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## NOAA 2007 ANNUAL GUIDANCE MEMORANDUM

The NOAA Strategic Plan articulates our vision and path for the future. Each year, however, we must look at progress along that path and determine where to place our emphasis. By adjusting our focus to take into account new and emerging events, we can modify our activities over the next several years to ensure our ability to accomplish strategic goals. This Annual Guidance Memorandum (AGM) sets priorities for Fiscal Year (FY) 2007 through 2011. It is a guide for transforming our plans into programs, a means for setting fiscal priorities, and an aid for deciding where our resources are best spent to achieve our goals. The AGM summarizes the internal and external environment in the Context section, identifies significant high priority areas to be addressed during this period under Future Directions, recognizes key Enablers essential to meet these Future Directions, and speaks to our commitment to partnerships to meet societal needs in the Approach. This document is not intended to address all NOAA activities. The AGM, along with the Strategic Plan, is a prime driver for defining the NOAA Program for FY 2007-2011, which will comprehensively address NOAA's full suite of activities.

### CONTEXT

FY 2007 marks the 200<sup>th</sup> birthday of the oldest component of NOAA, the Coast Survey, underscoring the point that the Nation's commerce is intertwined with the effectiveness and safety of US marine, air, and surface transportation systems. It also serves to remind us that many of the elements of NOAA, such as the Weather Bureau and the Bureau of Commercial Fisheries, were established early in the Nation's history, each to meet emerging national economic and social needs. Since then, the Nation's interests and economy have become increasingly interwoven with the marine and atmospheric environment, leading eventually to the formation of NOAA as a means for consolidating national efforts in these areas.

During this period society will need improved information on marine ecosystems, water resources, climate, and weather. Challenges associated with competing needs for limited natural resources, a growing population, and continued tight fiscal resources will require the best information services to support our national infrastructure including our transportation system. At the same time, it has become increasingly clear that oceanic and atmospheric systems are influenced by the same forces that shape the national

economy – globalization, advances in technology, new delivery systems, modern science, and the need to respond to changing and growing consumer demand. This has led to a number of new requirements and opportunities over the past few years.

- The report of the US Commission on Ocean Policy (USCOP) will be finalized in fall 2004. This report is significant for NOAA, as it touches every element of our work. It will call for NOAA to take a strong national and international leadership role on coastal and ocean issues. We accept this challenge and will be working to shape the national response over the coming months.
- FY 2007 marks the beginning of the International Polar Year (IPY 2007-2008), which “is envisioned as an intense, internationally coordinated campaign of research that will initiate the dawn of a new era in polar science”. We currently do not understand the role the poles play in issues relating to weather, water, climate, and living marine resources. NOAA has long-term capabilities in polar research, but we must use this opportunity to lead and leverage the IPY to understand the Polar Regions better.
- Needs for water, climate, and air quality information are increasing worldwide. As a lead agency for climate research, we must assume responsibility for many Climate Change Science Program (CCSP) deliverables, which are aimed at national and international policies. On a regional level, the Western Governors’ Association, in its approval of the National Integrated Drought Information System (NIDIS) report, endorsed a strong role for NOAA in providing a drought early warning system. Our successes in meeting critical air quality needs further demand that we expand and improve services.

These and other developments, such as meetings of the Group on Earth Observations, which have given rise to the Global Environmental Observing System of Systems (GEOSS), and the completion of the NOAA Research Review Team Report, which has underscored the importance of research to our mission and provided recommendations to strengthen that role in NOAA, give us cause to evaluate where we are and adjust our heading as needed. We must have the agility to respond to emerging needs as we continue to provide services vital to the Nation. We must provide national and international leadership to develop a comprehensive earth observing system, enhance our analytical and forecasting capabilities, conduct short and long-term research, engage our partners to improve the information, services, and products delivered to society, and work to foster stewardship of our Nation’s coastal and marine resources

## **FUTURE DIRECTIONS**

### **Taking the Pulse of the Planet – Integrate Global Observations**

Within the GEOSS framework, we must provide leadership to develop and implement national interagency systems. The Integrated Ocean Observing System (IOOS) must be developed as a major component of the US contribution to GEOSS. Our contribution to IOOS should focus on connecting and strengthening existing observing systems and developing new techniques and measurements to improve spatial, temporal, and spectral

density. At the same time, we must sustain existing critical capabilities, while improving the quality and broadening the application of our observations. We must be certain that we transform, enhance, and combine living marine resource surveys and other coastal monitoring programs to form an ecosystem component of GEOSS, designed to support management decisions, monitor our performance, and contribute to research. We should diversify our observations to make the most efficient use of existing and new survey vessels and other platforms and we should leverage platforms for multi-purpose observations.

We must make use of our analysis capabilities to ensure that the data we collect are optimal in number, accuracy, and distribution. Internally, we must connect NOAA's observing systems and data on the atmosphere, the oceans, Earth's surface, living marine resources, and space environment into a cohesive, adaptive, and accessible system, and we must employ a consistent data management strategy that facilitates data discovery and access for our users. We must move new but proven observing systems into an operational environment and redirect associated resources and research toward exploring new technologies, such as unmanned aerial vehicles, to meet future requirements. We must ensure the continuity of NOAA observations and improve how we get data into our laboratories, add value through quality control and processing, and provide useful information to decision makers and the public. By 2011 we must have in place an integrated observing and data management system that ensures data flow from sensors through model output to our customers. This system must also have the capacity to handle the large volumes of data associated with GEOSS. Growth of such a system should be characterized by solutions with NOAA-wide applicability.

### **Advance NOAA's Modeling Capability**

We must develop a world-class environmental modeling capability and a commensurate high-performance computing infrastructure. Our model approach must strive to meet all of NOAA's needs, ranging from research to operations, and must address issues relating to estuaries, oceans, weather, and climate change. It must be extendable to ecosystems as science matures and it must be commensurate with increasing data inputs from GEOSS, providing the best assessments and predictions about the future of the planet and its ecosystems. This requires an increased emphasis on developing and applying advanced data assimilation techniques to use in-situ and remotely sensed data in prediction models. It requires more computational power to increase temporal and spatial resolution of our forecast models down to urban scales, where demand for vital services is greatest. Resolution should be enhanced to improve local and regional benefits. We must actively continue to foster and strengthen our partnerships with the research community to improve our models and accelerate the transition of research into operations.

### **Provide Leadership for the Oceans**

By 2011, we should be able to forecast routinely the extent and impact of critical ecosystem events, such as harmful algal blooms, and the effects of human activities, such as those of noise on protected species. Through our observing efforts, we anticipate

increasing by 25% the number of protected, at-risk, and major commercial species stocks that we assess, while continuing our lead role in monitoring, management, and conservation of known populations and protected areas. We envision using NOAA information and services for the development of active regional forums that establish national capabilities for fostering improved ecological sustainability, and that maintain balance among competing uses of coastal, marine, and Great Lakes ecosystems.

To meet these challenges, we must be at the forefront in developing and implementing an ecosystems approach to management that is geographically specific, incorporates science, involves partners, addresses broader ocean issues, and is adaptive. We should perform a systems analysis with respect to our desired outputs to guide our efforts. We must continue to strengthen local and regional partnerships and improve existing regional coordination across NOAA and with other federal agencies, so that management activities at all levels flow from NOAA's ecosystem approach. If done correctly, this will result in the adoption of mutual goals and shared solutions to improve the regional services we deliver.

To put forecasts based on predictive models for our ecosystems into operation by 2011, we must consolidate and strengthen our investments in research and development that will produce an understanding of ecosystem function. In the near term, we must develop and implement a research agenda that includes indicators of ecosystem health and assessments of ecological and socioeconomic risk and benefit. This will require that we continue to expand monitoring and assessment of the ecological and environmental condition of regional ecosystems. We need to develop and advance geographic information systems (GIS) and other decision support tools to provide coastal and marine managers with the ability to consider multiple management alternatives. We must create environmental standards and appropriate monitoring and evaluation protocols that will set a new commercial code of conduct for marine aquaculture. We must continue to meet our mandate to rebuild and sustain fishery stocks, while improving the condition of other components of the ecosystems, including strengthening recovery planning for protected species and improving water quality. We must enhance the numerous social and economic benefits of coastal and marine ecosystems by fully implementing NOAA's conservation and restoration responsibilities. . .

## **Increase Climate Information, Services, and Products**

We must continue to improve our understanding of climate and we must continue to deliver climate-related products and services to support policy and management decisions. In 2007 NOAA will be the lead agency for a number of critical reports and recommendations on climate, including identifying the role of aerosols in climate change, analyzing the climate system, evaluating climate extremes and their impacts, studying the vulnerability to abrupt climate change, and producing climate projections for various emission scenarios. The year 2007 marks the completion of the Fourth Assessment for the Intergovernmental Panel on Climate Change (IPCC) and initiation of work on the research products for the Fifth Assessment that will take place during 2007-2011. The IPCC Assessments have prominent NOAA participation, including the leadership of

Working Group 1 (The Physical Basis of Climate Change). Support for these national and international priorities requires long-term research, process-oriented research, and observations that are essential as we provide accurate, relevant, and useful tools for society.

There is a paramount need to provide a transition from research to products and services that provide useful information for national and regional management decisions. In areas such as fire management, agriculture, water resource management, marine ecosystems, public health, coastal impacts, and air quality, we should continue to build on established climate prediction capabilities and focus on delivering specific regional and local climate services at all time scales that are relevant to decision makers and provide value to economic sectors sensitive to climate variability. We should continue to develop an early warning capability to predict climate extremes. The test-bed concept should be developed for facilities, models, and experimental products to provide a vehicle for this transition. Our participation in the implementation of the International Polar Year program during 2007-2008 and beyond is particularly important given the changes already observed in the Arctic.

### **Provide Critical Information for Water Resources**

Water managers across the Nation are experiencing freshwater shortages, particularly in the West. Coastal water resources are continually stressed as populations rise, and, as highlighted by the USCOP, coastal water quality is a growing concern. To meet these challenges, additional information on freshwater and estuary transition zones is required by decision-makers. By 2011 a comprehensive suite of water resource information and predictions should support our focus on ecosystem-based management by linking hydrologic and ecological models. We must provide national leadership, foster innovative partnerships, and support collaborative research to ensure successful development and implementation of such a comprehensive framework for the delivery of water resources information. This framework should include NIDIS and should provide an Internet portal of easily comprehended and standardized products. Improved short-term stream flow and long-term water supply predictions from NOAA's Advanced Hydrologic Prediction Service must be augmented by high-resolution forecasts of soil moisture, ground water, snow pack, and reservoir levels. This information will support the commercial development of on-demand risk analysis tools for managing scarce water resources and mitigating impacts of drought.

Our research and development enterprise and operational service delivery infrastructure must be better integrated and leveraged with other federal water agency activities to form the basis of a national backbone water information system. We must acquire, assimilate, and manage water quality monitoring data and deliver an innovative suite of timely, valuable products for water managers and the public. This enhanced capability to monitor, analyze, and predict water quantity and quality will allow us to predict water conditions for the oceans, Great Lakes, coasts, and contributing watersheds. It will also allow us to assess the related ecosystem impacts on living marine resources, human activities, and regional economies.

## **Support the US Transportation Systems**

We must continue to increase and improve the number and quality of products and services that contribute directly to the effectiveness and safety of the Nation's marine, aviation, and surface transportation systems. It is critical that we identify validated user needs that cannot be met with existing information and work with our partners to determine how to best meet these needs. Many of the NOAA observing systems directly support the Nation's multi-mode transportation framework, upon which human safety, environmental health, and our national economy depend. We must work with our public and private partners to conduct research and development in weather and geo-positioning to reduce the number of transportation-related fatalities and injuries, the variability in travel time, and the economic losses associated with weather-related inefficiencies in the transportation system. We also must develop new and expanded partnerships to improve the translation of research into operational value for users of the US transportation system and we must work to improve our ability to obtain and derive products from our observations for all modes of transportation. Through all of these efforts, we must address safety, efficiency, and security risks associated with transportation "choke points".

## **Enhance Environmental Literacy**

Efforts in all NOAA mission goals require involvement of the public both as contributors and users of NOAA information and services and as stewards of the environment. To improve the value of these interactions, we need to develop a cohesive program to promote environmental literacy that is built on existing and newly developed capabilities in education and outreach. Partnerships with education institutions and other entities such as the news media are paramount to success in this area. The foundation for this vision will be established in FY 2007 through sustainable education activities, enhanced partnerships with informal education entities, increased participation by underrepresented groups, evaluation of existing NOAA education materials, expansion of teacher professional development efforts, increased learning opportunities for students, improved collaboration with researchers, increased fellowship and internship opportunities, and increased coordination with other federal agencies.

## **Deliver Effective, Efficient Decision-Support Information**

NOAA provides products and services, such as those for weather, climate, charting, and stewardship, that are vital to the safety, health, and welfare of our society. We must strive to provide the highest value to taxpayers by ensuring that our operations maximize the contribution of science and technology to guarantee the highest quality, most efficiently delivered services.

Integrated information services delivery is a long-term NOAA objective. Efforts in this area are underway today with a regional focus, and will continue in FY 2005 and FY

2006, accelerate in FY 2007, and require concerted effort for years to come. We must investigate, develop, and expand the use of new technologies in data management and information systems, especially GIS, to accelerate the development and implementation of appropriate NOAA products and services and to integrate these services in ways that are meaningful to our customers. Integration of NOAA information across disciplines and across NOAA organizational elements will be driven by customer needs. We should provide products, services, and prediction capabilities that deliver specific regional and local environmental information at all time scales that are relevant to decision-makers. To maintain efficiency, operational concepts must be reviewed and opportunities for efficiencies periodically identified.

## **ENABLERS**

### **Enhance Skills and Capabilities of NOAA's Workforce**

Premier NOAA workforce performance is critical to meet the outcomes established within the Strategic Plan. Between 2007 and 2011, NOAA faces a “people” crisis. By 2007, 50% of our workforce will be eligible to retire. Emerging and rapidly changing science and technologies will demand an agile and flexible workforce. New strategies and business practices require new knowledge and skills. We will address these challenges by implementing a comprehensive plan for strategic workforce planning and analysis that includes identifying emerging competency requirements and formulating strategies designed to meet these requirements. We will build a corporate infrastructure to support this plan using internal and external partnerships. To provide a robust institutional knowledge, we must work toward increasing productivity and retention of our workforce through comprehensive learning programs, a culture of inclusiveness, and a focus on developing leadership and management skills.

### **Improve Administrative Programs**

We should continue to adopt best practices in all areas of administrative function to develop and defend budgets better, relate financial data to program performance, provide integrated planning and management across the agency, and support necessary process re-engineering. Because of the primary importance of administrative, financial and other corporate services to achieve each and all of our strategic outcomes, we must provide the human and financial resources needed to carry out these functions efficiently and effectively in support of NOAA programs nation-wide

### **Maintain and Provide Necessary Platforms**

A variety of platforms, including ships, aircraft, satellites, ground-based observing stations, and building facilities must function optimally to maximize our ability to accomplish our mission. We must build new observation platforms and facilities, provide necessary maintenance for those in existence, upgrade and replace equipment as needed,

train personnel to use and operate these platforms and facilities safely, and comply with environmental safety and health requirements at all NOAA facilities. We anticipate having at least four new survey vessels and three NPOESS satellites placed into operation between 2007 and 2011.

## **Improve Critical Infrastructure and Services**

We should immediately develop effective capabilities to deal with increasingly sophisticated and proliferating cyber threats. All NOAA programs require robust, secure, and efficient information technologies (IT) to meet mission goals, outcomes, and performance measures. All programs and activities must be compliant with applicable Department of Commerce (DOC) and NOAA IT security policies. Priority must be given to those NOAA IT systems categorized as “national critical” functions. We will support the Department of Homeland Security’s Federal Emergency Management Agency through NOAA Weather Radio, with its ability to provide “all-hazard” alerts, and with other applicable NOAA hazard alert and warning dissemination systems. To guarantee the availability of NOAA’s critical functions during a national emergency or a homeland security incident, we must meet all federal and DOC requirements for continuity of operations plans, including offsite backups for applicable systems and periodic drills.

## **Advance the Use of Technology**

Many of our priorities such as data management and communication for observing systems, advanced GIS for decision support tools, increased sensor resolution for our platforms, and improved accuracy and type of forecasts require the application of new technologies. By 2011, we must have a culture, process, and systems approach that can plan for and seamlessly apply new technologies to realize our goals. Part of this approach will require test beds that rapidly evaluate new technologies needed to improve products and services. The impact of our new and existing operations, products, and services must be sustained by considering the changes in technology over time. However, they must remain compatible with the evolving needs and means of the external community. We should capitalize on technologies readily available in the commercial and government marketplace. We must be aware of our niche in the technological environment, both as a provider and a user of innovation, and we must be dynamic participants within this environment.



## THE APPROACH

### “Meeting our priorities through effective partnerships”

We depend strongly on our partners at local, state, national, and international levels in acquiring, developing, and distributing vital information, conducting essential research, and providing services needed by society. We must work with international institutions, state and federal agencies, tribes, local and regional governments, non-governmental organizations, educational institutions, and private businesses in all that we do, not only to succeed in providing information or delivering products and services, but also to ensure that agency, national, and international goals are achieved. In doing so we also must focus on clearly identifying NOAA's core role and mission relative to other international organizations, federal and state agencies, universities, and private sector associates. This includes maintaining our commitment to significant funding of extramural research, it involves defining roles in place-based management systems, and it requires close interaction with national and international organizations in addressing broad, global issues. We will assure a reliable federal foundation for our cooperative efforts. This includes reliable and timely information, effective service delivery, continuity of record, and a common resource that our myriad partners can count on. No successful, societal response to environmental or ecological stress has ever been accomplished by a single agency or organization. Success requires the interaction, cooperation, and feedback that come only if all involved work together to achieve these goals. We are committed to working with partners at all levels to leverage our capabilities and provide the best for society in matters of the environment, the economy, and public safety.