

## TERMS OF REFERENCE

### Options for Developing a National Climate Service

Climate variability and change have a profound influence on the nation's and world's economic prosperity, human health, national security, and ecosystem services. Increasing impacts of a changing climate demonstrate the critical need to develop and communicate actionable information and provide services to support adaptation decisions. Societal demands for climate information to support decision-making have increased dramatically over the past decade and continue to grow. Federal resource managers, state, local and tribal governments, and private businesses all recognize that a changing climate greatly complicates their ability to plan for tomorrow.

NOAA is seeking advice and direction on potential options to respond to these challenges. Its principle advisory mechanism is of NOAA's Science Advisory Board and its subordinate Climate Working Group (CWG). The CWG hosted a workshop and organized a team to review NOAA's *Draft Strategic Plan for a Climate Service*. There were over 80 participants at the June 2008 workshop, mostly external to NOAA from a wide range of sectors and backgrounds. The review team commended NOAA on their efforts to date to develop climate services and developed a report (attached) recommending the establishment of external Tiger Teams to evaluate four different options for developing a National Climate Service; the SAB endorsed this recommendation. In response to this recommendation, the CWG will establish two types of committees, a Coordinating Committee and four "Tiger Teams," that will work together to examine each option and develop an integrated report. This effort should result in a new report entitled *Options for Developing a National Climate Service*. The report should include the pros and cons of the following four specific options for developing a National Climate Service:

1. Create a national climate service federation that would determine how to deliver climate services to the nation
2. Create a non-profit corporation with federal sponsorship
3. Create a national climate service with NOAA as the lead agency with specifically defined partners, and
4. Expand and improve weather services into weather and climate services within NOAA

#### **Coordinating Committee:**

**Structure:** The Coordinating Committee will consist of 10-12 individuals; membership will be drawn from internal and external to NOAA (including chairs of each of the four tiger teams) and will include broad representation across disciplines (e.g., climate science, ecology, social sciences, organizational design) and sectors (e.g., federal, state and local governments, academia, private sector, and non-governmental organizations). The CWG will select a chair of this committee. NOAA will provide secretariat support as needed.

**Charge:** Coordinate development of a report that includes at least the following sections (further description of each section below):

**Part 1. Why a climate service is needed.**

**Part 2. The definition of a climate service.**

**Part 3. How it should be implemented [based on the Tiger Team reports]**

**Part 4. How success will be judged.**

The Coordinating Committee will meet together and reach agreement on Parts 1, 2, 4 prior to development of Tiger Team reports. The definition of a climate service and the case for a climate service will be used by the Tiger Teams as they examine the pros and cons of their particular option. Agreeing on a common definition and why a climate service is needed will ensure the options can be compared against each other and evaluated for their likelihood of achieving the desired outcomes.

**Part 1. Why a climate service is needed.** (Written by the Coordinating Committee)

This must state the case for urgency and the potential benefits of the climate service. It should include 6 to 10 compelling examples of how climate services information and products will 1) produce actionable outcomes and 2) communicate the scope of potential climate services. These examples should include a range of specific examples of how the service will serve to develop products and information that will promote a variety of societal benefits.

Drawing from the specific examples discussed at the June workshop will strengthen this section (e.g. the re-location of coastal communities associated with sea level or the loss of protective sea ice, the expenditure of funds that would allow reuse of water in counties and municipalities, the development of mitigation policies associated with understanding regional changes in ecosystems). Translating these examples into recognition of the level of benefit in comparison with the cost of creating the service is an essential component as well.

**Part 2. The definition of a climate service.** (Written by the Coordinating Committee)

What is the role of a climate service? What should such a service be expected to achieve?

**Part 3. How it should be implemented.** (Integrated by the Coordinating Committee from reports written by Tiger Teams)

In their report, the CWG Review Team has provided guiding principles and objectives that they suggested should inform the analysis of each option. Therefore, the four options stated above should be evaluated in context of the guiding principles and objectives listed in the Tiger Team section below, with an analysis of the pros and cons of the four options, and a path forward from each of the four options. It should also:

- Define an evolution from targeted user groups, in which effective interaction can promote significant success to a broader and more comprehensive program in which the potential is not yet fully recognized.
- Propose options for the organizational structure of the service including leadership, governance, integration of partners, and budget authority.
- Evaluate the strengths and weaknesses of each proposed option regarding its ability to achieve the desired outcomes (defined in Part 4-How success will be judged).

The analysis of the pros and cons is not intended to be exhaustive, but rather sufficient to elucidate the ability of each option to address the listed set of objectives and goals of the service.

**Part 4. How success will be judged.** (Written by the Coordinating Committee with input from the Tiger Teams)

The report should define performance and success criteria for each option, including input and output, and outcome and impact metrics, drawing upon the recommendations from the NRC report “Thinking Strategically” as well as other sources.

**Timeline for Coordinating Committee Progress:**

<b>Milestone</b>	<b>Date:</b>	<b>Notes</b>
Establish chair of Coordinating Committee	Aug 8, 2008	CWG will select
Establish remainder of Coordinating Committee	September 2008	CWG, in consultation with the chair identified above, will select members
Schedule 2-day working session for Coordinating Committee to draft sections 1,2 and 4 of the report	October 10, 2008	Definition of a CS, why a service is needed (with examples), and metrics drawing on, but not limited to, the NRC report <i>Thinking Strategically</i>
Schedule virtual or actual 2-day working session for Coordinating Committee to finalize report and craft 1-page executive summary	late Nov/early Dec	
NOAA Internal review	January 2009	
CWG/SAB Review	TBD	
Coordinating Committee reviews comments and refines report to release final version	TBD	

**Tiger Teams (Four teams; one for each option listed above):**

**Structure:** 5-8 individuals, each chaired by an external participant, It should include “strong and experienced leaders and should include individuals both within and outside of NOAA that are representative of potential partners (other federal agencies, public and private sectors, academia, and users of climate information).” NOAA will provide secretariat support as needed. The chair and participants of each Tiger Team will be selected by the CWG in consultation with the chair of the Coordinating Committee. Each team is responsible for examining the pros and cons of one of the four options for a potential path for the development of a National Climate Service based on the criteria laid out in the guiding principles below.

**Charge:** The Tiger Teams will each independently evaluate the pros and cons of one of the four options for the development of U.S. climate services. Tiger Teams will collectively report on the four options to “provide well-reasoned guidance on the benefits and drawbacks of each potential path for development.” These reports will be completed with deliberate recognition of, and reference to, a series of principles and objectives. The analysis of each option is not intended as

a comprehensive and exhaustive exercise, but rather should be completed at a level that informs decisions in the development of a successful climate service. Additionally, each tiger team will provide input on Part 4 of the report on “How Success Will Be Judged” and suggest performance metrics for a Climate Service.

#### GUIDING PRINCIPLES AND OBJECTIVES FOR EXAMINING THE OPTIONS:

The scope of the proposed climate services must:

- Serve to develop products and information that will promote a variety of societal benefits including
  - Improve prediction and projection capabilities on the time scales that contribute to societal benefit
  - Promote a better understanding of how climate change and variability can promote an improved understanding of other environmental components
  - Improve decision-making capabilities in particular sectors and regions,
  - Engender new natural and social science capabilities that may have large expected and unexpected benefit, and
  - Promote improved federal, state and regional adaptation and mitigation strategies and policies.
  - Promote a more informed citizenry
- Reflect the full range of users, ranging from those who can define their needs and are ready to make use of specific information to those who have limited experience and for which the utility of climate information is not yet clear.
- Address the full range of time scales of interest to society without artificial or arbitrary divisions based on days, weeks, months, years or decades.
- Promote the extension of climate information to climate system information so that the fundamental problems associated with the climate system and diverse regions (e.g. the coastal region) and sectors (e.g. ecosystems, water, human health, agriculture, energy, insurance, social and economic infrastructure, national security, etc.) can be addressed.
- Support problem-based assessments and improved decision-making that are on global, regional, sectoral, and integrated scales.
- Create a science-based and research-supported capability that ensures that information is accessible, includes data, interpretation and integration, promotes communication and education, and promotes innovation and interaction.
- Create an active community of interaction that promotes the 3-way involvement of researchers, users, and climate information providers that is engaged throughout the process from planning, execution, assessment, and improvement and involves the active use of the information within the service.
- Recognize, incorporate and promote a “cascade” of roles extending from nationally-provided and vetted products, to defined roles of mission agencies, to a variety of interfaces with users (including regional or boundary interfaces such as Regional Integrated Science and Assessments (RISAs), Regional Climate Centers, state climatologists, NGOs, and the private sector), to the active engagement of a wide range of users.
- Define the role of various federal agencies

- Recognize that there are significant foundations required for a robust climate service underpinned by
  - A robust climate observing system
  - High spatial resolution climate system prediction and projection models with demonstrated skill
- Ensure that climate services are integrated with active research with feedbacks that will directly impact the generation of new climate service capabilities and climate services, and in turn, will directly influence research directions. This must be based on integrated, cross-cutting and end-to-end research that will support the production of climate system information. Fundamentally, this must be founded on the development of skillful forecasts and predictions and span a better understanding of human and natural systems and how they respond to change
- Include specific mechanisms to entrain successful products into the operations and capacity of the service

**Timeline for Tiger Team Progress:**

<b>Milestone</b>	<b>Date:</b>	<b>Notes</b>
Establish Chair of each Tiger Team	September 2008	See suggested participant list
Establish members of each Tiger Team	September 2008	See suggested participant list
Schedule concurrent 2-day working session for Tiger Teams	Federation Team: Nov (tentative) Non-profit: Nov. 3-4 NOAA and partnership: Oct. 21-22 Weather and Climate: Oct. 20-21	They will evaluate their option and submit the input for section 3 of the report

**Full Timeline for Progress:**

Milestone	Date		Notes
	Coordinating Committee	Tiger Team	
Establish chairs of Coordinating Committee, Tiger Teams	Aug 8, 2008	September 2008	
Establish remainder of Coordinating Committee	September 2008		External chair, 4 chairs of Tiger Teams, 5-7 additional external members, include organization expert (NAPA fellow, etc.)
Establish members of each Tiger Team		Sept.-Oct 2008	
Schedule 2-day working session for Coordinating Committee to draft sections 1,2 and 4 of the report	October 10, 2008		Definition of a CS, why a service is needed (with examples), and metrics drawing on the NRC report
Schedule concurrent 2-day working session for Tiger Teams		Federation Team: Nov (tentative) Non-profit: Nov. 3-4 NOAA and partnership: Oct. 21-22 Weather and Climate: Oct. 20-21	Teams will evaluate their option and submit the input for Part 3 of the report
Schedule virtual or actual 2-day working session for Coordinating Committee to finalize report and craft 1-page executive summary	Late Nov/Early Dec		
NOAA internal review of external report		Jan 2009	
CWG and SAB Review	TBD		
Coordinating Committee reviews comments and refines report to release final version	TBD		

