Secretary of Commerce, in cooperation with the Regional Fishery Management Councils and other interests, to establish a Bycatch Reduction Engineering Program (BREP) by mid-January 2008. The BREP will develop technological devices and other changes to minimize bycatch, seabird interactions, bycatch mortality, and post-release mortality in federally managed fisheries.

In 2007, NOAA Fisheries Service embarked on a congressionally mandated mission to improve and streamline fishery management compliance with the National Environmental Policy Act (NEPA).



The BREP will: be regionally based; be coordinated with NMFS cooperative research projects; provide information to fishery participants to encourage adoption of BREP technologies; and consult with Councils to incorporate BREP results in fishery management plans.

Section 316 also promotes incentives to reduce bycatch and seabird interactions and promotes projects in cooperation with industry to reduce seabird interactions. The BREP should greatly expand bycatch reduction work carried out by NOAA Fisheries Service in recent years, such as tagging thresher sharks to determine fishing mortality after being released from fishing gear.





Efforts to Address IUU Fishing

NOAA Fisheries Service has been working through its membership in several international organizations to address a growing trend worldwide of illegal, unreported and unregulated fishing (IUU fishing). These fishing activities by vessels that do not follow applicable laws and regulations include the reflagging of fishing vessels to evade controls and the failure to report catches or to misreport.

These irresponsible fishing activities pose a significant threat to the effective conservation and management of fish stocks resulting in adverse consequences for fisheries and for the communities that depend on them. This year, the United States finalized its national plan of action to address IUU fishing. The Department of State coordinated this effort, working with NOAA, the Coast Guard, and other federal agencies.

IUU fishing has implications for the quality of scientific data collection, the problem of bycatch, and the safety of other vessels. Many international organizations have already taken significant steps to address the threat of IUU fishing, including mandatory international vessel registries and a trade sanction process to penalize nations that allow their vessels to participate in IUU fishing.

NOAA Fisheries Service, on behalf of the U.S. Government, is designing a system that will implement our obligations to apply these international decisions to vessels that have been included on IUU vessel lists. In the meantime, NOAA Fisheries Service has been advising the U.S. industry to be aware that many international organizations have already taken action by creating IUU vessel lists and restricting port access.

Community-Based Restoration Program Reauthorized

The NOAA Community-based Restoration Program (CRP) is a financial and technical assistance program authorized under the MSRA, which helps communities implement sound habitat restoration projects. The CRP awards millions of dollars to national and regional partners and local grassroots organizations every year. Under a competitive review process, projects are selected for funding based on ecological benefits, technical merit, level of community involvement, and cost-effectiveness. Although the CRP program encourages meeting a minimum one-to-one match, projects have typically leveraged \$3 to \$5 non-federal dollars for every NOAA dollar invested.

Ending Overfishing and Rebuilding Overfished Stocks

Assessment Finds Atlantic Monkfish No Longer Overfished

Due to considerable uncertainty regarding the status of the Atlantic monkfish stock and concern about its health, NOAA Fisheries Service conducted a stock assessment as part of a workshop on data poor stocks. The information obtained from the stock assessment allowed new biological reference points to be developed based on revised yield-per-recruit analysis and a new assessment model that incorporates multiple survey indices and catch data. Based on these new reference points, overfishing is not occurring and monkfish would not be overfished. The Councils must adopt, and NOAA must approve, a modification to the monkfish fishery management plan in order to replace the existing biological reference points with those developed in the assessment. Atlantic monkfish has three years remaining in its rebuilding plan.

Irresponsible fishing activities pose a significant threat to the effective conservation and management of fish stocks resulting in adverse consequences for fisheries and for the communities that depend on them.

Seasonal Bottomfish Closures in the Main Hawaiian Islands to Address Overfishing

In response to overfishing of bottomfish in the Main Hawaiian Islands, NOAA Fisheries Service and the State of Hawaii closed the waters of the Main Hawaiian Islands to fishing for seven snapper and grouper species (onaga, ehu, gindai, opakapaka, kalekale, lehi, and hapuupuu) from May 1 - September 30, 2007. Both commercial and non-commercial fishing for these species was prohibited during the closed season. New conservation measures are under consideration, including catch limits, seasonal closures, and new permitting and reporting requirements.

New Measures to Keep Summer Flounder Rebuilding on Track

On January 19, 2007, NOAA Fisheries Service published an emergency rule to revise the 2007 summer flounder total allowable landings (TAL). The revised TAL of 17.11 million pounds was an increase from the 12.98 million pound TAL implemented on January 1, 2007, and reflected an extension of the rebuilding timeframe for summer flounder authorized in the MSRA. The MSRA provided a 3-year extension of the 10-year summer flounder rebuilding timeframe; provided that certain criteria were met (including that overfishing was not occurring). Utilizing a conservative 75-percent probability of success, NOAA



U.S. consumers spent an estimated \$65 billion for fishery products in 2005. That total includes \$20.5 billion for home consumption and \$44.5 billion for restaurants, etc.

Source: Fisheries of the United States 2005 (Published February 2007)

determined that the 17.11 million pound TAL would meet the criteria to rebuild the stock to the target biomass no later than January 1, 2013, the end date of the extended rebuilding timeframe. This emergency rule was extended on July 19, 2007, through the end of 2007.

Rebuilding Plans Revised for Seven Pacific Groundfish Species

NOAA Fisheries Service has modified the rebuilding plans for seven overfished groundfish species: bocaccio, canary rockfish, cowcod, darkblotched rockfish, Pacific Ocean perch, widow rockfish, and yelloweye rockfish. Management measures for 2007-2008 are intended to achieve but not exceed optimum yields; prevent overfishing; rebuild overfished

species; reduce and minimize the bycatch and discard of overfished and depleted stocks; provide harvest opportunity for the recreational and commercial fishing sectors; and, within the commercial fisheries, achieve harvest guidelines and limited entry and open access allocations for non-overfished species. The rebuilding



plans are supported by 2007-2008 management measures for groundfish taken in the U.S. exclusive economic zone off the coasts of Washington, Oregon, and California. Together they are intended to rebuild overfished stocks as soon as possible, taking into account the status and biology of the stocks, the needs of fishing communities, and the interaction of the overfished stocks within the marine ecosystem.

Market Based Management

Guidance for Limited Access Privilege Programs

During 2007, NOAA Fisheries Service has been working in partnership with the Regional Fishery Management Councils to continue our joint efforts to increase the use of Limited Access Privilege Programs (LAPPs). The Office of Policy worked with internal and external technical contributors to develop a NOAA Technical Memorandum entitled “The Design and Use of Limited Access Privilege Programs.” This non-binding technical advice evaluates the relative pros and cons of various LAPP approaches and includes options available to address general questions about the future use of LAPPs given past domestic and international experiences. The Office of Sustainable Fisheries has begun the development of a rulemaking process to provide legal guidance on the requirements in the LAPP provisions of the MSRA. In August and September 2007, scoping was conducted that requested input from stakeholders on which portions of the LAPP provisions have generated questions and the need for guidance.

Final Rule Establishes Red Snapper IFQ Program

NOAA Fisheries published a final rule to implement Amendment 26 to the Fishery Management Plan for Reef Fish of the Gulf of Mexico. Amendment 26 establishes an individual fishing quota (IFQ) program for the commercial red snapper sector of the reef fish fishery in the Gulf of Mexico. Initial participants in the IFQ program will receive percentage shares of the commercial quota of red snapper based on specified historical landings criteria. The percentage shares of the commercial quota will equate to annual IFQ allocations. Both shares and IFQ allocations will be transferable. The intended effect of this rule is to manage the commercial red snapper sector of the reef fish fishery to preserve its long-term economic viability and to achieve optimum yield from the fishery.

Georges Bank Cod Fixed Gear Sector Created

In 2004, Amendment 13 to the Northeast Multispecies Fishery Management Plan (FMP) established a process for the formation of sectors and a process for annual approval of proposed sector operations. Framework Adjustment 42 to the FMP created the Fixed Gear Sector, the second approved sector of the FMP, in 2006. Because Framework 42 was approved mid-way through the 2006 fishing year, only one vessel participated in the Fixed Gear Sector during that fishing year. In the current 2007 fishing year, 16 vessels are participating in the Fixed Gear Sector and are projected to fully harvest their allocated 777.1-metric ton total allowable catch (TAC) of cod. This allocation of cod equates to 9.16 percent of the total 2007 target cod TAC for the fleet. The Fixed Gear Sector has submitted

NOAA Fisheries Service continues to expand and enhance its use of Limited Access Privilege Programs (LAPPs) in the North Pacific.

their proposed operations plan for the 2008 fishing year, including a roster of 33 vessels. Due in part to the success of the current two sectors, the Council is considering inclusion of additional new sectors in Amendment 16, scheduled for implementation on May 1, 2009.

Gulf of Alaska Rockfish Program

NOAA Fisheries Service continues to expand and enhance its use of LAPPs in the North Pacific. In 2007, the Alaska Region established a quota-based management program for multi-species rockfish trawl fisheries in the Central Gulf of Alaska. The LAPP provides exclusive harvest privileges, or quota, to harvesters. Quota shares can be traded among participants, allowing fishermen to use an open market to buy or sell shares as necessary for their fishing operations.

Congress provided NOAA Fisheries Service general authority to implement this program — the details of the LAPP were developed after several years of collaborative efforts with the North Pacific Council, the fishing industry, and other public participants. Shore-based trawl catcher vessels and offshore trawl catcher/processor vessels are included in the program.

In the first year of fishing under the new management system, fishermen met many of the goals set for the program, including: keeping harvests below established catch limits; spreading catch throughout a

longer portion of the year; improving handling and fish quality resulting in better dockside prices; allowing harvesters to avoid dangerous weather by reducing the incentives to race for fish because their allocation is exclusive and guaranteed; coordinating deliveries to processing facilities thereby improving their operating efficiency; and reducing bycatch rates of non-target species.

NOAA Fisheries Service also improved the data collection and monitoring of this fishery by expanding the use of onboard observer coverage, video monitoring, onboard scales, and real-time electronic catch reporting.

FishWatch Developed to Aid Consumers

NOAA Fisheries Service has developed a new consumer information product called FishWatch which was launched in August, 2007. Unveiled at the Great American Seafood Cook-off in New Orleans, the initial reaction from consumers to the internet-based information was tremendous. More than 25,000 visits to the site were recorded in the first week, and the site continues to receive significant consumer attention.



At the launch, the web site contained information on 25 key species, as well as a number of background pages that explored many topics from Seafood and Health to an essay on how Fisheries Management works. Since then, an additional 11 species have been added, bringing the total to 36 species by the end of 2007.

Minimizing Bycatch

New Requirements to Address Bycatch in Atlantic Shark Fishery

NOAA Fisheries Service published a final rule on February 7, 2007, that requires participants in the Atlantic shark bottom longline fishery to operate fishing gear and follow protocols to increase the survival rates of sea turtles and other protected species caught in longline fisheries. Shark fishermen (gillnet and longline) are also now required to attend safe handling and release workshops that provide hands-on experience using this gear. This will allow protected resources and non-target species caught on shark bottom longline gear to be disentangled from fishing gear and, if appropriate, to have fishing hooks removed.

Measures implementing the Atlantic Large Whale Take Reduction Plan were finalized in October 2007, and include additional restrictions placed on shark gillnet fishermen. The rule prohibits gillnet fishing within the Southeast U.S. Restricted Areas during annual periods that coincide with the right whale calving season. Shark gillnet fishing is allowed within certain portions of the calving grounds, however, restrictions on shark gillnet gear are in place to reduce the probability of any interactions with Atlantic right whales.

In the fall of 2007, NOAA Fisheries Service requested public comment on a new shark fishery management plan. This rule proposed several changes to the Atlantic shark fishery in light of new stock assessments, including a reduction in shark fishing effort and reduced annual quotas. The proposed rule is also expected to reduce interactions with protected resources, prohibited sharks, and other non-target species in shark longline and gillnet gear.



Emergency Rule to Reduce Haddock Discards

In response to a New England Fishery Management Council request, the Secretary of Commerce, on August 10, 2007, implemented an emergency action to lower the minimum size of haddock to 18 inches for vessels fishing in the Gulf of Maine and on Georges Bank (GB). Because of a 19 inch size limit, fishermen were forced to discard large numbers of haddock that were just under the minimum size. The underlying reason for these discards is that there is a very large (2003) year class of haddock, the largest since 1963. However, it is growing more slowly than scientists anticipated. The temporary 18-inch minimum size limit enabled a larger fraction of the haddock catch to be landed until the haddock population grows to 19 inches.



NOAA Fisheries Service Northwest Science Center scientists are providing compelling suggestions for helping consumers manage the benefits and risks of eating seafood.

Although GB haddock is overfished, overfishing is not occurring. In recent years, less than 50 percent of the target Total Allowable Catch has been harvested. Allowing fish that would otherwise be discarded to be landed is not expected to increase fishing mortality, because there is limited selectivity in the gear used to catch haddock. NOAA Fisheries Service has monitored this fishery closely and there is evidence of a decline in the discard rate and no increase in fishing effort. The emergency rule has been extended into 2008.

New Fishing Restrictions to Address Overfishing of Red Snapper

NOAA Fisheries Service published a temporary rule on April 2, 2007, to reduce fishing mortality on red snapper by reducing harvest and bycatch levels. The regulations reduce the commercial and recreational quotas for red snapper, reduce the commercial minimum size limit for red snapper, reduce the recreational bag limit for Gulf red snapper, prohibit the retention of red snapper under the bag limit for captain and crew of a vessel operating as a charter vessel or headboat, and establish a target level of reduction of shrimp trawl bycatch mortality of red snapper.



This rule was extended through March 28, 2008, to continue addressing overfishing of red snapper while the agency considers the more permanent measures recommended by the Council in Amendment 27/14.

Improved Retention and Use of Marine Resources

Beginning in 2008, NOAA Fisheries Service will take two important steps to reduce waste and bycatch in the Bering Sea and Aleutian Islands (BSAI) groundfish fisheries. First, the agency will establish a minimum groundfish retention standard (GRS) for multi-species trawl catcher/processors in the BSAI. The GRS mandates that a minimum amount of groundfish be retained and processed onboard these trawl vessels, reducing waste of marine resources.

Second, NOAA Fisheries Service will implement Amendment 80, a Limited Access Privilege Program (LAPP) for the non-Pollock trawl catcher/processor fleet. This LAPP allows vessel operators to form cooperatives that receive exclusive harvest privileges. It shares many of the design and monitoring provisions used in the Gulf of Alaska Rockfish Program. This program will encourage vessel operators to coordinate their fishing operations to improve the economic efficiency of their operations, better meet the requirements of the GRS, and reduce incentives to engage in wasteful and dangerous fishing practices.

Implementation of Amendment 80 will position roughly 85 percent of the groundfish fisheries of the North Pacific, by both volume and value, under LAPP management. NOAA Fisheries Service anticipates that the fishing industry in the North Pacific will increasingly be able to adjust and refine their fishing operations to reduce bycatch and waste, while

increasing their profitability as the race for fish is replaced with market-based quota management.

Changes Proposed for Halibut Catch Sharing Plan

NOAA Fisheries Service proposed changes to the Pacific Halibut Catch Sharing Plan for the International Pacific Halibut Commission (IPHC) regulatory Area 2A off Washington, Oregon, and California. This rule would implement the portions of the Plan and management measures that are not implemented through the IPHC, which include sport fishery management measures for Area 2A. This rule would also revise the Area 2A non-treaty commercial fishery closed areas. These actions are intended to enhance the conservation of Pacific halibut, to provide greater angler opportunity where available, to protect yelloweye rockfish and other overfished groundfish species from incidental catch in the halibut fisheries, and to ensure consistency between State and Federal regulations.

NOAA Approves Standardized Bycatch Reporting Methodology

In October 2007, NOAA Fisheries Service approved an omnibus amendment to all 13 fishery management plans (FMP) of the New England and Mid-Atlantic Fishery Management Councils. This omnibus amendment establishes the standardized bycatch reporting methodology (SBRM) to be used for all 13 FMPs, and covers 39 managed species and 14 types of fishing gear throughout the Mid-Atlantic and New England regions. The amendment explains the methods and processes by which bycatch is currently monitored and assessed for Northeast Region fisheries; determines whether these methods and processes need to be modified and/or

supplemented; establishes standards of precision for bycatch estimation for all Northeast Region fisheries; and documents the SBRM established for all fisheries managed through the FMPs of the Northeast Region.

Seafood Health, Safety and Sustainability

Research at Northwest Fisheries Science Center: Seafood and Health

NOAA Fisheries Service scientists are providing compelling suggestions for helping consumers manage the benefits and risks of eating seafood. The scientists have developed a paper entitled, "The Seafood Dilemma, a Way Forward," published in May 2007. The study includes recommendations for a standardized program of monitoring and user friendly labeling of seafood.

In the study, the scientists proposed a U.S. national seafood assessment program to provide better and more timely information to consumers and regulators. The program would directly address the seafood dilemma faced by U.S. consumers regarding what species to consume, and should enhance the health benefits derived from increased seafood consumption, as well as public confidence in the seafood supply. Among the proposals in the program; conducting a systematic monitoring program of U.S. harvested fish and shellfish; developing consistent regulatory criteria among federal (e.g., EPA, FDA, USDA, and NOAA), state, and local regulatory agencies; increase the capacity for analyzing pathogens, algal toxins, and chemical contaminants, both for known risks as well as emerging threats; developing a process to quantify nutritionally beneficial components of fish and shellfish, including their omega-3



The President's Gamefish Executive Order

On October 20, 2007, President Bush signed Executive Order 13449, "Protection of Striped Bass and Red Drum Fish Populations." This Executive Order will assist in ensuring faithful execution of the Magnuson-Stevens Fishery Conservation and Management Act, the Atlantic Coastal Fisheries Cooperative Management Act, and the Atlantic Striped Bass Conservation Act, by conserving striped bass and red drum. The Executive Order also contains a policy statement to conserve Atlantic striped bass and red drum for recreational, economic, and environmental benefits, based on sound science and in cooperation with state, territorial, local, and tribal governments. The Executive Order authorizes the Secretary of Commerce, as appropriate, to include the prohibition of sale of striped bass and red drum caught within the Exclusive Economic Zone of the United States off the Atlantic Ocean and the Gulf of Mexico.

fatty acids; and providing this information in a user-friendly form on our website called FishWatch.

The study noted that developing such a program to deal with the complexities of the seafood dilemma would not be a trivial task, but the potential benefit to public health and well-being would make the effort worthwhile.

Research and Monitoring at the National Seafood Inspection Lab: Seafood Safety

The National Seafood Inspection Lab (NSIL) in Pascagoula, Mississippi, provides routine monitoring of contaminants, pathogens, and economic fraud in seafood products for NOAA Fisheries Service, the U.S. Food and Drug Administration, U.S. Customs, and others, and provides scientific support to the Seafood Inspection Program. Additionally, in 2007, NOAA Fisheries Service engaged in a variety of activities focused on the safety of seafood products, including developing faster species identification methods for supporting increased

monitoring for economic fraud by species substitution (such as Vietnamese catfish fillets sold as grouper fillets).

Seafood is considered important to a healthy diet. NOAA Fisheries Service scientists are obtaining a clearer understanding of the simultaneous influences of omega-3 fatty acids, selenium, and mercury on human neurological development as part of a long-term, ongoing epidemiological study with the Centers for Disease Control, the National Institute of Health, the University of Bristol, and the University of Southern Mississippi.

NOAA Fisheries Service also is acquiring analytical instrumentation and expertise to support increased monitoring for banned pharmaceuticals in aquaculture imports, and are developing a policy for the use of the results from their studies as the basis for improving seafood consumption risk assessments.

Scientists are obtaining a clearer understanding of the simultaneous influences of omega-3 fatty acids, selenium, and mercury on human neurological development.

NOAA Fisheries Service Director Addresses Concerns About Farm-Raised Imported Seafood from China

In June 2006, the U.S. Food and Drug Administration (FDA) issued an import control on farm-raised catfish, basa, shrimp, dace, and eel products imported from China. All shipments of these products from China were detained at the border until importers could prove they were free of antimicrobials (nitrofurans, malachite green, gentian violet, and fluoroquinolone) that are not approved for use in the United States. NOAA Fisheries' Service Director, Dr. William T. Hogarth, expressed support for this action to safeguard the health and well-being of American seafood consumers, and provided reassurance that these import controls should not prompt people to stop eating seafood. Although the FDA says that levels of these drug residues found in seafood are very low and do not pose an immediate health risk, the United States took the action to ensure the long-term safety of seafood. Science has shown seafood to provide tremendous health benefits for Americans.

Framework provided to Establish Seafood Promotion Councils

On April 11, 2007, NOAA Fisheries Service finalized a new framework for the establishment of Seafood Promotion Councils. This program is designed to

inform consumers about the quality of the seafood they purchase. Seafood Promotion Councils may be established by petitioners who produce a particular seafood product. A referendum of that particular industry's participants would then have to be held to approve the establishment of a Council. Participation in the Seafood Promotion Council program is voluntary, and only those wishing to participate in the Council will pay any fees. The Seafood Promotion Councils will not be funded by the federal government; any money spent in the creation of a Council will be recovered from the petitioners or the Council. A Seafood Promotion Council can establish brand labels to designate product quality.



GPRA Measures

Government Performance Results Act (GPRA) performance measures are an important part of how NOAA Fisheries Service demonstrates to the American public that their tax dollars are being well spent in achieving agency responsibilities and goals. In 2007 NOAA Fisheries Service had four GPRA performance measures. These performance measures addressed specific areas in management and science: The fish stock sustainability index (FSSI); the percentage of living marine resources (LMR) with adequate population assessments and forecasts; the number of protected species designated as threatened, endangered or depleted with stable or increasing population levels; and the number of habitat acres restored.

NOAA Fisheries Service met or exceeded its goals for all four of the measures in 2007. Our success in meeting those goals demonstrated NOAA Fisheries Service's progress in its stewardship of living marine resources.

The Fish Stock Sustainability Index was designed to capture information on the majority of NOAA Fisheries Service's most significant managed species. There are 230 fish stocks in the FSSI index in FY 2007. By the end of 2007, NOAA Fisheries Service's score stood at 524, up from 501 at the end of 2005.

The LMR with adequate population assessments measure covers 230 fish stocks and 237 stocks of threatened, endangered, or depleted species, for a total of 467. By the end of 2007, 40.6% of these stocks had adequate assessments, up from 38.8% in 2006.

As of the end of 2007, there were 26 threatened, endangered or depleted protected species with stable or increasing population levels. An additional 5,794 acres of habitat was restored to improve ecosystem function.

NOAA Fisheries Service's fisheries management and science programs were rated as "moderately effective", the second highest rating possible, by the Administration's Program Assessment Rating Tool (PART) evaluation process. In response to the evaluation results, NOAA Fisheries Service is taking action to further improve performance by: addressing overfishing through the establishment and implementation of sustainable annual catch limits for all managed fish stocks; and increasing the number of fisheries managed through market-based approaches, which can lead to longer and safer fishing seasons and provide incentives for conservation.

Habitat Conservation Program



In its first year, NOAA's Open Rivers Initiative completed three projects that restored over 30 miles of spawning and rearing habitat for migratory fish.



New Science-Based Tools Help Identify Essential Fish Habitat Areas

The New England Fishery Management Council has developed new science-based tools for designating essential fish habitat for 27 commercially important Northeast fish species. This tool will allow NOAA Fisheries Service to analyze a combination of fish abundance estimates with data on bottom temperatures, depth, and substrate types. The outcome will be a better understanding about environmental conditions and habitat areas for fish to spawn, breed, feed, and grow to maturity. This more robust analysis will improve NOAA Fisheries Service's ability to protect essential fish habitat from habitat-damaging fishing practices and other coastal and off-shore development pressures.

Beginning to Flow: The First Projects Completed Under NOAA's Open Rivers Initiative

In its first year, NOAA's Open Rivers Initiative completed three projects that restored over 30 miles of spawning and rearing habitat for migratory fish. The obsolete Brownsville Dam, located on the Calapooia River in Oregon, was removed in August 2007 — effectively eliminating an obstruction to migratory fish and a safety hazard to the surrounding Brownsville community. In California, two failing and undersized culverts were removed, allowing endangered salmon to reach their historic spawning and rearing grounds. In collaboration with local communities, the Open Rivers Initiative will continue to restore free-flowing river systems and yield unimpeded fish passage to historic habitat by removing obsolete dams and barriers that dot the rivers of coastal states.

Inaugural Report Builds a Foundation for Protecting Deep Sea Corals

The State of Deep Coral Ecosystems of the United States synthesizes current knowledge of deep coral ecosystems in U.S. waters. Completed in 2007, the report paints a picture of ecosystems at depths greater than 150 feet, revealing greater abundance and variety than was previously recognized. The report was developed under the auspices of the NOAA Coral Reef Conservation Program's Deep Coral Team and written by a team of scientists from NOAA Fisheries Service and the academic community.

Called for in the President's Ocean Action Plan, this peer-reviewed report presents a national overview and seven regional assessments that discuss the biology of deep corals and their associated species, spatial distribution of deep corals, stressors that may threaten their survival, current management measures, and regional priorities for future research. Conservation concerns led Congress to include measures in the MSRA to enhance research and protection of these remarkable habitats.

The United States has become a world leader in efforts to conserve deep ocean habitats. This report provides a basis for continuing efforts by NOAA and its partners to discover, understand, and protect these unique ecosystems.

Coral Reef Conservation Program Prompts Action in America Samoa

The U.S. Coral Reef Task Force held its 2007 fall meeting in Pago Pago, American Samoa, in August. During the meeting, two expert panels—one on coral reef ecosystems in a changing climate and the other on conserving coral reef ecosystems using a regional approach—presented key findings. Findings presented by the latter panel were largely based on data

gathered during the NOAA Coral Reef Conservation Program Rapid Ecological Assessment (RAMP) cruises to the region conducted by NOAA Fisheries Service. These data were published in the Coral Reef Ecosystem Monitoring Report for American Samoa (2002-2006) and provided to the Governor of Samoa. The report highlighted the impact of fishing gear used to catch large fish around Samoa. The Governor of Samoa therefore announced a fishing ban on fish (humphead wrasse, bumphead parrotfish, giant grouper, giant trevally, and shark) within territorial waters, as well as a commitment to develop a network of protected areas, in cooperation with regional partners, to help protect coral reef ecosystems.

Also at the meeting, a U.S. Coral Reef Task Force climate change working group was established, and the Governor announced an American Samoa Territorial Executive Order to address the adverse impacts of global warming and resulting climate change. NOAA Fisheries Service scientists, participating through the Coral Reef Conservation Program, are currently researching climate-related issues such as coral diseases (including coral bleaching), coral habitat alteration, and the implications of such problems to fish populations and local human communities that depend on these resources.

NOAA Builds Its Largest Barrier Island Project

In the largest barrier island restoration project ever designed and built by NOAA, 2.6 miles of Gulf of Mexico shoreline—including dune, swale, and beach habitats—were restored at the Chaland Headland restoration site in Louisiana's Plaquemines Parish. Despite delays and damage caused by Hurricanes Katrina and Rita, NOAA completed the first phase of this 800-acre barrier island

NOAA Cooperates with Energy and Defense Sectors to Protect Ocean Assets

NOAA Fisheries Service and the National Ocean Service, with support from other NOAA programs, are working closely with traditional energy sectors (such as oil and gas, hydroelectric dams, and liquefied natural gas) and new energy sectors (such as those focused on wind, wave, current, and tidal power) to help develop energy practices that minimize impacts on the living marine resources that NOAA is entrusted with protecting. While continuing its strong role with traditional energy sectors, NOAA has recently focused on new sectors such as wind-and water-driven energy. NOAA has shared data and information on areas that might be productive from an energy perspective, as well as those especially important for ensuring resource protections. These collaborations will help new industries develop energy in environmentally sound ways, with benefits to the nation's economy, environment, society, and security.

NOAA Fisheries Service and the U.S. Navy are working together to protect marine species during the Navy's mission-critical military readiness training activities, agreeing on a strategy for ensuring compliance with the applicable environmental statutes using available resources from both agencies. The strategy focuses on a thorough analysis of the effects of mid-frequency sonar on the environment in a series of comprehensive regional Environmental Impact Statements. NOAA Fisheries Service is also working with the Navy to ensure compliance with the Endangered Species Act and Marine Mammal Protection Act. This coordination is anticipated to be a 2-year process, from which the agencies could tier subsequent analyses for the purpose of streamlining the permitting process.





NOAA Fisheries Service's Cooperative Approach to Fish Passage on the Feather and Saco Rivers

In 2007, NOAA Fisheries Service successfully used cooperative approaches to ensure access to fish habitat past hydropower dams on the Feather River in California and the Saco River in Maine. NOAA Fisheries Service' proactive and cooperative approach on these two rivers provides healthy habitat for migratory fish and reduced costs for achieving its fish passage goals.



Through the Feather River Habitat Expansion Agreement, two species listed under the Endangered Species Act—Central Valley spring-run Chinook salmon and Central Valley steelhead—will have more habitats for spawning, rearing, and other critical life stages. The agreement was created to collectively resolve blockages to migratory fish passage at the Oroville, Poe, Upper North

Fork Feather River, and Rock Creek-Cresta hydropower dams. NOAA Fisheries Service staff partnered with conservation groups, government agencies, and two energy companies to develop a cooperative approach for identifying, evaluating, selecting, and implementing the most promising and cost-effective fish passage actions.

In Maine, NOAA Fisheries Service, the U.S. Fish and Wildlife Service, Maine state resources agencies, conservation groups, and FPL Energy (an energy producing consortium with headquarters in Florida) signed the 2007 Saco Fisheries Assessment Settlement Agreement, which enhances access for migratory fish at multiple hydropower dams over approximately 80 river miles on the Saco River from its mouth to the Maine–New Hampshire border. The settlement provides for an ecosystem approach to river management that protects habitat necessary for the survival of migratory fish. The settlement's approach provides upstream and downstream fish passage for Atlantic salmon, American shad, alewife, blueback herring, and American eel at the river's lower six hydropower projects; includes studies to evaluate fish passage and management needs at specific dams; enhances stocking efforts for Atlantic salmon throughout the Maine portion of the Saco watershed; and will help educate the public about migratory fish and the need for their passage at dams.

project, pumping over 1.7 million cubic yards of sand from offshore to reconnect three island fragments that had been breached by storms and erosion. The project, authorized under the Coastal Wetlands Planning, Protection and Restoration Act, also built over 250 acres of coastal wetland, and was conducted in partnership with the Louisiana Department of Natural Resources.

Louisiana has the highest rate of shoreline erosion in the country, with retreats ranging from 20 feet to more than 100 feet per year. Rebuilding and maintaining the extensive system of wetlands historically nourished by the Mississippi Delta is essential for the future health of estuarine-dependent fish populations. The restored habitat will also help protect the nation's energy infrastructure as well as Louisiana's coastal communities from the devastating effects of wind, waves, and flooding associated with storms.

NOAA Chesapeake Bay Office Deploys Three "Smart" Buoys

The NOAA Chesapeake Bay Office deployed three buoys in 2007 to begin development of the Chesapeake Bay Interpretive Buoy System. The buoy system marks significant points along the Captain John Smith Chesapeake National Historic Trail. These buoys are now operational off Jamestown, Virginia, in the James River; at the mouth of the Potomac River; and at the mouth of the Patapsco River near Baltimore, Maryland. In addition to providing real-time meteorological, oceanographic, and water-quality information at different points along the trail, the buoys promote awareness of the Bay's condition and support stewardship efforts dedicated to the preservation of the Bay and its natural environment. Real-time data from the buoys, historical and cultural content

related to buoy location, and educational applications are available online at www.buoybay.org or by calling 877-BUOY-BAY.

Advancing Research on Invasive Species

NOAA Fisheries Service is collaborating on research to understand and control invasive species in U.S. waters. Along the West Coast, NOAA Fisheries Service is partnering with the NOAA Aquatic Invasive Species program, is modeling the dispersal of European green crabs. The European green crab is implicated in the demise of the bivalve fishery in the northeastern United States and is known to compete with native crab species. The first phase of studies has been completed, modeling the larval dispersal distance from select bays along the U.S. contiguous West Coast. The next phase will model the dispersal of green crab larvae into southern Alaska in order to guide placement of early detection monitoring stations there.

In Alaska, NOAA Fisheries Service is working with state resource agencies and community groups, is training representatives of the Sitka Tribe and the Southern Southeast Regional Aquaculture Association to monitor for green crabs in the region so eradication and control efforts can be implemented should invasive crabs be detected.

On the East Coast, the invasive tunicate, *Didemnum* sp., threatens benthic fauna, including sea scallops on Georges Bank, the Northeast's most productive fisheries area. Annual ocean-going surveys have been conducted in collaboration with the U.S. Geological Survey and the University of Rhode Island, to determine the distribution, abundance, spreading rate, and ecology of the tunicate in order to identify approaches to addressing the problem.

National Fish Habitat Action Plan Approves Four Partnerships

In October 2007, the National Fish Habitat Action Plan officially recognized its first four National Fish Habitat Partnerships: the Southeast Aquatic Resources Partnership, Eastern Brook Trout Joint Venture, Midwest Driftless Area Restoration Effort, and Matanuska-Susitna Basin Salmon Conservation Partnership. Conservation projects are already bringing together community groups, Native American tribes, state and federal agencies, and conservation and sport-fishing organizations, and include efforts to plant streamside vegetation, remove structures blocking fish from their habitats, and protect intact habitat. Collectively, the four partnerships encompass over 1 million square miles of habitat. With one pilot partnership and 11 new candidate partnerships working to meet the criteria for approval, the Action Plan is moving toward its goal of 12 or more partnerships by 2010.

Celebrating the 15th Anniversary of the Damage Assessment, Remediation, and Restoration Program

On May 23, 2007, dozens of congressional staff and partners gathered to celebrate the 15th Anniversary of the Damage Assessment, Remediation, and Restoration Program (DARRP).

DARRP collaborates to protect and restore coastal and marine resources that are threatened or injured by oil spills, releases of hazardous substances, and vessel groundings. Through the cleanup process, NOAA has successfully protected resources at more than 500 waste sites. During DARRP's 15-year history, NOAA has recovered \$437 million through settlements with responsible parties, for the protection and restoration of many thousands of acres of habitat and other resources and services to the public.

DARRP encourages responsible parties to participate in cooperative damage assessment and restoration planning activities. The celebration event highlighted this cooperative approach and the results of DARRP's work across the country.

Habitat Conservation Plan Developed Through Innovative Partnership

NOAA Fisheries Service, in cooperation with Green Diamond Resource Company and the U.S. Fish and Wildlife Service, developed and approved a large-scale habitat conservation plan to conserve ESA-listed Chinook salmon, coho salmon, and steelhead trout on Green Diamond's timberlands in northern California. This 50-year plan covers 416,000 acres critical to the support and recovery of these species. The plan focuses on enhancing and extending habitat by protecting streamside areas, avoiding surface erosion and land slides, accelerating improvement of old and poorly designed roads, and opening access to spawning and rearing habitat that was previously blocked or naturally inaccessible. It is designed to minimize and mitigate the effects of Green Diamond's commercial timber management practices, and provides the company with regulatory assurances that enhance its ability to make long-term investments—thus allowing the company to remain competitive while becoming a better environmental steward.

Protected Resources



The crucial threats to Hawaiian monk seals are food limitation, entanglement, and shark predation.



Agency Undertakes Major ESA Recovery Planning Activities

Pacific Islands — NOAA Adopts Recovery Plan for Endangered Hawaiian Monk Seal

NOAA Fisheries Service adopted a new Endangered Species Act (ESA) Recovery Plan for the Hawaiian monk seal in 2007 and completed a 5-year review of Hawaiian monk seal status, as required by the ESA. The majority of the population of Hawaiian monk seals now occupies the northwestern Hawaiian Islands and there are six main breeding sub-populations. The species is also found in lower numbers in the main Hawaiian Islands, where the population size and range both appear to be expanding. The crucial threats to Hawaiian monk seals are food limitation, entanglement, and shark predation. Serious threats to Hawaiian monk seals are identified as infectious disease, habitat loss, fishery interaction, male aggression, and human

interaction. The plan identifies biotoxins, vessel groundings and contaminants as moderate threats to this species.

Recovery Plan Adopted for Puget Sound Chinook

NOAA Fisheries Service released the largest and most comprehensive salmon-recovery plan ever approved by the federal government in 2007. Adoption of the plan was the culmination of more than five years' effort by local communities across the 14 river basins that drain into Washington State's Puget Sound. The plan is aimed at restoring salmon to waters from the crests of the Cascade and Olympic mountains to the sound. NOAA Fisheries Service listed Puget Sound Chinook as threatened under the ESA in 1999, the first of its kind in a heavily urbanized area. In addition to lasting measurable results for salmon, the plan's actions are also expected to provide important ecological benefits to

the overall health of Puget Sound. The recovery plan is notable in that it was developed through the Shared Strategy for Puget Sound, a collaborative conservation effort that includes state, tribal and local governments, industry, conservation groups and others

Recovery Plan Adopted for Upper Columbia River Spring Chinook and Steelhead

NOAA Fisheries Center released its recovery plan for upper Columbia spring-run Chinook salmon and upper Columbia River steelhead. Both populations have been listed under the ESA since the late 1990's, and both are currently listed as endangered. This plan is the culmination of years of work by the Upper Columbia Salmon Recovery Board, consisting of representatives from affected counties and tribes. Local governments, watershed councils, land owners, environmental groups and others were all enormously helpful in creating this plan. A variety of additional partners, representing federal agencies, Washington state agencies, regional organizations, special purpose districts and members of the public, also participated in this recovery planning process. The plan's mission is to restore viable and sustainable populations of salmon and steelhead through collaborative, economically sensitive efforts, combined resources, and wise resource management of the Upper Columbia region.

Critical Habitat Designated for Southern Resident Killer Whales

NOAA Fisheries Service designated critical habitat for the Southern Resident killer whale in three areas: 1) the Summer Core Area in Haro Strait and waters around the San Juan Islands; (2) Puget Sound; and (3) the Strait of Juan de Fuca, which together comprise approximately

2,560 square miles (6,630 sq km) of marine habitat. These designations are expected to significantly contribute to increased protections for the resident killer whale population. The Southern Resident killer whale was listed as an endangered species in November 2005. In analyzing potential areas of critical habitat, NOAA Fisheries Service examined a range of alternatives, and considered economic impacts and impacts to national security. As such, the agency concluded that the benefits of exclusion of 18 military sites, comprising approximately 112 square miles, outweighed the benefits of inclusion because of national security impacts.

Greater Protection for Threatened Staghorn and Elkhorn Coral

In 2007, NOAA Fisheries Service developed a proposed rule detailing the prohibitions necessary to provide for the conservation of elkhorn and staghorn. Coral Biologists estimate more than 90 percent of elkhorn and staghorn corals have been lost because of coral bleaching due to rising sea temperatures, disease, and tropical storm damage. Both species were listed as threatened in May 2006. Species listed as endangered under the ESA are automatically covered by a suite of protective measures and prohibitions in the law. However, for species listed as threatened, such as elkhorn and staghorn corals, these same measures and prohibitions do not automatically apply.

Atlantic Whale Conservation Activities

Right Whale Conservation — Atlantic Large Whale Take Reduction Plan & National Right Whale Ship Strike Strategy

North Atlantic right whales are one of the world's most critically endangered mammal species — as few as 300

individuals may exist. Collisions with ships and entanglement in commercial fishing gear are the primary causes for the species' failure to recover. NOAA took three actions to reduce these threats in 2007, developing a number of ship strike reduction measures, implementing gear modifications to reduce bycatch and protecting right whale calving grounds.

In April 2006, the U.S. government submitted a proposal to the International Maritime Organization (IMO) to modify the Boston area Traffic Separation Scheme to reduce the threat of vessel collisions with right whales and other whale species in the area. The modifications, and some alternatives, were assessed in a U.S. Coast Guard Port Access Route Study. The realignment is expected to result in a 58 percent reduction in the risk of ship strikes to right whales, and an 81 percent risk reduction in ship strikes of other large whale species occurring in the area.

The IMO approved the proposal in December 2006 and the modification was implemented by NOAA Fisheries Service, the National Ocean Service and the Coast Guard on July 1, 2007. A Notice to Mariners was issued advising mariners of the July 1, 2007 implementation date for the new Boston Traffic Separation Scheme, and they were required to update their lithographic nautical charts.

The Atlantic Large Whale Take Reduction Plan, developed by the Atlantic Large Whale Take Reduction Team, includes measures to reduce serious injuries and deaths of right, humpback, and fin whales incidental to commercial fishing. NOAA Fisheries Service finalized additional measures to reduce bycatch along the entire U.S. east coast, including





protections for southeastern right whale calving habitat and broad-based management measures throughout the species' ranges.

A plan amendment to protect right whales in their southeastern U.S. calving habitat was finalized in June 2007. This amendment expands the current Southeast U.S. Restricted Area and prohibits the use of gillnets, with a few exemptions, in this Area during the right whale's calving season.

A second amendment, published in October 2007, has several requirements that reduce right whale entanglements with fishing gear. The requirements include using sinking lines to limit the amount of line in the water column; requiring weak links for trap/pot and gillnet gear that allow the line to 'break' if a whale becomes entangled; time/area management measures that coincide with the movements of large whales; establishing exempted waters where whales typically are not found and therefore gear modifications will not apply; and requiring gear marking to help identify the source of the entangled gear. In addition, the amendment also expands

the lobster trap/pot gear requirements to other trap/pot fisheries that pose a similar risk to right whales.

Atlantic Trawl Gear Take Reduction Team

In September 2006, NOAA Fisheries Service established the Atlantic Trawl Gear Take Reduction Team (ATGTRT) to address incidental mortality and serious injury of long and short-finned pilot whales and common and white-sided dolphins in several trawl fisheries, including the Northeast and Mid-Atlantic bottom trawl fisheries and the Northeast and Mid-Atlantic mid-water trawl (including pair trawl) fisheries.

At its inaugural meeting, the ATGTRT began developing a take reduction plan to reduce bycatch of these species. In April 2007, members shifted their focus to the development of a monitoring plan rather than the development of a full take reduction plan since none of the four marine mammal stocks were below their respective potential biological removal rates. NOAA Fisheries Service will be addressing bycatch issues on stocks above PBR while team members will be developing a monitoring plan

The Kemp's ridley sea turtle was listed as endangered throughout its range in 1973 under the ESA following a dramatic decline in the latter half of the 20th century.

for the Atlantic trawl gear fisheries that includes separate components to address gear research and education/outreach needs. NOAA Fisheries Service intends to complete this plan in 2008.

Assessment and Protection of Sea Turtle Populations

Final Sea Turtle Observer Rule

NOAA Fisheries Service issued a rule under the Endangered Species Act (ESA) in July 2007 requiring fishing vessels in designated fisheries to take observers on board to help collect information on bycatch of sea turtles and to enhance the agency's ability to address the sea turtle bycatch problem. Observers will help determine whether existing measures to reduce sea turtle bycatch are working, or whether new or additional measures are needed. The rule applies to designated fishing vessels operating in both state and federal waters, and to designated U.S. fishing vessels on the high seas. As part of this regulation, each year NOAA Fisheries Service will publish in the Federal Register a draft and final determination of fisheries it intends to monitor for sea turtle interactions. The determination will be based on the best available information regarding sea turtle-fishery interactions, sea turtle distribution or fishing gear characteristics.



Critically Endangered Kemp's Ridley Sea Turtle is in the Early Stages of Recovery

The Kemp's ridley sea turtle was listed as endangered throughout its range in 1973 under the ESA following a dramatic decline in the latter half of the 20th century. Photographic evidence collected in the 1940's indicated that the population was at least as large as 40,000 nesting females. By the mid-1980's the population had plummeted with only 700 nests documented in 1985. Since the late 1970's the United States and Mexico have

worked together in a bi-national program to conserve and recover the species. Today, the Kemp's ridley sea turtle appears to be in the early stages of recovery, due to strict protections afforded by the governments of Mexico and the United States along with assistance from partnerships with state, industry, and non-governmental groups. Just over 15,000 nests were documented in 2007, along with the largest arribada (Spanish for "arrival") of turtles recorded in the last 50 years. The increase can be attributed to two

primary factors — full protection of nesting turtles and their nests in Mexico and the requirement to use turtle excluder devices (TEDs) in both countries. TEDs are grid devices, installed in shrimp trawl nets, that allow turtles to escape the net. Without the full protections afforded the species under the ESA, the species would likely have become extinct in the early part of this century.



Partnerships Aid Stranded Marine Mammals and Investigate Causes

NOAA Fisheries Service Manages 10 Marine Mammal Unusual Mortality Events

Title IV of the Marine Mammal Protection Act (MMPA) defines marine mammal Unusual Mortality Events (UMEs) as strandings that are unexpected, involve a significant die-off of any marine mammal population, and demand an immediate response. During 2007, there were 10 concurrent UME investigations, including 5 newly declared events, an unprecedented number of events. Investigation of a UME is very difficult, they are logistically complex, labor intensive and very expensive. However, the investigations have important goals: to minimize marine mammal deaths, determine the cause of the event and the effect of the event on the marine mammal population, and to identify the role the environment may have played in the event. In recent years, these efforts to examine carcasses and live stranded animals have improved scientific knowledge of mortality rates and causes, allowing scientists to better understand population threats and stressors, and to determine when a situation is “unusual.”

NOAA Fisheries Service Funds 41 Partnership Grants to Respond to Stranded Marine Mammals

In 2007, the John H. Prescott Marine Mammal Rescue Assistance Grant Award Program awarded 41 competitive grants, totaling \$3,689,886, to partners in the national marine mammal stranding network. These grants are designed to accomplish several purposes such as: the recovery or treatment of marine mammals; the collection of data from living or dead stranded marine mammals for scientific research regarding

marine mammal health; and/or facility operations that are directly related to those purposes. This funding has helped the network and NOAA Fisheries Service make unprecedented improvements in our abilities to respond in emergency situations (natural disasters, oil spills, or disease outbreaks), as well as supporting daily operations to collect baseline data. Since 2001, there have been 270 Prescott awards to 74 unique recipients in 26 states and territories, totaling \$23,875,131.

Humpback Whale Rescue in Central California

In May 2007, a cow/calf pair of humpback whales wandered up the San Francisco Bay Delta, eventually ending up 90 miles from the ocean, where they spent 3 weeks in fresh and brackish water. Both whales had external wounds which deteriorated, and appeared to be in declining health. The whales aroused widespread public and media interest. NOAA Fisheries Service’s Marine Mammal Health and Stranding Response Program and Southwest Regional Office coordinated the interagency rescue efforts with state and federal partners, bringing together scientists from across the country. Their goal was to herd the whales back to the ocean. NOAA personnel also treated their infections, injecting the whales with antibiotics using a dart system, the first remote delivery of antibiotics to a large free-swimming whale. Although most attempts to change the whales’ behavior were not effective, scientists learned much that will contribute to future rescue attempts. The whales did find their way back to the Pacific, where scientists hope to track them for years to come.

Public Education about Interactions with Protected Species

TurtleWatch Program Helps Fishermen Avoid Sea Turtles

NOAA Fisheries Service’s TurtleWatch program provides up-to-date information about the thermal habitat of loggerhead sea turtles in the Pacific Ocean north of the Hawaiian Islands. It was created as an experimental product to help reduce inadvertent interactions between Hawaii-based longline fishing vessels and loggerhead turtles. Derived from the best available scientific information, the TurtleWatch map displays sea surface temperature and ocean current conditions and the predicted location of waters preferred by the turtles.

By identifying the ocean habitat favored by turtles, these maps are expected to help longline fishing vessels pursuing swordfish or other fish species in the region deploy their fishing gear in areas where loggerheads are less likely to occur. In this way, NOAA Fisheries Service hopes to provide benefits not only to the turtles, but also to the fishermen, who operate under strict limits on the number of turtle interactions allowed.

Acoustics Research Conducted

NOAA Fisheries Service is increasingly taking an active role in research and technology using acoustics to detect and characterize marine life, as well identify effects of sound exposure. Several of these efforts include direct studies of marine mammal behavioral reactions to sound exposure, listening and tracking systems to detect deep-diving marine mammals around seamounts, and cooperative efforts with the shipping industry to explore vessel-quieting technologies.

NOAA Fisheries Service & Partners Study Marine Mammal's Reactions to Underwater Sound

NOAA Fisheries Service and a number of participating researchers are leading a major research experiment to investigate behavioral responses of deep-diving cetaceans to different kinds of sounds at a sophisticated underwater listening range in the Bahamas. The project is designed to investigate the reactions of beaked whales to mid-frequency sounds, including the kinds of sonar signals that have induced strong negative reactions previously. The research group includes scientists from six countries organized into specialized teams focusing on different aspects of data acquisition and analysis. The behavioral response study (BRS) uses a state-of-the-art 82-element acoustic range covering a 600-square-mile area to detect and track marine animals. Scientists attach advanced listening tags to animals from small boats as part of the research. Precautionary mitigation and monitoring conditions are being used to ensure that animals are not harmed during the experiments.

Passive and Active Acoustic Sensors Help Understand Beaked Whales in Hawaii

Seamounts can strongly influence the distribution of various marine animals. To study the effects of seamounts on the presence and behavior of cetaceans in the Pacific Islands Region, NOAA Fisheries Service scientists deployed a high frequency acoustic recording package on the summit of Cross Seamount during April through October 2005. The most frequently heard cetacean vocalizations were echolocation sounds similar to those produced by several beaked whale species together with signals consistent with prey capture attempts. Interestingly, these beaked whale signals occurred almost entirely at night. Indirect measurements



of prey presence using a fisheries acoustic echosounder indicate that the seamount may enhance local productivity in near-surface waters. Concentrations of micro-nekton aggregated over seamount in near-surface waters at night and dense concentrations of these organisms were detected near the summit. These results, using different acoustic sensors, suggest that seamounts may provide enhanced foraging opportunities for beaked whales during the night.

International Symposium on Sounds from Large Vessels and Quieting Technologies

NOAA Fisheries Service hosted an international symposium in 2007 on the feasibility and economics of using vessel-quieting technologies on large vessels. The purpose of the symposium was to bring all interested parties together to discuss issues and collaborate on proposals. The discussions were lively and constructive, resulting in many new ideas for actions on technology, information-transfer, and implementation. The symposium was organized into four sessions dealing with: identifying target characteristics for vessel quieting and noise measurement needs; specifying which of the many possible quieting technologies are most important/feasible for large ships; exploring economic and other potential

NOAA Fisheries Service hosted an international symposium on the feasibility and economics of using vessel-quieting technologies on large vessels.

incentives for industry to implement quieting technologies; and synthesizing these options into a “menu” format of technological/operational quieting options.

The 2007 symposium followed up on a NOAA-sponsored symposium several years ago that initiated cooperation among industry, conservationists, and academics to identify and minimize adverse effects of sound from large vessels on marine life.



The first of a new class of noise-quieted NOAA fisheries survey vessels, the *Oscar Dyson*, successfully completed several acoustic and trawling inter-vessel comparison trials with NOAA survey vessel *Miller Freeman*.

Comparisons Made Between Fisheries Survey Vessel *Miller Freeman* and the New Noise-Quietened Survey Vessel *Oscar Dyson*

The first of the new class of noise-quieted NOAA fish survey vessels, the *Oscar Dyson*, successfully completed several acoustic and trawling inter-vessel comparison trials with NOAA survey vessel *Miller Freeman*. These trials were conducted in association with the 2007 Gulf of Alaska, Bogoslof Island and Shelikof Strait walleye pollock stock assessment surveys. The trials are of particular interest for resource management in Alaska as the *Oscar Dyson* is slated to replace the *Miller Freeman* as the primary acoustic survey vessel.

Gear Development for New Research Vessel *Henry B. Bigelow*

State of the art research survey gear has been developed for the *Henry B. Bigelow* for use in Northeast fishing areas based on advice from the regional Trawl Survey Advisory Panel. Scientists worked with fishermen and industry gear experts in the design, tank testing and field testing of new fishing gear. The new gear is more efficient, samples more of the water column, and will serve as the new standard for bottom trawl surveys. Calibration experiments have been designed and are currently being implemented to insure comparability and continuation of the current 40 year time series of surveys conducted in these important marine fisheries.

Scientists Lead Expedition to Conduct Census of Marine Life

NOAA Fisheries Service scientists led a team of world-renowned taxonomists on a 3-week expedition to French Frigate Shoals in the Papāhānaumokuākea Marine National Monument. The expedition was part of the international Census of Marine Life's Census of Coral Reef Ecosystems. This expedition was the first in a series of proposed surveys to take place around the globe, led jointly by Scripps Institution of Oceanography at the University of California–San Diego, the Australian Institute of Marine Science, and NOAA. The goal of the expedition was to conduct biodiversity surveys, with a focus on small marine organisms (i.e., invertebrates, algae, and microbes). Over 50 sites were surveyed throughout the atoll using a variety of ingenious collection methods including baited traps, brushing of rubble, underwater vacuuming with gentle suction, plankton tows, light traps, and sediment and water sampling. These methods were meticulously developed over the course of a year to minimize impact to the environment. The expedition found several potentially new species of crabs, corals, sea cucumbers, sea quirts, worms, sea stars, snails, and clams. From this expedition, well over 100 new species records will likely be identified for French Frigate Shoals.

NOAA Conducts Important Antarctic Research During the International Polar Year

The U.S. Antarctic Marine Living Resources Program participated in the Census of Antarctic Marine Life Scientific Steering Committee in Białowieża, Poland. Drawing international attention, 34 researchers from 13 countries participated in the Committee. The program supports and conducts studies that not only support the Census of

Antarctic Marine Life objectives, but also support the international Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR), in which the United States is an active member. In March 2007, the program completed the 21st year of in situ field studies in the South Shetlands region of the Antarctic. This expansive effort—a collaboration between NOAA and 10 research institutions representing five countries—conducted ship- and land-based studies focused on Antarctic krill and its predators. Ship-based surveys were conducted aboard the NOAA-chartered *R/V Yuzhmorgeologiya*. During the 35-day charter, the vessel traveled approximately 3,250 nautical miles, and the researchers conducted acoustic transects, conductivity-temperature-depth water collections, and zooplankton net samples. Land-based studies, conducted over the course of 117 days at Cape Shirreff on Livingston Island, focused on krill predators—primarily the Antarctic fur seal and chinstrap and Gentoo penguins. Researchers deployed radio transmitters, time-depth recorders, and ARGOS satellite transmitters, and tagged hundreds of seal pups and penguin chicks. In July 2007, results from the surveys were presented at the CCAMLR meeting. The U.S. Antarctic Marine Living Resources data and associated models were focal points of these meetings, and were integral to subsequent recommendations for fisheries managed by CCAMLR.

iPAQ Data Entry at Sea Speeds up Observer Data Collection

A new modification of hand-held data collection devices now enables observers to enter data at sea electronically and then transfer that data to land based computer databases electronically as soon as they land. Error checking is done as the data are entered. Auditors are finding large reductions in data errors, along with the

A new modification of hand-held data collection devices now enables observers to enter data at sea electronically and then transfer that data to land based computer databases electronically as soon as they land.

faster turnaround time. These data are used for quota monitoring in special access and US/Canada sharing agreement fisheries.

Marine Conservation Areas Created to Rebuild Depleted Stocks; Will Use New Scientific Sampling Technologies

Stocks of lingcod and six rockfish species, including four species important to California anglers and commercial fishermen, were declared overfished by the Pacific Fishery Management Council. In response, two marine conservation areas were created in Southern California. To assess the habitat and stocks of selected rockfish species in these areas, the newly developed advanced sampling technologies will allow NOAA Fisheries Service to conduct its mission more efficiently in terms of time and cost, less invasively to marine animals and their habitat, and in a non-lethal manner. The method combines the information obtainable from multi-frequency echosounders mounted on research vessels with video and still cameras deployed from a remotely operated vehicle. Through its cooperative research rockfish project, NOAA Fisheries Service and the council will be able to monitor the recovery of these overfished stocks in support of the West Coast Groundfish Fishery Management Plan.





Commissioning of the *Henry B. Bigelow*

On July 16, 2007 NOAA commissioned its newest fisheries survey vessel, the *Henry B. Bigelow*, at NOAA's Marine Operations Center-Atlantic in Norfolk, Virginia. It is the second of four ships in its class designed and built by VT Halter Marine Inc. in Moss Point, Mississippi. The ship was named in honor of the founding director of the Woods Hole Oceanographic Institution, a pioneering ocean researcher whose extensive investigations are recognized as the foundation of modern oceanography.

The 208-foot ship was built to meet the requirements of NOAA Fisheries Service. Recent acoustic tests run by the U.S. Navy show *Henry B. Bigelow* exceeds standards for a low noise signature set by the International Council for Exploration of the Seas. These standards were developed to optimize the effectiveness of fisheries research across the globe.

Henry B. Bigelow and her sister ships are so quiet that they can study fish without significantly altering their behavior. Their hydroacoustic technology uses sound waves to "see" fish on a computer screen, which makes fisheries assessments more efficient and accurate. Also, the ships can conduct bottom and mid-water trawls while running physical and biological-oceanographic sampling during a single deployment, a combined capability unavailable in the private sector.

With her state-of-the-art technology and unique research attributes, *Henry B. Bigelow* will help manage living marine resources in more than 100,000 square miles of ocean including Georges Bank, one of the world's most productive fishing grounds.



NOAA Fisheries Service successfully surveyed over 40 offshore banks and reefs during 60 days at sea in the Southern California Bight area in 2007 in cooperation with the recreational fishing industry. Nearly 100 species of fish are managed under the West Coast Groundfish Fishery Management Plan. These species comprise significant commercial and recreational fisheries along the West Coast. In California alone, the total value of the recreational component of this fishery is in excess of \$200 million annually and there are 313 Commercial Passenger Fishing Vessels operated statewide.

Smart Tags for Yellowtail Flounder

Utilizing archival tags to study the behavior of yellowtail flounder has yielded information not apparent during decades of intense research on this species. Until recently, the well-studied yellowtail flounder was thought to be a "sedentary" fish, feeding on epibenthic fauna and limited to relatively shallow, sandy habitats. This strict habitat preference and the fact that such habitats are spread out along the ocean floor, caused scientists to believe yellowtail flounder had limited

movement among offshore banks and shelves. However, the electronic tags revealed that yellowtail flounder exhibit distinct periods of on-bottom and off-bottom behavior, and likely use passive drift in midwater currents to move beyond expected geographic boundaries. These actions are similar to other flatfish species, but had never been discovered in yellowtail flounder until the use of archival tags.

Ultrasonic Telemetry of Atlantic Salmon

NOAA Fisheries Service recently completed 10 years of research studies using ultrasonic telemetry to assess Atlantic salmon smolt migration and completing an extensive study of wild Atlantic salmon estuary/coastal movements and survival of the smolt into the Gulf of Maine. In 2005, the ultrasonic telemetry arrays were moved to the Penobscot River and Bay. The number of target species has been expanding through cooperation with U.S. Coast Guard, University of Maine, Gulf of Maine Research Institute, and St. Andrews Biological Station. Currently, NOAA Fisheries Service deploys the most extensive marine array in the Gulf of Maine and is expanding this offshore. Current species monitored are both wild and hatchery-reared Atlantic salmon, striped bass, Atlantic sturgeon, shortnose sturgeon, and sea lamprey.

Image Analysis of Atlantic Salmon Scales

NOAA Fisheries Service's Atlantic Salmon Research and Conservation Taskforce has been using a state of the art image analysis system to study the rearing origin and growth dynamics of Atlantic salmon for over a decade. The image analysis system is an integrated microscope, video camera and desktop computer system used to measure distances between particular

Utilizing archival tags to study the behavior of yellowtail flounder has yielded information not apparent during decades of intense research on this species.

landmarks on an individual scale sample. These distances are representative of the individual fish's growth patterns in a fashion similar to growth rings of a tree. Data from these measurements can be used to model the growth of an individual fish or a fish population for origin identification (wild spawned or hatchery reared) and to identify the bottlenecks of survival for this endangered species.

Studies Using Remote Sensing Chlorophyll Data Leads to the Development of the 'Parental Condition Hypothesis' of Recruitment Control for Georges Bank Haddock

Researchers at the NOAA Fisheries Service have developed a protocol to partition the time and space dynamics of phytoplankton production for the Northeast Shelf ecosystem. These indices reflect the intensity and magnitude of seasonal plankton blooms. Of particular interest is the pattern that has emerged with the fall bloom on Georges Bank, which appears to affect haddock recruitment. Pre-spawn feeding is hypothesized to affect the quantity and quality of haddock reproductive output. The fall bloom connection is the only hypothesis that explains recent recruitments and in particular the recruitment of the 2003 year class, which was the largest on record.



New Cetacean Sounds Discovered

In the past year, NOAA Fisheries Service researchers described a new kind of dolphin communication. The sound consists of repeated patterns of “burst pulses” of varying lengths. A burst pulse is a series of echo-location clicks that are so close together that they make a continuous buzzing sound. The repeated

patterns of these clicks are closer to Morse Code than they are to any previously described type of dolphin call. So far, this type of sound appears to be made only by northern right whale dolphins. It is still not clear how the dolphins use this sound, but the sound is likely to be useful to NOAA researchers in acoustically identifying this species at sea.



The United States participated in the first ever joint meeting of the world's five tuna regional fisheries management organizations in Kobe, Japan during the week of January 22, 2007.

Highlights of the 20th Regular Meeting of the International Commission for the Conservation of Atlantic Tunas (ICCAT)

ICCAT made progress on a number of issues at its Twentieth Regular Meeting, which took place in November 2007, in Antalya, Turkey, but it failed to take meaningful action to address its most pressing issue, the decline of the eastern Atlantic and Mediterranean bluefin tuna stock which has been exacerbated by poor fishery monitoring and control. While the United States pressed ICCAT to adopt a measure to suspend bluefin fishing in the eastern Atlantic and Mediterranean until these issues could be addressed, the Commission instead adopted a non-binding measure requesting that member nations submit documents by February 2008 detailing how they are implementing ICCAT's 2006 management plan for the eastern fishery, and complete a report at the end of the fishing season on the results of implementation. ICCAT members also agreed that parties involved in the bluefin tuna fishery hold a stakeholder meeting in March 2008 to review fishery rules and market activities and to work out a voluntary action plan to reduce

fishing, caging, and imports to ensure catch levels are commensurate with those specified in the 2006 management plan. In a more positive action, ICCAT adopted a catch documentation scheme for bluefin tuna which should improve overall data reporting since the new approach will cover bluefin whether it enters international trade or not.

Other conservation and management actions taken by ICCAT included: a two-year measure for northern albacore that reduced the total allowable catch; measures for southern albacore that reduced the total allowable catch; measures to reduce fishing mortality in fisheries targeting porbeagle and shortfin mako sharks; a seabird bycatch mitigation measure requiring the use of tori lines on vessels fishing south of 20 degrees South, and requiring line weighting, and the adoption of a closed area in the Mediterranean to improve protection for small Mediterranean swordfish.

In other significant actions, ICCAT agreed to hire outside experts to conduct a performance review of the organization in 2008; amend its illegal, unregulated and unreported (IUU) vessel measure by adding a paragraph providing a process to incorporate vessels on other tuna regional fisheries management organizations IUU lists into the ICCAT IUU list; maintain trade sanctions against certain non-members; and adopt operational data exchange protocols to support implementation of ICCAT's centralized vessel monitoring program. The vessel monitoring program is intended to facilitate at-sea inspections for vessels fishing eastern Atlantic and Mediterranean bluefin tuna.

Finally, the United States representative was selected as Chairman of the Compliance Committee.

Presidential Directive on Destructive Fishing Practices

On October 2, 2006, President Bush sent a memorandum to the Secretaries of Commerce and State regarding "promoting sustainable fisheries and ending destructive fishing practices." Among other things, the Secretaries are to work with other countries to establish regional fisheries management organizations or other cooperative arrangements to protect ecosystems in high seas areas where no international fisheries regulation takes place, especially vulnerable marine ecosystems. NOAA Fisheries Service responded by undertaking initiatives in the high seas areas of the Northwest and South Pacific to negotiate long-term, binding rules governing fisheries that are not presently regulated under international rules. In both areas, NOAA Fisheries Service was successful in getting agreement on voluntary interim measures, such as protecting vulnerable marine ecosystems,

that will remain in place until the long-term, binding rules are brought into effect. Both sets of interim measures are fully consistent with recent guidance provided by the United Nations General Assembly.

NOAA Fisheries Service Works to Protect Sawfish and Seabirds

In June 2007 at the 14th Meeting of the Convention on International Trade in Endangered Species (CITES), members overwhelmingly adopted a proposal, put forward by the United States and Kenya, to prohibit international trade (list in Appendix I) of sawfish (*Pristidae* spp.), a highly endangered shark-like species. Sawfish live in nearshore habitats and are now rarely seen. Like other shark species, sawfish are late to mature, grow slowly and have a very low reproductive rate, characteristics that make them extremely vulnerable to exploitation. All species of sawfish have been listed on the World Conservation Union Red List of Threatened Species as critically endangered globally. Among other uses, sawfish are in demand for use in traditional medicines and live animals for aquaria.

In 2007, NOAA Fisheries Service continued to take a leading role to reduce seabird bycatch internationally by advocating science-based assessments and the application of proven technologies to mitigate the incidental capture of seabirds in longline fisheries. Activities were focused within regional fisheries management organizations whose fisheries have significant overlap with vulnerable seabirds, such as albatrosses and petrels. For example, in the Western and Central Pacific Fisheries Commission, NOAA Fisheries Service worked with other member nations to provide scientific and technical review and advice to the Commission on the adoption of minimum technical

specifications for agreed-to seabird bycatch mitigation measures. Within the International Commission on the Conservation of Atlantic Tunas (ICCAT), NOAA Fisheries Service supported the adoption of ICCAT's first measure calling for mandatory use of seabird avoidance measures. The Commission for the Conservation of Antarctic Living Marine Resources (CCAMLR) continued to see reduced seabird bycatch levels in its fisheries through the use of these effective measures. NOAA Fisheries Service worked with CCAMLR to reach out to adjacent regional fisheries management organizations and encouraged seabird bycatch reductions outside of CCAMLR waters.

Pacific Fisheries Conservation

U.S. Implements New Treaty Provisions for South Pacific Tuna Fisheries

NOAA Fisheries Service has revised regulations implementing the South Pacific Tuna Act, to reflect the changes agreed to in the Third Extension of the Treaty on Fisheries between the Governments of Certain Pacific Island States and the United States of America. New provisions under the treaty relate to vessel monitoring system (VMS) requirements, vessel reporting requirements, area restrictions for U.S. purse seine vessels fishing under the Treaty, and allowing U.S. longline vessels to fish on the high seas portion of the Treaty Area.

Global Tuna Summit

The United States participated in the first ever joint meeting of the world's five tuna regional fisheries management organizations in Kobe, Japan during the week of January 22, 2007. These organizations are responsible for the





U.S. Hosts International Whaling Commission in Anchorage, AK; Scientific Committee Recommends Approval of Alaska Native Subsistence Quota for Bowheads Based on NOAA's Genetic Research

The United States hosted the 59th annual meeting of the International Whaling Commission in Anchorage, Alaska in late May. US Representatives chaired the meeting as well as serving as head to the US delegation. A critical focus of this year's meeting was the review of the aboriginal subsistence whaling quotas. In the United States, ten Alaska Native villages in the far north conduct subsistence bowhead whale hunts overseen by the Alaska Eskimo Whaling Commission and NOAA Fisheries Service. Also under consideration this year were aboriginal whaling quotas for the eastern population of the North Pacific gray whale by the Makah Indian Tribe. The meeting was extremely successful for the United States. The Commission renewed, by consensus, the U.S. 5-year aboriginal subsistence whaling catch limits for both bowhead and gray whales. Another issue that received consensus support was a resolution by members to reinforce IWC's commitment to safety at sea and protection of the environment. The daily proceedings of the 2007 IWC meeting are available on the Internet at <http://www.iwcoffice.org/meetings/meeting2007.htm>

The Commission also agreed to a proposal from Dr. Hogarth, as Chair, to hold an intercessional meeting to discuss the future of the IWC.



management of highly migratory species, such as bluefin tuna and swordfish throughout the world's oceans. The groups represented at the meeting included the Inter-American Tropical Tuna Commission, International Commission for the Conservation of Atlantic Tunas, Indian Ocean Tuna Commission, Western and Central Pacific Fisheries Commission, and the Commission for the Conservation of Southern Bluefin Tuna.

The newly reauthorized MSRA calls for the United States to use multilateral activities such as the Kobe meeting to strengthen regional action on illegal, unregulated and unreported (IUU) fishing and bycatch. The issue of IUU fishing was discussed throughout

The newly reauthorized Magnuson-Stevens Act (MSRA) calls for the United States to use multilateral activities such as the Kobe meeting to strengthen regional action on illegal, unregulated and unreported (IUU) fishing and bycatch.

the week, particularly as it related to overcapacity and effects on non-target species.

In addition, the meeting included discussion of performance evaluations for each of the five tuna regional fisheries management organizations as has been called for by the U.N. Fish Stocks Agreement Review Conference. Participants agreed to a “Course of Action”, which lays out 14 key areas and challenges facing the tuna RFMOs. Within this course of action was the formation of a technical Working Group to look at issues such as harmonization of trade tracking programs. The United States hosted the first meeting of the technical working group in July, 2007 in Raleigh, NC. The technical working group agreed on several proposals to circulate to the tuna regional fisheries management organizations for their consideration on ways to improve and harmonize catch and trade monitoring schemes.

Western and Central Pacific Fisheries Commission

Reauthorization of the MSRA included the Western and Central Pacific Fisheries Convention Implementation Act. NOAA Fisheries Service, the Department of State and the regional fishery management councils are working on a proposed set of regulations to implement the basic provisions of the WCPF Convention and related decisions of the Commission. NOAA Fisheries Service is leading efforts to establish a Permanent Advisory Committee and is developing a memorandum of understanding with the Western Pacific, Pacific and North Pacific Fishery Management Councils that clarifies their role. NOAA Fisheries Service anticipates issuing a proposed rulemaking in early 2008.

Inter-American Tropical Tuna Commission

In 2007, the Inter-American Tropical Tuna Commission (IATTC) struggled with conservation measures for yellowfin and bigeye tunas, requiring the scheduling of two additional meetings. The Commission adopted a U.S. proposal to strengthen sea turtle mitigation measures. This resolution requires the implementation of United Nations Food and Agriculture Office guidelines to reduce sea turtle bycatch, injury and mortality and, if practicable, to bring aboard and resuscitate any comatose sea turtles. The United States took the lead role in bringing this resolution to strengthen sea turtle mitigation measures in the Pacific Ocean to the table at the IATTC. Also, after eight years of difficult negotiations, the United States led the adoption of a new formula for allocating IATTC expenses among members based on catch and utilization of eastern Pacific tunas and the level of national economic development.

Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) Acts to Protect Vulnerable Marine Ecosystems

CCAMLR adopted a conservation measure during its 2007 meeting designed to meet the deadline set by the United Nations for protecting vulnerable marine ecosystems (VMEs) from significant adverse impacts. “Bottom fishing activities” was defined by CCAMLR to include the use of any gear that interacts with the ocean floor. The measure limits bottom fishing activities through November 30, 2008 to those areas for which bottom fishing activities were approved by CCAMLR in the 2006/07 fishing season. Beginning

December 1, 2008, all individual bottom fishing activities will be subject to assessment by CCAMLR’s Scientific Committee to determine if they would contribute to significant adverse impacts to VMEs. The measure includes a move along and reporting rule when a vessel encounters a VME.

Conservation and Management of Pollock Resources in the Central Bering Sea

The United States participated in the 12th annual Conference of Parties to the Convention on the Conservation and Management of Pollock Resources in the Central Bering Sea, in September, 2007 in Beijing to finalize 2008 management decisions for this stock. Although there has been a prohibition on direct pollock fishing since 1994, the Parties have cooperated on scientific research, including examining factors that would affect pollock population dynamics and recovery. The management decisions for 2008 were based mainly on U.S. research conducted by the NOAA Research Vessel Miller Freeman on the spawning concentrations of pollock in the Bogoslof Island area. The survey reaffirmed that the pollock resource is low in abundance, at 29 percent of the minimum biomass necessary to set an Annual Harvest Level (AHL). As a result, the Parties set the AHL for 2008 at zero.



NOAA Fisheries Service, in collaboration with State and territory partners, is leading the first comprehensive inventory and assessment of all US coral reef protected areas.

Vessel Monitoring Continues to Expand

NOAA Fisheries Service has expanded Vessel Monitoring System (VMS) coverage to over 5,000 vessels, a 24 percent increase over last year (3,800 vessels). To date, over \$2.9 million has been disbursed to fishermen through an arrangement with the Pacific States Marine Fisheries Commission to reimburse them for the purchase of VMS units (1239 vessels reimbursed thus far).

\$15.3 Million Granted to U.S. States and Territories

NOAA Fisheries Service negotiated 27 Joint Enforcement Agreements during 2007. Twenty-two eligible States and five Territories and Commonwealths will receive over \$15.3 million dollars in Federal assistance. This includes \$100,000 which will go to Puerto Rico, who for the first time has entered into a Joint Enforcement Agreement. The 2007 Joint Enforcement Agreements will result in

141,900 hours of law enforcement services from State and Territorial partners. Over the past six years, this Cooperative Enforcement Program has granted \$80 million to states and territories for joint marine conservation law enforcement activities.

Illegal Harvest and Export of Coral Leads to Federal Sentence

In July 2007, a Florida man plead guilty to illegally harvesting brilliantly colorful *Ricordia Florida* coral (a corallimorph), prized by saltwater aquariums owners, from the Florida Keys National Marine Sanctuary. He was subsequently sentenced to 10 months in Federal prison and forfeiture of his thirty four foot sailboat. NOAA Fisheries Service enforcement agents investigated after receiving information indicating he was illegally selling contraband *Ricordia* with chipped Live Rock substrate to aquarium marine life dealers in Germany. NOAA Fisheries

Service enforcement agents working with U.S. Fish and Wildlife Service agents and Florida Fish and Wildlife Conservation Commission officers were able to intercept two German nationals at the Miami International airport with 500 specimens in their possession.

Seafood Importer Sentenced to 51 Months in Prison and Ordered to Pay \$1.13 Million for Illegal Shipments

Following an investigation, the owner of a seafood import company was sentenced to 51 months incarceration in Federal Prison. A \$1,139,000 fine also was levied against him and his companies for conspiring with Vietnamese fish exporters to intentionally mislabel hundreds of thousands of pounds of Vietnamese catfish to avoid U.S. anti-dumping duties imposed by the U.S. Department of Commerce. The owner had pled guilty to importing falsely labeled containers of catfish to avoid tariffs.

Whale Tour Operator Receives Civil Penalty for Colliding with Endangered Humpback Whale

Following an investigation that ended in early 2007, the operator of a Juneau based whale-watching tour vessel was fined \$7,000 for colliding with an endangered humpback whale. The owner of the vessel and the tour company were penalized an additional \$2,000. In August of 2006, the tour vessel was conducting a wildlife viewing cruise in Stephens Passage near North Pass in Southeast Alaska when the captain maneuvered the vessel into the path of three oncoming whales, placing the vessel closer than 100 yards from the endangered humpback whales. Subsequently, one whale collided with the vessel. A passenger suffered a head injury in the collision, requiring hospitalization.

Owners of Transport Ship Pay Damages for Cargo Spilled into the Monterey Bay National Marine Sanctuary

Owners and operators of the *M/V Med Taipei* settled with the U.S. government for violations of the MSRA. The *M/V Med Taipei* lost a number of shipping containers overboard in the Monterey Bay National Marine Sanctuary due to poor loading of the container vessel. The fifteen containers carried an assortment of items including; furniture, wheelchairs, clothing, hundreds of thousands of plastic items, several miles of cyclone fencing, and thousands of tires. The \$3.25 million in damages will be used to restore injured sanctuary resources.

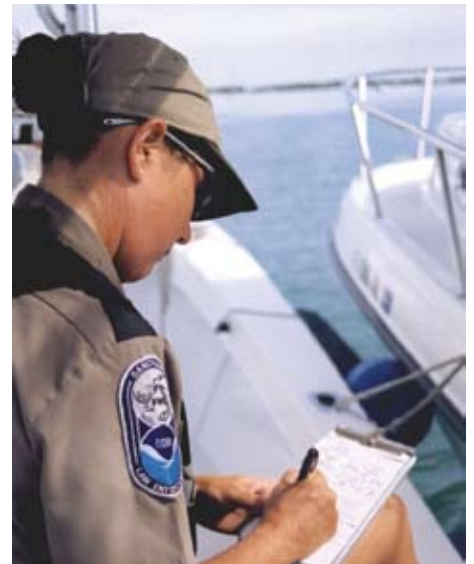
Ecuadorian Fishing Vessel Caught Fishing Off Jarvis Island Pays \$117,000 Civil Penalty

A foreign fishing vessel, the Ecuadorian *FV San Andres*, was caught by the United States Coast Guard fishing illegally in the U.S. Exclusive Economic Zone surrounding Jarvis Island, a U.S. insular possession in the Pacific Ocean. The investigation into this matter confirmed the violation, and that the company that owned the vessel was based out of Ecuador. A \$117,000 civil penalty was issued by NOAA's Office of General Counsel for Enforcement and Litigation and the company paid the full amount of the penalty.

Fishing Vessel Receives First Civil Penalty for Fishing Illegally in Papāhānaumokuākea National Marine Monument

A \$60,000 civil penalty was assessed to the owner and operator of a U.S. vessel unlawfully fishing in the Papāhānaumokuākea Marine National Monument. This case was the first federal enforcement action taken since President

Following an investigation that ended in early 2007, the operator of a Juneau based whale-watching tour vessel was fined \$7,000 for colliding with an endangered humpback whale.



Bush declared the area around the Northwestern Hawaiian Islands a marine national monument on June 15, 2006. The fishing vessel was first detected by NOAA Fisheries Service's Vessel Monitoring System, and visually confirmed by a U.S. Coast Guard aircraft on an over-flight. The civil penalty includes three counts of entering the monument and unlawfully harvesting monument resources. The owner and operator were also charged with possessing fishing gear that was not stowed or otherwise unavailable for use and failing to possess a valid Hawaii longline permit. While commercial bottomfishing continues to be allowed in the monument for a limited time





for those already in possession of valid Federal bottomfish permits, all other commercial and recreational fishing is prohibited.

NOAA Issues \$1.16 Million in Penalties to Lobsterman for Violations

NOAA's Office of General Counsel issued a \$1.16 million Notice of Violation to the owner and operator of the *FV Reaper* and *FV Twister*, for multiple violations of the MSRA and the Atlantic Coastal Fisheries Cooperative Management Act. During the course of this investigation, 426 lobster traps were seized in Pt. Judith, Rhode Island. This case involved NOAA Fisheries Service agents and state officers from Rhode Island and Connecticut working under the Joint Enforcement Agreement.

Poachers Indicted on Criminal Lacey Act Charges: Indictments Include Illegal Poaching & Smuggling of Leopard Sharks

A California man was sentenced to one year and one day in prison and ordered to pay \$100,000 restitution for his role in catching thousands of undersized juvenile leopard sharks in San Francisco Bay and selling them to aquarium dealers in the U.S., the United Kingdom, and the Netherlands. The sentencing was the result of a nearly two-year investigation conducted by NOAA Fisheries Service Enforcement agents in conjunction with the U.S. Fish & Wildlife Service, California Department of Fish & Game, the United Kingdom's Department for Environment

While commercial bottomfishing continues to be allowed in the monument for a limited time for those already in possession of valid Federal bottomfish permits, all other commercial and recreational fishing is prohibited.

Food and Rural Affairs Fish Health Inspectorate and The Netherlands General Inspection Service.

This investigation discovered that a total of six co-conspirators operated a shark smuggling ring which poached and sold over \$2 million worth of illegally harvest California leopard sharks around the world in violation of the Lacey Act. The organized smuggling ring of aquaria poachers is believed to have poached over 10,000 juvenile sharks.



Organization and Outreach



At the request of the Gulf of Mexico shrimp industry, NOAA Fisheries Service developed and presented a one-day marketing workshop in New Orleans on August 8, 2007.

NOAA Fisheries Service Co-Hosts Grouper Forum for Constituents in Gulf of Mexico

NOAA Fisheries Service, the Gulf of Mexico Fishery Management Council, and the Florida Fish and Wildlife Conservation Commission sponsored a forum on Gulf of Mexico Grouper February 27-28 in St. Petersburg, Florida. The free public forum provided a unique opportunity for the agencies and stakeholders to explore more effective ways to work together. Topics of discussion included: Understanding the State and Federal Regulatory Process; Understanding Grouper Assessments and Management; Update on Grouper Assessments; Enhancing Public Participation in Science and Management; and Enhancing Communication between Fishery Managers and the Public.

Fishery Managers have seen increased interest from the public on these issues, and additional involvement in management activities.

NOAA Fisheries Service Hosts Marketing Workshop for Shrimp Industry

At the request of the Gulf of Mexico shrimp industry, NOAA Fisheries Service developed and presented a one-day marketing workshop in New Orleans on August 8, 2007. The workshop was focused on providing participants with information they could use to export their products to the European Union. Chief presenters included NOAA Fisheries Service's Commercial Attaché to the European Union, who provided his perspective on import issues, and gave step-by-step instructions on the comprehensive process of successfully importing products. The director of the Seafood Inspection Program, outlined seafood quality and safety concerns and provided guidance on how to improve products. A panel of industry marketing specialists presented their success stories and also discussed overcoming problems. As a result of this meeting, several

industry groups are exploring efforts to initiate or expand exports to the European Union.

Those attending were very positive in their assessment of the workshop and have requested a followup workshop in the future. The workshop presentations and a summary are available on the internet.

Public Workshops on Steelhead Recovery in Central and Southern California

NOAA Fisheries Service hosted two series of public workshops in central and southern California to gather information for the development of federal recovery plans for the Southern California and South-Central Coast steelhead distinct population segments (DPSs) which are listed as endangered and threatened species, respectively, under the Endangered Species Act.

By hosting these two series of workshops, NOAA Fisheries Service was able to gain valuable stakeholder input on steelhead threats and recovery actions in watersheds ranging from the Pajaro River in central California southward to the Mexican border. Attendees included a wide range of interested parties including local water and flood control districts; Federal, State, and local government agency staff; NGOs, and the public.

NOAA Fisheries Service Hosts the 2007 Klamath River Fish Health Conference

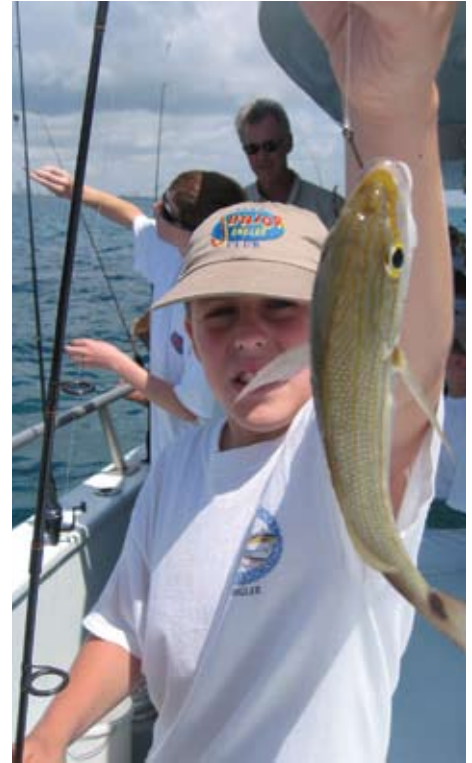
NOAA Fisheries Service sponsored the third annual Klamath River Fish Health Conference in partnership with US Fish and Wildlife and US Geological Survey.

The conference provided a forum for the exchange of current information on fish disease in the Klamath River. The information focused on research related to the critical disease outbreaks

that have caused mortality in salmon in the Klamath River downstream of Iron Gate Dam. Scientists from agencies and universities presented research results and discussed future approaches to address Klamath River fish disease, including flow alteration and habitat manipulation. The Klamath River Fish Health Conference was successful in bringing together agencies, tribes, stakeholders, and the public, and providing a forum for sharing information on fish health issues of the Klamath River Basin. The conference will remain an annual event, convening again in the winter of 2008 with NOAA Fisheries Service's participation and support.

NOAA Publishes Cooperative Research Guidebook

NOAA Fisheries Service published a new guidebook, entitled *Working Together: Developing a Cooperative Research Project and Proposal*, to help fishermen identify potential cooperative research topics, establish cooperative partnerships with scientists and other fishermen, and prepare successful cooperative research grant proposals. The guidebook was developed through a collaborative process that involved members of the fishing industry, scientists, and others interested in cooperative research. The guidebook provides background information on cooperative research as well as a step-by-step guide to developing a research proposal. A complementary website provides more detailed "how-to" information for cooperative research applicants including priority needs for research, links to potential cooperative research funding sources, and instructions for obtaining any necessary permits.



Northeast Cooperative Research Video Wins National Award

In Good Company: NOAA's Northeast Cooperative Research Partners Program video won a Telly award in 2007. The video was produced by NOAA Fisheries Service and the NOAA Office of Communications. Highlighting the cooperative relationships developed with the fishing industry to help guide the management of fishery resources in the Northeast Region, the video included exciting on-the-water footage and interviews with fishermen, scientists and managers who participated in the program. The Telly Awards, in their 28th year of competition, honor outstanding local, regional and cable TV video and film productions.





Best Guess Volunteers Support Recreational Data Collection in Hawaii

Father's Day weekend on the island of Oahu was the site for some non-conventional cooperative research by NOAA Fisheries Service volunteers. The Best Guess project was conducted to assist Hawaii Marine Recreational Fishing Survey surveyors in collecting important species-level data on landed fish. Occasionally, the surveyors cannot weigh or measure large ahi (tuna) because the fisherman does not want to remove the fish from the ice slurry, or have it handled by someone other than the crew. Without these important data however, estimates on the amount of fish landed in Hawaii could be wrong.

To solve this problem, a surveyor suggested allowing fishermen to give an approximation of the weight as a suitable proxy for the actual weight. To test this method, NOAA Fisheries Service organized a data collection at Hawaii's largest boat tournament, the Waianae Boat Fishing Club's Ahi Fever. Approximately 200 boats participated and the tournament had a record weekend, weighing in over 30,000 lbs of fish. By the time the last fish was scaled, NOAA Fisheries Service volunteers collected 367 guesses from 226 fishermen. Results showed that these Hawaii fishermen were very adept at guessing weights of their landed ahi and marlin. Eight out of 10 fishermen pinpointed the weight of their fish within 20 pounds and 21 fishermen guessed within a pound. NOAA Fisheries Service scientists will now analyze the information collected at the tournament to determine the best protocol for estimating the weight of recreational ahi catches in the field.

Expansion of Fishing Line Recycling Program in Southeast

NOAA Fisheries Service, working with a number of partners in Florida, is helping to revitalize and expand the Monofilament Recovery & Recycling Program. The program was started by officials of Brevard County, Florida to clean up beaches, fishing areas and other places where discarded fishing line occurred. The program has expanded throughout Florida, and with NOAA's help, is moving into Gulf states, California and soon into Hawaii.

The program is an innovative project dedicated to reducing the environmental damage caused by discarded fishing line. It strives to decrease the negative impacts of monofilament fishing line left in the environment by conducting regular cleanups and by encouraging anglers to recycle their used fishing line at tackle shops and outdoor bins.

Thanks to a grant from the National Ocean Service Office of Response and Restoration-Marine Debris Program, NOAA Fisheries Service has been working in partnership with several states, including Florida, Texas, Louisiana, Mississippi, and Alabama to significantly expand the program. The goal is to expand the program throughout the Gulf of Mexico, the Southeastern United States and the US Caribbean Sea. A similar program is under development with the State of California utilizing funds from the same grant program.

Working with the Florida Fish and Wildlife Conservation Commission, NOAA Fisheries Service also conducted a series of Bin Workshops where volunteers built several hundred collection bins.

In 2007, a study by the journal *Endangered Species Research* showed for the first time that humpback whales, once hunted to near-extinction in the North Pacific, are now spending their winters in the protected waters of the Papāhanaumokuākea Marine National Monument.

Cooperative Conservation in the Papāhanaumokuākea Marine National Monument

The Papāhanaumokuākea Marine National Monument, created by Presidential proclamation June 15, 2006, is an excellent example of cooperative conservation of the Nation's living marine resources. The monument is managed by NOAA, the Department of the Interior's U.S. Fish and Wildlife Service working closely with the State of Hawaii.

In 2007, a study by the journal *Endangered Species Research* showed for the first time that humpback whales, once hunted to near-extinction in the North Pacific, are now spending their winters in the protected waters of the Papāhanaumokuākea Marine National Monument. Researchers estimate that approximately twice the amount of suitable wintering habitat is found in the Northwestern Hawaiian Islands as compared to the main Hawaiian Islands.

The Papāhanaumokuākea Marine National Monument is the largest fully protected marine conservation area in the world. The monument provides significant protection for a wide variety of marine wildlife, including endangered species and their habitat.

The Papāhānaumokuākea Marine National Monument is managed jointly by three co-trustees, the Department of Commerce, Department of the Interior and the State of Hawaii, and represents a cooperative conservation approach to protecting an entire ecosystem. The monument area includes the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve, the Midway Atoll National Wildlife Refuge/Battle of Midway National Memorial, the Hawaiian Islands National Wildlife Refuge, the Hawaii State Seabird Sanctuary at Kure Atoll, and Northwestern Hawaiian Islands State Marine Refuge.

Outreach and Education

4th Annual Great American Seafood Cook-Off Held in 2007

NOAA Fisheries Service annually sponsors one of America's most prestigious culinary events each August in New Orleans. In 2007, Louisiana's governor again challenged U.S. state governors to appoint chefs to compete for the honor of being named King or Queen of American Seafood. The Cook-Off is limited to twenty premier chefs who showcase the local cooking styles of their states or embellish on their own personal signature seafood dishes. The primary criterion is that the seafood be harvested exclusively in U.S. waters and be sustainable. NOAA Fisheries Service Director Bill Hogarth, who also acted as a judge for the event, presented the winning trophy to Chef Tim Thomas, of Georgia, for his preparation of Wild Georgia Shrimp Ratatouille with Boursin and Cheese Grits. New for 2007 was a second day focusing on home preparations of seafood. Competing chefs prepared a wide variety of home-style meals, giving consumers attending the event a chance to sample their many simple, yet delicious dishes.



Another first for the 2007 Cook-Off was the unveiling of NOAA Fisheries Service's new consumer education tool, FishWatch. FishWatch is designed to help consumers identify the status of fishery stocks and understand the management and science requirements involved with building and maintaining sustainable fisheries. Those attending the Cook-Off were able to access the internet-based website to learn about many of their favorite seafoods.

Watershed Restoration Technology Transfer

On Nov. 28th, the Watershed Program, part of the Environmental Conservation Division at the Northwest Fisheries Science Center, held its fifth biennial Open House. Nearly 300 participants from throughout the Pacific Northwest, including local, state, regional, federal and tribal government, non-profit organizations, consulting firms, and university students and faculty attended to learn about the research being conducted by the Watershed Program.

Topics covered during the Open House included estimates, predictions, and ecology over big areas; secrets of life history diversity; experiments in nutrient additions; recolonization and reintroduction; and informing policy and management. By holding such events, the Watershed Program reaches a wide audience to showcase the exceptional research being conducted by NOAA scientists. The scientist help keep stakeholders abreast of current NOAA research priorities, generating new valuable collaborative opportunities.

NOAA Offers Scholarships for Summer Day Camps

The NOAA Chesapeake Bay Office—in partnership with Nauticus (a maritime museum in Norfolk, Virginia) and the Chesapeake Bay National Estuarine Research Reserve in Virginia—hosted two summer science camps for students aged 9–12. The NOAA @ Nauticus camp examined how the natural resources of the Chesapeake Bay have changed in the 400 years since Captain John Smith explored the watershed. The camp included a visit to the NOAA ship Thomas Jefferson and a kayak trip on the Lynnhaven River that enabled participants to learn firsthand about living resources in the lower part of the Bay. The second summer science camp was held on the campus of the Virginia Institute of Marine Science in Gloucester Point, Virginia. Participants in this camp explored wetlands, underwater grass beds, blue crabs, oysters, and other Bay flora and fauna through field trips, group activities, games, and crafts. The week concluded with a full-day paddle trip on the scenic York River. Both Virginia camps offered full scholarships for participants.



NOAA Celebrates 200th Anniversary

NOAA's 200th Celebration in 2007 highlighted the rich history of science, service, and stewardship provided to the American public by the National Oceanic and Atmospheric Administration and its predecessors. Throughout the year, many stories were told, from the founding of the U.S. Survey of the Coast by Thomas Jefferson to the present-day activities of NOAA as an agency dedicated to the protection, management, and understanding of our ocean, coasts, and skies.

In 1807, President Thomas Jefferson founded the U.S. Coast and Geodetic Survey (as the Survey of the Coast) to provide nautical charts to the maritime community for safe passage into American ports and along our extensive coastline. The Weather Bureau was founded 1870 and, one year later, the U.S. Commission of Fish and Fisheries (parent agency to what is now known as NOAA Fisheries Service) was founded. Individually, these organizations were America's first physical science agency, America's first agency dedicated specifically to the atmospheric sciences, and America's first conservation agency.

During the nationwide celebration, NOAA's scientists, managers and support staff developed and hosted a number of events. Most gatherings were local, celebrated at a science laboratory, a regional

center, or other facility. Other gatherings were national in scope. A key part of the NOAA 200th was the exhibit: Treasures of NOAA's Ark: Journey Through Time which started NOAA Heritage Week in February. Guests who traveled through the exhibit's 200 years of NOAA's science, service, and stewardship were fascinated by newly discovered and restored artifacts from NOAA's past, and inspired by the scientific discoveries of NOAA's professionals.

In addition, NOAA Fisheries Service staff also led the development and hosting of a NOAA-wide celebration in collaboration with the Gloucester Maritime Heritage Center and the city of Gloucester, Mass.

Gloucester is America's oldest fishing port and it provided the backdrop for an early autumn NOAA 200th weekend event that featured the NOAA Fisheries Service role in the community. For more than 350 years, Gloucester's residents have made their living from the ocean, drawing on the Atlantic's natural bounty to feed the nation and the world. During the three-day event more than 300 people helped celebrate Gloucester's rich fishing history by participating in a variety of activities including boat building, habitat conservation and fishing gear demonstrations, nautical knot tying, interpretations of marine railway and piers, tours of the ice house, mill building, weather balloon release, and tours of a fishing vessel.



B-WET Chesapeake, coordinated through the NOAA Chesapeake Bay Office, has operated in the Chesapeake Bay since 2002 and has reached approximately 100,000 students and 12,000 teachers.

3rd Annual Summer Science Camp Held

In Seattle, NOAA Fisheries Service staff worked with other NOAA counterparts and the University of Washington Sea Grant program to offer the third annual summer Science Camp at NOAA's Western Regional Center. Campers used critical thinking skills to investigate a fictional fish kill on Puget Sound through a series of hands-on scientific activities. Scholarships were also offered for this program to encourage broad participation from throughout the community.

NOAA's Student and Teacher Education Program Shows Improved Stewardship Ethic

In early 2007, the NOAA Bay Watershed Education and Training Program (B-WET) for the Chesapeake Bay watershed completed an intensive multiyear evaluation that shows that students who participate in programs supported by B-WET are more knowledgeable about the watershed and more likely to take action to protect the Bay. The study also showed that teachers trained by B-WET are more confident in their ability to use field experiences to teach about the watershed and are more likely to do so. B-WET supports the Chesapeake Bay Program's commitment to ensure that every student in the watershed has a meaningful watershed educational experience before graduation. B-WET Chesapeake, coordinated through

the NOAA Chesapeake Bay Office, has operated in the Chesapeake Bay since 2002 and has reached approximately 100,000 students and 12,000 teachers.

Use of Barbless Circle Hooks in Hawaii Shoreline Fisheries Promoted to Reduce Bycatch of Fish and Protected Species

NOAA Fisheries Service scientist continue their work with Hawaii recreational shorefishermen on the use of barbless circle hooks during their fishing activities. Already in its third year, the Barbless Circle Hook Project has distributed over 35,000 barbless circle hooks to fishermen in the main Hawaiian Islands. NOAA Fisheries Service is asking fishermen to voluntarily use barbless circle hooks when they see seals and turtles in the immediate area or when they fish areas that have been known to have high levels of interactions with these species.

Two of the largest public shoreline tournaments in the State now have a barbless circle hook category and have seen participation in this category increase annually. In 2007, on the Big Island a monk seal was able to free itself from what turned out to be a barbless hook. As a result of this project, Hawaii shoreline fishermen are making an effort to fish responsibly and avoid interactions with marine mammals and protected species.

Seafood Inspection Partnerships

In 2007, the Office of Sustainable Fisheries and the Seafood Inspection Program (SIP) began to expand an informal partnership to better meet agency outreach, food safety information sharing, and commercial trade and industry goals. The Seafood Inspection Program was growing to meet additional domestic and international requests for their services. At the same time the Office of Sustainable Fisheries was focusing its efforts on



Secretary of Commerce Carlos M. Gutierrez (right) visits the NOAA Fisheries Service booth at the 2007 International Boston Seafood Show.

more effective outreach through trade exhibiting and meetings with industry groups. The result was a much more coordinated outreach and communication structure for both Offices.

In April 2007, the Seafood Inspection Program leadership expanded their activities at the Boston Seafood Expo, the Brussels Seafood Expo and the China Seafood Expo. In addition to coordinating with PAC on exhibit layout and design, SIP staff also took advantage of international contacts available through PAC's two commercial trade specialists.

SIP staff are also working more closely with the trade specialists in their areas of expertise, the European Union and the Asian Pacific markets. The specialists help SIP by unsnarling trade problems that may occur, and SIP is working more closely to help with inspection and other support activities that may be needed.

In 2008, the partnership is expected to expand further as SIP supports agency efforts to eliminate illegal, unlawful and unregulated fishing practices. SIP staff will assist as directed to gather samples, coordinate forensics studies and examine seafood product for safety and quality.



“As a major growth engine, aquaculture can help preserve the historic ties that fishing communities have to the oceans and create a new and vibrant means for job creation.”

— U.S. Secretary of Commerce Carlos M. Gutierrez
at NOAA's National Marine Aquaculture Summit,
June 2007

A national aquaculture summit, the introduction of the National Offshore Aquaculture Act of 2007, a new 10-Year Plan for Marine Aquaculture, and an alternative feeds initiative were among the highlights for NOAA Fisheries Service in 2007.

Convened by U.S. Secretary of Commerce Carlos M. Gutierrez in June 2007, the National Marine Aquaculture Summit attracted over 200 seafood and other industry leaders, investors, policy experts, government officials, researchers, and representatives of non-government organizations from across the nation. Energized by eight panel discussions over two days, participants identified opportunities and challenges for U.S. marine aquaculture and focused on what the federal government could do to help enable a more robust U.S. aquaculture industry. Topics included legislation,

research and development, economic incentives, investment programs, and scientific research.

At the heart of discussions was the pending National Offshore Aquaculture Act of 2007. Transmitted to Congress in March and subsequently introduced in the House (H.R. 2010) and the Senate (S. 1609), the bill received a hearing in the House and is awaiting further action by Congress. If enacted, the bill would give NOAA the authority to permit and regulate aquaculture in federal waters, (from state waters to 200 miles off U.S. coasts). The bill would also establish a research program for all of marine aquaculture.

On balance, the summit panelists concluded that the United States is poised and ready to expand ecologically responsible marine aquaculture. They also concluded that legislation

should provide for the development of an environmentally responsible and sustainable aquaculture industry, while also providing the framework for regulatory certainty that will aid development and growth of new business.

The summit also highlighted some of the other important economic drivers that prompted the Administration to develop and propose the marine aquaculture legislation, including a desire to increase domestic production to close the \$9 billion seafood trade deficit and to give American seafood farmers and investors greater opportunity to participate in the \$70 billion global aquaculture industry. Domestic aquaculture accounts for only about 1.5 percent of global aquaculture production. Experts agree that with seafood consumption continuing to rise in the United States and without legislative action to spur domestic aquaculture, the country will see a major shortfall in seafood supply in the next 25 years.

In October, NOAA Fisheries Service finalized and adopted the 10-Year Plan for Marine Aquaculture as an agency-wide policy document. The plan is intended to guide the agency as it works toward establishing marine aquaculture as an integral part of the U.S. seafood industry and as a viable technology for replenishing important commercial and recreational fisheries. The plan provides specific goals for NOAA Fisheries Service's Aquaculture Program and an assessment of the challenges the agency will face in its effort to reach its goals.



The goals in the 10-Year Plan are:

- A comprehensive regulatory program for environmentally sustainable marine aquaculture;
- Development of commercial marine aquaculture and replenishment of wild stocks;
- Public understanding of marine aquaculture; and
- Increased collaboration and cooperation with international partners.

The plan was prepared by NOAA Fisheries Service at the request of the Marine Fisheries Advisory Committee, which advises the Secretary of Commerce on all living marine resource matters that are the responsibility of the Department.

In November, NOAA Fisheries Service, in partnership with the U.S. Department of Agriculture, initiated a long-term effort focused on accelerating the development of alternative feeds for aquaculture. The purpose of the initiative will be to identify alternative dietary ingredients

for aquaculture that will reduce the amount of fishmeal and fish oil contained in aquaculture feeds while maintaining the important human health benefits of farmed seafood.

The program also played an integral part in the completion of the National Aquatic Animal Health Plan which has been submitted for administrative review by federal agencies involved in aquaculture. This plan provides a framework and guidance for the federal agencies responsible for managing aquatic health in the United States.

The agency's primary aquaculture research program, the National Marine Aquaculture Initiative, attracted over 240 proposals seeking \$85 million in research funding in 2007. Grant recipients will be announced in 2008.



Awards

2007 Department Gold and Silver Medal Awards

Gold Awards

Individual Award

Gerald Scott – Southeast Fisheries Science Center

For leadership in the scientific assessment and management of fish stocks for the International Commission for the Conservation of Atlantic Tunas.

Group Awards

William Hogarth, Steven Murawski, Samuel Rauch, III, Heather Sagar, Carrie Selberg, Laura Cimo, Mark Holliday, Matteo Milazzo, Alan Risenhoover, Galen Tromble – NOAA Fisheries Service Headquarters

Christopher Scheve, Kevin Allexon – Office of the Secretary

Leah Harrelson – Office of the Under Secretary

Karl Anderson, C. Stewart Harris – NOAA Office of Legislative Affairs

Adam Issenberg, Constance Sathre – NOAA Office of the General Counsel

For leadership in skillfully assisting in passage of the 2006 Magnuson-Stevens Fishery Conservation and Management Reauthorization Act, a major Administration priority.

NOAA's National Hydropower Team

David K. White, Steve Edmondson, James Simondet, Eric Theiss, Steve Thomas, Richard Wantuck – Southwest Regional Office

John K. Johnson – Northwest Regional Office

Kimberly Lellis, Melanie Harris – Office of Habitat Conservation

Prescott Brownell, Stephania Bolden, Miles Croom, Pace Wilber – Southeast Regional Office

Sean McDermott, David Bean, Louis Chiarella, Peter Colosi – Northeast Regional Office

Dan Hytrek, Ruth Lowery, Mark Hodor, Eve Joy, Charles Lynch – NOAA Office of General Counsel

For unprecedented leadership in improving fish passage to ensure sustainability of fish populations and habitat affected by hydropower facilities.

Michael Tosatto – Pacific Islands Regional Office

Daniel Cohen – Office of General Counsel

Tina Wilhelm, Vincent Collins, Sean Corson, Randall Kosaki, Edward Lindelof, Brooke Paige, Michael Weiss – National Ocean Service

Theodore Beuttler, Jane Chalmers, Alexa Cole, Silar Deroma, Adam Issenberg, Joel LaBissonniere, Elizabeth Packard, Mary Ward – Office of the Under Secretary

For extraordinary dedication and professionalism in supporting the establishment of the Northwestern Hawaiian Islands Marine National Monument.

Silver Awards

Individual Awards

Edward DeMartini – Pacific Islands Fisheries Science Center

For developing analyses using visual survey methods, and not physical specimens, to assess the health of central Pacific coral reef fish communities.

Group Awards

Roy Crabtree, Heather Blough, Rodney Dalton, Sarah Devido – Southeast Regional Office

Peter Hood, Antonio Lamberte, John Reed, Philip Steele, David McKinney – NOAA Office for Law Enforcement

Monica Smit-Brunello – NOAA Office of the General Counsel

For design and implementation of an Individual Fishing Quota Program for the Gulf of Mexico commercial red snapper fishery.

Richard Merrick – Northeast Fisheries Science Center

Gregory Silber – Office of Protected Resources

Barbara Zoodsma – Southeast Regional Office

Linda Johnson – NOAA Office of the General Counsel

For leadership in developing a ship strike strategy to recover North Atlantic right whales in partnership with the US Coast Guard and the International Maritime Organization.

Daphne MacFarlan, Thomas Moore – Office of Habitat Conservation

Kevin Kirsch, Sean Meehan – NOAA Ocean Service

For developing and implementing the T/V Margara Emergency Coral Reef Restoration Project to successfully reattach over 10,000 corals.

Randall Absolon, Gordon Axel, Brian Burke, Kinsey Frick, Eric Hockersmith, Byron Iverson, Bruce Jonasson, Mark Kaminski, Darren Ogden, Samuel Rambo – Northwest Fisheries Science Center

For cutting-edge radiotelemetry equipment and research techniques to rapidly provide precise data for management decisions to recover listed salmon.

Kathryn Bisack, Heather Haas, Henry Milliken, Kimberly Murray, Debra Palka, Marjorie Rossman, Gordon Waring – Northeast Fisheries Science Center

John Higgins, Jr., Glen Salvador, John Kenney, Jr. – Northeast Regional Office

For reducing incidental catch of Northwest Atlantic Ocean marine mammals and turtles to promote their recovery to sustainable population levels.

Jeffrey Polovina – Pacific Islands Fisheries Science Center

Gary Hufford – NOAA's National Weather Service

Wolfgang Menzel, Donald Gray, John Sapper, Kent Hughes, Eileen Maturi, Richard W. Reynolds, Xiangqian Wu – NOAA's National Environmental Satellite, Data, and Information Service

For using geostationary satellite data to create sea surface temperature products useful to understand and manage ecosystems, weather, and climate.

NOAA Administrator Awards

Individual Awards

Jennifer Anderson – Northeast Regional Office

For leadership in managing northeast Days At Sea program to provide more timely and detailed data to commercial fishermen and NOAA resource managers.

James M. Coe – Alaska Fisheries Science Center

For leadership at regional and national levels contributing significantly to successful expansion of the Demonstration Project within NOAA Fisheries Service.

Patrick Moran – Office of International Affairs

For adroit leadership in achieving U.S. international fisheries and environmental stewardship objectives at the Northwest Atlantic Fisheries Organization.

Joseph Serafy – Southeast Fisheries Science Center

For advancing scientific knowledge of linkages among tropical mangroves, fishes, and fisheries via First International Symposium on Mangroves as Fish Habitat.

Roy Torres – Office for Law Enforcement

For exposing the largest known shark smuggling operation in U.S. history, and your devotion to the conservation of U.S. living marine resources.

Group Awards

Susan Boring, Madelyn Martinez, Howard Brown, William Leet – Southwest Regional Office

For demonstrating NOAA's commitment to protect people and Endangered Species Act listed fish species in response to northern California flood emergencies in 2006.

William Chappell, Catherine Belli (Retired) – Office of Sustainable Fisheries

For improving quality and timeliness of the regulatory actions required for managing marine fisheries resources, while reducing staff in the clearance process by 50%.

David King, James Smart, Barney Baker, Sand Borrego, Allen Harvison, Scott McKillip, Scott Harrington – Alaska Fisheries Science Center

For nationally recognized leadership in transferring knowledge about fabricating, maintaining, and managing research fishing gear for assessment surveys.





Brian Lance, Matthew Eagleton, John Olson – Alaska Regional Office

Erika Ammann – Office of Habitat Conservation

Jonathan Taylor, LTJG – NOAA Office of Marine and Aviation Operations

For conceiving, planning, and installing the first modular artificial reef in the sub-Arctic waters off of Alaska to mitigate loss of marine habitat.

Michael Sturtevant, M. Shawn Barry – Office of Management and Budget

Robert Gorrell – Office of Sustainable Fisheries

Bernard Cody, Leila Afzal – NOAA Office of General Counsel

For initiating the first industry/NOAA partnered fishing capacity reduction program, a \$35M buyback in the longline catcher processor non-pollock groundfish fishery.

Eric Thunberg, John Walden, Scott Steinback – Northeast Fisheries Science Center

For creativity under pressure in producing high quality economic analyses in support of the NE Multispecies Emergency Action and Framework 42.

Kim Dawson Guynn, Robert Gorrell – Office of Sustainable Fisheries

Dean Swanson – Office of International Affairs

Andrew Cohen Michael Gonzales – Office for Law Enforcement

Robin Tuttle – Office of Science and Technology

For reducing illegal fishing of Patagonian Toothfish in the remote Southern Ocean, and established effective means to promote legal export – import trade of this species worldwide.

David Landsman – Office of Habitat Conservation (member of a Group award submitted by the NOAA Ocean Service).

For successfully implementing an effective and nationally recognized program that supports NOAA's mission to keep our oceans free of marine debris.

2007 NOAA Technology Transfer Award

Vera Trainer, Bich-Thuy Eberhart, John Wekell (Retired) – Northwest Fisheries Science Center (members of a Group award submitted by the NOAA Ocean Service)

For development and commercialization of a rapid, cost-effective detection of algal toxins threatening human health and marine resources in coastal waters.

2007 Department Bronze Medal Award Recipients

Deborah R. Hart – Northeast Fisheries Science Center

For significant advances in the theory of rotational area fisheries and leadership in its application to Atlantic sea scallop assessment and management.

Ellen P. Keane – Northeast Regional Office

For coordinating NOAA's policy position and rulemaking to require "chain mats" in the Atlantic sea scallop dredge fishery to protect sea turtles.

Mary H. Ruckelshaus, Michelle M. McClure – Northwest Fisheries Science Center

For leading 30 authors and 100 reviewers from federal, state, tribal, local government, and non-profit entities in synthesis on the Puget Sound, Sound Science, a report which provides policy makers with the first consensus on threats to the ecosystem and research required for recovery.

William L. Michaels – Office of Sustainable Fisheries

Joseph M. Godlewski – Northeast Fisheries Science Center

For the development and successful deployment of a fiberoptic towed body package capable of housing and deploying a variety of oceanographic, acoustic, and video packages.

Richard H. Towler, Jr., Kresimir Williams – Alaska Fisheries Science Center

For inventing and refining an inexpensive electronic measuring device to provide quick and accurate measurements of fish lengths.

Sarah D. Brabson – Office of the CIO

Shannon W. Sprague – NOAA Ocean Service

Kimberly E. Benson – NOAA Office of Education

For leadership in initiating and overseeing the first evaluation of the Chesapeake Bay Watershed Education and Training program.

Erin E. Kupcha, Holly M. McBride, Otis L. Jackson, Barbara M. North – Northeast Fisheries Science Center

For the development of an at-sea electronic entry system for fisheries observer data, including concept design, testing, and final implementation.

William T. Peterson, Edmundo Casillas, Joanne M. Butzerin, John W. Ferguson – Northwest Fisheries Science Center

For developing a web-based description of eleven ocean productivity indicators which enables the forecasting of adult salmon returns years sooner than previous techniques.

Ann K. Matarese, Janet L. Benson, Deborah M. Blood, Susan J. Picquelle, William Rugen – Alaska Fisheries Science Center

For developing the Ichthyoplankton Information System, a web-based science product which is the first decision support tool providing vital marine larval fish data to resource managers for fisheries management and ecosystem and climate impact assessments.

Daniel Torquemada – Office for Law Enforcement

Brian L. Cluer, Stacy K. Li, Charleen A. Gavette, Charlotte A. Ambrose – Southwest Regional Office

Amanda Wheeland – NOAA Office of General Counsel

For precedent-setting verification of non-compliance with Endangered Species Act requirements to protect listed fish from timber harvest impacts.

Mary E. Rolle, Mark A. Hodor – NOAA Office of General Counsel

Steven A. Kokkinakis, Shelby L. Mendez – PPI

Angela Somma – Office of Protected Resources

Emily R. Lindow – Office of the Assistant Administrator

David A. Bizot, David T. MacDuffee, David Kaiser, John A. Armor – NOAA Ocean Service

For developing and implementing a coordination and review process to expeditiously provide NOAA-wide recommendations on liquified natural gas licensing proposals.

Erik Zobrist, Cheryl Brodnax – Office of Habitat Conservation

Richard Hartman, Rachel Sweeney, Patrick Williams – Southeast Regional Office

Joy Merino Hunter – Southeast Fisheries Science Center

Jason Manthey – Office of the Chief Administrative Officer

Jeannie Jennings, Pamela Stichweh – NOAA Acquisitions and Grants Office

For restoring 1800 essential habitat wetland acres in support of a \$1B fishing industry and a buffer to create a more storm-resilient coastal Louisiana.

Scott J. Carlon, Steven M. Fransen, Edward B. Meyer, Bryan D. Nordlund, Melissa G. Jundt, Ritchie J. Graves, Michelle R. Day, Keith R. Kirkendall – Northwest Regional Office

Jane S. Hannuksela, Chris D. Fontecchio – NOAA Office of General Counsel

For intensive negotiations with over 260 stakeholder groups which ensure reliable, clean energy production at 23 hydroelectric projects while conserving protected species.

Timothy J. Tynan, Matt Longenbaugh, Elizabeth G. Gaar, Gary S. Sims, Elizabeth L. Babcock – Northwest Regional Office

Susan Bishop – Northeast Regional Office

For the development of Endangered Species Act recovery plans for Puget Sound Chinook and Hood Canal summer chum salmon, the first ESA recovery plans for species of Pacific salmon to be finalized under the statute's requirements.

Karen H. Abrams – Office of Habitat Conservation

Gretchen Arentzen, Merrick Burden, Stephen L. Copps, Jr., Stephen Freese – Northwest Regional Office

Jane S. Hannuksela, Stacey L. Nathanson – NOAA Office of General Counsel

Suzanne Russell, W. Waldo Wakefield II – Northwest Fisheries Science Center





Mary Yoklavich – Southwest Fisheries Science Center

For protecting U.S. West Coast essential groundfish habitats via regulations to restrict fishing, buy-out trawlers, and create Marine Protected Areas.

Margaret W. Miller – Southeast Fisheries Science Center

Jennifer A. Moore, Stephania K. Bolden – Southeast Regional Office

Andy Bruckner – Office of Habitat Conservation

Marta F. Nammack – Office of Protected Resources

Cheryl Scannell – Office of General Counsel

Brian D. Keller – NOAA Ocean Service

For completing a biological review that led to the successful listing of elkhorn and staghorn corals as threatened under the Endangered Species Act.

Roger P. Hewitt, Kevin T. Hill, Nancy C. H. Lo, David A. Griffith, Ronald C. Dotson, David Demer, Richard L. Charter – Southwest Fisheries Science Center

For conducting the first, international, ecosystem-based synoptic sardine survey along the entire U.S. West Coast, from British Columbia to Baja, California.

Frank Lockhart – Northwest Regional Office (group member – Office of Oceanic and Atmospheric Research)

For extraordinary efforts in support of the White House Joint Subcommittee on Ocean Science and Technology (JSOST), including its development of the first-ever U.S. National Ocean Research Priorities Plan and Implementation Strategy.

Scott Ferguson, Joyce Miller – Pacific Islands Fisheries Science Center (group members – Office of Oceanic and Atmospheric Research)

For conducting complex hydrographic surveys in western Pacific ports to update nautical charts in support of safe navigation and economic development.

Jerome E. Erbacher – Office of Sustainable Fisheries (group member – Office of the Chief Administrative Officer)

For leading a business process reengineering effort, involving over 1300 stakeholders, to strengthen NOAA's budget, workforce management, and grants functional areas.

John Gorman, Steve Ignell – Alaska Regional Office

Carol Ciufolo, Bob Williams – Office of Management and Budget (group members – Office of the Chief Administrative Officer)

For designing and constructing the Ted Stevens Marine Research Institute facility in Juneau, Alaska.

Office of the Chief Information Officer

Dennis Morgan, Jim Sargent – Office of the CIO (group members – Office of the Chief Information Officer)

For systematically updating the NOAA Enterprise Architecture, which enabled Commerce to achieve a favorable OMB rating and serve as a model for other bureaus in the Department.

John Kern, John Rapp – Office of Habitat Conservation (group members – Office of the General Counsel)

For development of the Louisiana Regional Restoration Planning Program, the first statewide program to expedite restoration of injured natural resources.

Deborah Ben-David – NOAA Office of General Counsel

James Lecky, Brandon Southall, Craig Johnson, Jolie Harrison, Steve Leathery, Donna Wieting – Office of Protected Resources

For exemplary work in issuing an MMPA incidental harassment authorization to the Navy for its 2006 Rim of the Pacific exercises in the North Pacific Ocean near Hawaii.

NOAA 2007 Distinguished Career Award Recipients

Lelia Wise – Office of Science and Technology

For exacting attention to accuracy in fisheries data management and an extraordinary willingness to help others during 40 years of service to NOAA and its predecessor agencies.

Robert S. Waples – Northwest Fisheries Science Center

For ground breaking applied research in the field of conservation genetics which greatly advanced the protection of genetic diversity in marine organisms.

John Helle – Alaska Fisheries Science Center

For pioneering scientific accomplishments in measuring the ecological basis of marine productivity, enabling an ecosystem approach to fishery management.

2007 External Award Recipients

December 2006

Robert Avent Medal, Georgia Institute for Biodiversity and Sustainability

Dr. William T. Hogarth, NOAA Assistant Administrator for Fisheries

For outstanding contributions to the understanding and management of fisheries in U.S. waters.

April 2007

Dwight A. Webster Award, Northeastern Division of the American Fisheries Society

Dr. Kenneth Sherman, Director of the Narragansett, Rhode Island Laboratory

Northeast Fisheries Science Center

For sustained excellence in marine fisheries research.

May 2007

William E. Ricker Resource Conservation Award, American Fisheries Society

Resource Evaluation and Assessment Division, Northeast Fisheries Science Center

For outstanding contributions in fisheries resource conservation of groundfish stocks, including scientific basis for rebuilding overfished stocks.

June 2007

Marine Biotechnology Award of Excellence, Pan American Biotechnology Association

Dr. Vera Trainer, Northwest Fisheries Science Center (and colleagues)

For ground breaking study revealing the molecular basis for resistance and accumulation of saxitoxin in softshell clams, published in Nature in 2005.

July 2007

2007 Award of Publication Excellence

James Peacock, Northwest Fisheries Science Center

For excellence in layout and design of the Sound Science Report on the state of science of Washington's State Puget Sound Ecosystem.

September 2007

2007 Dr. Nancy Foster Habitat Conservation Award

Estuaries Section, American Fisheries Society/NOAA Fisheries Service

Dr. Usha Varanasi, Director, Northwest Fisheries Science Center

For 30 years of outstanding contributions towards protecting, conserving, and restoring the Nation's coastal and marine habitat.

November 2007

2006 Presidential Early Career Award for Scientists and Engineers

Dr. Mark Scheuerell, Northwest Fisheries Science Center

For nationally and internationally recognized cutting-edge research into salmon population and ecosystem dynamics.





NOAA Fisheries Service Vision: The American people enjoy the riches and benefits of healthy and diverse marine ecosystems.

Publication Production and Project Management

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U.S. Secretary of Commerce

Carlos M. Gutierrez

**Under Secretary of Commerce for Oceans and
Atmosphere and Administrator, National Oceanic
and Atmospheric Administration—NOAA**

Conrad C. Lautenbacher, Jr.
Vice Admiral, U.S. Navy (Ret.)

**Assistant Administrator for Fisheries
NOAA Fisheries Service**

William T. Hogarth, Ph.D.

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U. S. Government – 2008



United States Department of Commerce
National Oceanic and
Atmospheric Administration



Economic Statistics for NOAA

s i x t h e d i t i o n

A P R I L 2 0 0 8

New For This Year:

**Economic Dimensions of
NOAA Products and Services**

Program Planning
and Integration



Office of the NOAA
Chief Economist

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Foreword

This is the sixth edition of *Economic Statistics for NOAA*, a compendium of economic statistics relevant to NOAA’s mission and programs. It is intended to serve as a common reference to the economic impacts and benefits of NOAA programs and provide a consistent set of economic statistics for NOAA management and staff when preparing for Congressional visits and testimony, budget preparation, speeches, and other external events. *Economic Statistics for NOAA* illustrates the economic importance of NOAA’s programs to the Nation’s economy and public well-being.

Economic Statistics for NOAA was prepared by Rodney Weiher, NOAA Chief Economist, and Avery Sen, Policy Analyst, in Program Planning and Integration, with the assistance and input of staff throughout NOAA. The section on “Economic Dimensions of NOAA Products and Services” was prepared by Professor Charles Colgan at the University of Southern Maine in Portland, Dr. Tom Teisberg, Principal of Teisberg Associates in Charlottesville, Va., and Rodney Weiher.

Questions and comments should be directed to NOAA Chief Economist Dr. Rodney Weiher by e-mail at rodney.f.weiher@noaa.gov or by telephone at (301) 713-3322.



Vice Admiral Conrad C. Lautenbacher, Jr., US Navy (ret.)
Under Secretary of Commerce for Oceans and Atmosphere
Administrator, National Oceanic and Atmospheric Administration
Washington, DC
March 2008

Introduction: NOAA and Value Creation

NOAA's responsibilities range from forecasting weather and climate to a lead role in assuring the sound management of the nation's ocean and coastal resources. In fulfilling its diverse missions, NOAA programs create economic value.

NOAA's research and forecasts lead to reduced damages from storms and other natural hazards. NOAA provides information that helps businesses make decisions and allows key industries like transportation and agriculture to operate more efficiently. NOAA's management programs for ocean and coastal areas help enhance both the current and future productivity of these economically vital resources.

It is not possible to reduce all of NOAA's economic contributions to the Nation – and to the world – down to a single number. There are many different services that NOAA provides which affect the economy in diverse ways, and there are a variety of ways in which those effects are measured by economists.

Economic Statistics for NOAA provides a summary of statistics and findings of recent research that either directly measures economic benefits of particular programs, or indicates the general economic context in which particular NOAA programs create economic value.

This revised edition includes updated statistics on harmful algal bloom impacts, weather and health statistics, fishery economics, the most recent available statistics on coastal populations and economic output, and additional statistics on the economic benefits of meteorological satellites.

Two criteria were established for inclusion. The first is relevance and importance to NOAA's mission and activities. Second is the ability to cite a credible source in either peer-reviewed or gray literature or correspondence.

Statistics are grouped into three general categories.

- **General Economic and Social Impacts** reflect how natural marine, atmospheric, and coastal phenomena affect the general public. For example, weather and climate sensitive industries account for nearly 30 percent of the Nation's GDP.
- **Contributions to U.S. Income, Employment, and Output** are statistics that directly reflect the market value and human uses of resources impacted by NOAA's programs. For example, the economic value added to the national economy by the U.S. commercial fishing industry was approximately \$29 billion in 2002. Other statistics are a direct measure of the economic benefits of investing in NOAA programs, such as improvements in El Niño forecasts.

- **Coastal Ocean Economics, Population, Employment and Benefits**
statistics illustrate the demographic, social, and economic importance of the Nation's coastal areas. They also reflect the quantitative importance of so-called "nonmarket" benefits of coastal resources such as beaches and recreational boating, which are not directly measured in dollar terms.

This edition of *Economic Statistics for NOAA* also contains a new section, "The Economic Dimensions of NOAA Products and Services," which provides a brief introduction to how NOAA creates economic value and the different concepts and methods of measuring the economic value that are represented in *Economic Statistics for NOAA*.

The NOAA Library (<http://www.lib.noaa.gov>) serves as the repository for information in this publication. You may also access many of the sources on the NOAA Economics & Social Science website's electronic library (<http://www.economics.noaa.gov/library/library.htm>).

NOAA is also developing a comprehensive Economics website which will include not only **Economic Statistics for NOAA** citations, but a broad range of economic data on benefits, impacts, users, and uses of NOAA products. Completion of the site is expected in the spring of 2008.

General Economic and Social Impacts

Weather and Climate Impacts

Weather and climate sensitive industries, both directly and indirectly, account for about one-third of the Nation's GDP [note: \$4 trillion in 2005 dollars] ranging from finance, insurance, and real estate to services, retail and wholesale trade and manufacturing.

Cite: Dutton, John A., *Opportunities and priorities in a new era for weather and climate services*, Bulletin of the American Meteorological Society, September 2002, volume 83, no. 9, pp 1303-1311.

Industries directly impacted by weather such as agriculture, construction, energy distribution, and outdoor recreation account for nearly 10 percent of GDP.

Cite: U.S. Department of Commerce, National Oceanic and Atmospheric Administration, *The economic implications of an El Niño*. NOAA Magazine Online, March 6, 2002, available only online at: <http://www.noaanews.noaa.gov/magazine/stories/mag24.htm>.

A recent analysis of the impact of weather on gross economic output over the last two and a half decades estimates that 3.4% of the of variation in mean gross state output is explained by weather alone. Variation in output due to weather across sectors ranges from 12.1% in agriculture to 2.2% in wholesale trade. The largest absolute variation in dollar terms is in the fire and other casualty insurance sector, ranging on the order of \$132 billion annually. Aggregate dollar variation in U.S. economic activity attributable to weather variability is \$260 billion a year of 2000 gross domestic product.

Cite: Harrod, Megan, Peter H. Larsen, Jeffrey K. Lazo, and Donald M. Waldman. 2007. "Sensitivity of the U.S. Economy to Weather Variability" NCAR Societal Impacts Program, Boulder, Colorado working paper.

The costliest U.S. drought of the past forty years occurred in 1988 and caused more than \$61 billion (in 2002 dollars) of economic losses. More than 5,000 heat-related deaths were also attributed to the heat wave associated with that event.

Cite: Lott, N., and T. Ross, *Tracking and evaluating U.S. billion dollar weather disasters, 1980-2005*, 86th AMS Annual Meeting, 29 January - 2 February 2006, Atlanta, Georgia, combined preprints [CD-ROM], American Meteorological Society, Boston, MA, 1.2, 7 p. (January 2006)

Drought is estimated to result in average annual losses to all sectors of the economy of between \$6-8 billion.

Cite: *Economic Impacts of Drought and the Benefits of NOAA's Drought Forecasting Services*, NOAA Magazine, September 17, 2002. Website:

<http://www.noaanews.noaa.gov/magazine/stories/mag51.htm>.

Although drought does not have major impacts on the overall viability of U.S. agriculture it does impose costs on regional and local agricultural economies. The 1999 drought, for example, led to farm net income losses of approximately \$1.35 billion. Areas of the Northeast encountering extreme and severe drought bore 62 percent of these losses. Farm net income losses were equivalent to only three percent of the U.S.'s expected net farm income for 1999; however, 25 percent of U.S. harvested cropland and 32 percent of pastureland were affected.

Cite: *Economic Impacts of Drought and the Benefits of NOAA's Drought Forecasting Services*, NOAA Magazine, September 17, 2002. Website: <http://www.noaanews.noaa.gov/magazine/stories/mag51.htm>.

Severe fire seasons due to drought and frequent winds can result in billions of dollars in damages. The Western Fire Season Spring-Summer 2000 resulted in nearly seven million acres burned and an estimated \$2 billion in damage costs (includes fire suppression).

Cite: *Economic Impacts of Drought and the Benefits of NOAA's Drought Forecasting Services*, NOAA Magazine, September 17, 2002. Website: <http://www.noaanews.noaa.gov/magazine/stories/mag51.htm>.

Average annual damage from tornadoes, hurricanes, and floods is \$11.4 billion, of which:

- hurricanes average \$5.1 billion and 20 deaths per year;
- floods account for \$5.2 billion, and average over 80 deaths per year,
- tornadoes cause \$1.1 billion in damages.

Cite: National Center for Atmospheric Research (NCAR), Environmental and Societal Impacts Group, and the Atmospheric Policy Program of the American Meteorological Society, 2001, *Extreme Weather Sourcebook 2001: Economic and Other Societal Impacts Related to Hurricanes, Floods, Tornadoes, Lightning, and Other U.S. Weather Phenomena*, National Center for Atmospheric Research, Boulder, Colo. Available only online at <http://www.sip.ucar.edu/sourcebook/>.

The costliest U.S. hurricane was in 1926 in Miami, causing \$90 billion in damage (in 2000 dollars). By contrast, Hurricane Andrew (1992) caused \$35 billion (in 2000 dollars).

Cite: Jarrell, Jerry D., Landsea, Christopher W., Mayfield, Max, and Rappaport, Edward N. October 2001 update, *The Deadliest, Costliest, and Most Intense United States Hurricanes from 1900 to 2000 (and Other Frequently Requested Hurricane Facts)*, NOAA Technical Memorandum NWS TPC-1. Hurricane Research Division, Miami, Fl. Available online at: <http://www.aoml.noaa.gov/hrd/Landsea/deadly>.

In 2002, severe weather caused \$5.8 billion in damages which was less than in 2001. Weather-related injuries showed upward trends in 2002, rising to 3,090 from 2,718 in 2001.

Cite: *2002 U.S. Natural Hazard Statistics Report, Summary of Natural Hazard Statistics for 2001 in the United States*, updated Nov. 12, 2003.
Website: <http://www.nws.noaa.gov/om/hazstats.shtml> .

\$6 billion annually is lost in economic efficiencies as a result of air traffic delays, of which 70 percent is attributed to weather.

Cite: *2002 State of the U.S. Airline Industry: A Report on Recent Trends for U.S. Carriers*, Air Transport Association, Washington, D.C., 2002. Website: <http://www.airlines.org/public/industry/display1.asp?nid=1026>.

Lightning causes \$4 to 5 billion in losses each year in the civilian sector.

Cite: Kithil, R., *21st Century Lightning Safety for Facilities & Structures*, Presented at the International Lightning Detection Conference, Tucson, Ariz., October, 2002.

Lightning has consistently been one of the top three causes of weather-related deaths in the country. It kills between 50 and 70 people and injures hundreds more each year.

Cite: NWS Office of Climate, Water, and Weather Services. Thirty and 10 year average fatalities for various weather types can be viewed at: <http://www.nws.noaa.gov/om/hazstats.shtml>.

Lightning costs about \$2 billion annually in airline operating costs and passenger delays.

Cite: Northeast States Emergency Consortium, Wakefield, Mass., 2002.
<http://www.serve.com/NESEC>.

The costliest U.S. tornado outbreak caused nearly \$1.6 billion in insured losses on May 3-7, 1999, with the greatest losses in the Oklahoma City, OK area.

Cite: Insurance Information Institute, 2002.
<http://www.disasterinformation.org>.

The U.S. has sustained 70 weather-related disasters over the past 27 years in which overall damages/costs reached or exceeded \$1 billion. The total normalized losses for the 70 events exceed \$560 billion. 61 of these disasters occurred during the 1988-2006 period with total unadjusted damages/costs exceeding \$430 billion.

Cite: Lott, N., and T. Ross, *Tracking and evaluating U.S. billion dollar weather disasters, 1980-2005*, 86th AMS Annual Meeting, 29 January - 2

February 2006, Atlanta, Georgia, combined preprints [CD-ROM], American Meteorological Society, Boston, MA, 1.2, 7 p. (January 2006)

Economic costs of snow arise from:

- snow removal (exceeds \$2 billion per year for U.S.),
- road closures that cause lost retail trade, wages, and tax revenue (exceeds \$10 billion per day for closures in eastern U.S.),
- flight delays (\$3.2 billion per year for U.S. carriers),
- damage to utilities (up to \$2 billion per event),
- flooding from snowmelt (\$4.3 billion for 1997 floods), and
- cost to agriculture and timber from frost and ice (up to \$1.6 billion per ice storm).

Cite: Adams, R., Houston, L., Weiher, R., *The Value of Snow and Snow Information Services*, Report prepared for NOAA's National Operational Hydrological Remote Sensing Center, August, 2004.

During 2005, there were 5,301 hospital discharges related to excessive heat. Of those treated, 27 % were between the ages of 65-84, 45% were receiving Medicaid/Medicare and 34% classified as low income.

During 2005, there were 3,405 hospital discharges related to excessive cold. Of those treated, 24% were between the ages of 65-84, 61% were receiving Medicaid/Medicare and 33% classified as low income.

During 2005, the average length of stay to treat hospital stays related excessive heat and cold was 3.5 days and the average mean charges to treat excessive heat and cold was \$16,741 and the national hospital bill to treat excessive heat and cold is \$1,492,981,042.

Cite: Healthcare Cost and Utilization Project (HCUP), Nationwide Inpatient Sample, Agency for Healthcare Research & Quality, Department of Health and Human Services. Available through the HCUPnet on-line query system at: <http://hcupnet.ahrq.gov/>.

notes

Insured Losses

Natural catastrophes (storm, flood, hail, etc.) caused insured losses of \$15 billion across the globe. In contrast, man-made disasters (explosions, aviation, accidents, etc.) caused just under \$2 billion. Natural catastrophes were thus responsible for significantly more losses than major man-made disasters in 2003. The bulk of the damage from natural catastrophes, \$8 billion, was caused by storms.

Five insured billion-dollar losses in 2003, amounting to \$8 billion, were the result of natural catastrophes in North America. These included events in the following table:

Costly insured losses in 2003:

Event	Insured losses (US dollars)	Victims (dead and missing)	Country
Tornadoes	\$3.2 billion	45	US
Hurricane Isabel	\$1.7 billion	36	US, Canada
Storms and hail	\$1.6 billion	--	US
Cedar fire, urban forest fires	\$1.1 billion	14	US (CA)
Old fire, urban forest fires	\$1.0 billion	4	US (CA)

Cite: Swiss Re sigma preliminary estimates of catastrophe losses. December 16, 2003.

<http://www.swissre.com/INTERNET/pwswpspr.nsf/fmBookMarkFrameSet?ReadForm&BM> [If the following web link does not work, go to www.swissre.com, then click on media centre, news, news releases 2003 (in left hand column) and then click on 16 Dec 2003 news release.]

Catastrophe (cat) bonds are little-known securities through which investors bet on hurricanes, earthquakes and even terrorist attacks. Insurance companies issue them to help pay excess claims from such events. Last year, \$1.73 billion in new cat bonds were issued in eight transactions. At the end of 2003, about \$4 billion in cat bond debt was outstanding worldwide, about \$1.3 billion of it relating to North Atlantic hurricane risk. "There is no question that this marketplace could not exist if we did not have sophisticated natural-disaster models... and the models are just getting better all the time."

Cite: The New York Times, *Storm Chasing on Wall Street*, September 19, 2004.

Other Extreme Weather (both insured and uninsured):

- The costliest U.S. drought of the past forty years occurred in 1988 and caused more than \$56 billion (in 2000 dollars) of economic losses. More than 5,000 heat-related deaths were also attributed to the heat wave associated with that event.
- The costliest U.S. wildfire of the past forty years occurred in October 1991 in Oakland, Calif., resulting in more than \$3 billion in losses (in 2000 dollars) and 25 deaths.
- The costliest U.S. flood event occurred in the Midwest during the summer of 1993, resulting in more than \$26 billion in losses (in 2002 dollars) and 48 fatalities.
- Two of the most costly ice storms in U.S. history occurred during the 1990's—in the Northeast in January 1998 (more than \$1.5 billion) and in the Southeast in February 1994 (more than \$3.7 billion).

Cite: Lott, N., and T. Ross, *Tracking and evaluating U.S. billion dollar weather disasters, 1980-2005*, 86th AMS Annual Meeting, 29 January - 2 February 2006, Atlanta, Georgia, combined preprints [CD-ROM], American Meteorological Society, Boston, MA, 1.2, 7 p. (January 2006)

A dollar spent on mitigation saves society an average of \$4, with positive benefit-cost ratios for all hazard types studied. In addition to savings to society, the federal treasury can redirect an average of \$3.65 for each dollar spent on mitigation as a result of disaster relief costs and tax losses avoided.

Cite: *Natural Hazard Mitigation Saves: An Independent Study to Assess the Future Savings from Mitigation Activities*, Multihazard Mitigation Council of the National Institute of Building Sciences, 19 December 2005. Available at: <http://www.nibs.org/MMC/mmcnews.html>

notes

Solar Storms

- In January 1997, a geomagnetic storm severely damaged the U.S. Telstar 401 communication satellite, which was valued at \$200 million, and left it inoperable.
- A geomagnetic storm in 1994 damaged two Canadian communication satellites, which were replaced at a cost of about \$400 million.
- A geomagnetic storm in 1989 “blacked out” the power distribution system for Quebec, Canada, and left 6 million people without electricity for 9 hours at a cost of \$300 million.
- Although these events and their specific impacts were not predicted, current technology promises to provide real-time warnings and measures to contend with solar-induced storms.

Cite: Green, Arthur W. and Brown, William, *Reducing the Risk from Geomagnetic Hazards*, USDOJ and USGS Fact Sheet 177-97. Website: http://geohazards.cr.usgs.gov/factsheets/html_files/geomag/geomag.html.

Diverted polar flights can cost up to \$100,000 each because of the additional fuel required. In the period 17-24 January 2005, United Airlines was forced to operate 26 of these less-than-optimum flights due to space weather.

Cite: Genevieve Fisher, *Integrating Space Weather and Meteorological Products for Aviation*. Atmospheric Policy Program, American Meteorological Society, Washington, D.C., 2003 Website: http://www.ametsoc.org/atmospolicy/documents/Fisher_BAMS_Nov03.pdf

\$500 million in satellite insurance claims from 1994 to 1999 were the direct or indirect result of space weather.

Cite: Kunstadter, C., 2002. U.S. Aviation Underwriters Inc. New York City.

The U.S. Department of Defense has estimated that disruptions to government satellites from space weather cost about \$100 million a year

Cite: Rodgers, David J., Lesley M. Murphy, Clive S. Dyer, 2000. *Benefits of a European Space Weather Programme*. DERA report no. DERA/KIS/SPACE/TR000349. ESWPS-DER-TN-0001. Issue 2.1 December 19, 2000. ESA Space Weather Programme Study (ESWPS).

notes

El Niño Impacts

California storm losses in the 1997-98 El Niño were \$1.1 billion.

Overall, the 1997-1998 El Niño is estimated to have had total U.S. economic impacts on the order of \$25 billion.

Cite: Changnon, Stanley A., ed. *El Niño 1997-1998: The Climate Event of the Century*, Oxford University Press, 2000.

Property losses were \$2.6 billion; crop losses approached \$2 billion.

Cite: Weiher, Rodney F. (ed.), *Improving El Niño Forecasting: The Potential Economic Benefits*, U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Office of Policy and Strategic Planning, Washington, D.C. (2000), p. 18. Also available online at:
http://ioc.unesco.org/goos/ed_nino.pdf.

notes

Coastal Storm & Tsunami Impacts

Coastal storms account for 71 percent of recent U.S. disaster losses annually. Each event costs roughly \$500 million. With 14 events in a year, losses would total \$7 billion per year.

Cite: The H. John Heinz III Center for Science Economics and the Environment, *The Hidden Costs of Coastal Hazards: Implications for Risk Assessment and Mitigation*, Island Press, 2000, Washington, D.C.

On the morning of 26 December 2004, an earthquake occurred in the Indian Ocean west of Sumatra. It was the largest earthquake in 40 years. There were approximately 170,000 people killed, 100,000 missing and more than 1,000,000 homeless. The estimated economic losses exceed \$10 billion.

Cite: *Annual Review: Natural Catastrophes 2004* in the Munich Re Group Knowledge Series, Topics Geo, 2005, p. 60

Since 1900, over 200 tsunami events were observed or caused effects on the coasts of the United States and its territories. These events caused more than 500 deaths and more than \$186 million damage which included damage to buildings, piers, ferry terminals, and boat harbors.

Cite: *Tsunamis Affecting Alaska, 1737-1996*, by James Lander, National Geophysical Data Center Publication KGRD No. 31, 1996, p. 195

Tsunamis Affecting the West Coast of the United States, 1806-1992, by James Lander, P. Lockridge, and M. Kozuch, National Geophysical Data Center Publication KGRD No. 29, 1993, p.242.

United States Tsunamis, 1690-1988, by James Lander and P. Lockridge, National Geophysical Data Center Publication 41-2, 1989, p. 265

False tsunami warnings result in additional significant economic impact. The State of Hawaii estimated \$40 million in evacuation costs from a 1986 false tsunami warning.

Cite: <http://www.magazine.noaa.gov/stories/mag153.htm>

notes

Hurricane Impacts

Hurricane Katrina was the deadliest hurricane to strike the US since 1928 (approximately 1,300 deaths versus 2,500 in Southeast Florida in 1928).

Hurricanes Katrina, Rita, and Wilma produced a record 2.773 million insurance claims.

Seven of the 10 most expensive hurricanes in US history occurred in the 14 months from August 2004–October 2005: Katrina (\$40.0 billion insured losses), Rita (\$4.7), and Wilma (\$6.1).

Katrina is the costliest hurricane in United States history. Even after adjusting for inflation, the estimated total damage cost of Katrina is roughly double that of Hurricane Andrew (1992). Normalizing for inflation and for increases in population and wealth, only the 1926 hurricane that struck southern Florida surpasses Katrina in terms of damage cost.

The property/casualty insurance industry will likely experience a \$20 billion + event approximately every 10-12 years, on average—mostly associated with hurricanes.

Cite: *Hurricane Season of 2005: Impacts on US P/C Insurance Markets in 2006 and Beyond*, Insurance Information Institute, NY, NY, December 7, 2005
<http://www.disasterinformation.org/disaster2/facts/presentation>

Hurricane Katrina affected the entire states of Mississippi and Louisiana, plus twenty two counties in Alabama and nine in Florida. Rita affected all of Louisiana plus twenty six counties in Texas. The coastal zone counties of the four states comprise nearly a quarter of employment and wages in the four states. In Louisiana, the coastal parishes (counties) are more than half of the state's economy. The combined coastal zone and watershed counties on the Gulf of Mexico comprised 14% of employment in Alabama, 4% in Mississippi, 6% of Florida, but 33% of Texas employment and more than 80% of Louisiana.

The region accounts for more than a quarter of U.S. employment in marine construction, more than a fifth of employment in fisheries and ship and boat building, and almost two thirds of the employment in the ocean-related component of oil and gas exploration and production. It also accounts for a disproportionate share of marine transportation related employment.

Cite: Colgan, C. and Adkins, J., *2005 Hurricane Damage to the Gulf of Mexico Ocean Economy*, Monthly Labor Review, February, 2006.

[The US Minerals Management Service] estimates that 3,050 of the Gulf's 4,000 platforms and 22,000 of the 33,000 miles of Gulf pipelines were in the direct path of either Hurricane Katrina or Hurricane Rita. Because of the large amount of

infrastructure in the path of hurricane-force winds and waves, the amount of damage was substantial. In comparison with Hurricane Ivan in 2004, Hurricanes Katrina and Rita accounted for considerably more damage because of the paths taken by these two devastating storms. However, there was no loss of life or significant oil spills from wells on the outer continental shelf (OCS) attributed to either storm.

One hundred percent of Gulf oil production, which is approximately 1.5 million barrels a day, was out of production during both storms and 94 percent of gas production, which is 10 billion cubic feet of gas a day, was out of production during Hurricane Katrina. More than 90 percent of the manned platforms and 85 percent of working rigs were evacuated at one time.

Cite: Mineral Management Service, U.S. Department of the Interior, Press Release, January 19, 2006.
<http://www.mms.gov/ooc/press/2006/press0119.htm>

Hurricanes Charley and Ivan are the second and third costliest U.S. hurricanes on record, \$14 and \$13 billion, respectively.

Cite: The National Hurricane Center Web site
http://www.nhc.noaa.gov/archive/2004/tws/MIATWSAT_nov.shtml

Prior to 2005, the costliest hurricane seasons were:

2004: ~\$42 billion in U.S. damage

1992: ~\$35 billion in U.S. damage (adjusted for inflation, 2000 values)

1989: ~\$10.6 billion in U.S. damage

Cite: The National Hurricane Center Web site
http://www.nhc.noaa.gov/archive/2004/tws/MIATWSAT_nov.shtml

Since 1900, hurricanes and tropical storms making landfall on the U.S. Gulf Coast have caused more than 9,000 deaths and more than \$100 billion in damages (adjusted to 2004 dollars) to homes and property.

Cite: NOAA, Atlantic Oceanographic and Meteorological Laboratory, Hurricane Research Division. Located at
<http://www.aoml.noaa.gov/general/lib/mgch.html>

Some key economic impacts of Hurricane Isabel on the Washington, DC, MSA area were:

- Two million lost riders to Metro with a \$2.6 million loss in revenue.
- 257,443 Federal Government non-essential DC employees losing 2 days of employment with a \$147.4 million loss in revenue.
- 530,000 lost customers to PEPCO and \$40 million in revenue loss.
- 1.3 million Private/Non-Governmental DC employees losing 2 days of employment and \$485.4 million in revenue loss.

Cite: Margaret Fowke, *Key Economic Impacts of Hurricane Isabel*, Office of Strategic Planning and Policy, NWS/NOAA, November 2003. Copies available from NOAA Central Library, Silver Spring, Maryland. Website: <http://www.lib.noaa.gov>.

notes

Harmful Algal Bloom (HAB) Impacts

A median estimate of the annual economic impacts of harmful algal blooms (HABs) in the United States is about \$97 million over the period 1987-2006. These impacts are the sum of different kinds of *direct output* impacts across four categories of effects: public health (divided between ciguatera and shellfish poisonings); commercial fishing; recreation and tourism; and monitoring and management costs. Direct output impacts include lost sales in markets that are directly affected by HABs. Such effects may involve shellfish bed closures, labor losses due to illness, tourism losses, and costs of beach cleanups and enforcement of shellfish laws, etc. Economic impacts of these types do not measure changes in economic *value* (e.g., lost consumer and producer surpluses). Further, these estimates ignore potential gains in other markets or loss mitigation as consumers switch seafood suppliers and recreation destinations and producers switch inputs.

Cite: Hoagland, P. 2006. The public policy of harmful algal blooms. Keynote presentation at the 12th International Conference on Harmful Algae. International Society for the Study of Harmful Algae, Copenhagen (4-8 September).

Some of the most recent (last ten years) local estimates of economic impacts from HABs are reported below.

2005: Lost sales of shellfish in Maine and Massachusetts due to closures imposed as a consequence of the 2005 bloom of *Alexandrium fundyense* are estimated to be \$18.4 million for the months of June and July in Massachusetts and for the months of May through September in Maine. Economic impacts of these types do not measure changes in economic *value* (e.g., lost consumer and producer surpluses).

Cite: Jin, D., E. Thunberg and P. Hoagland. 2007. Economic impact of the 2005 red tide event on commercial shellfish fisheries in New England. Mimeo. Woods Hole, Mass.: Marine Policy Center, Woods Hole Oceanographic Institution (15 March).

2005: Lost sales of oysters in Florida as a consequence of a five-month closure due to red tide blooms and high levels of pathogens occurring subsequent to hurricanes Dennis and Katrina are estimated to be \$6 million.

Cite: Vail, V. 2005. Personal communication with the Section Leader, Marine Fisheries Services, Florida Fish and Wildlife Conservation Commission, Tallahassee, FL (29 September). Cited in: Bauer, M., ed. 2006. *Harmful Algae Research and Response: A Human Dimensions Strategy*. Woods Hole, Mass.: National Office for Marine Biotoxins and Harmful Algal Blooms, Woods Hole Oceanographic Institution, p. 8.

2002-2003: Washington State closed its recreational fishery for razor clams, which occurs on the tidelands along the coast. This closure has been estimated to result in economic impacts of \$10-12 million. Economic impacts of these types measure reductions in expenditures for recreational fishing. They do not measure changes in economic *value* (e.g., lost consumer surplus).

Cite: Ramsdell, J.S., D.M. Anderson and P.M. Gilbert, eds. 2005. Harmful Algal Research and Response: A National Environmental Science Strategy (HARRNESS) 2005-2015. Washington: Ecological Society of America.

2002: Invasive algal blooms along Maui's Kihei coast cause over \$20 million in potential revenue lost each year to the State of Hawaii. This loss includes reductions in property values, lost rental incomes, and clean up costs.

Cite: Herman, C., P. Van Beukerring, P., S. Pintz, S., and J. Dierking. 2002. Economic valuation of the coral Reef of Hawaii; Hawaii Coral Reef Initiative Research Program Final Report

2000: in Galveston County, Texas, the direct economic impacts of a red tide on tourism, commercial oyster harvests, and beach cleanups were estimated to be \$10 million. Total direct, indirect, and induced impacts may have been between \$16 and \$18 million, affecting as many as 400 jobs. Economic impacts of these types do not measure changes in economic *value* (e.g., lost consumer and producer surpluses).

Cite: Evans, G. and L. Jones. 2001. Economic impact of the 2000 red tide on Galveston County, Texas: a case study. TPWD No. 666226, FAMIS 403206. College Station, Tex.: Department of Agricultural Economics, Texas A&M University (19 June).

1997: A bloom of *Pfiesteria spp.* led to an estimated \$43 million in lost sales of seafood in Maryland. Economic impacts of these types do not measure changes in economic *value* (e.g., lost consumer and producer surpluses).

Cite: Lipton, D.W. 1999. *Pfiesteria's* economic impact on seafood industry sales and recreational fishing. In B.L. Gardner and L. Koch, eds., *Proc. Economics of Policy Options for Nutrient Management and Pfiesteria*. College Park, MD: Center for Agricultural and Natural Resource policy, University of Maryland, College Park, pp. 35-38.

1997: A bloom of *Pfiesteria spp.* led to estimated surplus losses to seafood consumers in the mid-Atlantic region of the United States at between \$37 and \$72 million in the month following the bloom.

Cite: Whitehead, J.C., T.C. Haab and G.R. Parsons. 2003. Economic effects of *Pfiesteria*. *Ocean and Coastal Management* 46:845-858.

1996: The impacts from a 1996 red tide in Louisiana on commercial oyster harvesters, dealers, processors, distributors, and retailers were estimated to be more

than \$4 million. [Economic impacts of these types do not measure changes in economic *value* (e.g., lost consumer and producer surpluses).]

Cite: Lavergne, D.R. 1997. Estimated economic impact to the Louisiana oyster harvester due to red tide. Mimeo. Baton Rouge, La.: Louisiana Department of Wildlife and Fisheries (July).

notes

Seafood Impacts

Bacteria species or strains (termed “isolates”) of the bacterial genus *Vibrio* may produce illness or death. As with toxigenic cholera, these effects most likely result from the consumption or handling of uncooked seafood or direct contact with marine or estuarine waters, fish, shellfish, or other marine wildlife. Exposures occur most frequently in the summer months. In 2004, 479 cases of illness were reportedly due to *Vibrio* isolates. Of these cases, 179 resulted in hospitalization. There were 39 mortalities. It is unknown how many of these cases were contracted from exposures in other countries. The majority of deaths resulted from exposures to *Vibrio vulnificus*. During the summer of 2004, there was an outbreak of 62 cases of *Vibrio parahaemolyticus* resulting from the consumption of raw oysters in Alaska. All of these numbers are likely to be underestimates, as only toxigenic *Vibrio cholerae* must be reported at the national level. There are no published economic impact estimates of *Vibrio* morbidities or mortalities in the United States.

Cite: Anon. 2004. Summary of human *Vibrio* isolates reported to CDC, 2004. Last accessed on 28 March 2006. Centers for Disease Control and Prevention (CDCP). 2005. *Fact Sheet: Vibrio vulnificus*. Washington: Department of Health and Human Services (September 8).

Scombrototoxic Fish Poisoning (SFP): On average, there are 81 cases of scombrototoxic fish poisoning (also known as scombroid or histamine poisoning) originating in the United States each year. SFP is caused by the bacterial spoilage of seafood, especially tuna, mackerel, and bonito. During the ten-year period from 1988 to 1997, scombroid fish poisoning was reported in 145 outbreaks involving 811 persons from at least 20 states. National surveillance data on SFP is based on outbreaks of acute foodborne disease reported by state health departments to CDC. Many cases probably are not reported. There are no published economic impact estimates of SFP morbidities.

Cite: Anon. 2000. Scombroid fish poisoning--Pennsylvania, 1998. *MMWR Weekly* 49(18):398-400 (12 May).

Shellfish Poisonings: Shellfish poisonings are caused by the human consumption of shellfish from environments where significant blooms of toxic algae (a variety of algal species produce toxins) have occurred. Shellfish feed naturally on these algae, and the toxin is sequestered in the body of the shellfish. Shellfish poisonings include paralytic (PSP), neurotoxic (NSP), amnesiac (ASP), and diarrhetic (DSP), among others. Many shellfish poisoning cases go unreported, and public health experts utilize multiples of reported cases to arrive at estimates of the total number of shellfish poisonings. During 1987-92, the total number of reported cases in the United States averaged 21 per year, including one death in Alaska in 1990. The total number of cases, including both reported and unreported illnesses, averaged 207 per year. The cost of illnesses from these three types of shellfish poisonings have been estimated to average about \$500,000 per year (2006 dollars).

Cite: Hoagland, P., D.M. Anderson, Y. Kaoru and A.W. White. 2002. The economic effects of harmful algal blooms in the United States: estimates, assessment issues, and information needs. *Estuaries* 25(4b):677-695.

Human sickness and death from tainted seafood resulted in lost wages, medical treatment, and investigation averaging \$22 million per year.

Cite: Anderson, D.M.; Hoagland, P.; Kaoru, Y.; White, A.W.; *Estimated Annual Economic Impacts from Harmful Algal Bloom (HABs) in the United States*, Technical Report WHOI-2000-11 Woods Hole Oceanographic Institute, Woods Hole, Mass., p. 5.

notes

Coastal Pollution and Hazardous Waste Site Impacts

More than 700 coastal hazardous waste sites have contaminated sediments in our Nation's estuaries that reduce the economic and ecological productivity of coastal resources.

Cite: *Coastal Hazardous Waste Site Review*, NOAA Office of Response and Restoration, NOAA, 1999.

Polluted runoff caused over 16,000 beach closings and swimming advisories in 2001.

Cite: *Testing the Waters 1999: A Guide to Water Quality at Vacation Beaches*, Natural Resources Defense Council (NRDC), July 1999, Table 3, "Sources of Beachwater Pollution." 2002 and August 2003 version is at <http://www.nrdc.org/water/oceans/ttw/titinx.asp>

NOAA has successfully recovered compensation for restoration at over 110 hazardous waste and oil spill sites around the Nation.

Cite: Office of Response and Restoration, NOAA National Ocean Service, Policy Working Paper 02-1, May 2002.

Since 1990, NOAA has recovered over \$300 million for restoration of coastal and marine resources injured from chemical releases and oil spills.

Cite: *Reversing the Tide: Restoring Our Nation's Coastal and Marine Environment*, NOAA Damage Assessment and Restoration Program, 2002 and 2003.

Pollution has rendered 44 percent of tested US estuaries and 12 percent of ocean shoreline waters unfit for uses such as swimming, fishing, or supporting aquatic life.

Cite: *Health of the Oceans Report 2002*, The Ocean Conservancy, <http://www.oceanconservancy.org/dynamic/downloads/healthOceans.pdf>. p. 44.

notes

Aquatic Nuisance Species

Pimentel *et al.* assembled a comprehensive review and update of invasive species and associated cost estimates for the United States in 2005. The total damage and control cost is at least \$120 billion per year (includes plant and animal species, both terrestrial and aquatic, as well as human diseases) and might be “several times higher” if they were “able to assign monetary values to species extinctions and losses in biodiversity, ecosystem services, and aesthetics.” Of the \$120 billion in total damage and control estimates, \$2.5 billion are associated with aquatic nuisance species. States having experienced significant aquatic nuisance species impacts include California, Florida, and Hawaii. Also, zebra mussels have caused significant impact in the Great Lakes region.

Cite: Pimentel, D., R. Zuniga and D. Morrison. 2005. *Update on the environmental and economic costs associated with alien-invasive species in the United States*. *Ecol. Econ.* 52:273-288

notes

Contribution to U.S. Income, Employment, and Output

Fisheries Contributions

Commercial landings by U.S. fishermen in 2005 were 4.4 million metric tons, valued at \$3.8 billion.

Cite: Fisheries of the United States, 2005,
<http://www.st.nmfs.noaa.gov/st1/fus/fus05/index.html>

The U.S. total value of imported fishery products was \$25.1 billion in 2005. U.S. imports of edible fishery products totaled 5.1 billion pounds in 2005 and were valued at a record \$12.1 billion.

Cite: Fisheries of the United States, Foreign Trade Section 2005
<http://www.st.nmfs.noaa.gov/st1/fus/fus05/index.html>

U.S. exports of edible fishery products in 2005 were 2.9 billion pounds, valued at \$4.1 billion; total U.S. exports of fishery products (edible and non-edible) in 2005 was valued at \$13.6 billion.

Cite: Fisheries of the United States, Foreign Trade Section 2005
<http://www.st.nmfs.noaa.gov/st1/fus/fus05/index.html>

Nationwide, anglers spent \$14.6 billion on marine recreational fishing in 2000, which generated over \$30.5 billion in sales, \$12 billion in income and supported nearly 350,000 jobs.

Cite: Steinback, Scott, Brad Gentner, and Jeremy Castle. 2004. The economic importance of marine angler expenditures in the United States. NOAA Prof. Paper NMFS 2, 169 p.

U.S. consumers ate 16.2 pounds of seafood per capita in 2005. The United States is the third largest consumer of seafood in the world.

Cite: Fisheries of the United States, Per Capita Section, 2005, p. 73
<http://www.st.nmfs.noaa.gov/st1/fus/fus05/index.html>

Approximately 65,690 people were employed in the seafood processing and wholesale sectors in 2005.

Cite: Fisheries of the United States, 2005, Employment, Crafts and Plant Section, p. 82, <http://www.st.nmfs.noaa.gov/st1/fus/fus05/index.html>

The value added to gross domestic product (GDP) by the commercial fishing industry was \$32.9 billion in 2005.

Cite: Fisheries of the United States, 2005

<http://www.st.nmfs.noaa.gov/st1/fus/fus05/index.html>

Total expenditures for fisheries products are estimated at \$65.2 billion yearly. [Expenditures include the final retail value of seafood products sold through stores and food service outlets plus secondary wholesale and processing of industrial products.]

Cite: Fisheries of the United States, 2005,
<http://www.st.nmfs.noaa.gov/st1/fus/fus05/index.html>

The west coast and New England groundfish, Gulf of Mexico shrimp, swordfish, and shark fisheries can support 2,167 vessels sustainably.

Cite: Kirkley, James, John Ward, John Walden, and Eric Thunberg, The Estimated Vessel Buyback Program Costs to Eliminate Overcapacity in Five Federally Managed Fisheries A Preliminary Report, Division of Fisheries Statistics and Economics, Office of Science and Technology, NOAA Fisheries, Silver Spring, Md., June 28, 2002.

The Northeast Multispecies Fishery Management Plan was designed to rebuild 19 fish stocks found in the northwest Atlantic and managed by NOAA Fisheries to levels mandated under the Sustainable Fisheries Act (SFA). Before implementation, it was critical to determine the net national benefits which would result from the proposed action. Model results showed that the preferred alternative resulted in increased national benefits of \$161 million dollars over the status-quo alternative when all stocks are rebuilt in 2026.

Cite: New England Fishery Management Council (NEFMC). 2003.
Amendment 13 to the Northeast Multispecies Fishery Management Plan.

Implementing days-at-sea leasing in the Northeast Multispecies Fishery

The primary management tool used to control fishing mortality under the northeast multispecies plan is limits on allowable fishing days. NMFS established rules that would allow fishing vessels to lease days at sea to one another and estimated the likely price for leased quota, and whether vessels could lease days and still be profitable.

After the first year, from May 1, 2004 – April 30, 2005, over 6,000 days were leased at a value of \$2.5 million. The average number of days leased was 24 and there were 174 lessors and 163 lessees. It was also shown that the program enhanced the profits earned by the vessels that leased days. The program's success has led to consideration of other market based arrangements for managing fishery resources.

Cite: New England Fishery Management Council (NEFMC). 2006.
Framework Adjustment 42 to the Northeast Multispecies Fishery Management

Plan and Framework Adjustment 3 to the Monkfish Fishery Management Plan.
Draft Version.

Nationwide, anglers spent \$14.6 billion on marine recreational fishing in 2000, which generated over \$30.5 billion in sales, \$12 billion in income and supported nearly 350,000 jobs.

Cite: Steinback, Scott, Brad Gentner, and Jeremy Castle. 2004. *The economic importance of marine angler expenditures in the United States*. NOAA Prof. Paper NMFS 2, p.169.

The buyback program costs for the five federally managed New England groundfish fisheries are \$999.6 million (dollars deflated to a 2002 base year), including the cost of removing latent permits.

Cite: Kirkley, James, John Ward, John Walden, and Eric Thunberg, *The Estimated Vessel Buyback Program Costs to Eliminate Overcapacity in Five Federally Managed Fisheries A Preliminary Report*, Division of Fisheries Statistics and Economics, Office of Science and Technology, NOAA Fisheries, Silver Spring, Md., June 28, 2002.

Forty-five percent of the 73 federally managed fisheries reviewed in seven regional reports by NOAA Fisheries are at sustainable capacities.

Cite: Ward, John M.; Brainerd, Theo; and Milazzo, Matteo; *Identifying Harvest Capacity and Over-Capacity in Federally Managed Fisheries, A Preliminary Qualitative Report*, Office of Science and Technology and Office of Sustainable Fisheries, Department of Commerce, National Oceanic and Atmospheric Administration, NOAA Fisheries, March, 2001.

notes

Aquaculture

U.S. aquaculture sales total almost \$1 billion per year, including both marine and freshwater products.

Cite: *Fisheries of the United States*, U.S. Commercial Landings, 2002, p. 23.

It is estimated that 44 jobs are created for every 1,000 metric tons of aquaculture grown.

Each 1 million tons of aquaculture is estimated to reduce fish imports by \$2.5 billion. [Note: due to typographic error, the printed version of this booklet erroneously states that the figure is 200 million tons and \$5 billion.]

Cite: Office of Constituent Services, *U.S. Marine Aquaculture; Possibilities, Potential, and Capacity*, Draft Final Report, NMFS, May 26, 2004, p.22.

The global aquaculture industry has expanded greatly in the last 20 years; particularly in the production of carp, shrimp, salmon, and shellfish. For example, cultured shrimp production has increased steadily since the 1970s to over 1 million metric tons--or 27% of total world production of 3.6 million metric tons.

While wild production of shrimp has leveled off at approximately 3 million metric tons, cultured production is projected to increase to approximately 2 million metric tons by 2005, and represents 40% of global production.

Salmon, also of economic importance to the US, has shown even more startling farmed production figures since the 1970s. While wild salmon production increased from under 500,000 metric tons prior to 1979 to a peak level of 1.1 million metric tons in 1995, it has since dropped to around 800,000 metric tons.

At the same time, farmed salmon production increased from virtually nothing in the 1970s to 1.2 million metric tons in 2001, and now represent 60% of the global salmon supply.

Cite: *Relationship of Aquaculture to the US Seafood Supply and Seafood Trade*, Briefing paper to the NOAA Executive Council, November, 2003. Copies available from NOAA Central Library, Silver Spring, Maryland.
Website: <http://www.lib.noaa.gov>.

notes

Coastal Contributions

In 2000-2001, the artificial and natural reefs off the four-county area of southeast Florida (Palm Beach, Broward, Miami-Dade and Monroe counties) supported almost 28 million person-days of recreational diving, fishing and viewing activities. These activities generated about \$4.4 billion in local sales, almost \$2 billion in local income, and 70,400 full and part-time jobs.

Cite: Johns, G.M., Leeworthy, V.R., Bell, F.W. and Bonn, M.A. *Socioeconomic Study of Reefs in Southeast Florida. Hazen and Sawyer, Final report for Broward, Palm Beach, Miami-Dade and Monroe Counties*, Florida Fish and Wildlife Conservation Commission and National Oceanic and Atmospheric Administration. October 19, 2001. Available at: <http://marineeconomics.noaa.gov/reefs/02-01.pdf>.

Hawaii's coral reefs generated \$172.1 million in value added to the economy of Hawaii from reef related recreation and tourism, aquarium trade and commercial Fishing. Recreation and tourism accounted for \$170.8 million in value added while aquarium trade and commercial fishing accounted for \$2.5 million in value added.

Cite: Cesar, Herman, Pieter van Beukering, Sam Pintz and Jan Dierking. 2002. *Economic Value of the Coral Reefs of Hawaii*, Final Report, December 23, 2002. Research funded by National Oceanic and Atmospheric Administration, Coastal Ocean Program under awards NA87OA0381, NA96OP0187, NA060A0388, and NA 160A1449 to the University of Hawaii Coral Reef Initiative Research Program (HCRI). <http://www.hawaii.edu/ssri/hcri/reports-cesar.htm>.

In 1997-98, recreational fisherman and divers that used artificial reefs off Northwest Florida spent \$415 million in the five-county area of Bay, Walton, Okaloosa, Santa Rosa and Escambia counties. This spending generated \$83.66 million in wages and salaries, which supported 8,163 full and part-time jobs in the five-county area.

Cite: Bell, F.W., M.A. Bonn and V. R. Leeworthy. 1998. *Economic Impact and Importance of Artificial Reefs in Northwest Florida*. Under contract Number MR235, Office of Fisheries Management and Assistance Service, Florida Department of Environmental Protection, Tallahassee, Florida. December 1998. This report can be obtained at the following: <http://marineeconomics.noaa.gov/Reefs/nwfl.pdf>.

Through innovative approaches to spill preparedness, response, damage assessments and restoration, NOAA contributes approximately \$75 million annual to the U.S. economy.

Cite: Office of Response and Restoration, NOAA Oceans and Coasts, Policy Working Paper 02-1 May 2002

Travel and tourism is the Nation's largest employer and second largest contributor to the GDP, generating over \$700 billion annually. Beaches are the leading tourist destination, with coastal states earning 85 percent of all U.S. tourism revenues. Approximately 89.3 million people vacation and recreate along U.S. coasts every year.

Cite: Leeworthy, Vernon R., *Preliminary Estimates from Versions 1-6: Coastal Recreation Participation, National Survey on Recreation and the Environment (NSRE) 2000*, National Oceanic and Atmospheric Administration, NOAA Oceans and Coasts, Special Projects Office. Website: <http://marineeconomics.noaa.gov>.

In 1995-96, economic impacts of coastal recreation in Monroe County, home to the Florida Keys National Marine Sanctuary, were \$1.33 billion in sales/output, \$506 million in income, and 21,850 jobs.

Cite: English, D.B.K., Warren Kriesel, Vernon R. Leeworthy, and Peter C. Wiley. *Economic Contribution of Recreating Visitors to the Florida Keys/Key West. Linking the Economy and Environment of the Florida keys/Florida Bay*. National Oceanic and Atmospheric Administration, National Ocean Service, Strategic Environmental Assessments Division, Silver Spring, MD. November 1996. This report can be obtained at <http://marineeconomics.noaa.gov/SocmonFK/publications/96-26.pdf>.

Fishing represents a large portion of marine recreation in the United States. Saltwater fishing alone draws nearly 21.3 million participants nationwide which accounts for 10.3 percent of the population age 16 or older. Saltwater fishing ranked third most popular activity in marine recreation in the United States.

Saltwater fishing is expected to attract over 24 million participants by 2010.

California ranks second in the nation in terms of participation in saltwater fishing with more than 2.7 million participants, falling only behind Florida. Texas is ranked third with more than 1 million fewer saltwater fishing participants than in California.

Based on the 2000 participation estimates and an estimated value range of \$75 to \$200 per participant per year, the annual **expenditures** associated with recreational fishing in California ranged from \$205 million to \$545 million in the year 2000.

...in the span of ten years (2005-2010), the nation will see an increase in fishing participation of 12%. Based on these national estimates, the **expenditures** associated with marine recreational fishing in California could increase to between \$230 million and \$610 million.

Based on the 2000 participation estimates (20.3 million person-days) and an estimated value range of \$15 to \$90 per person day, the annual **[non-market]** value

of recreational fishing in California likely ranged from \$305 million to \$1.83 billion in the year 2000.

...in the span of ten years (2005-2010), the nation will see an increase in recreational fishing activity of 12%. Based on these national estimates, the **non-market** value of marine recreational fishing in California could increase to \$342 million to over \$2 billion annually by the year 2010.

Nationally, **non-market** values for marine recreational fishing ...range from \$17 per day in Delaware to \$146 per person day in Alaska. (2005 dollars).

Cite: Pendleton, L., and Rooke, J., *Understanding the Potential Economic Impact of Recreational Fishing*, (March 2006), “Non-Market Literature Portal,” www.oceaneconomics.org

Numerous studies have demonstrated the economic value of wildlife viewing, especially whale watching. We estimate that whale watching in California alone probably generates on the order of \$20 million in **gross revenues annually** and **net revenues** of between \$4 million and \$9 million...We estimate the **non-market value** for whale watchers alone at more than \$40 million annually.

Annual **expenditures** associated with marine wildlife viewing (exclusive of whale watching) range from \$7-10 million in California [Krass, 1989] to \$26 million in Stellwagen Bank in New England. **Non-market** benefits range from \$35 million in New York [Johnson, et. al., 2000] to \$287 million in Florida [Leeworthy and Bowker, et. al., 1997].

Cite: Pendleton, Linwood, *Understanding the Potential Economic Impact of Marine Wildlife Viewing and Whale Watching in California*, (December 2005), “Non-market Literature Portal”, www.oceaneconomics.org

notes

Beach Visitation

Going to the beach is a family affair, with nearly four in ten (37 percent) U.S. households visiting the beach and taking a child on the trip. Just 23 percent of overall traveling households include a child when traveling. Nearly 110 million person-trips were made by U.S. households to the beach last year, up seven percent from the year before. A person-trip is one person traveling 50 or more miles, one-way, away from home. Households visiting the beach spend an average of \$850 per trip, excluding transportation to their destination, compared to just \$463 for overall traveling households. More than one-third (35 percent) of beach trips last seven nights or more. On average, overnight beach trips last an average of 5.9 nights, compared to 4.1 nights for overall travel. Beach travelers are more likely than overall traveling households to stay in a condo or timeshare (16 percent vs. four percent) or in an RV (eight percent vs. five percent).

Cite: Coastal States Organization, *Travel Industry of America Domestic Travel Market Report, 2002 and 2003*.

In 2000, an estimated 63.7 million Americans from the civilian, non-institutionalized population 16 years of age or older visited a saltwater beach for outdoor recreation and spent 878.7 million days at the beach. This was projected to increase to 67.6 million participants spending 927.7 million days in 2005 and to 70.9 million participants spending 969.6 million days at the beach in 2010.

Cite: Leeworthy, Vernon R., Bowker, J. M., Hospital, Justin D., and Stone, Edward A. 2005. Projected Participation in Marine Recreation: 2005 & 2010. National Survey on Recreation and the Environment 2000. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service, Special Projects, Silver Spring, Maryland. March 2005, p.152.
<http://marineeconomics.noaa.gov/NSRE/NSREForecast.pdf>

California's coastal industries contribute more than \$17 billion and 370,000 jobs to the state's economy.

Cite: *How Much is the Beach Worth? Calculating the Value of the Environment*, see the web site for the NOAA Coastal Services Center's magazine, volume 4, issue 1, Jan./Feb.2001 Coastal Services, <http://www.csc.noaa.gov/magazine/2001/01/worth.html>. Note: Check the URL prior to quoting numbers from this website site as it gets updated periodically.

In the summer of 2000 (June-August), it is estimated that there was almost \$1 billion in spending on beach activities in Los Angeles and Orange counties, California. An estimated 58,600 full and part-time jobs are supported annually by beach visitors to Los Angeles and Orange county beaches.

Cite: Hanemann, W. Michael, Linwood Pendleton, and David Layton, 2001.

Summary Report on Expenditure Module, the Southern California Beach Valuation Project, Dec. 16, 2001. Report can be obtained at http://marineeconomics.noaa.gov/SCBeach/4Summary_Expenditures.pdf.

In 1999-2000, the top three states for beach visitation were Florida (15.2 million participants and 177.2 million days), California (12.6 million participants and 151.4 million days), and Hawaii (3.6 million participants and 101.2 million days).

Cite: Leeworthy, V.R. and Wiley, P.C., *Current Participation Patterns in Marine Recreation*, Table A-3, p. 25. Website: http://marineeconomics.noaa.gov/NSRE/NSRE_V1-6_May.pdf.

In seven estuaries alone, tourism and beach going activities generate economic benefits of more than \$16 billion to their respective regions.

Cite: *Natural Resources Valuation: A Report by the Nation's Estuary Program*, Environmental Protection Agency (EPA), 1997.

notes

Satellites

A new generation of weather satellites called the National Polar Orbiting Environmental Satellite System (NPOESS) is under development to replace data from the current POES satellites and civilian data from the military DSMP satellites. The value of civilian benefits of NPOESS to the U.S. between 2013 and 2026 is estimated at \$0.9-\$1.2 billion per year in year 2007 dollars, with a present discounted value of \$12.6-\$16.8 billion, discounted at 7%. Benefits include both continuity of observations and improvements. A general analytic framework that emphasizes productivity gains and environmental security is suggested.

Cite: Leveson, Irving, NPOESS Civil Benefits and Contributions to Economic and Environmental Security, study prepared for the NPOESS Integrated Program Office, Leveson Consulting, April, 2007.

In 2003, sales by the commercial remote sensing industry, including aerial and satellite segments, were estimated at USD\$ 2.6 billion, with the satellite segment representing roughly a third of the total sales.

By 2010 sales could reach USD\$ 6 billion with USD\$ 2 billion for the satellite segment.

Cite: CRSL Industry Statistics, as reported by *Space 2003: Exploring the Future of Space Applications*, by OECD, 2004

Since 1993, 22 licenses have been granted by NOAA for the operation of approximately 40 commercial remote sensing satellites, representing over \$2 billion in system investments.

Cite: NOAA Licensing Files, International and Interagency Office, NOAA Satellites and Information.

10 of the 30 satellites scheduled to orbit by 2007 will be commercial.

Cite: Stoney, William E, Mitertek Systems, *Markets and Opportunities*, Earth Imaging Journal, Jan Feb 2005, Vol 2, No.1.

Each year from 1980 to 1995, on average, five commercial jets encountered volcanic ash clouds in flight. About 10 percent of these encounters resulted in loss of power.

Cite: Kite-Powell, Hauke, *Benefits of NPOESS for Aviation-Volcanic Ash Avoidance*, Marine Policy Center, Woods Hole Oceanographic Institute (WHOI), October, 2000.

The overall economic risk from airborne volcanic ash effects historically is about

\$70 million per year.

Cite: Kite-Powell, Hauke, *Benefits of NPOESS for Aviation–Volcanic Ash Avoidance*, Woods Hole Oceanographic Institute (WHOI), October, 2000.

The benefit from NPOESS data to volcanic ash avoidance in commercial aviation is estimated at \$10 million per year.

Cite: Kite-Powell, Hauke, *Benefits of NPOESS for Aviation–Volcanic Ash Avoidance*, Woods Hole Oceanographic Institute (WHOI), October, 2000.

The economic value of an operational geomagnetic storm forecasting system in the North American electricity industry is estimated at about \$450 million over three years, well above the \$100 million cost of the system.

Cite: Tiesberg, T. J., and Weiher, R., *Valuation of geomagnetic storm forecasts: An estimate of the net economic benefits of a satellite warning system*, Journal of Policy Analysis and Management, Vol. 19, No. 2, 2000, pages 329-334.

The total annual marginal benefits from the Advanced Baseline Images (ABI) and Hyperspectral Environmental Sounder (HES) on GOES-R are approximately \$638 million annually with discounted sum-of-direct benefits of approximately \$3.1 billion over a 13-year effective benefit lifecycle.

Cite: *GOES-R Sounder and Imager Cost/Benefit Analysis*; NOAA, NESDIS Office of Systems Development, November, 2002.

Collectively, the world fleet undertakes in excess of 33,000 ocean transits annually. The expected average annual benefit to ship routing from NPOESS data in the two decades following the launch of NPOESS in 2007 is about \$95 million per year. Because of the U.S. share of world trade, perhaps 20 percent of the total benefit—some \$20 million per year—will be realized by consumers in the United States.

Cite: Kite-Powell, Hauke, *Benefits of NPOESS for Commercial Ship Routing–Transit Time Savings*, Marine Policy Center, Woods Hole Oceanographic Institute (WHOI), October, 2000.

In 2005, NOAA satellites, with their sophisticated search and rescue technologies, brought 222 people to safety from dangerous and potentially life threatening ordeals—from Alaska to New York State.

NOAA's satellites, along with Russia's Cospas satellites, are part of an elaborate international Search and Rescue Satellite-Aided System (COSPAS-SARSAT). Since the system became operational in 1982, almost 18,000 lives have been saved worldwide with the assistance of CPSPAS-SARSAT, including more than 5,100 lives in the US.

Cite: Cospas-Sarsat Information Bulletin No. 18, February 2006
<http://www.cospas-sarsat.org/Documents/informationBulletin.htm>

NOAA Press Release 2006-008, NOAA, U.S. Department of Commerce
<http://www.publicaffairs.noaa.gov/releases2006/jan06/noaa06-008.html>

A Cost Benefit Analysis concluded that for every Federal dollar spent on the national Search and Rescue Satellite Aided Tracking (SARSAT) program the Nation derived more than 11 dollars in benefit. In summary, the total benefit of the program exceeded \$259M in 2004

Cite: Search and Rescue Satellite Aided Tracking (SARSAT) Program Cost Benefit Analysis (Draft), NESDIS, NOAA, March 2006

A recent analysis estimated the benefits of improved data from GOES-R measured in term of the cost avoided or benefits gained by each industry or sector resulting from more accurate forecasts, reduced operations costs, and fewer accidents and deaths (using the methodology as endorsed by OMB guidelines for calculating benefit-cost analysis of federal programs). Data are presented as of the year 2005, and future benefits/savings from 2015 to 2027 (the period in which when the satellite becomes operational) have been discounted at 7% to the year 2005 to determine present value of the future streams of expected savings in each of the following five sectors:

- Improved tropical cyclone forecasting resulting in more effective action to protect property and to enable evacuation of individuals residing in the path of the storm: \$0.450 billion in 2015 (average of \$130,000 per U.S. coastline mile from Maine to Texas) and \$2.4 billion from 2015 to 2027 (average of \$690,000 per U.S. coastline mile from Maine to Texas)
- Enhanced aviation forecasting resulting in improvements in avoidable delays, value of passenger time avoided, avoidable repair costs due to volcanic ash, and avoidable risk of aircraft/life lost: \$0.169 billion in 2015 and \$0.768 billion from 2015-2027
- More accurate temperature forecasts contributing to improved energy demand expectations and savings in the electricity and natural gas sectors: \$0.512 billion in 2015 and \$2.56 billion from 2015-2027
- Enhanced forecasts leading to more efficient irrigation of crops — resulting in water savings, energy savings by not having to pump water, and revenue gains from selling excess water: \$0.061 billion in 2015 and \$1.09 billion from 2015-2027
- Improved forecasting of tropical cyclones resulting in reduced losses to the recreational boating industry: \$0.031 billion in 2015 and \$0.141 billion from 2015-2027

Across the five activities, the combined annual value for 2015 exceeds \$1.2 billion. The present value of the combined estimated benefits for the 2015-2027 period approaches \$7 billion.

Cite: Centrec Consulting Group, LLC., *An Investigation of the Economic and Social Value of Selected NOAA Data and Products for Geostationary Operational Environmental Satellites (GOES)*, report submitted to NESDIS, February 2007

notes

Marine Commerce

Last year, United States deep-draft seaports and seaport-related businesses generated approximately 8.4 million American jobs and added nearly \$2 trillion to the economy, according to a just-completed study by a Lancaster, PA-based business consulting service that specializes in port-sector economic impact studies.

Of the 8,397,301 Americans working for ports and port-related industries in 2006, nearly 7 million were employed by firms involved in handling imports and exports, such as retailers, wholesalers, manufacturers, distributors and logistics companies.

In addition, the new study also shows that businesses providing goods and services to U.S. seaports directly and indirectly paid \$314.5 billion in total wages and salaries. Of this total, \$207.4 billion came directly from businesses involved in handling international waterborne commerce.

Cite: American Association of Port Authorities news release, August 28, 2007 (www.aapa-ports.org)

More than 78 percent of U.S. overseas trade by volume and 43.5 percent by value comes and goes by ship, including 9 million barrels of imported oil daily.

Cite: *2003 Pocket Guide to Transportation* Table 5-5, U.S. Department of Transportation, http://www.bts.gov/publications/pocket_guide_to_transportation/2007/

Waterborne cargo alone contributes more than \$742 billion to the U.S. GDP and creates employment for more than 13 million citizens.

Cite: *An Assessment of the U.S. Marine Transportation System, A Report to Congress*, U.S. Department of Transportation, September 1999. <http://ntl.bts.gov/DOCS/report>.

26,000 miles of commercial waterways serve 361 ports, which have more than 5,000 waterfront facilities. 3.3 billion barrels of oil are imported through U.S. ports annually. 8,000 foreign vessels make 50,000 port calls annually.

Cite: Peters, Katherine McIntyre, *Covering the Waterfront*, Government Executive, September 1, 2004-11-15 , p. 44.

Annually, the U.S. marine transportation system moves more than two billion tons of domestic and international freight; imports 3.3 billion barrels of oil to meet U.S. energy demands; supports 110,000 commercial and recreational fishing vessels that contribute \$111 billion to state economies.

Cite: *An Assessment of the U.S. Marine Transportation System, A Report to*

Congress, U.S. Department of Transportation, September 1999.
<http://ntl.bts.gov/DOCS/report>.

Every year, 134 million passenger-day trips are ferried to work and other destinations on U.S. waterways, along with five million cruise ship passengers.

Cite: *Maritime Transportation System Report to Congress*, 1999, p. vii, Executive Summary. Website: <http://www.dot.gov/mts>.

The Maritime Transportation System ships 48 percent of the oil needed to meet U.S. energy demands.

Offshore oil and gas development currently produces 22 percent of all domestically produced oil and 27 percent of natural gas. Federal royalties and taxes on offshore production average about \$4 billion per year.

Cite: http://www.pewoceans.org/articles/2001/10/04/brief_19075.asp

Waterborne Commerce Facts:

- Crude petroleum comprised 65.7% of U.S. waterborne in-transits, while primary manufactured goods ranked second with 10.7% based on weight in 2005.
- The top five U.S. ports ranked by dollar value of foreign traffic for calendar year (CY) 2005 were the same as CY2004: Los Angeles, CA; Long Beach, CA; New York, NY and NJ; Houston, TX; and Charleston, SC.
- In 2005, 9.7% of all U.S. waterborne commerce by weight was containerized (2.0% of domestic and 14.9% of foreign).
- The Consolidated Port of Hampton Roads exported the largest volume of coal in the U.S., 16.7 million short tons in 2005, down 8.2% from 2004.
- The St. Lawrence Seaway Development Corporation reported 31.3 million metric tons (34.5 million short tons) moving on the Montreal-Lake Ontario section of the St. Lawrence Seaway for calendar year 2005, a 1.5% increase from 2004.
- Great Lakes traffic for 2005 was down 7% from last year, and remains well under the average tonnage for the 1990's.
- Tonnage on the Gulf Intracoastal Waterway (GIWW) was 116 million tons, down from last year's all-time high of 123 million tons, mainly due to Hurricanes Katrina and Rita.
- In 2005, a year marked by the devastation of Hurricane Katrina, the Port of New Orleans was down 15.6% from 78.1 million tons to 65.9 million. Although the Port of South Louisiana, was down 5.3%, it still registered the 6th highest total in

the history of the port with 212.2 million tons.

Cite: “The U.S. Waterway System – Transportation Facts,” Navigation Data Center, U.S. Army Corps of Engineers, February 2007. Available at: <http://www.iwr.usace.army.mil/ndc/factcard/fc06/factcard.pdf>

notes

Coastal Ocean Observing Systems

Preliminary estimates of the potential economic benefits from new investments in regional coastal ocean observing systems in US waters range from \$500 million to \$1 billion per year, estimated largely in terms of increased economic activity and social surplus realized as a result of improved information about coastal marine conditions. The estimates are constructed for ten geographic regions encompassing all coastal waters of the United States, and cover a wide range of industrial and recreational activities including recreational fishing and boating, beach recreation, maritime transportation, search and rescue operations, spill response, marine hazards prediction, offshore energy, power generation, and commercial fishing.

Cite: Kite-Powell, H.L., C.S. Colgan, M.J. Kaiser, M. Luger, T. Pelsoci, L. Pendleton, A.G. Pulsipher, K.F. Wellman, and K. Wieand. 2004. Estimating the economic benefits of regional ocean observing systems. A report prepared for the National Oceanographic Partnership Program. Marine Policy Center, Woods Hole Oceanographic Institution.

The annual economic return to the U.S. economy of NOAA's El Niño ocean observing and forecast system is between 13 and 26 percent, which is significantly higher than the Office of Management and Budget's 5.8 percent minimum rate of return specified for Federal projects.

Cite: Sassone, P., and Weiher, R., *Cost-Benefit Analysis of TOGA and the ENSO Observing System*. In R. Weiher (ed.) *Improving El Niño Forecasting: The Potential Economic Benefits*, NOAA, Office of Policy and Strategic Planning, 1999. p. 47. Website: http://ioc.unesco.org/goos/el_nino.pdf.

Estimates suggest that \$11.9 million in direct annual economic benefits can be attributed to Physical Oceanographic Real-Time System (PORTS) data in the Houston/Galveston area with a reasonable degree of confidence. Another \$2.2 to \$3.7 million in annual benefits are less easily traced but may be linked to PORTS; and an additional \$1.8 to \$2.8 million could potentially be realized with the full utilization of PORTS data. Thus, our best estimate of the presently realized quantifiable benefit from the Houston/Galveston PORTS data is \$14.1 to \$15.6 million. This estimate is best interpreted as a lower bound on total benefits flowing from PORTS data, since not all uses of PORTS data can be quantified.

Cite: Kite-Powell, H., *Estimating Economic Benefits from NOAA PORTS Information: A Case Study of Houston Galveston*, The Port of Houston Authority, Houston, TX, March 2007.

Estimates suggest that \$2.4 to \$4.8 million in direct annual economic benefits can be attributed to PORTS data in the Tampa Bay area with a reasonable degree of confidence. Another \$2.2 million in annual benefits are less easily traced but may

be linked to PORTS; and an additional \$2.2 million could potentially be realized with the full utilization of PORTS® data. Thus, our best estimate of the presently realized quantifiable benefit from Tampa Bay PORTS® data is \$4.4 to \$7.0 million. This estimate is best interpreted as a lower bound on total benefits flowing from PORTS® data, since not all uses of PORTS® data can be quantified.

Cite: Kite-Powell, H., *Estimating Economic Benefits from NOAA PORTS® Information: A Case Study of Tampa Bay*, Tampa Bay Harbor Safety & Security Committee, Tampa Bay, FL, July 2005.

Weather, Climate and Storm Warnings

The largest single customer of NOAA products are the 105 million U.S. households who consult the daily forecast at least once a day. NOAA's annual budget for weather forecasting (NWS/NESDIS) is about \$1,383 million. The average U.S. household, therefore pays about \$13 a year for NOAA's weather services.

A detailed National survey using stated-preference nonmarket valuation approaches to elicit household values for both current and improved weather forecast services revealed:

- the average value of all current weather forecast information from public and private sectors is approximately \$109 per household, with a total national value of \$11.4 billion per year.
- the annual value of improving the daily forecast in terms of more accurate one-day and multi-day forecasts, geographic detail, and frequency of updates is \$16 per household, or \$1.73 billion per year.

Total annual Federal spending for weather information is about \$25 per household (including aviation and defense, in addition to NOAA), which produces an annual benefit-cost ratio of 4.4 to one to U.S. households alone, or net national benefits of \$8.8 billion a year. This does not include benefits in agriculture, transportation, construction, or benefits to households in other countries that rely on weather information from the U.S.

Cite: Lazo, J. and Chestnut, L., *Economic Value of Current and Improved Weather Forecasts in the U.S. Household Sector*, report prepared for NOAA's Chief Economist by Stratus Consulting, Boulder, CO, November 2002.

Weather derivatives are financial contracts in which money changes hands based on seasonal average temperatures, degree days, or precipitation amounts. According to the Weather Risk Management Association (WRMA 2005), the total "notional value" of seasonal weather derivatives executed between parties has been about \$2 billion per year in 1998-2000, \$4 billion in 2001-2002, \$4 billion in 2002-2003, \$4.5 billion in 2003-2004 and \$8.4 billion in 2004-2005. This has resulted in a total notional value of \$24 billion in weather risk management contracts worldwide over the past six years, with about 1/3 of this in the latest year.

Cite: WRMA, 2005: Fifth annual industry survey. Website: www.wrma.org.

The size of the Private/Commercial Meteorological value added sector is estimated to be approximately \$400-700 million in annual gross receipts, with the number of firms estimated at 400, most of which are sole proprietorships, and employment of approximately 4,000 people.

Cite: Commercial Weather Services Association

NOAA's National Weather Service forecasts, warnings, and the associated

emergency responses result in a \$3 billion savings in a typical hurricane season. Two-thirds of this savings, \$2 billion, is attributed to the reduction in hurricane-related deaths, and one-third of this savings, \$1 billion, is attributed to a reduction in property-related damage because of preparedness actions.

Cite: Dr. Hugh Willoughby, HRD/AOML, *Costs and Benefits of Hurricane Forecasts*, minutes of 55th Interdepartmental Hurricane Conference, 5-9 March 2001, Orlando, FL.

Estimates indicate that the value of existing 48-hour hurricane forecast information to oil and gas producers averaged roughly \$8 million per year during the 1990s, which substantially exceeds the operating budget of the National Hurricane Center... Forecast value dramatically increases with improvements in accuracy, rising by more than \$15 million per year with a simulated 50% improvement in 48-hour forecast accuracy.

Cite: Considine, Timothy J., Christopher Jablonowski, Barry Posner, and Craig H. Bishop, *The Value of Hurricane Forecasts to Oil and Gas Producers in the Gulf of Mexico*, *Journal of Applied Meteorology*: Vol. 43, No. 9, pp. 1270-1281.

Reducing the length of coastline under hurricane warnings saves at least \$640,000 per coastal mile in costs of evacuations and other preparedness actions.

Cite: Various sources but note in particular per mile evacuation costs are highly variable with reports in the literature varying from under \$100,000 to \$1 million. Hence, this estimate must be applied with great care, especially in program evaluation.

National implementation of the Advanced Hydrologic Prediction Service (AHPS) will save lives and an estimated \$240 million per year in flood losses, and will contribute an additional \$520 million per year in economic benefits to water resources users.

Cite: *Use and Benefits of the NWS River and Flood Forecasts*, National Hydrologic Warning Council, April 1, 2002.
<http://www.nws.noaa.gov/oh/ahps/AHPS%20Benefits.pdf>

Potential benefits from better forecasting of snow and snow events include:

- improvements in frost forecasts (up to \$6,000/hectare/yr for fruit orchards),
- long-range stream flow forecasts (over \$170 million/year in hydropower benefits for three river systems),
- temperature predictions (over \$500 million/year from natural gas and electric utility providers),
- icing diagnostics at airports (exceeds \$600 million/yr at U.S. airports),
- predictions of road ice formation and fog (exceeds \$29 million/yr from rerouting trucks in U.S.), and

- marine forecasts of winds and waves (exceeds \$95 million/yr from transit time savings and cargo loss reductions in U.S. coastal waters).

Cite: Adams, R., Houston, L., Weiher, R., *The Value of Snow and Snow Information Services*, Report prepared for NOAA's National Operational Hydrological Remote Sensing Center, August, 2004.

Installation of Doppler radar by the NWS reduced [tornado] fatalities by 45% and injuries by 40% from their already historically low levels in the late 1980s and early 1990s.

Cite: Sutter, D., and Simmons, K., *WSR-88D Radar, Tornado Warnings, and Tornado Casualties*, *Weather and Forecasting*, 20(2): 301-310, 2005

Between 1992 and 2004, the NWS's NEXRAD radar system prevented over 330 fatalities and 7800 injuries from tornadoes, at a monetized benefit of over \$3 billion, compared with a total capital and site acquisition and preparation cost of less than \$1.7 billion (in 2004 dollars).

Tornadoes during the day are much less dangerous than at night, with fatalities 64% lower and injuries 43% lower for daytime tornadoes. This provides indirect evidence that tornado warnings are saving lives, but suggests that improvements in the dissemination of warnings at night could save more lives.

Residents of mobile homes remain at risk from tornadoes; over 40% of fatalities occur in mobile homes, and the fatality rate is more than ten times greater than that for residents of permanent homes.

In 2002, 186 million person hours were spent under tornado warnings in the U.S., and the value of this time was about \$3 billion. The NWS is experimenting with refining its tornado warnings from the current county basis. This could reduce the person hours under tornado warnings by half or more.

Cite: Sutter, D., and Simmons, K., *The Value of Tornado Warnings and Improvements in Warnings*, presentations at the American Economics Association annual meeting (Boston, January, 2006), and the American Meteorological Society annual meeting (February, 2006).

Utility Industry

US electricity generators save \$166 million annually using 24-hour temperature forecasts to improve the mix of generating units that are available to meet electricity demand.

Incremental benefits are relevant in assessing the merits of investments that will improve forecast accuracy.

The *incremental* benefit of an improvement in forecast accuracy is estimated to be about \$1.4 million per percentage point of improvement per year.

For a 1 degree centigrade *improvement* in accuracy, the benefit is about \$59 million per year.

Cite: Teisberg, T., Weiher, R., and Khotanzad, A.; *The Economic Value of Temperature Forecasts in Electricity Generation*, Bulletin of the American Meteorological Society, December, 2005; pp. 1765-71.

For temperatures below 0F and above 80F (below -18C and above 27C) there can be 350MW of excess or insufficient electricity generated in the TVA region for every 1F error. The exact cost of an imperfect forecast will depend on the market price of electricity, but the marginal cost could exceed \$1million per degree day. [Note that this is the marginal cost of energy with respect to time and does not necessarily mean an absolute cost of \$1 million.]

Cite: Sen, Avery, *The Benefits of Remote Sensing for Energy Policy*, Space Policy, Vol. 20, pp. 17-24, 2004.

The Tennessee Valley Authority [TVA] generates 4.8% of the nation's electricity. Forecasts over its 80,000 square miles have been wrong by an average of 2.35 degrees these last 2 years, fairly typical of forecasts nationwide. Improving that to within 1.35 degrees would save TVA as much as \$100,000 a day, perhaps more.

Cite: USA Today; June 19, 2001.

The value of understanding the interrelationships between weather variables and electric load can save a small utility at least \$0.5 M annually through improved temperature forecasts.

Cite: Tribble, A.N., 2003: The relationship between weather variables and electricity demand to improve short-term load forecasting. Ph. D. dissertation, School of Meteorology, University of Oklahoma, 221 pp., from Building The National Cooperative Mesonet: Program Development Plan For COOP Modernization" dated October 2003.

By effectively using accurate rainfall forecasts in our hydro operations, Duke Power can save several million dollars annually in preventing ‘wasted’ water—water moved past the hydro station but not used for hydroelectric generation.

Cite: Bill Coley, President of Duke Power; comments at the First AMS Policy Forum in January 2001.

notes

Agriculture

Monthly precipitation data was the key to determining the outcome of a \$2 billion lawsuit brought by several southwest Indian tribes against the U.S. government concerning the overgrazing of reservation rangeland.

Cite: Future of the National Weather Service Cooperative Observer Network 1998, The National Academy Press, p. 7,
<http://www.nap.edu/openbook/0309061466/html>.

The dispensation of \$500 million in federal drought insurance was decided by precipitation records from the Cooperative Weather Observing Network (COOP) stations during the 1988 drought in the Midwest. In one case, \$6 million was paid on the basis of records from one station.

Cite: Future of the National Weather Service Cooperative Observer Network 1998, The National Academy Press, p. 7,
<http://www.nap.edu/openbook/0309061466/html>.

There are 600,000 irrigated acres across Oklahoma. It costs \$4 to put one inch of irrigated water on each acre. If more scientific irrigation strategies were adopted based on reliable local data, it is likely that one acre-inch of irrigated water could be saved each year. As a result, the agriculture industry in Oklahoma would realize an annual savings of \$2.4 million.

Cite: Professor Ron Elliott, Oklahoma State University.

The value of weather forecasts for Australia and U.S. agriculture is about \$1/acre (equal to 2 to 3 percent of U.S. farm income).

Cite: Weiher, Teisberg, and Adams, Valuing Weather Forecasts, conference workshop, World Bank, Roshydromet, NOAA; Moscow, Russia, November 2003.

A recent study of potential benefits of improved NOAA hydrological information by the Office of the NOAA Chief Economist examined the potential economic value of soil moisture information for private irrigation management in the semi-arid Great Plains. The study estimated significant benefits to farmers that, if aggregated for the states of Nebraska and Kansas, are worth \$55 million per year and potentially over \$200 million per year. About 45 percent of these benefits result from more profitable irrigation and 55 percent from the opportunity value of conserved groundwater. Other private or public benefits of soil moisture data would add to these benefits.

Cite: Supalla, R., Martin, D., Adams, R., Weiher, R., *Potential Economic Value of Soil Moisture Data for Irrigation Management in the Central Great Plains*, October, 2005, www.economics.noaa.

Measuring and explaining annual variability in forage production will improve with time as soil moisture and grass yield data become increasingly available... Considering the linkages between rainfall and herbage production, a flexible, profit maximizing strategy is preferable to a constant (livestocking) strategy when producers have reasonably accurate long-range weather forecasts (e.g., 6 month lead time)... Improved weather forecasts have the potential to increase ranch returns by as much as 40% over levels obtained with a constant stocking rate that does not adjust to forage conditions.

Cite: Torell, L., McDaniel, K. and Hurd, B. *Exploratory Case Study on the Value of Improved Soil Moisture Forecast Information for Rangeland Management*, July, 2007, www.economics.noaa.

notes

General Commerce

Better preparation, response, and mitigation will reduce the average cost (\$500 million per event) of storm-related disasters by 10 percent (\$50 million per event). A 10 percent reduction in the cost of storm-related disasters means a \$700 million in savings per year (with an average 14 events saving \$50 million each per year).

Cite: *Evaluation of Erosion Hazards*, H. John Heinz III Center for Science, Economics, and the Environment, Washington, DC, April 2000.

Economists have quantified the benefits of improved El Niño forecast in various sectors:

- Benefits to U.S. agriculture by altering planting decisions have been estimated at \$265-300 million annually, throughout El Niño, normal, and La Niña years.
- Similarly, benefits to Mexican agriculture range from \$10 to \$25 million annually.
- Benefits in U.S. corn storage could approach \$200 million annually.
- Even in a small Northwest Coho salmon fishery, annual benefits are estimated at \$250,000 to \$1 million.
- Worldwide agriculture benefits of better El Niño forecasts are at least \$450 to \$550 million per year.
- An analysis of NOAA's operational El Niño forecasting system, comparing forecast systems costs with anticipated benefits in just the U.S. agriculture sector, yielded an estimated annual rate of return on that investment of between 13 to 26 percent.

Cite: Weiher, Rodney, ed. *Improving El Niño Forecasting: The Potential Economic Benefits*, NOAA, U.S. Department of Commerce, 1997, p. 29, p. 41, p. 43, p.47, for U.S. Agriculture, Corn Storage, Fisheries and Operational Forecast System, respectively.

Adams, R.M.; Houston, L.L.; McCarl, B.A.; Tiscareno, M.L.; Matus, J.; and Weiher, R.F., *The Benefits to Mexican Agriculture of an El Niño Southern Oscillation (ENSO) Early Warning System*, Journal of Agricultural and Forest Meteorology, 2003, vol 115, pp. 183-194.

McCarl, B., and Kim, M., *The Value of El Niño and NAO Information in Worldwide Agriculture*, Working Paper, Department of Agriculture Economics, Texas A&M University, College Station, Texas.

NOAA Satellites and Information's Air-Freezing Index (AFI) reduces construction costs by \$330 million per year and saves an equivalent of 8.6 million gallons of heating fuel.

Cite: *Economic Value for the Nation*, NOAA Satellites and Information,

September 2001.

A Heat Watch/Warning System used in Philadelphia since 1995 is estimated to have saved 117 lives over its first three years of operation. The total dollar benefits of this system are estimated to be \$468 million, while costs are on the order of \$200,000, for this three year period. Philadelphia's is one of 17 such systems running in the U.S. and one of 29 worldwide.

Cite: Teisberg, T., Ebi, K., Kalkstein, L., Robinson, L., and Weiher, R., *Heat Watch/Warning Systems Save Lives: Estimated Costs and Benefits for Philadelphia 1995-1998*, Bulletin of the American Meteorological Society, 85:1067-74.

For every \$1 that energy companies spend in acquiring NOAA climate station data, they receive a potential benefit of saving \$495 in infrastructure costs that would be required to maintain their own climate database storage, archiving, and reporting system. Extrapolating the savings to the entire U.S. energy market yields a potential benefit of \$65 million.

Cite: *Investigating the Economic Value of Selected NESDIS Products*, Centrec Consulting Group, LLC, January, 2003.

For every \$1 that railway companies spend acquiring NOAA climate data, they receive a potential benefit of saving almost \$13,140 in infrastructure costs that would be required to maintain their own climate data base storage, archiving, and reporting system. Extrapolating the savings to the entire U.S. railway market yields a potential benefit of \$11.5 million.

Cite: Centric Consulting Group, LLC., *The Economic Value of Selected NOAA Products within the Railway Sector*, report submitted to NESDIS, June 2005. http://www.centrec.com/public_client_project.htm (listed as PDF)

notes

Research

Air Quality

It is estimated that by the year 2010, \$10B and 65,000 jobs will have been saved by Texas' revisions of their air quality management plan, according to an independent economic analysis by the University of Chicago and University of Houston. The revisions were made based on NOAA's discoveries of previously unexpected factors that cause the Houston area to experience the highest ozone levels in the nation.

Cite: Tolley, George and Smith, Bruce, *An Economic Evaluation of Alternative Strategies Cleaning Up Houston's Act*, Final Report to Greater Houston Partnership from RCF, Inc. January, 2001.

Supercomputers

Using conservative assumptions about the contribution of a new supercomputer to the potential overall improvements in weather forecasting indicates discounted benefits in:

- the household sector (ordinary day-to-day forecasts, not including severe weather) at \$69 million
- certain agriculture sectors at \$26 million
- avoided weather fatalities at \$21 million

Cite: *Benefit analysis for NOAA High Performance Computing System for Research Applications*, Stratus Consulting, Boulder, CO, December, 2003.

Estimated benefits of approximately \$1 billion are attributable to a planned 50 percent increase in high performance computing power at NOAA's Geophysical Fluid Dynamics Laboratory. Benefits include better understanding of both gradual and abrupt climate change, extreme climate and weather, and air quality.

Cite: *GFDL Benefit/Cost Analysis*, Geophysical Fluid Dynamics Laboratory, Princeton, NJ, June, 2002

notes

Defense

The “Long Range Weather Forecasting Support of Energy Use at Navy Activities” (LRF) program has documented in excess of \$60 million of savings over the past 15 years.

Cite: Chief of Naval Operations Memorandum, 20 April 1998.

A decision to relocate the Norfolk harbor fleet could cost \$5 million and require 72 hours advance notice. This includes costs to recall personnel and make ready ships in maintenance or being overhauled. It costs \$17 million to move out of port all of the Navy’s ships along the east coast .

Cite: International Hurricane Conference 2001 meeting presentation.

During Hurricane Floyd in 1999, the Command’s early warning gave the Atlantic Fleet sailors time to move 82 ships and submarines out of harm’s way. The sortie costs the Navy over \$17 million, but a decision to not sortie may have resulted in billions of dollars in damages.

Cite: *Navy Promotes Hurricane Awareness*, News Release from the Naval Meteorology and Oceanography Command, June 16, 2000.

notes

Sea Grant

In 2005-06, Sea Grant Extension in the Cleveland Region has focused on retaining and expanding small local businesses by actively initiating contacts, developing surveys and proactively responding to the needs of local businesses to aid them in their efforts to remain viable and competitive. A total of 65 new jobs were created and over \$27.9 million was invested in local businesses in the coastal zone.

Cite: Ohio Sea Grant Annual Report, 2006.

With increasing competition from imports, the North Carolina seafood industry needs to develop new “value-added” seafood products—and to “brand” them as North Carolina specialties. Between 2001 and 2005, North Carolina Sea Grant and the NC State University Seafood Laboratory helped six North Carolina businesses develop 54 value-added products. Thirty of those products were selected for commercial production and marketing to grocery stores, caterers and other businesses. With Sea Grant assistance, one processor developed the “Coastal Treasure” brand, and has shared the experience with others in the industry. Another processor is selling “ready to eat” seafood products, including spreads and salads, under the “Carolina’s Finest Seafood” brand. The projects not only resulted in specific new seafood products, but also generated Sea Grant extension/information products that explain how to make the move to new markets. A “Blueprint” publication shows processors the steps needed to create a “brand identity” for value-added seafood. Sea Grant also works with the processors to ensure that the new products for retail and wholesale markets are developed and produced in line with state and national seafood safety regulations.

Cite: North Carolina Sea Grant Annual Report, 2006.

Boaters see the importance of water quality in the Chesapeake Bay and are willing to pay an estimated \$7.3 million a year for water quality improvements, a new study finds. The study, published in *Marine Resource Economics*, is believed to be the first of its kind nationwide to estimate the importance of water quality to boaters.

Cite: Maryland Sea Grant Annual Report, 2006.

Scientists and resource managers are alarmed by documented overfishing and declines of 50 percent and more in shark populations in the northwest Atlantic. Experts suspect comparable if not greater declines globally. Genetics provides a useful way to collect catch and trade data for more effective fisheries management. Sea Grant Researchers have developed a revolutionary, rapid and reliable method of DNA analysis to identify shark species from fins, carcasses and other body parts. This one-step forensics technique now puts teeth in NOAA’s efforts to identify and prosecute U.S. fishing vessels suspected of catching and selling protected species such as the dusky and the great white shark. In one recent period, this technology helped federal prosecutors confirm the presence of prohibited species in four of five

investigations, resulting in fines of more than \$100,000. Thus far, the team has fully developed and tested DNA markers for 18 U.S. Atlantic shark species.

Cite: Florida Sea Grant Program Assessment Briefing Book, 2005.

With USDA support, Sea Grant initiated a multi-faceted program to assist fishermen who face the dual threat of a flood of seafood imports and dropping prices for their catches. As part of the program, WSG trains fishermen in marketing and business management, partners with the publisher of Fishermen's News to deliver networking workshops, assists direct marketing efforts at fish piers in Bellingham, Seattle, Blaine, and Port Townsend, and provides quality control training for coastal salmon trollers. Direct marketing by Bellingham fishermen netted them \$27,000 in profits above regular catch value; 54 non-tribal and 20 tribal fishermen have begun Intensive Technical Assistance in managing their fishing businesses; Makah tribal salmon trollers are receiving from \$0.50 to \$0.75 more per pound in 2006 for higher-quality king salmon.

Cite: Washington Sea Grant Annual Report, 2006.

Conflicts between ocean-going tugs and Dungeness crab gear have historically caused severe problems along the Pacific Coast. Crab pots foul tugs and barges and loss of crab gear is a severe economic problem for fishermen. Over the years, WSG has brought the two industries together to negotiate towlanes and this year introduced electronic versions of towlane charts to greatly simplify entering and accessing data. The agreement increases the safety of towboat operations and saves the two industries an estimated \$1 million annually by lowering crab gear replacement needs, reducing towboat repair costs, and minimizing additional fuel expenses for both industries.

Cite: Washington Sea Grant Annual Report, 2006.

In Virginia alone, there are over 100,000 licensed saltwater recreational anglers, who make over 4 million fishing trips each year and spend in excess of \$550 million. Use of live bait is one popular method used in catching fish. The Virginia Sea Grant Marine Advisory Program developed a demonstration baitfish culture system in collaboration with a local bait/tackle dealer (industry partner). Cultured spot (*Leiostomus xanthurus*) have been sold for \$1.50 per fish and the small-scale recirculating tank restocked with cultured bull minnows. As a result of the small-scale project, the industry partner has requested assistance in designing a larger baitfish culture system capable of producing 10,000 spot annually. This will serve as an economic model that can be used for others.

Cite: Virginia Sea Grant Annual Report, 2006.

[A] framework can be applied at the county, state, regional and national levels to allow the estimation of direct, indirect and induced output; value added; and employment impacts for each industrial sector (tourism, fishing, public health, etc.) and for aggregate sectors. Estimates for the national direct output impacts average

\$75 million per year; the indirect impacts average \$27 million per year; and the induced impacts average \$56 million per year. This approach will provide policy makers, resource managers, and stakeholders a tool to better understand the scale of impacts from HABs as well as the distribution of impacts across economic sectors.

Cite: WHOI Sea Grant Annual Report, 2006.

Alaska Sea Grant researchers developed a process to microencapsulate oil from an underutilized species of flatfish, the Arrowtooth flounder. The product, a protein powder, is used in glazes to coat salmon filets, extending their freshness and shelf life. Seafood buyers are evaluating the powder. Production of these Alaska fish oil supplements is expected within the next two years.

Cite: Alaska Sea Grant Annual Report, 2006.

Oregon Sea Grant and Alaska Sea Grant assisted seafood processing plants in finding ways to become more energy efficient and therefore more productive. Experiments at seafood processing plants in Alaska and Oregon showed that seafood freezing times were reduced by as much as 30 percent by using more freeze-friendly packaging, balancing air flow through blast freezers, and reducing fan speed at non critical times, and other steps that would be expected to benefit processors with significant gains in energy efficiency, plant productivity, and product improvement. Published in 2006, the publication, *Planning Seafood Cold Storage*, draws from the successes of Sea Grant's work with Oregon and Alaska seafood processors.

Cite: Oregon Sea Grant Annual Report, 2006.

Alaska Sea Grant provided crucial help to an Alaska Trade Delegation visiting China in early 2006, arranging tours for two processing plants, a flatfish growing facility (turbot and halibut), and a sea cucumber growing facility. Sea Grant assisted seafood companies and state representatives in relationship-building with Chinese industry personnel and presented research on Omega-3 fatty acid levels of premium Copper River sockeye and farmed salmon to more than 100 Chinese retailers, wholesalers/distributors, and news media in Shanghai. As a direct result of the trade delegation, one Alaska processor contracted to sell three containers of pink salmon each month to a Chinese importer. Another processor has thus far sold four containers of arrowtooth flounder to a Chinese importer, and more shipments are expected. Walmart in China, Korea, and Japan invited Alaska to conduct in-store promotions in different store locations in Fall 2006. A China-based Korean importer/processor is in contact with an Alaskan producer to import premium grade salmon into selected retail stores in Shanghai. The Southeast Alaska Dive Fishery Association requested Alaska Sea Grant assistance in developing a live shellfish product program with China. Alaska Sea Grant will continue efforts in this important international arena, and has been asked to assist with future trade delegations and relationship-building in China.

Cite: Alaska Sea Grant Annual Report, 2006.

Sea Grant funded biologists have identified the molecular mechanisms by which marine sponges synthesize their silica skeletons. They are now translating these mechanisms to develop new approaches for low-cost synthesis of semiconductors. Compared to current manufacturing practices, the methods they have developed operate at low temperature and use no harmful or caustic chemicals. Materials with novel structures and electronic properties are being produced. Results are especially encouraging for lowering manufacturing costs and improving energy efficiency of solar energy (photovoltaic) converters.

Cite: California Sea Grant Annual Report, 2006.

A growing problem among many commercial fisheries is the disposal of shell waste (chitin) from crustaceans they harvest. Sea Grant research has shown derivatives of this waste can be used to produce bandages, burn dressings, dietary supplements and cosmetics. Presently, Sea Grant scientists at the University of Alabama are investigating the use of waste chitin as a starting material for engineering “designer solvents” that will replace the need for traditional toxic, flammable, and volatile organic solvents.

Cite: Mississippi-Alabama Sea Grant Annual Report, 2006.

notes

U.S. Coastal Economy Impact and Benefits

Ocean Economics

Coastal States

- In 2004, the thirty coastal states with 82% of the US population contributed 83%, or \$9.7T, of the national GDP on only 22% of the US land, a 9% increase in GDP from 2000.
- Coastal states GDP grew at about the same pace as the United States GDP between 2000 and 2004 (US 9%; Coastal States 9%; Coastal Counties 8%; Watershed 9%).
- While GDP increased 9% between 2000 and 2004, there was little change in all coastal states employment, which was 79% of national employment, or 102,096,734 jobs in 2004.
- Alaska's employment experienced the highest growth (8%) between 2000 and 2004, although its employment base was also one of the lowest of coastal states.
- Coastal states wages increased only slightly between 2000 and 2004 (less than 1%).
- In 2004 the average coastal states wage was \$36,733 compared to the national average wage of \$35,874.

Coastal Counties

- In 2004, total coastal counties (with 34% of total coastal state land) contributed the following to coastal states:
 - 58% of the GDP
 - 54% of the employment
 - 59% of the wages
 - 53% of the Population
 - 52% of Housing
- From 2000 to 2004, total coastal counties
 - GDP increased 8%
 - Employment decreased 0.7%
 - Wages increased 0.2%

GDP

- All coastal counties contributed \$5.6T to the national GDP in 2004, an 8% increase between 2000 and 2004.
- The coastal counties of California, New York, Florida, and New Jersey contributed \$3T or 25% to the national GDP in 2004.
- Florida's and South Carolina's shoreline counties experienced the 2 largest GDP increases (>17%) of any comparable geography between 2000 and 2004.

Employment and Wages

- While GDP increased by 8% for all coastal counties, employment declined slightly and wages remained about the same between 2000 and 2004.

Comparison of States

- Florida's GDP growth rate was almost twice that of California between 2000 and 2004, with only half the population and less than half the size of the economy,
 - CA: 9% (\$1.4T in 2004)
 - Florida: 17% (\$.5T in 2004)
- In 2004, on just 25% of state land area (which is almost 1.1% of U.S. land area), California's coastal counties provided:
 - 11% of U.S. economy
 - 86% of CA state GDP or over \$1.4T
 - 81% of CA workforce or 12M jobs
- In 2004, on just 0.3% of U.S. land, Florida's shoreline counties provided:
 - 4% of U.S. economy
 - 78% of FL state GDP or \$0.5T
 - 76% of FL workforce or 5M jobs
- Shoreline Adjacent employment growth rate comparison between 2000 and 2004:
 - GDP: Florida 17% vs. California: 12%
 - Employment: Florida 6% vs. California: -0.2%
 - Wages: Florida 10% vs. California: 1%
- In the Gulf of Mexico, approximately 50% of Louisiana's economy was dependent on its coastal counties in 2004: wages = 49%; GDP = 51%; and jobs = 51%.
- In the Gulf of Mexico, over 80% of Louisiana's economy was dependent on its watershed counties in 2004: wages = 81%; GDP = 83%; and jobs = 83%.

Cite: National Ocean Economics Project,
<http://noep.mbari.org/Market/coastal/coastalEcon.asp>

Population and Housing

- Coastal states population increased 6% between 2000 and 2006. 82% of the population lived in coastal states on just 22% of the land (including Alaska and HI) in 2006.

- The United States was most heavily populated in the coastal counties with 183 persons/ square mile compared to the United States density of 33 per square mile in 2006.
- Inland county population grew at a faster rate than shore-adjacent population between 2000 and 2006.
 - Shore-adjacent growth rate: 4%.
 - Coastal state growth rate: 6%.

Cite: National Ocean Economics Project, <http://noep.mbari.org/Demographics/demogSearch.aspx>

Ocean Economy

- The total Ocean Economy increased 15% between 2000 and 2004 to \$128.3B.
- Tourism & Recreation was the largest Ocean Economy sector with almost \$70B in GSP in 2004.
- Marine Transportation grew faster than all other sectors at 41% compared to 13% for Tourism & Recreation between 2000 and 2004.

Cite: National Ocean Economics Project, <http://noep.mbari.org/Market/ocean/oceanEcon.asp>

Fisheries

- Sea scallops (\$433M) and American lobster (\$417M) generated the highest landed value of all U.S. fisheries in 2005.
- Of the top-ten U.S. fisheries by value in 2005, only half the species were finfish; the rest were shellfish, mollusks, and crustaceans.

Cite: National Ocean Economics Project, <http://noep.mbari.org/LMR/>

Offshore Oil and Gas

- Total offshore oil production value (for first purchase price) was almost 30% of total U.S. oil production in 2004 or \$27B.
- Total gas value at well head was approximately 20% of total U.S. gas production in 2004 or \$20B.

Cite: National Ocean Economics Project, <http://noep.mbari.org/Minerals/>

Coastal Benefits

In 1999-2000, over 43 percent of the civilian population 16 years and older participated in at least one of the 19 marine outdoor recreation activities, which translates into over 89 million participants.

Cite: Leeworthy, Vernon R. and Peter C. Wiley. 2001. *Current Participation Patterns in Marine Recreation*. National Survey on Recreation and the Environment (NSRE 2000), National Oceanic and Atmospheric Administration, National Ocean Service, Special Projects Office, Silver Spring, MD. November 2001. This report can be obtained at: http://marineeconomics.noaa.gov/NSRE/NSRE_2pdf.

Overall, the total number of people participating in all forms of marine recreation is expected to increase with the largest increases expected for beach going activities. California ranks second only to Florida in the number of participants in coastal recreation (17.6 million participants). While California also ranks second to Florida in the percent of its population that participates in marine recreation (10.7% for Florida, 8.7 % for California), its large population places California first in the Nation in the number of residents that participate in marine recreation annually (12.2%).

Cite: Pendleton, L., and Rooke, J., *Understanding the Potential Economic Impact of Marine Recreational Fishing: California*, (March 2006), “Non-Market Literature Portal” www.oceanomics.org

A survey of almost 900 people living in the four-county area (Los Angeles, Orange, Riverside, and San Bernardino) over a one year period revealed their 1999 beach-going activities. An economic model was developed to estimate how changes in beach characteristics (e.g., water quality, parking, life guards) and user characteristics are related to changes in economic welfare (consumer’s surplus). The model was used on five policy/management scenarios involving changes in water quality and beach closures to estimate changes in economic welfare. In addition, a scenario was run which closed all 51 beaches in Los Angeles and Orange Counties for an entire year. The total changes are presented here.

- An improvement in water quality of one letter grade at Malibu Surfrider Beach results in an increase in consumer’s surplus of \$140,564.
- A degradation of water quality of five letter grades at Zuma Beach results in a decrease in consumer’s surplus of over \$5.2 million.
- A closure of Huntington Beach (HB) for one day in July would result in a welfare loss of \$115,657.
- A month-long closure of HB during July would result in a decrease in consumer’s surplus of over \$3.5 million.
- A season-long beach closure (all of June, July, and August) at HB would result in a loss of welfare of over \$9 million.

- A loss of all trips to all 51 beaches in this two-county area (over 53.3 million trips) would result in a loss of consumer's surplus of over \$4.7 billion.

Cite: Hanemann, Michael, Pendleton, Linwood, and Mohn, Craig. 2005. *Welfare Estimates for Five Scenarios of Water Quality Change in Southern California, A Report from the Southern California Beach Valuation Project*. Research Funded by the National Oceanic and Atmospheric Administration, The Minerals Management Service, The California Office of Spill Prevention and Response, the CA State Water Resources Control Board, and the Santa Monica Bay Restoration Commission. Available at: <http://marineeconomics.noaa.gov/SCBeach/laobeach1.html>

The nonmarket coastal resource value in the Channel Islands area of southern California is at least \$575 million (1994 dollars), for the protection of Bald eagles, Peregrine falcons, White croaker and Kelp bass.

Cite: *Prospective Interim Lost Use Value Due to DDT and PCB Contamination in the Southern California Bight*, Natural Resource Damage Assessment, Inc., La Jolla, Calif., September, 1994.

To prevent oil spills off the coast of Central California over a 10-year period, Californians would be willing to pay \$75 per household.

Cite: *The Value of Preventing Oil Spill Injuries to Natural Resources along California's Central Coast*, Natural Resource Damage Assessment Inc., San Diego, Calif., March, 1996.

Prevention of another major oil spill similar to the *Exxon Valdez* is valued at approximately \$3 billion to the U.S. public (1990 dollars).

Cite: *A Contingent Valuation Study of Lost Passive Use Values Resulting from the Exxon Valdez Oil Spill*, Natural Resource Damage Assessment, Inc., La Jolla, Calif., November, 1992.

Estimates of annual California beach visitation range from 150 million visits to more than 378 million beach visits. Using a conservative estimate of 150 million beach visits, we estimate that market expenditures by beach-goers in California could substantially exceed \$3 billion each year. Using a conservative estimate of 150 million beach visits, and a range of estimates for the non-market value of a California beach day (the value placed on access to the beach beyond travel costs, parking fees, and tolls), we estimate that non-market expenditures by beach-goers in California could substantially exceed \$2 billion each year.

Cite: Pendleton, L. and Kildow, J., *The Non-market Value of Beach Recreation in California*, February, 2006, "Non-market Literature Portal." Available at: oceaneconomics.org.

In 2000-2001, annual nonmarket recreation values for the artificial and natural reefs of southeast Florida by both residents and visitors was estimated at \$256 million and an asset value of \$8.5 billion.

Cite: Johns, G.M., Leeworthy, V.R., Bell, F.W., and Bonn, M.A., 2003. *Socioeconomic Study of Reefs in Southeast Florida*, Final Report October 2001 and revised June 2003. Report for Broward, Palm Beach, Miami-Dade and Monroe Counties, Florida Fish and Wildlife Conservation Commission, National Oceanic and Atmospheric Administration. Report can be obtained at <http://marineeconomics.noaa.gov/Reefs/02-01.pdf>.

In 2003, annual non-market recreation values for the artificial and natural reefs of Martin County, Florida, by both residents and visitors was estimated at \$3.6 million and an asset value of \$172 million.

In 2003, the expenditure due to reef related activities in Martin County, Florida, supported almost 529,000 person-days of recreational snorkeling, diving, and fishing activities. These activities generated about \$13.1 million in local sales, about \$5.8 million in local income, and over 180 full- and part-time jobs.

Cite: Hazen and Sawyer. 2004. *Socioeconomic Study of Reefs in Martin County, Florida, Final Report*. Hazen and Sawyer for Martin County, FL: Hollywood, FL. p.120. Available at: <http://marineeconomics.noaa.gov/Reefs/MartinCounty2004.pdf>

In 1995-96, the Florida Keys National Marine Sanctuary had a total annual nonmarket economic use value of \$1.2 billion, based on visitation. \$910.5 million of this annual value was attributed to natural resource-based activities and \$294.4 million was attributed to non-natural resource-based activities. The total asset value of Sanctuary, based on visitation for natural resource-based activities, was estimated at \$30.4 billion (using a 3 percent discount rate).

Cite: Leeworthy, Vernon R. and J.M. Bowker. 1997. Nonmarket Economic User Values of the Florida Keys/Key West. *Linking the Economy and Environment of Florida Keys/Florida Bay*. October 1997. National Oceanic and Atmospheric Administration, National Ocean Service, Strategic Environmental Assessments Division, Silver Spring, MD and USDA, Forest Service, Southern Forest Research Station, Outdoor Recreation and Wilderness Assessment Group, Athens, GA. The report can be obtained at: <http://marineeconomics.noaa.gov/SocmonFK/publications/97-30.pdf>.

In 1997-98, artificial reef use, by recreational fishermen and divers (visitors and residents) of a five-county area of Northwest Florida, had an estimated annual nonmarket economic use value of \$24 million and an asset value of \$801 million.

Cite: Bell, F.W., M.A. Bonn and V. R. Leeworthy. 1998. *Economic Impact and Importance of Artificial Reefs in Northwest Florida*. Under contract Number MR235, Office of Fisheries Management and Assistance Service,

Florida Department of Environmental Protection, Tallahassee, Florida.
December 1998. This report can be obtained at the following:
<http://marineeconomics.noaa.gov/Reefs/nwfl.pdf>.

In 2000, Hawaii's coral reefs around the Main Islands had an annual nonmarket economic value for recreation and tourist reef-related use of \$133.3 million. Amenity value (measured as reef-related property value) was estimated at \$40.05 million. Biodiversity value was measured by expenditures for all scientific research related to the Main Islands (a proxy for scientific value) and non-use or passive economic use value was based on a benefits transfer. Biodiversity was estimated to have an annual value of \$17.84 million. Total annual nonmarket value was estimated to be about \$191 million with an asset value of about \$6.4 billion using a 3 percent discount rate.

Cite: Cesar, Herman, Pieter van Beukering, Sam Pintz and Jan Dierking. 2002. *Economic Value of the Coral Reefs of Hawaii*. Final Report, December 23, 2002. Research funded by National Oceanic and Atmospheric Administration, Coastal Ocean Program under awards NA87OA0381, NA 96OP0187, NA060A0388, and NA160A1449 to the University of Hawaii for the Hawaii Coral Reef Initiative Research Program (HCRI).
http://www.hawaii.edu/ssri/hcri/rp/cesar/noaa_final_report_01-02/cesar_final_report-01.

While it is not clear how SCUBA and snorkeling activities are distributed across the state, we estimate that diving in California, statewide, probably generates on the order of \$138 million to \$276 million in annual gross **revenues** from SCUBA diving alone. The potential magnitude of expenditures associated with snorkeling is similar.

We estimate that snorkeling in California may have generated between \$153 million and \$344 million. Diving and snorkeling also generates non market benefits for the many divers along the California coast. We estimate the **non-market** use value for California divers at between \$21 million and \$69 million annually and a range of \$19 million to \$115 million for snorkeling.

Cite: Pendleton, L., and Rooke, J., *Understanding the Potential Economic Impact of SCUBA Diving and Snorkeling: California*. (February, 2006), "Non-Market Portal" www.oceaneconomics.org

notes

The Economic Dimensions of NOAA Products and Services

I. Introduction: NOAA and Value Creation

NOAA's responsibilities range from weather and climate forecasting to a lead role in assuring the sound management of the nation's ocean and coastal resources. In fulfilling its diverse missions, NOAA programs create economic value. NOAA's research and forecasts lead to reduced damages from storms and other natural hazards. NOAA provides information that helps businesses make decisions and allows key industries like transportation and agriculture to operate more efficiently. NOAA's management programs for ocean and coastal areas help enhance both the current and future productivity of these economically vital resources.

It is not possible to reduce all of NOAA's economic contributions to the nation – and to the world – down to a single number. There are many different services that NOAA provides which affect the economy in diverse ways, and there are a variety of ways in which those effects are measured by economists. *Economic Statistics for NOAA* provides a summary of statistics and findings of recent research that either directly measures economic benefits of particular programs, or indicates the general economic context in which particular NOAA programs create economic value.

What follows is intended to provide a brief introduction to how NOAA creates economic value and the different concepts and methods of measuring economic value that are represented in *Economic Statistics for NOAA* (hereafter *Economic Statistics*). The appendix provides guidance on how different estimates of value and economic activity can be compared.

II. Overview: How NOAA Contributes to the U.S. Economy

NOAA contributes to the economy in two fundamental ways: First, by providing information that people find valuable, and second, by managing, or helping to manage, natural resources that are themselves valuable. Understanding the economic value created by NOAA basically involves asking how people use/value the information that NOAA provides, or how the values of resources are enhanced through NOAA management.

A. Value of The Information NOAA Provides

The information that NOAA provides can be placed into two general classes: operational information and research information. Both kinds of information derive their value from the ways in which people use the information, but there are significant differences in the challenges involved in estimating their values.

1. Operational Information.

Much of the information created by NOAA is "operational" in nature. This category includes the full range of weather information together with ocean conditions and forecast information. Such information is valuable because people, businesses, and governments use it regularly to make better decisions. Improved decisions range

from critical decisions about preparation for dangerous storms, to significant business decisions, such as how much electricity needs to be available tomorrow for air conditioning, to routine individual decisions, such as how to plan a weekend outing.

Operational information is valuable when it is accurate and timely. Accuracy means the information correctly predicts what will happen and where. Timeliness means that the information gets to people and organizations in time for them to respond appropriately. Information is most valuable when it is most precise and when it is available sooner rather than later.

A key example of operational information provided by NOAA is storm forecasts. When this information is accurate and timely, people can respond in ways that limit the costs of storms. To measure this type of value, economists try to assess the life and property damages that could result from storms and to assess how information coupled with changes in behavior reduces those damages. This damage reduction is the value created by the information. Important examples of storm forecasts include tornado warnings and hurricane warnings.

Regarding tornado forecasts, *Economic Statistics* cites a study that estimates that the NWS's NEXRAD radar system prevented over 330 fatalities and 7800 injuries from tornadoes, with a monetized benefit of over \$3 billion between 1992 and 2004 (compared with a total capital cost of less than \$1.7 billion) (p.50).

In the case of hurricane warnings, an accurate forecast makes it possible to target the hurricane evacuation zone correctly and gives sufficient time to allow the evacuation to be safe and orderly. This is important because evacuation itself has very high cost, but so does failure to evacuate if a life-threatening storm strikes. *Economic Statistics* cites estimates that reducing the length of coastline under hurricane warnings saves at least \$600,000 per coastal mile in cost of evacuation and other preparedness actions (p.49).

Other operational information provided by NOAA includes routine weather forecasts that improve business decisions and productivity. For example, *Economic Statistics* cites a study that estimates US electric generators save \$166 million annually using 24-hr temperature forecasts to improve the mix of generating units that are available to meet electricity demand (p. 51).

Routine weather forecasts provided by NOAA are also used by individuals in their daily lives. While this information may not seem very important relative to storm forecasts or critical business decisions, there are so many such routine individual decisions made in the US every day that significant total value is created by the forecasts that improve this decision-making. *Economic Statistics* notes that America's 105 million households consult the daily forecast at least once each day (p. 48).

NOAA also provides routine types of operational information, in the form of charts and navigational information, which are needed for safe and efficient operation of

the nation's marine transportation and recreational boating industries. Although this information does not need to be updated as often as weather forecasts, the accurate measurement of tidal heights and water depths in the coastal waterways, often in real time, is just as important to safety of lives and property as are storm forecasts. One study cited in *Economic Statistics* estimates benefits of \$15 million annually to shipping in the Houston/Galveston port alone from real time physical oceanographic data (p. 47).

2. Research Information

Research in a number of fields is also a key part of the information that NOAA provides. NOAA is a world leader in weather and climate research and also in all aspects of oceanographic research. NOAA's research at both the basic and applied levels is critical to a wide variety of activities and decisions in the U.S. and around the world.

Measuring the economic value of NOAA's research programs is a difficult task because the transformation of research into human activities that have economic value often takes a great deal of time, and the connections between specific research and outcomes are hard to trace. A good example is research into climate change, where the effects of change, and the best mitigating policy responses, are still very uncertain and still lie some time into the future.

Nevertheless, there have been some economic studies on the value of information flowing from specific research investments, such as those in air quality, supercomputers, and the Sea Grant Program. One example, cited in *Economic Statistics*, estimates that new supercomputers used in research have a potential contribution to improved weather forecasting of \$115 million annually (p.57). Another example is the transition of tropical ocean research to an operational ENSO forecasting system, with estimated annual benefits to US agriculture of \$256-300 million annually (p. 55).

B. Value of NOAA Resource Management Activities.

NOAA has direct responsibility for management of the nation's fisheries resources in the areas beyond state jurisdiction. NOAA also manages a network of protected areas in estuaries and in the coastal waters. Finally, in cooperation with other federal agencies and with state and local governments, NOAA assists in the management of the diverse and complex human and natural ecosystems of U.S. coastal areas, including the Great Lakes. Enhancing the values of these natural resources means dealing with complex tradeoffs among competing resource uses using state of the art environmental information and decision support tools. In managing ocean fisheries, NOAA creates value through policies that prevent over-fishing and consequent decline of key fish stocks, which would reduce the value of the fishing industry and the values to consumers of fish.

For areas such as marine sanctuaries and estuarine reserves, NOAA seeks to preserve unique natural or historical resources on which people may place high values because they are historically unique (e.g. the U.S.S. *Monitor* wreck site) or

because they contain unusual natural features that are rare or unique. People may value such places because of the opportunity to visit and experience their features or they may value them because they are unusual, even if they never intend to visit them. For example, a study cited in *Economic Statistics* estimates that visitors to the Florida Keys National Marine Sanctuary derived a total economic value of \$1.2 billion annually (p. 70).

The management of coastal resources affects a complex mix of values. The relatively small coastal areas of the U.S. are home to half the economic activity in the country, so what happens here has significant effects on the overall U.S. economy. Coastal counties have 183 persons/square mile compared to the US density of 33 per square mile. Coasts contain some of the areas where many, if not most, Americans go for recreation, such as beaches. These are valuable in part because of the economic activity they generate and partly because of the simple experience of a “day at the beach”. For example, a recent study estimates market expenditures by California beach goers exceed \$3 billion annually and non-market values (values that beach goers place on access to the beach beyond what they pay in terms of travel cost, parking fees, etc.), exceed \$2 billion (p. 69). Coasts also contain important natural resource features, such as the habitats that are spawning areas for most commercially important fisheries; these are sources of value in their own right.

This brief overview of the many services that NOAA provides gives a general sense of the ways in which NOAA creates value. The following sections discuss in greater detail the different approaches that have been taken to estimate these values, and the various metrics that are used in making these estimates.

III. Approaches: Measuring NOAA’s Value Creation

A. Direct vs. Suggestive Measures of Value Created by NOAA

Economic Statistics summarizes a large collection of estimates of both the economic value created by NOAA and the scale of economic activities affected by NOAA’s programs. At one extreme are statistics that explicitly estimate the direct benefits derived from NOAA programs. For example, there is a citation of a study that indicates NOAA forecasts and associated responses to hurricanes save \$3 billion in a typical hurricane season (p. 49). At the other extreme, there are numbers that simply suggest the general importance of a particular context in which NOAA programs create value, without directly measuring the difference that NOAA programs actually make in that context. For example, a cited study estimates that every 10 to 12 years, we should expect a storm event (typically a hurricane) costing \$20 billion (p. 18).

1. Direct Measures of Value

Estimates of the direct benefits derived from a NOAA program are generally based on studies of the difference between an economic situation with the NOAA program and the situation without that program. There are at least three general ways to go

about producing such estimates: survey methods, simulation modeling, and historical data analysis.

In survey methods, a carefully designed and tested survey is used to ask people to consider two or more different situations (e.g. having NOAA weather forecasts vs. not having them) and state the benefit they perceive in having the forecasts. For example, a detailed sample survey of U.S. households estimated that they are willing-to-pay about \$110 annually for weather forecast information--\$11.4 billion annually in total (p.48).

In simulation modeling, business decision-making is effectively replicated in a computer model, with and without availability of NOAA forecasts or services, and the economic consequences calculated for both situations. In an example referred to earlier, simulation studies of farmer's crop selection decisions estimate benefits of approximately \$275 million annually with an improved seasonal forecast (p. 55).

In data analysis, historical information is analyzed to determine how much change in benefits occurred due to the availability of NOAA forecasts or services. For example, the reduction in heat-related deaths following the introduction of new heat-wave forecasts in Philadelphia since 1995 is estimated to have saved 117 lives over its first three years, for total benefits of \$468 million (p.56).

2. Suggestive Measures of Value

Suggestive measures of the value created by NOAA programs are often easier to produce than direct measures of the difference that NOAA programs actually make. This is because suggestive measures do not have to ask how the situation would be different if there were no NOAA program and what that difference would mean in terms of the economic value that is generated.

There are many examples of such suggestive measures of value in *Economic Statistics*. For example, one study estimates that travel and tourism generates over \$700 billion of GDP annually, and that 85 percent of this is spent in coastal states (p. 36). These numbers suggests that NOAA programs that contribute to the health of the coast and coastal communities produce value, but they say nothing about how much value those programs actually create.

B. Metrics Used to Measure Value

Whether a study produces a direct or a suggestive measure of value created by NOAA programs, it may use any of a large variety of metrics for quantification. These metrics range from economic welfare measures which attempt to measure the dollar value individuals or institutions would be willing to pay for a program or an economic activity, to monetary economic activity measures such as Gross Domestic Product (GDP), to physical counts such as number of visits to a beach or deep-sea fishing trips.

1. Economic Welfare Measures of Benefits.

Economic welfare measures are determined solely from the point of view of the individual and then summed up across the relevant population (e.g. the nation, a region, a beach, etc.). These measures are sometimes called “non-market benefits” because they are not fully captured by the market prices that people pay for the goods and services they purchase, often because there are no observable market prices for these goods (e.g. recreational fishing, boating, beach visitation). Measures of non-market benefits are particularly important in the areas of health and safety and recreation benefits.¹

Health and Safety Benefits. Of particular importance to NOAA are benefits of programs that save lives, reduce injuries, or otherwise improve health that are most naturally expressed in raw numbers – fewer deaths, fewer injuries, fewer doctor/hospital visits, etc. However, these benefits are sometimes converted into dollar measures of economic welfare because doing so makes it possible to compare them to the dollar costs of the programs that produce those benefits. Though sometimes controversial, the estimation of the monetary value of health and safety is essential for understanding the economic rationale for many government programs.

Many Federal agencies frequently must compare the costs of programs (e.g. to limit air pollution, reduce highway accidents) to the benefits obtained – reduced risk of premature death, illness, reduced highway deaths, etc. A great deal of research has been done to determine the most appropriate number to use, especially for reduced deaths. This research has considered data on the extra compensation earned in high-risk occupations, as well as individuals’ stated willingness to incur a higher risk of death in exchange for economic benefits. Based on such research the EPA, for example, uses a value of \$6 million per life saved. The benefits of NOAA’s NEXRAD’s radar system cited earlier (over \$3 billion between 1992 and 2004) are based on such estimates (p. 56).

Recreation Benefits. Expressing non-monetary benefits in terms of monetary values applies to a wide variety of non-market benefits besides health and safety, including many forms of recreation values central to NOAA’s activities such as recreational fishing and beach and coastal recreation. A good example is the value of beach and related recreational activities like snorkeling. People pay large amounts of money to go to the beach, often traveling long distances. These expenditures are often counted as economic activity (see below), but the real value to the person on the beach is not what they spend on a hotel room or airplane or restaurant meal, but the net value of the opportunity to engage in this activity, i.e. to swim, sun, snorkel, surf, or just sit in a cool place on a hot day.

¹ Estimating economic welfare or social surplus benefits involves concepts and measurement of “producer and consumer surplus”. Consumer surplus is essentially the difference between what a person is willing-to-pay for an item less what she has to pay, summed over all consumers of the item. Producer surplus is the difference between what a producer would be willing to sell a product for and what he actually receives for it, summed over all producers. Combining producer and consumer surplus is a measure of social surplus, or economic welfare, and changes in social surplus from a policy or management action is essentially a measure of economic benefits of the action.

This is the value they receive, and it is net of the out-of-pocket costs incurred to engage in the activity. This net value can be thought of “willingness-to-pay” for the opportunity to have the recreational experience. For example, visitors to the Florida Keys National Marine Sanctuary had a total annual non-market economic use value of \$1.2 billion in 1995-96 (p. 70). Willingness-to-pay, however, is not directly observable and must be obtained from survey responses or inferred from other economic data.

Many studies of the value of NOAA programs focus on losses that might be avoided with proper management. For example, beaches closed because of pollution or recreational fishing opportunities damaged by lost habitat would reduce the economic benefits that people receive from those resources. Avoiding these losses is a benefit because people are better off if the losses are avoided or reduced. A study of Los Angeles and Orange County California beaches indicates that if all trips (over 53.2 million annually) were cancelled as a result of beach closures involving water quality, the loss of consumer surplus would exceed \$4.7 billion annually. (p. 69)

Economic welfare studies have one major advantage and one major disadvantage. The advantage is that they are in many ways the best measure of economic value because they measure the real net welfare change that occurs as a result of a particular decision or action. The disadvantage is that these types of studies are difficult and costly to undertake. As a result, there are too few estimates of welfare benefits associated with NOAA’s activities, and other ways must sometimes be found to provide at least some economic measures for the full range of those activities. The next section explains some of the other economic measures that may be used.

2. Economic Activity Measures of Benefits —GDP, Sales, Jobs

Measures of economic activity such as “growth in the economy” or “jobs growth” are frequently of great interest to policy makers since these types of economic changes are among the most widely understood and easily perceived changes in economic value. However, saying that economic activity has increased (more output, more jobs) is not necessarily the same as saying that economic benefits have increased in the welfare sense discussed above (although the term “benefit” may be loosely applied to both).

Monetary Measures of Economic Activity. Four categories of activity measurement are expressed in dollar terms based on the prices of goods and services sold in markets. These measures, GDP, Value Added, Industry Sales and many types of Avoided Costs, are collectively sometimes called market measures because they rely on prices set in markets to determine their value. The term “market values” distinguishes them from the economic welfare concepts discussed above which do not rely solely on market transactions to fix values. Each of these monetary measures of activity is discussed in more detail in the sections below.

a. Output -- GDP. The most commonly used “national product” number is Gross Domestic Product (GDP). Other very closely related numbers at the national level include Gross National Product, Net National Product, Net National Income, and some others. At the state level, the analogous statistic is the Gross Domestic Product-state.

The GDP figure regularly released measures final products sold to consumers (as opposed to intermediate goods used as inputs in making final products) at their market prices. For example, if 100 loaves of bread are produced and sold to consumers for \$2 per loaf, then the contribution of this bread to GDP is \$200. Note that this is simply what is spent on bread, and thus it is a measure of economic activity in the making of bread, including all the steps from the wheat farmer, grain elevator operator, train, and baker. It does not inform us about how much consumers’ value the opportunity to buy bread, or producers value the opportunity to sell bread.

b. Output – Value Added. Value added is very closely related to GDP. Value added essentially measures the portion of GDP that is generated at each stage of production (e.g. raw materials made into intermediate goods, intermediate goods made into final goods). So the sum of value added amounts produced along a sequence of steps from raw materials to final product equals the value of the final product, which is the contribution of that product to GDP.

In the bread example above, the baker might have bought bread ingredients and other supplies (packaging, electricity, etc.) for \$50. In this case, the value added by the baker would be \$150. The sum of the value added amounts for all his suppliers, and their suppliers in turn, would have to be \$50. An example from *Economic Statistics* is \$32.9 billion in value added to GDP by the commercial fishing industry (p. 31).

c. Output – Industry Sales/Consumer Expenditures. Value added is a difficult figure to estimate, and is available only at the state and national levels. Because of these limitations “industry sales” is often used to express the total dollar volume of goods or services sales from a particular activity. The sales by an industry are equivalent to the expenditures to buy the industry’s output, so “sales” or “expenditures” are used more or less interchangeably. *Economic Statistics* has several such citations like \$2.6 billion in sales by the commercial remote sensing industry in 2003 (p. 40) or \$415 million spent by recreational fisherman and divers of Northwest Florida annually (p.35).

It is important to note that “sales” and value added are not the same measurement. When one industry produces and sells to another industry, the result is what is called an “intermediate” input. For example, when the fish harvesting industry sells to fish processors and distributors, the sales (“landed values”) of the harvesting industry are an input to the production of processed fish foods (for example, frozen filets), which are then sold to the consumer. The sales of fish harvests are a cost to processors. This is why the full accounting for levels of economic activity by industry is done using the “value added” measure discussed above.

d. Avoided costs (also losses, damage). The term “avoided costs” is used in a variety of situations in which information or some action by NOAA results in avoiding some loss of economic value measured as lost GDP, lost employment, or reduced value of assets such as property. For example, weather and climate predictions have been shown to result in avoided costs measured as potentially lost sales, lost GDP, lost employment, or the lost value of property such as housing. Avoided costs can also mean avoiding public costs in the form of government expenditures that do not have to be made.

In some cases, avoided cost can be a true economic welfare measure like social surplus. For this to be true, the cost avoided has to be one that would have been incurred except for the NOAA program. The avoided cost also must be measured as the minimum possible expenditure that would have been required to restore welfare to its previous level if the cost had not been avoided. Under these circumstances, avoided cost is what people would willingly pay to avoid the cost, and it is a valid welfare measure that can be compared to the cost of the NOAA program that makes this cost avoidance possible.

Avoided property value losses or damages are the most common type of avoided losses that may be true welfare measures. If a NOAA program results in avoidance of such losses, people would be willing to pay up to the amount of those losses to have the program that makes the loss avoidable.

While all of the above monetary metrics are denominated in dollars, it is important to recognize that these numbers cannot safely be added across different studies. This is because they are often derived from different points of view. For example, an estimate of sales in one fishery cannot be added to another estimate of value added in a related fishery to arrive at a meaningful total for the combined fisheries.

Non-monetary Measures of Economic Activity. Many studies of economic activity associated with NOAA programs measure the economic activity in non-monetary terms. Most commonly these studies use employment or the levels of physical outputs from various activities.

a. Employment. Employment that exists because of natural systems is a fairly common measure of the benefit derived from those systems. For example, nearly 70,000 thousand people were employed in the seafood processing and wholesale sectors in 2005. Since jobs are generally desirable and relatively easy to count, they are an appealing measure. Jobs are a measure of activity levels and thus are useful primarily as a way of comparing the relative importance of different economic sectors—70,000 jobs in seafood processing and wholesale versus 8.4 million in sea port sector activities as reported in *Economic Statistics* (p. 31; p. 44). However, jobs are not a measure of economic welfare, nor are they very easily converted into such a measure.

b. Physical Outputs. Much of the readily available data about the resources of concern to NOAA are measured most directly as units of activity. For example, the

port systems are measured by vessel traffic and tons of cargo or number of passengers. Recreational activity counts, such as trips to the beach or deep-sea fishing trips, are another type of direct activity measure. Because many government agencies keep track of these units of production, they are often the economic data that most people see. But they are obviously limited in their ability to demonstrate economic value.

IV. Conclusion

This brief introduction to the various ways of defining and measuring economic value is intended to help the user of *Economic Statistics* to understand the different ways that NOAA’s programs and activities create economic value and the types of metrics and studies that are used to measure these values. Users will have to decide whether the definitions and ways of approaching the estimation of values in the studies referenced here are appropriate to their needs.

A short Appendix that follows provides additional guidance for users on what to look for in economic studies and guidance on when it is or is not appropriate to compare numbers from different studies.

Appendix: Understanding How Numbers Can Be Compared

The diverse ways in which economic value can be expressed raises the question of which numbers can be compared with one another and which cannot. Users often want to know what proportion of some larger measure is represented by a particular estimate, for example what portion of the national economy is accounted for by a particular state. Also, users may wish to add one type of measure to another to better gauge the size of benefits or economic activity.

The following provides a rough guide to how different measures should be used. One aspect of use is comparability of estimates. The guide identifies comparability in terms of additivity, that is, whether adding two numbers together gives a meaningful result. The principle of additivity means that two numbers that can be added together can also usually be combined through other arithmetic means. However, users are warned that details of specific estimates or methodologies contained in the references may limit or preclude comparability, so it is generally advisable to consult the original studies.

- Social surplus measures can usually be added.

When studies present their results as estimates of “economic benefits” within the meaning of valuing welfare as discussed in the introduction, the results can usually be considered comparable. Producer surplus plus consumer surplus equals social surplus. The only limitations occur when studies may overlap in terms of populations or time periods studied.

- Among the monetary measures of economic activity, compare sales with sales, and GDP with GDP, but not sales with GDP.

Many studies estimate the value of industry or firm sales, for example the sales related to marine recreational fishing. These estimates are very useful for understanding the size of economic activity in a local economy, but they are not the same thing as measuring output as GDP or GDP-state (gross state product). These latter measures are designed to be added up across regions and industries without double counting, while sales figures are not designed to do this.

- Employment is a measure of economic activity, not of economic benefits

Many studies identify employment as an important economic value affected by a program or issue of concern. Employment is a good example of a measure of economic activity with which many people are familiar, and which often provides a good measure of levels and changes in activity. But employment (or more precisely wages) is not a welfare benefit and should not be compared with other welfare benefits.

- Stocks and flows are two different, but related, values

One of the most frequently asked questions about many of the resources examined in the cited studies is “what is the value of that resource?” For example, “what is the value of fisheries spawning habitat in an estuary” or “what is the value of a beach” or “what is the value of property at risk from a tsunami?” These questions raise the difference between what economists call the value of a stock and the value of a flow.

At one level the distinction is simple. Consider a bond issued by a company or the US Treasury. The income earned from ownership of the bond is not the same thing as the value of the bond. The income is a flow (the value “flows” over some period of time in the form of regular interest payments, ending with a final repayment of principal). The current value of the bond is a stock value - it is the current value of the future flows to be received by virtue of owning the bond. Obviously, the value of the stock and the value of the flows due to it are related to one another.

Studies that attempt to estimate the stock value of a natural resource, such as wildlife habitat, face the problem that there is no market price for the land (or water) in use as wildlife habitat. Or if there is a market price, it is usually for some use other than wildlife habitat. In these cases economists make use of the relationship between flow value and stock value to calculate the stock value of the habitat in terms of the future flows of use and nonuse values from the habitat.

When estimating the values of specific resources, therefore, it is important to distinguish between the value of the flows of goods and services, which occur over time, and the value of the stock (or asset value) of that resource, which is its value at one particular point in time. Studies that attempt to estimate such values will usually make this distinction and users citing such studies should be careful which figures are being referenced. In a study cited earlier, the total asset value of the Florida Keys National Marine Sanctuary was estimated at \$30.4 billion using a 3% discount rate, while the annual value (flow) was \$1.2 billion (p.70).

- Damage and loss calculations should handle insurance appropriately

Because many of NOAA’s information services seek to avert damages from a variety of sources, many of the studies related to the economic value of NOAA services seek to identify actual or potential damages avoided. One aspect of such studies that varies widely is the extent to which insurance is taken into account in the estimates.

The simplest way to calculate welfare loss from a particular storm is to add the actual damages (calculated as the cost of restoring damaged assets to their pre-damaged values), regardless of whether these damages are covered under insurance or not. This loss is a true societal welfare loss, as someone in society will have to pay to replace what was lost, or do without what was lost.

The role of insurance is somewhat complicated. In the short run, insurance only affects who actually pays for a loss that has occurred -- whether it is the asset owner or his insurer. In the long run, the insured owner of the asset will pay the expected value of his losses, because the premiums paid by people carrying insurance must be sufficient to cover the losses incurred by these people, over the long run. (A caveat here is that administrative costs would have a minor effect on the equivalence of premiums and expected losses.) Also, when insurance is subsidized by the government, as is the case with some flood insurance, premiums need not cover expected losses, but the difference will be made up for by payments from taxpayers in general.

Because of this connection between expected losses and premium payments, it would be possible, in theory, to estimate the losses from insured perils using insurance premiums (including subsidies). It would also be possible, in theory, to measure the benefits of NOAA programs that reduce losses by calculating reductions in insurance premiums (including subsidies) attributable to the NOAA program. However, these approaches would present some significant analytical challenges.

Perhaps the main message here is that the role of insurance in measuring losses is complicated, and studies that rely on insurance premiums and/or insured loss data need to be scrutinized carefully to assess whether they address these complications adequately.

notes

The Future of Marine Fisheries: Fisheries and Ocean Policy Priorities for The New Administration

Recommendations of the Marine Fisheries Advisory Committee

October 2008

Earlier this year the Marine Fisheries Advisory Committee (MAFAC)¹ delivered a report to NOAA entitled *Vision 2020: The Future of U.S. Marine Fisheries*. *Vision 2020* provided a wide array of short and long-term policy recommendations to serve as guidance for achieving the desired future state of marine conservation and management. Building on *Vision 2020*, this memorandum highlights the highest priority immediate steps that the new administration should take to continue progress on enhancing marine resource management and strengthening the economies of vital coastal communities.

Sustainable Fisheries Policy Recommendations

- **Fully Fund Stock Assessment Work to Support Implementation of Annual Catch Limit and Accountability Measures Rulemaking.** The landmark 2006 Magnuson-Stevens Act (MSA) reauthorization requires that fishery management plans provide for the setting of annual catch limits in the fisheries and accountability measures to ensure that such catch limits are not exceeded. Successful implementation of these requirements depends, in part, on constituent confidence that the annual catch limit determinations are based on adequate scientific information. In 2008, only 128 of 230 key fish stocks are considered to have assessments that are sufficiently comprehensive and timely. Continued support is needed to obtain the FY 2009 NOAA budget proposal of an \$8.5 million increase in funding fish stock assessments. Future NOAA budgets going forward should expand funding for this budget priority.
- **Identify Candidate Fisheries for Management as Limited Access Limitation Programs (LAPPs).** Setting annual catch limits in fisheries is critical to protecting fishery resources. Often times, taking the next step to apportion the annual catch quota on an individual share basis is needed to provide economic and social stability to fishermen and provide individual accountability in meeting sustainable fishing goals. The MSA includes comprehensive guidelines for establishing LAPPs. NOAA Fisheries should exert strong leadership promoting LAPPs by completing a review in early 2009 of existing fishery management plans to identify top-tier candidate fisheries to be managed as LAPPs. NOAA Fisheries should consult with the regional fishery management councils in preparing its recommendations.

¹ MAFAC was established in 1970 to advise the Secretary of Commerce on matters relating to conservation and management of living marine resources under the jurisdiction of the Department. MAFAC is composed of a diverse group of stakeholders appointed by the Secretary. Contact: MAFAC Executive Director, Mark.Holliday@noaa.gov, (301) 713-2239 ext. 120.

The Future of Marine Fisheries: Fisheries and Ocean Policy Priorities for The New Administration

- **Fully Fund LAPP Line Item in NOAA Fisheries' Budget.** The FY 2009 NOAA budget proposed a \$4.8 million increase for implementation of the LAPP provision in the MSA reauthorization. The NOAA budget going forward should continue to include this in base funding, and if possible, increase this funding level.
- **NOAA Policy and Administration Should Focus on Cost Effective Implementation of LAPPs.** NOAA's policy on LAPP implementation should identify cost effective measures for administration of LAP programs and monitoring of LAPP participants, including certifying private sector firms to provide catch monitoring and observer services. NOAA administration of LAPPs should employ to the extent possible a common infrastructure for management, data collection and analysis, and enforcement activities to reduce overall program costs.
- **Expand NOAA Fisheries' Office of International Fisheries Capacity to Combat Illegal Fishing Beyond U.S. Waters.** A number of fish species whose harvest contributes significantly to the economy range beyond the U.S. 200-mile zone. Sound conservation depends upon effective U.S. participation in international management regimes. The MSA mandates that NOAA Fisheries help combat Illegal, Unregulated and Unreported (IUU) fishing internationally. IUU fishing not only poses a conservation threat, but illegal fish products adversely impacts legally harvested U.S. fish products in the marketplace. It is in the conservation and economic interest of the U.S. to expand the capacity of NOAA Fisheries' Office of International Fisheries to ensure full and effective participation in international fishery management organizations and to help combat IUU fishing.

Issue Areas of Particular Importance to NOAA Constituents

Aquaculture Development

To keep pace with the food supply needs of the nation and the world, and to reduce our seafood trade deficit, a national investment in the development and oversight of sustainable aquaculture systems is needed. Regional investments in technical support, capital equipment and other infrastructure would pay economic dividends. MAFAC urges the new administration to:

- Continue critical efforts to develop a single, multi-agency regulatory and permitting process to support environmentally-sound marine aquaculture in the Exclusive Economic Zone;
- Expand a research program for all of marine aquaculture;
- Implement without delay NOAA's 10-year plan for marine aquaculture development;

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- Re-introduce legislation to codify a statutory framework for marine aquaculture, and designate NOAA as the lead federal agency for implementing a national policy on environmentally and economically sustainable marine aquaculture;
- Support and expand existing sustainable near-shore aquaculture programs.

There is not universal public acceptance of the need for marine aquaculture development. The public must be assured that aquaculture development is undertaken under strict environmental and coastal ecosystem regulations, and this responsibility is best met by the Department and NOAA. In particular, NOAA Fisheries should work with commercial fishermen, seafood processors, trade associations and state and local governments to integrate wild stock production with aquaculture production to maximize the value of domestic seafood production and related industries and ensure our nation's food security. Efforts should be made to ensure that aquaculture products complement rather than compete with wild fish products in the marketplace, and to ensure that coastal communities and residents can be full participants in, and beneficiaries of, aquaculture development.

Climate Change, Coastal Habitat Protection and Management of Marine Resources

Climate change and accelerating coastal development are two drivers changing the traditional approach to management of marine resources. Population pressures on our coastal areas are well documented. But impacts on our fishery resources from coastal development, accompanying increases in pollution, and loss of inshore habitats are not receiving comparable national attention. Concurrently, impacts of climate change, including sea level rise, warming of ocean and inshore waters, ocean acidification and related effects are compounding pressures on our coastal areas and fisheries. While we have made great strides in our historical focus of managing effects of fishing on our fish stocks, we have made few in addressing the substantial loss of productivity resulting from increases in the size and duration of coastal anoxic zones, loss of wetland and other inshore habitats, and other impacts associated with a large influx of people moving into our coastal zones. We are also only beginning to understand the effects of global climate change on our fishery resources.

NOAA is uniquely positioned to lead a national effort to assess and respond to these drivers. NOAA has the scientific and organizational capacity to bring together scientists and managers from diverse areas of climate study, coastal zone management and biological/ecosystem assessments. It can marshal different geographic, sector and governmental collaborators to evaluate and respond to the science and policy implications of these trends. NOAA should take steps to assert a leadership role in the

The Future of Marine Fisheries: Fisheries and Ocean Policy Priorities for The New Administration

federal inter-agency effort in this area of national concern. The next Administration should place organizational emphasis on using the cross-cutting capacity of NOAA to address these drivers as the nation's lead ocean agency.

Recreational Fisheries

In January 2009, NOAA Fisheries is scheduled to implement a landmark national recreational angler registry and data collection program. Enhancement of the nation's recreational fishing data collection program is necessary to achieve conservation goals and improve decision making, including adaptive and precautionary management, by the Secretary and regional fishery management councils. It is critically important that NOAA's leadership carefully monitor the development and efficacy of these programs to ensure that these vital fisheries information programs are operating efficiently and are closely coordinated with the states within the next two years. Additionally, the agency should staff one or more recreational fisheries liaison positions to interact directly with the regulated community. Liaisons should report directly to the Regional Administrators and/or the Assistant Administrator for Fisheries.

Conclusion

MAFAC appreciates the opportunity to provide these views to the incoming leadership at NOAA and the Department, and we look forward to continuing our role of providing policy advice and perspective to the next administration. For additional information on the future of U.S. marine fisheries, copies of the MAFAC *Vision 2020* report are available on the web at:

http://www.nmfs.noaa.gov/ocs/documents/Vision_2020_FINAL-1.pdf

Vision 2020: The Future of U.S. Marine Fisheries

**Final Report
of the
Marine Fisheries Advisory Committee**



U.S. Department of Commerce
National Oceanic and Atmospheric Administration
December 2007

FOREWORD

The Marine Fisheries Advisory Committee (MAFAC) advises the Secretary of Commerce on all living marine resource matters under the purview of the Department of Commerce. MAFAC members evaluate and assess national programs, recommend priorities, and provide their views on future directions. MAFAC members have a wide range of expertise, including but not limited to, commercial and recreational fishing, aquaculture, seafood processing, seafood marketing and sales, consumer interests, coastal communities, and environmental advocacy. MAFAC was established in 1970 to serve as a federal advisory body, complying fully with the Federal Advisory Committee Act.

Introduction

In September 2006, the Assistant Administrator of NOAA's National Marine Fisheries Service (NMFS) asked the Marine Fisheries Advisory Committee (MAFAC) to prepare a report on the desired future state of U.S. Marine Fisheries. The specific request from the Assistant Administrator to MAFAC was "...to create, in clear, simple, non-jargon language, a stakeholders' consensus on the desired future state of domestic and international fisheries." This report is MAFAC's response. It is organized into three sections:

Section 1: Trends and their Impact on Marine Fisheries that provides context and reference points for comparison with the future;

Section 2: MAFAC Findings based on these trends; and

Section 3: Summary Recommendations regarding fulfillment of MAFAC's vision of the future of our Nation's marine fisheries.

Appendices detailing the rationale behind the recommendations complete the report.

Section 1: Trends and their Impact on Marine Fisheries

Marine fisheries have been, are, and will continue to be important to our Nation for a multitude of reasons. Marine fisheries provide employment and recreational opportunities as well as a food source. The passage of the Fishery Conservation and Management Act (FCMA) of 1976, P.L. 94-265,¹ (renamed in 1980 for the late Senator Warren Magnuson and in 1996 to include Senator Ted Stevens) and the establishment in 1983 of the exclusive economic zone (EEZ) ushered in a new era of federal fishery management. The United States has the largest EEZ in the world, 3.4 million square nautical miles. In addition, the United States' EEZ has a tremendous variety of fish stocks (in excess of 905 stocks²) and other living marine resources.

The dynamics of marine fish populations are affected indirectly by climate change, habitat availability, and water quality. They are also affected directly by human factors such as fishing and environmental degradation. Human fishing practices are affected by the dynamics of the marine ecosystem and fluctuations in fish abundance. Thus, a complex relationship exists between fish and fishermen that must be maintained to foster the existence of both. At the intersection of these complex interactions are fisheries managers who require high-quality observations and well supported predictions about species status and abundance. Accurate and precise biological, economic and social science data is required for management decisions. Presently, concerns arise if the biological, physical, social and economic data are deemed insufficient for managing marine fisheries sustainably.³ The goal of fisheries management is to assure sustainable

¹ The FCMA also created the eight regional fishery management councils.

² "Toward Rebuilding America's Marine Fisheries, Annual Report to Congress on the Status of U.S. Marine Fisheries 2006": <http://www.nmfs.noaa.gov/sfa/statusoffisheries/SOSmain.htm>

³ "An Ocean Blueprint for the 21st Century", U.S. Commission on Ocean Policy: http://www.oceancommission.gov/documents/full_color_rpt/welcome.html

marine fisheries. In the simplest sense, sustainable use of a resource means that the resource can be used indefinitely.

TREND: BASED ON STATUS OF STOCKS ASSESSMENTS, GLOBAL FISHERIES PRODUCTION WILL MOST LIKELY GROW SLOWLY, IF AT ALL, TO 2020.

Most assessments on the world-wide status of marine fisheries indicate that on a species by species level, most species considered have reached or are near maximum sustainable exploitation levels⁴. Thus, wild marine fisheries harvest which has peaked, at approximately 93 million tons per year on a worldwide basis⁵, should not be expected to grow significantly.

TREND: THE CONSUMER DEMAND FOR FISH AND SHELLFISH CONTINUES TO GROW.

At the same time that marine fisheries harvest has plateaued or peaked, global consumption of fish has doubled since 1973⁶. Countries with rapid population growth, rapid income growth and rapid urbanization tend to have the largest increase in consumption of animal products including fish. The developing world has seen such increases. Today, fish and shellfish on average provide 25 percent of protein consumption in developing countries and 13 percent in developed countries. China, where income growth and urbanization are major factors, dominates consumption of fish products.

TREND: SEAFOOD CONSUMPTION IS INCREASING IN THE U.S. ON A PER CAPITA BASIS.

In 2006, Americans consumed 16.5 pounds (edible weight) per person, up from 16.2 pounds per person in 2005 and 0.9 lb higher than the 10-year average. Records were set in 2006 for per capita consumption of fillets and steaks, and shrimp in all forms of preparation.⁷

TREND: CONSUMPTION, DOMESTIC AND WORLDWIDE, IS EXPECTED TO INCREASE AS THE HEALTH BENEFITS OF A DIET RICH IN SEAFOOD PROTEIN BECOME INCREASINGLY RECOGNIZED.⁸

This trend of a rising demand for seafood was recently confirmed by a panel at the annual meeting of the American Association for the Advancement of Science (AAAS). The panel further noted that demand will continue to exceed wild capture fisheries' ability to provide the fish meals demanded by consumers.

TREND: ALTHOUGH DOMESTIC WILD-CATCH FISH STOCKS ARE IMPROVING, DOMESTIC DEMAND FOR SAFE⁹ SEAFOOD WILL CONTINUE TO EXCEED DOMESTIC SUPPLY FROM WILD STOCKS. In the United States, the domestic wild-catch of edible products is approximately 3.5 million

⁴ "Review of the state of world marine fishery resources", FAO report, 2005.

<http://ftp.fao.org/docrep/fao/007/y5852e/y5852e00.pdf>

⁵ *Ibid.*

⁶ "Fish to 2020: Supply and Demand in Changing Global Markets", International Food Policy Research Institute Report, 2003. <http://www.ifpri.org/pubs/books/fish2020/oc44front.pdf>

⁷ "Fisheries of the U.S., 2006", NMFS Report, 2007. NMFS Current Fisheries Statistics No. 2006

⁸ 2006 Seafood and Health Conference "Seafood is a low-fat source of high quality protein and the health benefits of eating seafood make it one best choices for growing children, active adults and the elderly."

⁹ Seafood inspection and assurance of a safe product is becoming a more frequent domestic consumer concern. Congressional hearings and introduction of legislation reflect this growing interest.

mt¹⁰, while current U.S. supply of edible products including imports is more than 12.3 million mt. NOAA Fisheries Service statistics¹¹ reveal that more than 80 percent of our nation's fish stocks are already at sustainable levels (with some yearly variation). Even if all domestic fisheries were simultaneously managed to their long-term potential yield, total supply would be increased by only another 3.1 million mt.

TREND: THE CONTINUATION OF POLICIES THAT DO NOT ADDRESS OVERCAPACITY WILL PLAGUE BOTH THE DOMESTIC AND FOREIGN COMMERCIAL HARVESTING SECTORS. Excess fishing capacity (fishing capacity is the ability to catch fish or fishing power) and overcapitalization (capitalization, related to capacity, is the amount of capital invested in fishing vessels and gear) reduce the economic efficiency of fisheries and usually are precursors to overfishing. Overcapacity is difficult to manage indirectly, resulting in management regimes that encourage costly and unsafe race-to-fish competitions for limited fishery resources. In 2006, the U.S. fishing capacity of the existing fleet far exceeded the target catch level of many stocks of fish. This overcapacity has reduced economic efficiency and created a race for the fish. In addition, it has negatively impacted the economic livelihoods of many coastal communities dependent on marine fisheries. As harvesting costs continue to rise due to inflation and increasing energy and other business expenses, additional but necessary management restrictions could impact the economic viability of our coastal communities.

The Magnuson-Stevens Fishery Conservation and Management Reauthorization Act (MSRA) in 2006 provided new guidance on the use of Limited Access Privilege programs that directly address the fishery conservation and overcapacity reduction goals of the Nation. Additional new provisions mandating catch limits and catch accountability should improve fish stocks and enhance fishing opportunities.

TREND: THE MARINE RECREATIONAL FISHERY SECTOR WILL CONTINUE TO GROW AS OUR POPULATION GROWS, LIVES LONGER, AND HAS MORE LEISURE TIME. Recreational fishing continues to be one of the most popular outdoor sports. Anglers took nearly 93 million saltwater trips in 2005. The increased size of the recreational fishing population creates disputes over allocation of limited resources between commercial fishermen and recreational anglers, and even within different sectors of the recreational community. Technological innovations, however, will continue to assist the survival rate in catch and release fisheries.

TREND: THE CONTRIBUTION OF AQUACULTURE TO SUPPLY FISH, CRUSTACEANS, MOLLUSKS AND OTHER AQUATIC RESOURCES WILL CONTINUE TO GROW. Aquaculture will supply an increasing proportion of the world's seafood supply. Globally, aquaculture has increased from 3.9 percent of total fisheries production by weight in 1970 to 27.1 percent in 2000 and 43 percent in 2004.¹² Aquaculture continues to expand more rapidly than all other

¹⁰ "Fisheries of the U.S., 2006". *op. cit.*

¹¹ "Report on the Status of the U.S. Fisheries for 2006", NMFS annual Report to Congress, <http://www.nmfs.noaa.gov/sfa/statusoffisheries/SOSmain.htm#07>

¹² "State of world aquaculture, 2006", FAO Report, <http://www.fao.org/docrep/009/a0874e/a0874e00.htm>

FEDERAL ADVISORY COMMITTEE ACT

- (1) exercise control and supervision over the establishment, procedures, and accomplishments of advisory committees established by that agency;
- (2) assemble and maintain the reports, records, and other papers of any such committee during its existence; and
- (3) carry out, on behalf of that agency, the provisions of section 552 of Title 5, United States Code, with respect to such reports, records, and other papers.

§9. Establishment and purpose of advisory committees; publication in Federal Register; charter: filing, contents, copy

(a) No advisory committee shall be established unless such establishment is--

- (1) specifically authorized by statute or by the President; or
- (2) determined as a matter of formal record, by the head of the agency involved after consultation with the Administrator, with timely notice published in the Federal Register, to be in the public interest in connection with the performance of duties imposed on that agency by law.

(b) Unless otherwise specifically provided by statute or Presidential directive, advisory committees shall be utilized solely for advisory functions. Determinations of action to be taken and policy to be expressed with respect to matters upon which an advisory committee reports or makes recommendations shall be made solely by the President or an officer of the Federal Government.

(c) No advisory committee shall meet or take any action until an advisory committee charter has been filed with (1) the Administrator, in the case of Presidential advisory committees, or (2) with the head of the agency to whom any advisory committee reports and with the standing committees of the Senate and of the House of Representatives having legislative jurisdiction of such agency. Such charter shall contain the following information:

- (A) the committee's official designation;
- (B) the committee's objectives and the scope of its activity;
- (C) the period of time necessary for the committee to carry out its purposes;
- (D) the agency or official to whom the committee reports;
- (E) the agency responsible for providing the necessary support for the committee;
- (F) a description of the duties for which the committee is responsible, and, if such duties are not solely advisory, a specification of the authority for such functions;
- (G) the estimated annual operating costs in dollars and man-years for such committee;
- (H) the estimated number and frequency of committee meetings;
- (I) the committee's termination date, if less than two years from the date of the committee's establishment; and
- (J) the date the charter is filed.

A copy of any such charter shall also be furnished to the Library of Congress.

food-producing sectors. Worldwide, the sector has grown at an average rate of 8.8 percent per year since 1970, compared with only 1.2 percent for capture fisheries and 2.8 percent for terrestrial farmed meat production systems over the same period. Production from aquaculture has greatly outpaced population growth, with per capita supply from aquaculture increasing from 1.54 lb in 1970 to 15.6 lb in 2004, representing an average annual growth rate of 7.1 percent. Today, our domestic aquaculture industry provides 1.5 percent of the US seafood supply¹³. While foreign aquaculture production contributes to an ever increasing proportion of U.S. imports, particularly of shrimp, salmon, tilapia and a variety of bi-valves and mollusks. Total U.S. aquaculture production is about \$1 billion annually¹⁴ compared to worldwide aquaculture production of about \$70 billion annually. According to the UN Food and Agriculture Organization,¹⁵ global aquaculture production will need to double by the year 2030 to maintain current worldwide per capita consumption. An expanded U.S aquaculture industry can increase the production of fish and shellfish to meet increasing domestic and international demand, assist in fishery stock recovery via enhancement, and decrease the U.S. seafood trade deficit.

TREND: DEMANDS WILL INCREASE FOR ADDITIONAL DATA AND SCIENCE NECESSARY TO SUPPORT ECOSYSTEM-BASED MANAGEMENT. Humans are components of the ecosystems they inhabit and use. Their actions on land and in the oceans measurably affect ecosystems, and changes in ecosystems subsequently affect humans. Understanding and modeling this cycle of sustainability of fisheries and ecosystems at an acceptable level of certainty requires a much broader understanding of appropriate and effective science than has been encompassed by traditional, single-species fishery management. Ecosystem research and analyses will increasingly form the basis for new analytical models and assessments of the factors that influence ecosystem status, and predict environmental and social impacts of various management approaches. Using these tools, techniques, and ecosystem indicators, NOAA Fisheries and state and regional management partners will simultaneously be considering multiple objectives, identifying risk factors and uncertainty, and forecasting the cumulative environmental impact of policy choices.

TREND: IN THE FUTURE, INTERNATIONAL FISHERIES MANAGEMENT WILL HAVE A GREATER IMPACT ON THE STATUS OF FISHERIES STOCKS WORLDWIDE. The U.S. government and the U.S. fishing industry are actively involved in the operation of most of the international Regional Fishery Management Organizations (RFMOs). Many of the highly migratory species (HMS) caught by U.S. fishermen in the U.S. EEZ are also harvested in significant amounts by foreign fleets on the high seas. The U.S. government has responsibility to work with other nations to maintain healthy highly migratory and high seas stocks. Eliminating illegal, unregulated and unreported fishing practices is a global agenda. Multilateral policies, standards and guidance on achieving fisheries sustainability will be increasingly common and depend on consumer and market choices, and broader trade

¹³ Presentation by NOAA's Dr. Michael Rubino at February 2006 Aquaculture America Meeting: "Offshore Marine Aquaculture: Building on Policy, Technology and Research"

http://www.lib.noaa.gov/docaqu/presentations/aa_offshorepanel_files/rubino_aa_06.pdf

¹⁴ "NOAA Ten Year Plan for Marine Aquaculture", NOAA Aquaculture Plan: U.S. Department of Commerce, National Oceanic and Atmospheric Administration, October 2007.

http://aquaculture.noaa.gov/pdf/finalnoaa10yr_rweb.pdf

¹⁵ "State of world aquaculture, 2006", FAO Report *op. cit.*

and economic sanctions in addition to traditional negotiations to achieve desired fisheries management outcomes.

Section 2: MAFAC Findings

Considering the trends discussed above, the following findings and conclusions were reached:

1. Seafood demand will continue to exceed supply even if overfishing is eliminated, current environmental factors which adversely impact stock health and productivity are reversed, and the status of all our domestic wild stocks is optimal.
2. Domestic fisheries alone do not and are unlikely to meet America's demands for seafood.
3. Consumers must have confidence in the safety, quality, and labeling of seafood products worldwide.
4. Limited access privilege programs that protect the fishermen as well as the resource must be established where feasible as quickly as possible with extensive stakeholder input.
5. Recreational anglers will continue to increase in numbers and impact.
6. Sustainable, productive fish stocks and rationalized fisheries will be prerequisites to decrease allocation disputes between and among sectors.
7. The commercial and recreational fishing sectors will continue to play a major role in the economic viability of coastal communities
8. To meet the increasing demand for seafood products and to reduce our current trade deficit, a robust domestic aquaculture industry must be part of the future of U.S. marine fisheries.
9. Ecosystem-based management approaches will be a major part of the fishery decision-making process.
10. International fisheries will become more important in the future and the United States must continue to be engaged in international RFMOs.

Four recurring themes appeared in almost every analysis and discussion of issues.

1. Better data are necessary for management decisions. Every one of the issue areas examined requires more data, more timely data, and data of higher quality to achieve the outcomes desired for fisheries in 2020. In the absence of adequate data, wrong decisions or overly precautionary policies will have profound economic and environmental consequences. The current investment in data seems disproportionately low relative to the societal value of the resources under NOAA's stewardship. Fortunately one of NOAA's strengths is in its tremendous capacity for conducting scientific research and collecting data and information. Where this strength turns into value for the public is when the data and science are applied to management policies and decision making.
2. There are wide-spread opportunities to develop and adopt technology to assist in achieving the outcomes desired for 2020. Due to the scale and scope of the issues being addressed in fisheries, cost-effective solutions for 2020 will likely involve some form of

technology innovation. This will range from: engineering solutions that refine fishing gear selectivity; to improving the efficiency and success of aquaculture production; to adopting low-cost, modular, self-contained sensor packages that can be deployed in various environments to greatly increase sampling range and efficiency for research and monitoring of data required for ecosystem-based assessments. A focused look at internally and externally developed technology's potential role from a perspective other than a single discipline, line office or program point of view could result in substantial programmatic and cost breakthroughs.

3. Achievement of the Nation's ocean policies in 2020 must result from collaboration and partnerships across levels of government, sectors, and disciplines to advance the ecological, social, and security interests of present and future generations. NOAA must identify and promote opportunities that bring together different interests and expertise to communicate, coordinate, and collaborate on formulating sound environmental policies and sustainable ocean management. This will result in the vigorous exchange of science, engineering, technology and policy expertise both domestically and internationally.

4. To obtain these predicted benefits will require additional resources. Implementing the recommendations for 2020 described in this report will sustain current resource values and, through rebuilding and recovery, will significantly increase the value of our nation's living marine resources. U.S. marine fisheries (commercial, recreational and aquaculture) are an economic engine for the nation.¹⁶ There is a strong positive relationship between the public's interest in proper stewardship of our fisheries and the cost necessary for success. The return on investment for additional funding is high, readily supporting a business case for significantly increasing the nation's investment to satisfy the vision of safe seafood and efficient and sustainable fisheries in 2020.

Section 3: Summary Recommendations

MAFAC envisions a future with healthy, sustainable fish populations, a robust fishing and marine offshore aquaculture industry, ample recreational fishing opportunities, numerous, vibrant coastal fishing communities, and a safe and healthy seafood supply for the nation. To achieve this vision, the following recommendations are proposed. (More specific details and rationale for each are found in the Appendices of the report.)

Demand, Supply and Quality of Seafood Products

1. Public health benefits of seafood should continue to be researched, understood and communicated. NOAA should help educate consumers domestically and world-wide about the wide array of health benefits from aquatic foods. The goal is to empower the public to tailor their consumption decisions to individual health needs while reflecting accurate and informed conservation concerns.

¹⁶ With every one pound increase in U.S. fish and shellfish supply, \$2.41 in value is added to the U.S. Gross National Product. Non-consumptive and recreational uses contribute billions of dollars to the economy as well.

2. NOAA should seek both industry and government commitments worldwide to strengthen seafood safety programs, including cooperative efforts through the United Nations/World Health Organization's Codex Alimentarius (food code standards).
3. NOAA should support the federal government's continuation of free trade policies for seafood, and pursue elimination of tariff and non-tariff trade barriers through the World Trade Organization, bilateral and multilateral agreements.
4. Seafood safety and associated human health should be enhanced through improved NOAA enforcement, research, outreach and education, and NOAA should establish itself as an unequivocal source of unbiased peer-reviewed scientific information.

Commercial Fisheries

5. NOAA must achieve and maintain sustainable levels of stocks important to commercial fisheries.
6. NOAA must match fleet capacity with available, sustainable harvest.
7. Limited access privilege programs should be thoroughly analyzed for applicability in all fishery management plans for participants in the commercial and recreational sectors, with the goal of significantly increasing their use by 2020.
8. Commercial fishermen, processing businesses, trade associations and state and local government representatives working with NOAA Fisheries should seek ways to integrate wild stock production with aquaculture production to maximize the value of domestic seafood production and related industries, including, but not limited to efforts to develop "niche" markets for value added products and wild products. Integration of wild and farmed production can contribute to the development of a stable, year-round processing industry ensuring coastal community sustainability.
9. NOAA must work with states and coastal communities to ensure continued infrastructure necessary to support viable seafood industry along our coasts.

Recreational Fisheries

10. NOAA must achieve and maintain sustainable levels of stocks important to recreational fisheries.
11. Sale of recreationally-caught fish is a form of commerce and should be prohibited at state and federal levels. Improved recreational harvest data are essential and a recreational registry must be implemented and used.
12. Fishery management plans should include analyses of quota transfer between recreational and commercial sectors, and should incorporate market mechanisms where appropriate.
13. Efforts should be directed to enhance a conservation ethic and pride of a national resource amongst all fishery user groups.

Aquaculture

14. The development of a significant domestic, environmentally sound aquaculture industry is essential for the production of safe and healthy seafood, assisting in the rebuilding of depleted stocks, and providing employment opportunities in coastal communities.

15. National offshore aquaculture legislation providing a coordinated, cohesive and efficient regulatory process should be passed by Congress and implemented immediately.
16. The domestic aquaculture industry should receive financial and technical support similar to that available to the American agricultural industry.
17. Continuous, comprehensive monitoring of offshore aquaculture sites must be included to safeguard wild stocks and assure environmental impacts of facilities are insignificant.

Management

18. Coastal and ocean habitat protection must be a primary concern of fishery managers as a basic requirement for robust and sustainable fish stocks.
19. Ecosystem-based management, including assessments that integrate both habitat protection and multi-species interactions, should be the norm and not the exception for U.S. fisheries management.
20. Cooperative management efforts among states, regional management authorities and federal managers should be maintained and enhanced as a basis for sound domestic fisheries management.
21. Stock status and catch data must be accessible to all stakeholders and provide the information needed to make informed management decisions.
22. Subsistence fishing is recognized as an important source of protein for rural and native communities. However it needs to be included in the calculation of total catch with an efficient, comprehensive, and uniform data collection method.
23. The United States should exert strong leadership in the international forums that manage fish stocks beyond countries' Exclusive Economic Zones.
24. The U.S. government must exert every influence possible aimed at maintaining healthy highly migratory species stocks and barring IUU fish from entering the global market place.

Appendices II-VI of this report contain individual papers prepared by MAFAC members categorized under the following headers: Demand, Supply and Quality of Seafood Products; Commercial Fishing; Recreational Fishing; Aquaculture; and Management. These papers provide more details in support of the conclusions and recommendations noted above. Each paper was prepared using a standard template and reviewed by a MAFAC Vision2020 work group, the Committee as a whole, and circulated for public review.

APPENDICES

APPENDIX I. PREPARATION OF REPORT

In September 2006, the Assistant Administrator of NOAA's National Marine Fisheries Service (NMFS) asked MAFAC to prepare a report on the desired future state of U.S. Marine Fisheries. The specific request from the Assistant Administrator to MAFAC was "to create, in clear, simple, non-jargon language, a stakeholders' consensus on the desired future state of domestic and international fisheries."

To meet this request, MAFAC formed a subcommittee composed of MAFAC members to draft a concept paper of what should be included in such a report. The concept paper was circulated and input was received from all MAFAC members regarding a long list of topics to be considered. In December 2006, a MAFAC writing group met in New York to categorize the input received. After review and consideration, the committee organized the input into four subject categories. The committee circulated their proposal to the full committee and the concept and categories were unanimously accepted, and a draft report was subsequently prepared.

The draft report was a major agenda item of the June 2007 MAFAC meeting. By the end of the meeting, MAFAC had reached a consensus on the contents of the report. In August the draft report was transmitted to NMFS, and to receive stakeholder input the report was placed by MAFAC on a dedicated website [Fish2020](#) for review. At the December 2007 MAFAC meeting all MAFAC members reviewed the public input and collectively revised the report to reflect the accepted comments. This final report reflects the input of all MAFAC members as well as input from various stakeholders.

APPENDIX II - DEMAND, SUPPLY AND QUALITY OF SEAFOOD PRODUCTS

Issue Statement 1: Demand for fish and seafood continues to increase both domestically and worldwide due to population growth, growth of income and growing recognition of the health benefits of a seafood rich diet.

Background: Given the projected population growth worldwide over the next two decades, it is estimated that at least an additional 40 million tons of aquatic food will be required by 2030 to maintain the current per capita consumption¹⁷ Research is expanding our understanding of the health benefits of a diet rich in seafood¹⁸. If research continues in the same direction, it will likely raise per capita consumption around the world creating an even larger demand for seafood.

Current Situation: Americans consumed a record 16.6 pounds of seafood per capita in 2004 and health professionals are encouraging a doubling of the recommended amount to two 6 oz. seafood meals per week. Globally, consumer demand for fish and shellfish continues to climb, especially in affluent, developed countries which in 2004 imported 33 million tons of aquatic food worth over \$61 billion.

Preferred State in 2020: Consumers worldwide have adequate supplies of sustainable seafood to satisfy demand for health and nutritional benefits, which are economically affordable and meet personal preferences.

Proposed Actions to Accomplish Preferred State: (a) Educate consumers domestically and worldwide on the health and nutritional benefits of seafood;
(b) Continue free trade policies and pursue elimination of non-tariff trade barriers through World Trade Organization, bilateral and multilateral agreements.

Proposed Entity(s) to Promote Action: (a) Department of Commerce's NOAA Fisheries Service and Foreign Commercial Service; (b) U.S. Department of Agriculture's (USDA) Foreign Agriculture Service; (c) Department of Health and Human Services (HHS), National Institutes of Health (NIH) and the Food and Drug Administration (FDA); (d) the private sector; and (e) consumers.

Issue Statement 2: The public is concerned regarding the safety of aquatic foods due to chemical and biological hazards. The public lacks the necessary understanding of the relative risks versus health benefits of a diet rich in seafood.

Background: Seafood causes food borne illness worldwide due to both naturally occurring and handling/processing induced pathogens, toxins and chemical

¹⁷ "State of world aquaculture, 2006", FAO Report: *op. cit.*

¹⁸ See for example web sites of Seafood and Health Alliance <http://www.seafoodandhealth.org/> and National Seafood Educators <http://www.seafoodeducators.com/home.html>

contamination. Seafood safety programs (both public and private) may be inadequate in many countries; yet the U.S. imports over 70 percent of the fish and shellfish consumed domestically. Research over the past 25 years has identified major health benefits of seafood consumption causing health officials to encourage greater consumption (e.g., Americans should double their current seafood consumption levels). However, increases in demand domestically and/or worldwide basis, will place additional stress on seafood safety programs as well as wild capture fisheries.

Current Situation: Seafood safety remains of paramount importance to consumers and public health officials, yet strong seafood safety programs in which the consumer has confidence are lacking.

Preferred State in 2020: Consumers are confident in the safety of both domestic and imported fish and seafood products due to improvements in public and private standards and inspection infrastructure worldwide. Furthermore, more consumers are taking advantage of the health benefits of seafood through increased consumption.

Proposed Actions to Accomplish Preferred State: Effective seafood safety programs, coupled with great consumer education on the health benefits of a diet rich in seafood products, would be a beneficial for health and economic reasons. Both industry and governments worldwide need to strengthen food safety programs, including cooperative efforts through the United Nations/World Health Organization's Codex Alimentarius (food code standard). Consumers are informed about the wide array of health benefits from aquatic foods and empowered to tailor their consumption decisions to individual health needs.

Proposed Entity(s) to Promote Actions: Congress would need to appropriate additional funds at a minimum to strengthen the seafood safety and inspection program. The Administration entities include: (a) NOAA Fisheries; (b) HHS's FDA, NIH and Centers for Disease Control; (c) USDA's Food and Nutrition Service; and (d) the private sector.

APPENDIX III. COMMERCIAL FISHING

The U.S. commercial fishing industry depends upon the long-term sustainability of fishery resources and their ecosystems. Contributing over 35 billion dollars to the Gross National Product, the fishing industry provides an important food source for the nation, creates over 65,000 jobs¹⁹, and affords a traditional way of life for many coastal communities. The U.S. is the world's fifth largest fishing nation and its fleet of approximately 23,000 vessels roams all of the world's oceans. Commercial fishermen nationwide have seen profound changes over time in stock abundance, markets, the stakeholder process, and management of the resource. MAFAC members identified the following four issues to be considered for the future of the commercial fishing community.

Issue Statement 1: Our Nation's fisheries need to be managed to meet sustainable fishery goals, but even if fully achieved they are unable to meet domestic demands for many fish products.

Background: Some marine fisheries continue to be under stress from overexploitation, habitat degradation, or both. Various factors, both natural and human-related, affect the status of fish stocks and their ecosystems. Such factors include: environmental changes, pressure from commercial fishing effort, and loss of habitat.

The long term potential yield of the fisheries within the U. S. EEZ is estimated to be 8.1 million tons per year²⁰. However, to reach and harvest sustainably at this level, current efforts to rebuild stocks must be extended to all overfished stocks and rebuilding completed. Efforts to reduce bycatch must be increased. To help meet demand, by-catch and unaccounted mortality will need to be continually reduced to help meet conservation goals. Harvest and landings data need to be improved to account for all mortality. In addition, the current domestic fishing fleet capacity exceeds what is necessary to obtain the target catch level for most fisheries. Fisheries must be rationalized to assure sustainability and protect the fishermen by elimination "the race for the fish." All these measures will be required to approach the long-term potential yield by 2020.

Current Situation: Three principal strategies that are available to or used by fishery managers to manage fishery yields are: regulating fishing effort, restoring habitats, and increasing recruitment. The first two methods are the basis for currently managing our fisheries. Recent landings of U.S. commercial and recreational fisheries are still only slightly more than 60 percent of the long term potential yield. Current management measures are designed to maintain sustainable fisheries stocks, to rebuild depleted stocks to meet the potential long term yield and consumer's demand for fish products.

¹⁹ "Fisheries of the U.S.,2006". *op. cit.*

²⁰ "Our Living Oceans: Report on the Status of U.S. Living Marine Resources, 1999", NOAA Report, <http://spo.nwr.noaa.gov/olo99.htm>

Preferred state in 2020:

- (a) Our Nation's fisheries are actively being rebuilt and are at or approaching sustainable conservation goals.
- (b) Technological advancements and market demands have resulted in reductions in undesired bycatch and in increased use of marketable underutilized species.
- (c) Our U.S. fisheries are close to achieving long term potential yield.
- (d) Coastal commercial infrastructures is maintained or enhanced to support sustainable fisheries and communities.

Proposed Actions:

- (a) NOAA Fisheries should consider the role of underutilized species to meet current domestic demand after considering biological, ecological, socioeconomic and technological implications.
- (b) Incentives or market development should occur only when research is completed.
- (c) Rebuild all depleted stocks by 2020.
- (d) Data used for managing marine fisheries must be relevant, reliable, timely, and have stakeholders' confidence.

Issue Statement 2: Some international Regional Fisheries Management Organizations (RFMOs) fail to implement necessary conservation measures to ensure maintenance of healthy stocks, thus reducing the total amount of seafood available to the nation's population.

Background: Many commercial stocks, such as tuna, are highly migratory species which spend most of their life in the open ocean. They are harvested by U.S. commercial and recreational fishermen and by foreign fishing fleets. Although the United States has management authority for several HMS species, most are managed cooperatively by Regional Fisheries Management Organizations (RFMOs).

Current Situation: The performance of RFMOs is uneven, with regard to effective management of stocks under their jurisdiction. This unevenness impacts the U.S. in several ways. First, because the U.S. imports a significant amount of seafood, any mismanagement of stocks on the high seas will ultimately reduce the amount of seafood available for American consumers. Second, because consumers often do not distinguish between poorly managed fisheries overseas and well managed fisheries in the U.S., domestic fishing companies and fishermen can be unfairly accused of inadequate commitment to sustainability. Finally, U.S. fishermen frequently are required to significantly reduce harvests without similar measures being adhered to by foreign fishing fleets. Total harvest reductions are necessary to effectively improve the health of these stocks. The United Nations and the RFMOs themselves are considering means to make the international management of highly migratory fish stocks more effective.

Preferred State in 2020: All fisheries, domestic and international, are effectively managed to sustain long term optimum yields.

Proposed Actions: The U.S. government provides assistance to RFMOs to promote sustainable stocks using available political, economic and other strategic tools to ensure other countries follow the recommendations of RFMO scientific staff.

Issue Statement 3: Overcapitalization has been and continues to be a serious concern in a number of U.S. fisheries. Too many fishermen racing for too few fish has resulted in more restrictive, highly complex and often ineffective management regimes. The race for fish, coupled with other factors has increased operating costs. The result has been lower net economic returns in a number of commercial fisheries.

Background: U.S. commercial landings were relatively stable at about 3 million tons per year from 1935 to 1977 when the U.S. extended its jurisdiction to 200 miles. With the passage of the Fishery Conservation and Management Act in 1976 and other policies, the federal government provided incentives to rehabilitate and expand the domestic fishing fleets. These incentives took two forms: open access management which allowed unrestricted entry to the fisheries, and a number of direct and indirect subsidies to the fishing industry. The goal of these incentives was to ensure full domestic utilization. Since 1977, landings have more than doubled. However, for many fisheries fishing effort grew more rapidly than was sustainable, resulting in overcapacity and in some cases overfishing.

Current Situation: Today, fisheries managers utilize a number of “command and control” management measures to control fishing effort such as limits on fishing days, gear restrictions and trip limits. In addition, most fisheries have some form of limited access. Increasingly managers and fishermen alike are looking at other ways to more effectively reduce and manage fishing capacity including buyback programs, permit stacking programs and limited access privilege programs with assignable fishing privileges.

Preferred state in 2020: By 2020 we will have reached the goal of rebuilding sustainable fish populations while maintaining productivity and biodiversity. This will result in increased biomass, providing greater harvesting and processing opportunities for domestic fisheries and increased supply to consumers. Fishing capacity will be at a level to both efficiently and sustainably harvest domestic fisheries and provide greater economic returns to participants and fishery-dependent communities. Limited access privilege programs (LAPPs) will be in place in most applicable U.S. fisheries, providing market mechanisms to match capacity with available harvest levels.

Proposed Actions:

- (a) Commercial fishing interests and other stakeholders should work with regional fishery management councils and NOAA Fisheries to develop regionally-appropriate plans to:
 - (1) Reduce overcapitalization; and
 - (2) Match fishing capacity to sustainable harvest levels through the use of LAPPs, industry buyback programs and other appropriate mechanisms.
- (b) NOAA should play a leadership role by at least tripling the number of fisheries under LAPP management by 2020.

Issue Statement 4: Technology offers a myriad of benefits to fishermen, some of which have significant environmental benefits. In many cases, technology can complement and enhance federal conservation and management goals and objectives.

Background: Many commercial fishermen utilize increasingly sophisticated technology during fishing operations. Electronic equipment common in the wheelhouse today includes state of the art sonar equipment to locate target species, computer logbooks and electronic net sensors. Enhanced sonar capability promotes selective fishing and increases operational efficiencies, including fuel efficiency. Onboard computer logbooks are an important reference tool providing historical catch information and can allow for real-time reporting. Electronic net sensors deployed with the gear can provide important data on proximity to the ocean floor, net profile and the filling rate of fish in the cod end. Each of these technological applications can enhance operational efficiencies and conservation objectives through cleaner fishing and minimizing fishing gear impacts on the environment.

In addition, in recent years many fishery management plans have mandated the use of vessel monitoring systems (VMS) as a management tool. VMS, or onboard satellite tracking systems, provides managers increased flexibility in developing management measures that can be adequately monitored and enforced.

Current Situation: In recent years, cooperative research involving NOAA Fisheries, the fishing industry, universities and the private sector has produced fishing gear innovations to increase retention of target species, minimize bycatch of non-target species and reduce impact of fishing gear on ocean habitat. The projects are numerous and ongoing, such as: turtle excluder devices (TEDs) in shrimp trawls, chain modifications to reduce flatfish bycatch in the scallop fishery, modified footropes to reduce bottom contact, and technologies to deter seabirds from taking baited fish hooks. Technological innovation is critical in enabling U.S. fishermen to increase efficiency while enhancing selective fishing practices which minimize ocean habitat impacts.

Preferred state in 2020: By 2020 advances in technology will not only result in more sophisticated products, but also the application of the technology can be used for scientific purposes as well as commercial purposes. Advances in gear and monitoring technologies can help obtain information to improve management, reduce bycatch and minimize habitat impacts caused by fishing. NOAA Fisheries is able to increase its efforts to assist in projects that outfit fishing vessels with acoustic equipment that enhances stock assessment capabilities. Also, programs that equip fishing vessels with ocean monitoring equipment is greatly expanded. NOAA's overall science program will be significantly enhanced by utilizing alternative industry research platforms. NOAA Fisheries should continue to place a high priority on expanding its cooperative research program.

Proposed Actions: Actions necessary to achieve the goal of employing state-of-the-art technology in commercial fishing operations to enhance efficiency and promote conservation of living marine resources include: (a) Technology research and

development to create more environmentally friendly fishing gear and practices. These designs would improve the performance of fishing gear to help reduce bycatch and minimize habitat impacts, and support additional data collection programs that enhance management, stock assessments and ocean monitoring.

(b) NOAA Fisheries and the commercial fishing industry should continue to develop industry partnerships such as its Cooperative Research Programs and Bycatch Reduction Engineering Programs.

reassign the under harvested quota to provide additional recreational opportunity, and vice versa.

Proposed Actions to Accomplish Preferred State:

- (a) Improve collection of recreational catch, release, and harvest data,
- (b) Create and use the recreational angler registry.
- (c) Continue to promote catch and release fisheries,
- (d) Reduce daily bag limits and implement minimum or maximum size limits when necessary for those fish stocks where resorting to total catch and release is not necessary,
- (e) Promote research to accurately quantify and minimize post release mortality,
- (f) Increase the length of seasonal closures when necessary and encourage the recreational community to maximize the profitability of open seasons,
- (g) Amend fishery management plans to allow for timely conversion of unused commercial allocation to the recreational sector and vice versa;
- (h) Implement a variety of programs and incentives to enhance the conservation ethic of recreational anglers.

Proposed Entity(s) to Promote Actions:

- (a) The leadership of the recreational fishing community should promote the total recreational fishing experience, instill a conservation ethic, and de-emphasize landings.
- (b) Industry and NOAA Fisheries should continue to support research and technology designed to reduce post release mortality.
- (c) Management (councils, commissions, NOAA Fisheries) should consider extending closed seasons to reduce mortality.
- (d) Management, (councils, commissions, NOAA Fisheries), should amend fishery management plans to allow, when appropriate, the conversion of commercial quota onto recreational quota and vice versa.

APPENDIX IV: RECREATIONAL FISHING

Issue Statement 1: Growth in populations and coastal tourism are resulting in increasing numbers of recreational fishermen. Therefore, the impact these fishermen are having on fish stocks is increasing. As this demand for recreational fishing continues to increase, recreational fishermen will request increases in fish allocated to the recreational sector.

Background: According to a NOAA report²¹, an estimated 153 million people lived in coastal counties in 2003. This population represents an increase of 33 million people or 28 percent from 1980. In addition, a review of NOAA sponsored Marine Recreational Fisheries Statistical Survey data from the years 1981 to 2005 shows a near doubling nationally of marine recreational anglers from 6.9 million to 11.2 million or a growth rate of approximately 3 percent per year. The value of recreational fishing as an economic engine for coastal communities should be recognized and exploited to a greater degree. The recreational fishing experience could rival or exceed recreational fishing catch as a prime motivator for recreational fishing.

Current Situation: The current rate of increase in the angling population creates new management concerns. If the rate of recreational fishermen continues to increase at 3 percent per annum, by 2020 the number of recreational fishermen will increase by 7.3 million to a projected level of 18.5 million. This change will result in a significant increase of fishing effort and catch (i.e., mortality), all else equal. By 2020 continued growth in recreational angling will require that anglers focus more on the fishing experience and less on the number of fish landed. However, while post-release mortality in catch and release fisheries is usually low (often 2-5 percent), as fishing effort increases, post-release mortality will become an increasing proportion of total mortality. It is conceivable that the cumulative total of post-release mortality could increase to levels equal to the total allowable mortality for a fishery. As the number of recreational fishermen continues to increase, improved monitoring will be necessary to assess the fishing effort and catch. A national saltwater angler's registry under development will be a necessary tool to collect data.

Preferred State in 2020: Many recreational species have limited population growth rates and are too valuable to be caught only once. By 2020, catch and release fishing is emphasized and accounted for in specific species assessments. The proper techniques for release are refined and disseminated to lower post release mortality. For other fisheries, minimum size limits and reduced daily bag limits are sufficient management measures to maintain healthy standing stocks. Additional seasonal closures are considered to eliminate or redirect effort. By 2020, angler satisfaction is derived from the recreational fishing experience rather than the take or "kill" fish. To achieve optimum yield, adaptive management measures such as a temporary reallocation of quota is available to managers. For example, if commercial quota is not harvested, managers are able to temporarily

²¹ "Population Trends along the Coastal United States: 1980-2008", 2005 NOAA report, <http://marineeconomics.noaa.gov/socioeconomics/assessment/population.html#Download>

APPENDIX V. AQUACULTURE IN THE UNITED STATES

In 2004, the U.S. Commission on Ocean Policy²² expressed concern about America's seafood trade deficit and noted the increasing importance of aquaculture products in seafood trade. It noted also that new developments in technology made aquaculture possible in the open waters of much of the U.S. Exclusive Economic Zone (EEZ), where it might now be done on a large enough scale to make a meaningful impact on the trade deficit. Accordingly, it directed NOAA to develop a comprehensive, environmentally sound permitting and regulatory program for marine aquaculture in the EEZ, to which NOAA responded with a 10-year Marine Aquaculture Plan²³ and a proposal for the **National Offshore Aquaculture Act of 2007**.

Issue Statement 1: Growth of American marine and offshore aquaculture should be supported by government and facilitated by providing a coordinated and efficient regulatory system and sufficient funds to achieve this goal.

Background: Development of marine aquaculture in the U.S. is hampered by confusing or overlapping laws, regulations and jurisdictions. Aquaculture operations in offshore waters lack a clear, timely and efficient regulatory regime, and questions about exclusive access have created an environment of uncertainty that is detrimental to investment in this industry²⁴.

Current Situation: The U.S. has not yet developed the necessary policies for locating, (siting), conducting, and monitoring offshore aquaculture operations. A new governance framework is necessary if offshore aquaculture is to succeed²⁵.

Aquaculture expansion is supported by the U.S. government, but there is public concern about environmental impacts including possible pollution, escapes, competition with wild fish, disease transmission and food safety. This concern has been heightened by misinformation about aquaculture in the news media²⁶.

Global supply of seafood from wild-caught stocks has plateaued, while demand continues to increase. Aquaculture now provides 43 percent of the world's seafood. Nutritionists encourage Americans to double their present consumption of seafood to benefit their health.

Preferred State in 2020:

(a) A mature statutory framework will exist for the efficient development of aquaculture in the U.S. EEZ, which protects both the environment and private aquaculture property

²² "An Ocean Blueprint for the 21st Century", *op. cit.*

²³ NOAA Aquaculture Plan *op. cit.*

²⁴ "An Ocean Blueprint for the 21st Century" *Ibid.*

²⁵ "Recommendations for an Operational Framework for Offshore Aquaculture in U.S. Federal Waters." Cicin-Sain, B. et al., 2005

²⁶ "State of world aquaculture, 2006", FAO Report, *op. cit.*

rights, and provides traceability in the market to protect against the substitution of illegally taken wild stocks.

(b) States will have developed comprehensive nearshore aquaculture plans with technical assistance from NOAA using funds provided by section 309 of the Coastal Zone Management Act. These state plans will protect existing nearshore aquaculture from adverse effects of coastal development and will identify and preserve areas with good potential for future aquaculture development. They will also provide coordinated and efficient regulation.

(c) Aquaculture will be recognized an instrument of national food security policy and will be validated by appropriate incentives and a business climate that encourages good aquaculture practice.

(d) Consumers and the public will be accurately informed about aquaculture and will support sound public policy on its behalf

Proposed Actions: Both statutory and regulatory actions are necessary for a robust domestic marine aquaculture industry by 2020.

Statutory actions:

(a) Develop and codify a statutory framework for marine aquaculture in the U.S. EEZ. Perfect, as needed, the statutory framework for marine-offshore aquaculture.

(b) Identify NOAA as the lead federal agency for all offshore marine aquaculture.

(c) Develop economic policies that encourage environmentally sound and economically viable marine aquaculture, include exploring options to promote community and fisherman entry into aquaculture through the use of specific access privileges, cooperatives, and other statutory or regulatory changes

(d) In addition, modify current financial assistance and development programs at the state and federal level to facilitate creation of aquaculture operations similar to the support received by the agriculture industries.

(e) Authorize regional pilot projects involving commercial fishing families to provide a mechanism for fishermen's involvement as well as an educational and outreach tool.

Regulatory actions:

(a) Encourage states to utilize CZMA section 309 funds to accomplish comprehensive planning for aquaculture development in the territorial sea.

(b) Provide sufficient financial support for research and development on all aspects of marine aquaculture including evaluation of best management practices to minimize ecosystem impacts.

(c) Consider establishment of aquaculture zones within the EEZ which would reduce the burden on applicants to submit *new* applications for every proposed project.

(d) Promote outreach and education to enhance public understanding of marine aquaculture.

(e) A Programmatic Environmental Impact Statement (PEIS) for aquaculture projects should consider cataloguing local species and habitat; identifying potential risks to sensitive habitats, fish and wildlife; review of potential wastes, chemicals, and biological pollutants and the anticipated ramifications for local fish and wildlife populations; relevant information on marine ecosystems from the use of feeds; design and placement

of aquaculture facilities and expected impact; and expected effect on the human environment including impacts on small businesses and coastal communities.

Proposed Entity(s) to Promote Actions:

- (a) Congress for statutory actions with input from the Executive Branch and the public (including industry interests).
- (b) State authorities responsible for implementing the Coastal Zone Management Act for coordinating the development of comprehensive aquaculture plans with CZMA 309 funding.
- (c) Executive Branch, primarily through NOAA and the Joint Subcommittee on Aquaculture, for regulatory actions with input from the industry, the public, the regional fishery councils, fisheries commissions, and the coastal states.

APPENDIX VI: MANAGEMENT

Based on the current trend, ecosystem-based approaches to management will be the norm and not the exception by 2020. The ecosystem-based management approach is defined as management that is adaptive, geographically specified, takes account of ecosystem knowledge and uncertainties, considers multiple external influences, and strives to balance diverse societal objectives. An ecosystem-based approach to management is incremental and collaborative since the authorities for ecosystem management are distributed across many levels of government, and management requires participation of many different stakeholder groups in public and private sectors.

Ecosystem-based management approaches must be based on high quality, reliable scientific data. For ecosystem-based management to succeed, a significant expansion in the type and quantity of data collected and analyzed must occur. Furthermore, timely accessibility by managers to these new and different kinds of high quality data is critical to success. It is essential to initiate new data collection programs, particularly those utilizing advanced technology, and to expand and improve existing data collection and delivery programs. MAFAC members identified the following issues to be considered when discussing management tools for the future.

Issue Statement 1: Place-based management approaches are gaining acceptance in dealing with a variety of ocean use issues, including protection of unique habitat, location of industrial and scientific research facilities, and conservation and management of living marine resources.

Various state and federal regulatory agencies and private sector interests will become more involved. Traditional fisheries management entities need to recognize the addition of these new and in some cases influential broad based stakeholders.

Background: Marine Managed Areas (MMAs), an example of place-based marine resource management, have been proven an effective tool to supplement traditional management techniques. Examples include seasonal fisheries closures, Marine Protected Areas (MPA's), and No-Transit Zones.

Current Situation: In progress: Number of MPA's and results. Allocations and mitigations/conflicts expected.

Preferred State in 2020: Unique habitats, essential fish or marine mammal critical habitats, and rare marine ecosystems are protected with MMA's developed with stakeholder advice and support.

Proposed Actions: (a) Place-based management must be better coordinated within NOAA.

(b) If Marine Managed Areas involving living marine resources are designated, they should be based on the best scientific information available.

(c) Criteria for assessing the costs and benefits of closing an area must be identified, assessed and considered before a decision is made.

(d) The area should be monitored. A timetable should be established for review of the closed area's performance that is consistent with the purposes of the closed area.

Proposed Entity(s) to Promote Actions: (a) NOAA Fisheries should champion place-based management in partnership with NGOs, fishermen and other marine resource stakeholders.

Issue Statement 2: Technology plays a vital role in ecosystem-based marine resource conservation and management and in the development of responsible aquaculture practices. Continued improvements in technology will further enhance sustainable marine resource management efforts.

Background and Current Situation:

Technology is integral to NOAA Fisheries' science program, and it plays a significant role in the agency's enforcement and monitoring efforts. Here are some examples of how technology is currently being utilized.

- Satellite imaging assists ocean observation and is an increasingly important tool for assessing fish and marine mammal stocks, identifying "bycatch hotspots," and mapping sensitive habitat.
- In the Alaska region, scientists attach satellite transmitters to marine mammals to collect information on diving patterns. This data is then used to determine the animals' foraging and migratory characteristics, and it assists managers in developing conservation and management measures designed to minimize competition for prey between marine mammals and fishing activities.
- Vessel Monitoring Systems (VMS) employ electronic transmitters on fishing vessels. These transmitters relay information about a vessel's location via satellite. VMS is used not only to enforce management area closures, but is utilized on the west coast for depth-based management for commercial and recreational groundfish fishing.
- Satellite communications assist in fisheries monitoring and enforcement. Federal fishery observers communicate vessel catch data to a central data base on a daily or weekly basis, and this catch accounting is essential to ensure that total allowable catch levels are not exceeded. Also, video monitoring through mounted on-deck cameras is being studied as an alternative to placing observers onboard vessels.
- Work is continuing on state-of-the-art acoustic technology to improve fishery survey work, which is a key component of stock assessment. In fact, NOAA has launched two new research vessels that are among the most technologically advanced research vessels in the world to replace the aging vessels in its fleet, and two more research vessels are under construction.

Preferred State in 2020: NOAA will be utilizing technology to increase dramatically our understanding of the ocean environment, protect and conserve marine resources and provide direct and measurable benefits for the fishing community.

(a) In conjunction with other federal agencies and non-federal partners, NOAA will have implemented an integrated ocean observing system (IOOS), including the placement of biophysical moorings that perform myriad tasks. IOOS systems provide continuous, real-time observations that include acoustic readings that help determine fish and marine mammal migrations and optical technologies that help monitor ecosystem health.

(b) Research in life history, stock structure, brood-stock considerations, spawning, rearing and release of juveniles and ecological concerns will have advanced such that stock enhancement, using hatchery reared juveniles to supplement wild production, is a widespread viable management tool to be considered for rebuilding depleted marine stocks. Research and development of stock enhancement should have expanded such that by 2020 the U.S. can take a role in developing international guidelines and standards. U.S. efforts should have proceeded on a regional basis with a focus on stocks that most greatly impact current and future fisheries management and harvest.

(c) NOAA will be employing Geographic Information System (GIS) tools throughout the country for further improving ecosystem-based management. GIS software allows for visual representation of important ecosystem attributes in map form. Mapping has a number of effective applications for marine resource management, including identifying bycatch hotspots.

(d) NOAA scientists will be routinely utilizing acoustic technology to characterize the seabed. Historically, the process for learning more about seabed composition (a critical aspect of the marine habitat) required removal of core samples. This work technology will also be in place serving NOAA's hydrographic survey mission, working across scientific disciplines to use acoustic technology to perform both habitat research and navigational chart updates.

(e) NOAA Fisheries will be widely employing autonomous underwater vehicles (AUVs), or Seagliders, to enhance its science program. Seagliders are small, free-swimming vehicles that are extremely energy efficient and can be deployed for months at a time. Working jointly with university scientists, NOAA will routinely employ Seagliders to record oceanographic measurements traditionally collected by research vessels, but at much less expense.

Proposed Actions: (a) Both Congress and NOAA Fisheries should place a priority on applying technological innovations to strengthen science and management programs within the agency.

(b) Future administrations of NOAA should continue the emphasis placed by the current administration on intra-agency and inter-agency coordination of science and technology programs. NOAA's future leadership should also continue to seek partnerships with universities as well as other entities engaged in marine research.

(c) Congress must adequately fund NOAA Fisheries' science and technology programs, recognizing that ecosystem-based management objectives, including an enhanced

understanding of the ocean environment, cannot be achieved without investments in technological innovations.

Proposed Entity(s) to Promote Actions: Congress, NOAA leadership, academia.

Issue Statement 3: Allocation disputes currently confound the management of many fisheries. Councils often are faced with making difficult allocation decisions with little scientific information to guide these decisions. Councils should have the option to use assignable fishing rights to resolve allocation issues between commercial and recreational sectors, and within sectors.

Background: Allocation of fisheries between and among sectors has historically been done through political forces exerted on councils or Congress; this has often been a difficult and contentious process. Where assignable fishing rights have been created, market forces rather than regulations have determined fishery entry and exit decisions. Some allocation issues, including those between commercial and recreational fishermen, could be better resolved through limited access privilege programs (LAPs) and all councils should evaluate these mechanisms available to them.

Current State: Individual Transferable Quotas (ITQs) and harvesting cooperatives have enabled industry to consolidate, and provided a mechanism to allocate fisheries to those placing the highest values on the fishery (willing to pay the most). To date these tools have only been deployed in commercial sectors. Acceptance of rights based approaches varies among regions, with strong positions held on both sides.

ITQs are successfully in place on all three coasts of the U.S. Although the North Pacific Fisheries Management Council has successfully implemented ITQs programs for several of its commercial fisheries, the first attempt to implement ITQs for the for-hire halibut sector failed after more than six years of work, due to resistance from the recreational community. Concerns include ability to outbid the commercial sector, ability to pay off their shares, and the potential for migration of recreational shares into the commercial sector. The lack of accurate catch histories complicates initial allocation. Given the proven political clout of the recreational sector, many see it easier and cheaper to compete for allocation through the political process of the councils and Congress, rather than risk allowing market forces to play out.

Preferred State in 2020:

- (a) LAPs are widely used in both commercial and recreational sectors to provide the right incentives, address overcapacity and address allocation issues within the sectors and across the sectors.
- (b) Reliable catch reporting systems are in place to support stock assessments, fisheries management, and allocation decisions.

Proposed Action:

- (a) NMFS needs to work with councils to deploy the new assignable rights authority contained in the MSRA.
- (b) Proactive involvement by NMFS with councils during the development stage will help ensure adherence to required processes and standards, resulting in approvable plans.
- (c) Continue efforts to promote the value of assignable rights based approaches and publicize success stories in cooperation with the councils.

Proposed Entity(s) to Promote Actions: NMFS, councils, commercial and recreational organizations and other interested stakeholders.

FEDERAL ADVISORY COMMITTEE ACT

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5 U.S.C. app.

As Amended

§1. Short title

This Act may be cited as the "Federal Advisory Committee Act Amendments."

§2. Findings and purpose

(a) The Congress finds that there are numerous committees, boards, commissions, councils, and similar groups which have been established to advise officers and agencies in the executive branch of the Federal Government and that they are frequently a useful and beneficial means of furnishing expert advice, ideas, and diverse opinions to the Federal Government.

(b) The Congress further finds and declares that--

- (1) the need for many existing advisory committees has not been adequately reviewed;
- (2) new advisory committees should be established only when they are determined to be essential and their number should be kept to the minimum necessary;
- (3) advisory committees should be terminated when they are no longer carrying out the purposes for which they were established;
- (4) standards and uniform procedures should govern the establishment, operation, administration, and duration of advisory committees;
- (5) the Congress and the public should be kept informed with respect to the number, purpose, membership, activities, and cost of advisory committees; and
- (6) the function of advisory committees should be advisory only, and that all matters under their consideration should be determined, in accordance with law, by the official, agency, or officer involved.

§3. Definitions

For the purpose of this Act--

- (1) The term "Administrator" means the Administrator of General Services.
- (2) The term "advisory committee" means any committee, board, commission, council, conference, panel, task force, or other similar group, or any subcommittee or other subgroup thereof (hereafter in this paragraph referred to as "committee"), which is--
 - (A) established by statute or reorganization plan, or
 - (B) established or utilized by the President, or
 - (C) established or utilized by one or more agencies,

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in the interest of obtaining advice or recommendations for the President or one or more agencies or officers of the Federal Government, except that such term excludes (i) any committee that is composed wholly of full-time, or permanent part-time, officers or employees of the Federal Government, and (ii) any committee that is created by the National Academy of Sciences or the National Academy of Public Administration.

(3) The term "agency" has the same meaning as in section 551(1) of Title 5, United States Code.

(4) The term "Presidential advisory committee" means an advisory committee which advises the President.

§4. Applicability; restrictions

(a) The provisions of this Act or of any rule, order, or regulation promulgated under this Act shall apply to each advisory committee except to the extent that any Act of Congress establishing any such advisory committee specifically provides otherwise.

(b) Nothing in this Act shall be construed to apply to any advisory committee established or utilized by--

(1) the Central Intelligence Agency; or

(2) the Federal Reserve System.

(c) Nothing in this Act shall be construed to apply to any local civic group whose primary function is that of rendering a public service with respect to a Federal program, or any State or local committee, council, board, commission, or similar group established to advise or make recommendations to State or local officials or agencies.

§5. Responsibilities of Congressional committees; review; guidelines

(a) In the exercise of its legislative review function, each standing committee of the Senate and the House of Representatives shall make a continuing review of the activities of each advisory committee under its jurisdiction to determine whether such advisory committee should be abolished or merged with any other advisory committee, whether the responsibilities of such advisory committee should be revised, and whether such advisory committee performs a necessary function not already being performed. Each such standing committee shall take appropriate action to obtain the enactment of legislation necessary to carry out the purpose of this subsection.

(b) In considering legislation establishing, or authorizing the establishment of any advisory committee, each standing committee of the Senate and of the House of Representatives shall determine, and report such determination to the Senate or to the House of Representatives, as the case may be, whether the functions of the proposed advisory committee are being or could be performed by one or more agencies or by an advisory committee already in existence, or by enlarging the mandate of an existing advisory committee. Any such legislation shall--

(1) contain a clearly defined purpose for the advisory committee;

(2) require the membership of the advisory committee to be fairly balanced in terms of the points of view represented and the functions to be performed by the advisory committee;

(3) contain appropriate provisions to assure that the advice and recommendations of the advisory committee will not be inappropriately influenced by the appointing authority or by any special interest, but will instead be the result of the advisory committee's independent judgment;

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(4) contain provisions dealing with authorization of appropriations, the date for submission of reports (if any), the duration of the advisory committee, and the publication of reports and other materials, to the extent that the standing committee determines the provisions of section 10 of this Act to be inadequate; and

(5) contain provisions which will assure that the advisory committee will have adequate staff (either supplied by an agency or employed by it), will be provided adequate quarters, and will have funds available to meet its other necessary expenses.

(c) To the extent they are applicable, the guidelines set out in subsection (b) of this section shall be followed by the President, agency heads, or other Federal officials in creating an advisory committee.

§6. Responsibilities of the President; report to Congress; annual report to Congress; exclusion

(a) The President may delegate responsibility for evaluating and taking action, where appropriate, with respect to all public recommendations made to him by Presidential advisory committees.

(b) Within one year after a Presidential advisory committee has submitted a public report to the President, the President or his delegate shall make a report to the Congress stating either his proposals for action or his reasons for inaction, with respect to the recommendations contained in the public report.

(c) [Annual report] Repealed by the Federal Reports Elimination and Sunset Act of 1995, Pub. L. No. 104-66, § 3003, 109 Stat. 707, 734-36 (1995), amended by Pub. L. No. 106-113, § 236, 113 Stat. 1501, 1501A-302 (1999) (changing effective date to May 15, 2000).

§7. Responsibilities of the Administrator of General Services; Committee Management Secretariat, establishment; review; recommendations to President and Congress; agency cooperation; performance guidelines; uniform pay guidelines; travel expenses; expense recommendations

(a) The Administrator shall establish and maintain within the General Services Administration a Committee Management Secretariat, which shall be responsible for all matters relating to advisory committees.

(b) The Administrator shall, immediately after October 6, 1972, institute a comprehensive review of the activities and responsibilities of each advisory committee to determine--

(1) whether such committee is carrying out its purpose;

(2) whether, consistent with the provisions of applicable statutes, the responsibilities assigned to it should be revised;

(3) whether it should be merged with other advisory committees; or

(4) whether it should be abolished.

The Administrator may from time to time request such information as he deems necessary to carry out his functions under this subsection. Upon the completion of the Administrator's review he shall make recommendations to the President and to either the agency head or the Congress with respect to action he believes should be taken. Thereafter, the Administrator shall carry out a similar review annually. Agency heads shall cooperate with the Administrator in making the reviews required by this subsection.

(c) The Administrator shall prescribe administrative guidelines and management controls applicable to advisory committees, and, to the maximum extent feasible, provide advice, assistance, and guidance to advisory committees to improve their performance. In carrying out his functions under

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this subsection, the Administrator shall consider the recommendations of each agency head with respect to means of improving the performance of advisory committees whose duties are related to such agency.

(d)(1) The Administrator, after study and consultation with the Director of the Office of Personnel Management, shall establish guidelines with respect to uniform fair rates of pay for comparable services of members, staffs, and consultants of advisory committees in a manner which gives appropriate recognition to the responsibilities and qualifications required and other relevant factors. Such regulations shall provide that--

(A) no member of any advisory committee or of the staff of any advisory committee shall receive compensation at a rate in excess of the rate specified for GS-18 of the General Schedule under section 5332 of Title 5, United States Code;

(B) such members, while engaged in the performance of their duties away from their homes or regular places of business, may be allowed travel expenses, including per diem in lieu of subsistence, as authorized by section 5703 of Title 5, United States Code, for persons employed intermittently in the Government service; and

(C) such members--

(i) who are blind or deaf or who otherwise qualify as handicapped individuals (within the meaning of section 501 of the Rehabilitation Act of 1973 (29 U.S.C. §794)), and

(ii) who do not otherwise qualify for assistance under section 3102 of Title 5, United States Code, by reason of being an employee of an agency (within the meaning of section 3102(a)(1) of such Title 5),

may be provided services pursuant to section 3102 of such Title 5 while in performance of their advisory committee duties.

(2) Nothing in this subsection shall prevent--

(A) an individual who (without regard to his service with an advisory committee) is a full-time employee of the United States, or

(B) an individual who immediately before his service with an advisory committee was such an employee,

from receiving compensation at the rate at which he otherwise would be compensated (or was compensated) as a full-time employee of the United States.

(e) The Administrator shall include in budget recommendations a summary of the amounts he deems necessary for the expenses of advisory committees, including the expenses for publication of reports where appropriate.

§8. Responsibilities of agency heads; Advisory Committee Management Officer, designation

(a) Each agency head shall establish uniform administrative guidelines and management controls for advisory committees established by that agency, which shall be consistent with directives of the Administrator under section 7 and section 10. Each agency shall maintain systematic information on the nature, functions, and operations of each advisory committee within its jurisdiction.

(b) The head of each agency which has an advisory committee shall designate an Advisory Committee Management Officer who shall--

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§10. Advisory committee procedures; meetings; notice, publication in Federal Register; regulations; minutes; certification; annual report; Federal officer or employee, attendance

(a)(1) Each advisory committee meeting shall be open to the public.

(2) Except when the President determines otherwise for reasons of national security, timely notice of each such meeting shall be published in the Federal Register, and the Administrator shall prescribe regulations to provide for other types of public notice to insure that all interested persons are notified of such meeting prior thereto.

(3) Interested persons shall be permitted to attend, appear before, or file statements with any advisory committee, subject to such reasonable rules or regulations as the Administrator may prescribe.

(b) Subject to section 552 of Title 5, United States Code, the records, reports, transcripts, minutes, appendixes, working papers, drafts, studies, agenda, or other documents which were made available to or prepared for or by each advisory committee shall be available for public inspection and copying at a single location in the offices of the advisory committee or the agency to which the advisory committee reports until the advisory committee ceases to exist.

(c) Detailed minutes of each meeting of each advisory committee shall be kept and shall contain a record of the persons present, a complete and accurate description of matters discussed and conclusions reached, and copies of all reports received, issued, or approved by the advisory committee. The accuracy of all minutes shall be certified to by the chairman of the advisory committee.

(d) Subsections (a)(1) and (a)(3) of this section shall not apply to any portion of an advisory committee meeting where the President, or the head of the agency to which the advisory committee reports, determines that such portion of such meeting may be closed to the public in accordance with subsection (c) of section 552b of Title 5, United States Code. Any such determination shall be in writing and shall contain the reasons for such determination. If such a determination is made, the advisory committee shall issue a report at least annually setting forth a summary of its activities and such related matters as would be informative to the public consistent with the policy of section 552(b) of Title 5, United States Code.

(e) There shall be designated an officer or employee of the Federal Government to chair or attend each meeting of each advisory committee. The officer or employee so designated is authorized, whenever he determines it to be in the public interest, to adjourn any such meeting. No advisory committee shall conduct any meeting in the absence of that officer or employee.

(f) Advisory committees shall not hold any meetings except at the call of, or with the advance approval of, a designated officer or employee of the Federal Government, and in the case of advisory committees (other than Presidential advisory committees), with an agenda approved by such officer or employee.

§11. Availability of transcripts; "agency proceeding"

(a) Except where prohibited by contractual agreements entered into prior to the effective date of this Act, agencies and advisory committees shall make available to any person, at actual cost of duplication, copies of transcripts of agency proceedings or advisory committee meetings.

(b) As used in this section "agency proceeding" means any proceeding as defined in section 551(12) of Title 5, United States Code.

§12. Fiscal and administrative provisions; record-keeping; audit; agency support services

(a) Each agency shall keep records as will fully disclose the disposition of any funds which may be at the disposal of its advisory committees and the nature and extent of their activities. The

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General Services Administration, or such other agency as the President may designate, shall maintain financial records with respect to Presidential advisory committees. The Comptroller General of the United States, or any of his authorized representatives, shall have access, for the purpose of audit and examination, to any such records.

(b) Each agency shall be responsible for providing support services for each advisory committee established by or reporting to it unless the establishing authority provides otherwise. Where any such advisory committee reports to more than one agency, only one agency shall be responsible for support services at any one time. In the case of Presidential advisory committees, such services may be provided by the General Services Administration.

§13. Responsibilities of Library of Congress; reports and background papers; depository

Subject to section 552 of Title 5, United States Code, the Administrator shall provide for the filing with the Library of Congress of at least eight copies of each report made by every advisory committee and, where appropriate, background papers prepared by consultants. The Librarian of Congress shall establish a depository for such reports and papers where they shall be available to public inspection and use.

§14. Termination of advisory committees; renewal; continuation

(a)(1) Each advisory committee which is in existence on the effective date of this Act shall terminate not later than the expiration of the two-year period following such effective date unless--

(A) in the case of an advisory committee established by the President or an officer of the Federal Government, such advisory committee is renewed by the President or that officer by appropriate action prior to the expiration of such two-year period; or

(B) in the case of an advisory committee established by an Act of Congress, its duration is otherwise provided for by law.

(2) Each advisory committee established after such effective date shall terminate not later than the expiration of the two-year period beginning on the date of its establishment unless--

(A) in the case of an advisory committee established by the President or an officer of the Federal Government such advisory committee is renewed by the President or such officer by appropriate action prior to the end of such period; or

(B) in the case of an advisory committee established by an Act of Congress, its duration is otherwise provided for by law.

(b)(1) Upon the renewal of any advisory committee, such advisory committee shall file a charter in accordance with section 9(c).

(2) Any advisory committee established by an Act of Congress shall file a charter in accordance with such section upon the expiration of each successive two-year period following the date of enactment of the Act establishing such advisory committee.

(3) No advisory committee required under this subsection to file a charter shall take any action (other than preparation and filing of such charter) prior to the date on which such charter is filed.

(c) Any advisory committee which is renewed by the President or any officer of the Federal Government may be continued only for successive two-year periods by appropriate action taken by the President or such officer prior to the date on which such advisory committee would otherwise terminate.

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§15. Requirements relating to the National Academy of Sciences and the National Academy of Public Administration

(a) In General- An agency may not use any advice or recommendation provided by the National Academy of Sciences or National Academy of Public Administration that was developed by use of a committee created by that academy under an agreement with an agency, unless--

(1) the committee was not subject to any actual management or control by an agency or an officer of the Federal Government;

(2) in the case of a committee created after the date of the enactment of the Federal Advisory Committee Act Amendments of 1997, the membership of the committee was appointed in accordance with the requirements described in subsection (b)(1); and

(3) in developing the advice or recommendations, the academy complied with--

(A) subsection (b)(2) through (6), in the case of any advice or recommendation provided by the National Academy of Sciences; or

(B) subsection (b)(2) and (5), in the case of any advice or recommendation provided by the National Academy of Public Administration.

(b) Requirements- The requirements referred to in subsection (a) are as follows:

(1) The Academy shall determine and provide public notice of the names and brief biographies of individuals that the Academy appoints or intends to appoint to serve on the committee. The Academy shall determine and provide a reasonable opportunity for the public to comment on such appointments before they are made or, if the Academy determines such prior comment is not practicable, in the period immediately following the appointments. The Academy shall make its best efforts to ensure that (A) no individual appointed to serve on the committee has a conflict of interest that is relevant to the functions to be performed, unless such conflict is promptly and publicly disclosed and the Academy determines that the conflict is unavoidable, (B) the committee membership is fairly balanced as determined by the Academy to be appropriate for the functions to be performed, and (C) the final report of the Academy will be the result of the Academy's independent judgment. The Academy shall require that individuals that the Academy appoints or intends to appoint to serve on the committee inform the Academy of the individual's conflicts of interest that are relevant to the functions to be performed.

(2) The Academy shall determine and provide public notice of committee meetings that will be open to the public.

(3) The Academy shall ensure that meetings of the committee to gather data from individuals who are not officials, agents, or employees of the Academy are open to the public, unless the Academy determines that a meeting would disclose matters described in section 552(b) of Title 5, United States Code. The Academy shall make available to the public, at reasonable charge if appropriate, written materials presented to the committee by individuals who are not officials, agents, or employees of the Academy, unless the Academy determines that making material available would disclose matters described in that section.

(4) The Academy shall make available to the public as soon as practicable, at reasonable charge if appropriate, a brief summary of any committee meeting that is not a data gathering meeting, unless the Academy determines that the summary would disclose matters described in section 552(b) Title 5, United States Code. The summary shall identify the committee members present, the topics discussed, materials made available to the committee, and such other matters that the Academy determines should be included.

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(5) The Academy shall make available to the public its final report, at reasonable charge if appropriate, unless the Academy determines that the report would disclose matters described in section 552(b) of Title 5, United States Code. If the Academy determines that the report would disclose matters described in that section, the Academy shall make public an abbreviated version of the report that does not disclose those matters.

(6) After publication of the final report, the Academy shall make publicly available the names of the principal reviewers who reviewed the report in draft form and who are not officials, agents, or employees of the Academy.

(c) Regulations- The Administrator of General Services may issue regulations implementing this section.

§16. Effective Date

Except as provided in section 7(b), this Act shall become effective upon the expiration of ninety days following October 6, 1972.

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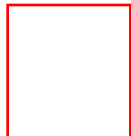
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