Connecting Priorities Between PPAI's Predictions & Projections and Communicating Climate Information Activities

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2015 US CLIVAR Summit August 4-6 Tucson, Arizona

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Agenda

- Connecting Priorities
- Evaluation of US CLIVAR Research
- Strategy for US CLIVAR-climate intermediary interactions

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Cross-Cut Strategies

	POS Panel	PSMI Panel		PPAI Panel	
Cross-Cutting Strategies⇨ Goals ⇩	**Sustained and new observations**	**Process studies**	**Model development strategies**	**Quantifying improvement in predictions and projections**	**Communication of climate information**
Understand the role of the oceans in observed climate variability on different timescales	Document variations	Data to evaluate and improve models	Improve modeling of climate across processes and timescales	Understand limits of climate predictability	Prioritize observing network and predictability studies and improve predictions of ocean and climate variability
Understand the processes that contribute to climate variability and change in the past, present, and future	Document climate-critical processes	Investigate processes to help explain variations	Property conserving climate reanalyses	Quantifying importance of model uncertainty in projections	Set priorities for observations and predictability studies; communicate about confidence and predictability
Better quantify uncertainties in the observations, simulations, predictions, and projections of climate	Initialize and evaluate model simulations	Model assessment	Improve models	Quantify model, intrinsic and scenario errors	Address needs for predictability and sensitivity studies
Improve the development and evaluation of climate simulations and predictions	Initialize and evaluate climate models	Provide data to develop and test model process representation	Reduce biases in climate models	Quantify importance of model physics errors	Determine key targets for model development across communities
Collaborate with research and operational communities that develop and use climate information	Provide multi-disciplinary datasets	Provide process understanding and opportunity for collaboration across disciplines	Communication between observational and model communities	Improved communication across disciplinary boundaries	Provide information on dominant climate phenomena and predictability

Quantifying Improvements in Predictions and Projections

1) Addressing Predictability & Prediction Across Timescales
2) Identifying Predictability and Skill Baseline and Limits
3) Evaluating Forecast Quality and Quantifying Uncertainties
4) Assessing whether ensemble spread is appropriate representation of uncertainty
5) Testing models against observational data and quantifying model biases and errors

Communication of Climate Information

1) Identifying specific pathways for effective engagement of applications
2) Improving practices of model documentation and comparable quantitative evaluation
3) Developing information on uncertainties for climate service agencies that is useful for applications
4) Improving comprehension of distinctions of and connection among climate variability, anthropogenic forcing, and evolution of current climate state

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Connecting Priorities

- Managing expectations: Risk management in the face of forecast uncertainty
- Successful transitions
- Research to Applications
  - Seasonal fire forecasts
  - NMME Missouri River Basin
  - Andrea's NRC presentation

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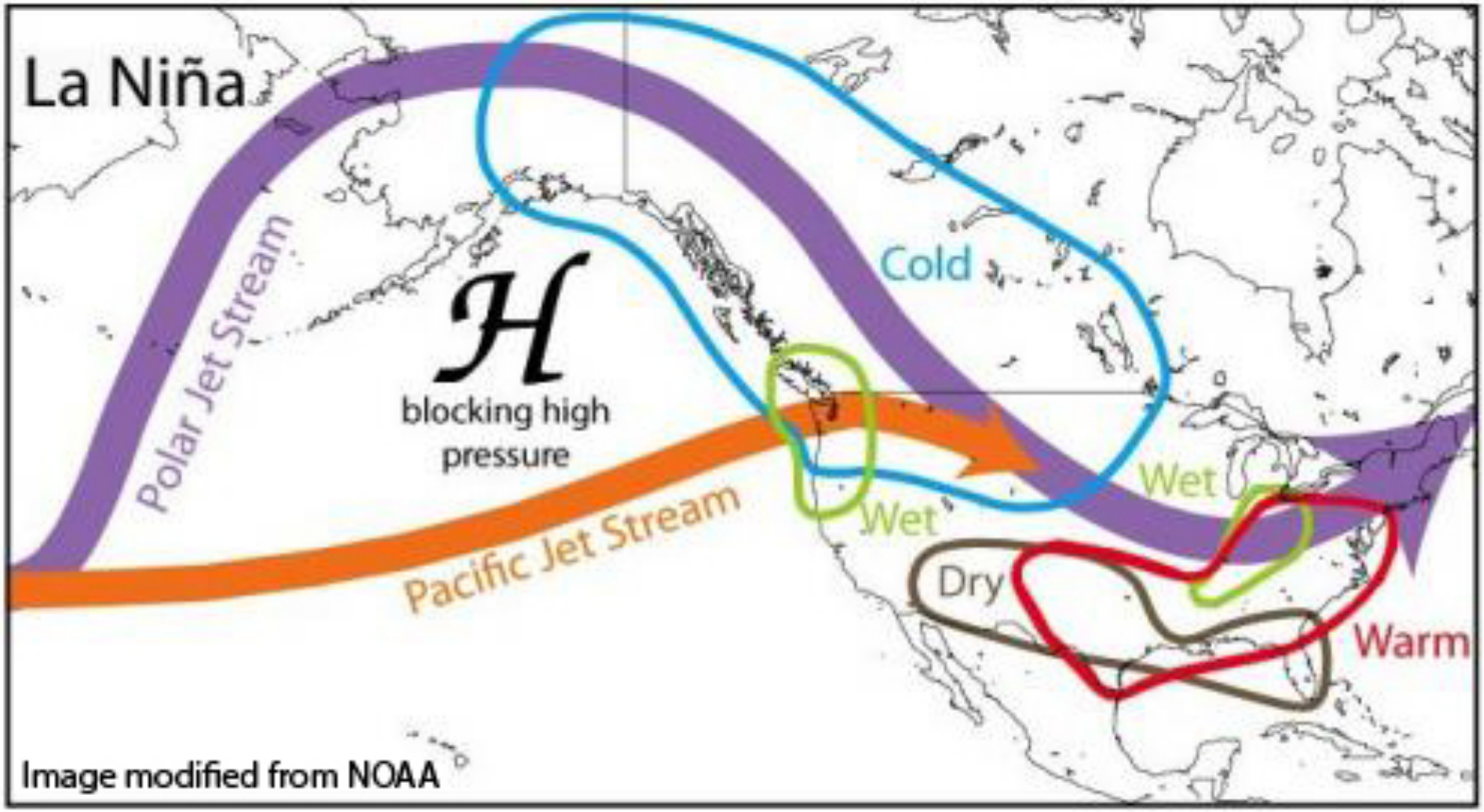

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National Seasonal Assessment Workshop

2003-2013

National Interagency Coordination Center

ECOSYSTEM CLIMATE FIRE APPLICATIONS

DRI Desert Research Institute

CLIMAS Climate Assessment Project for the Southwest

Firefighter safety

Escalating costs of fire suppression

Prevention and public planning

Setting priorities for allocation of firefighting resources at local, regional, and national scales

Multi-agency coordination and decision making → preparedness levels

Describing the level of uncertainty in fire behavior projections or model simulations

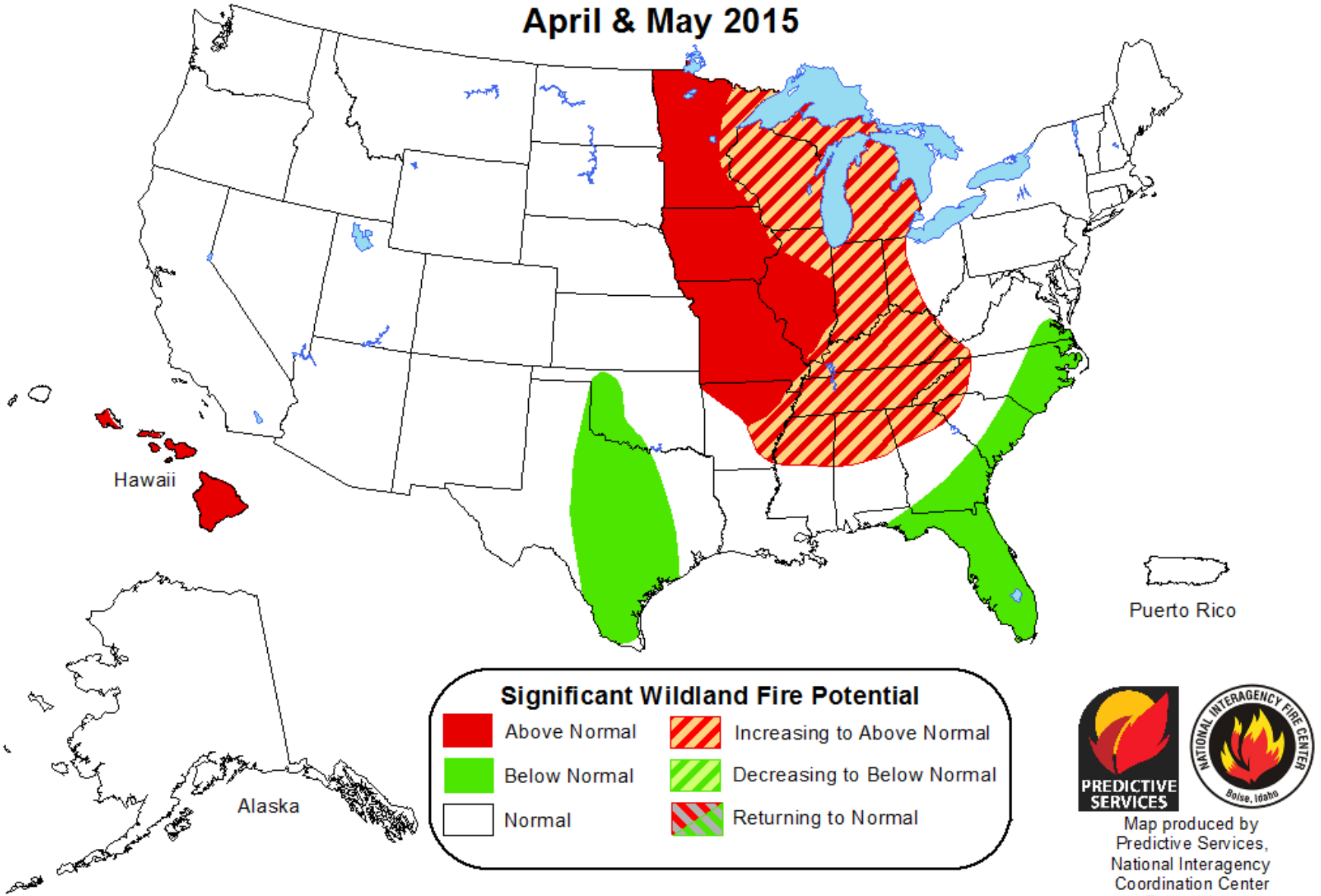
Supplemental and seasonal severity funding requests

Prescribed fire planning and priority-setting

Supporting landscape-level burn projects → long time periods

Estimating the number of incidents over the course of a fire season

Significant Wildland Fire Potential Outlook
April & May 2015

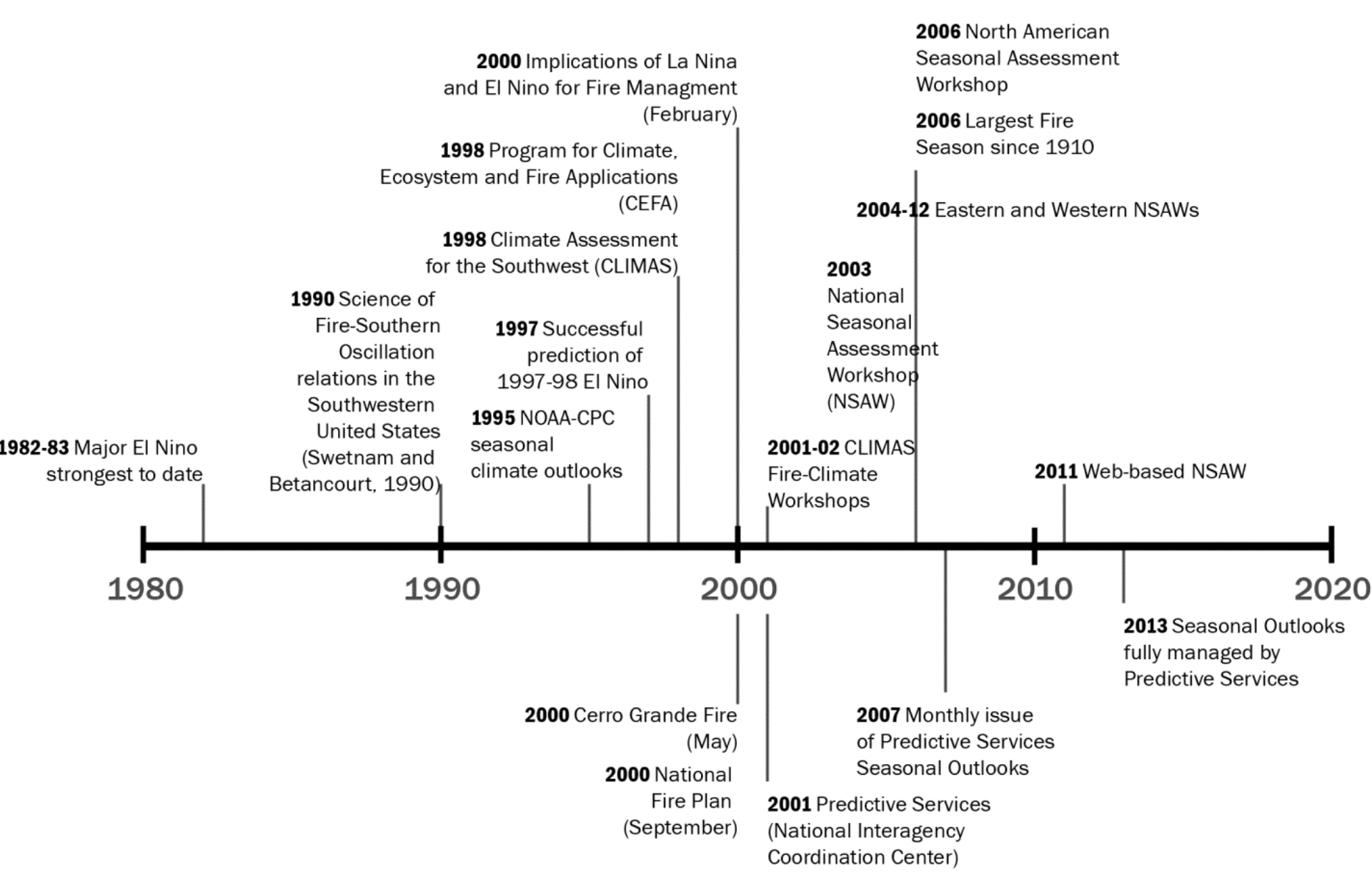


Above normal significant wildland fire potential indicates a higher than usual likelihood that wildland fires will occur and/or become significant events. Wildland fires are still expected to occur during forecasted normal conditions as would usually be expected during the outlook period. Significant wildland fires are still possible but less likely than usual during forecasted below normal periods.

PREDICTIVE SERVICES

NATIONAL INTERAGENCY FIRE CENTER Boise, Idaho

Map produced by
Predictive Services,
National Interagency
Coordination Center
Boise, Idaho
Issued February 1, 2015
Next issuance March 1, 2015



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Expert Assessment Forecast

- NOAA Seasonal Outlook
- Drought assessment
- Alternative forecasts
- Fuel condition assessments

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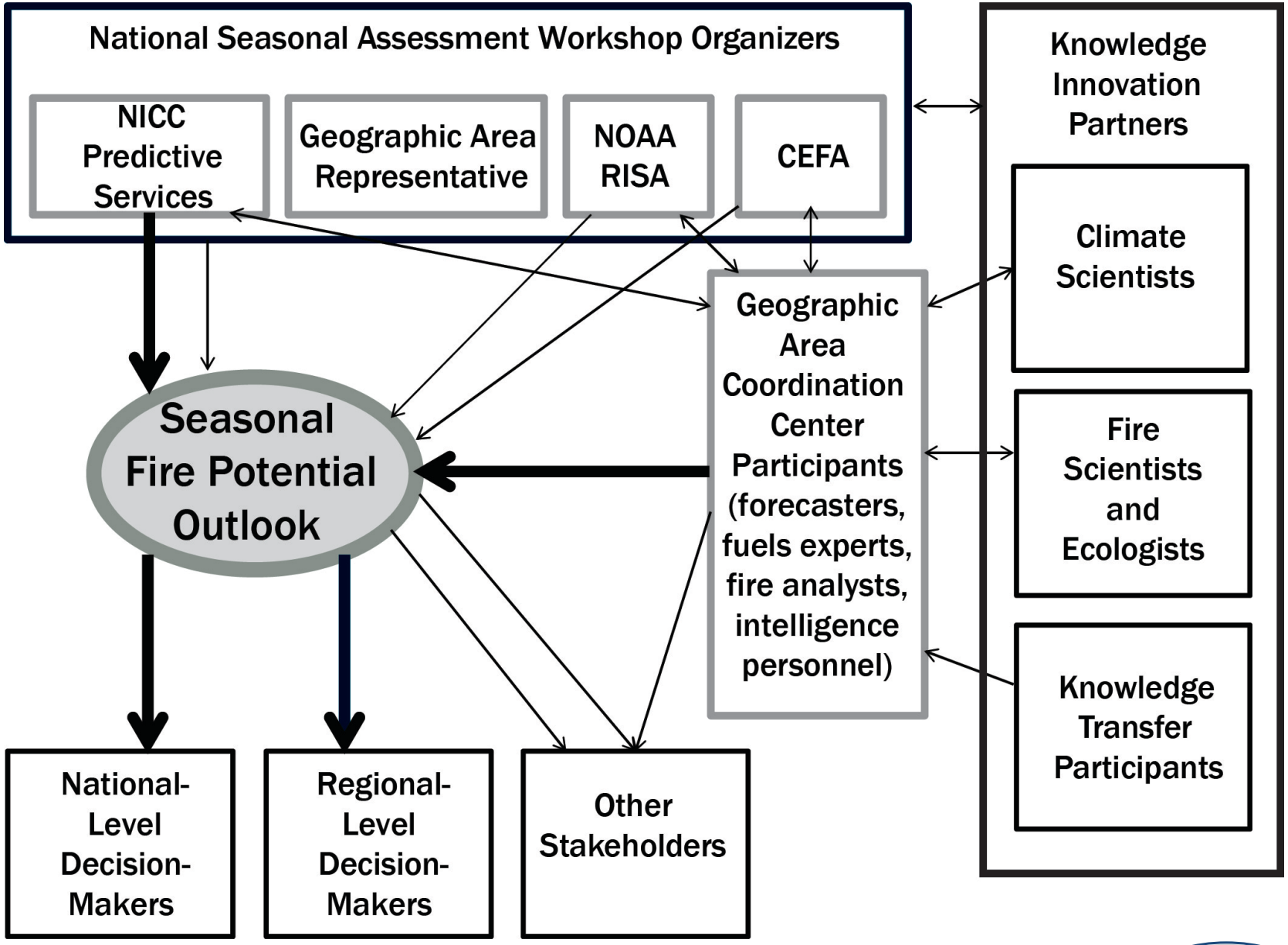

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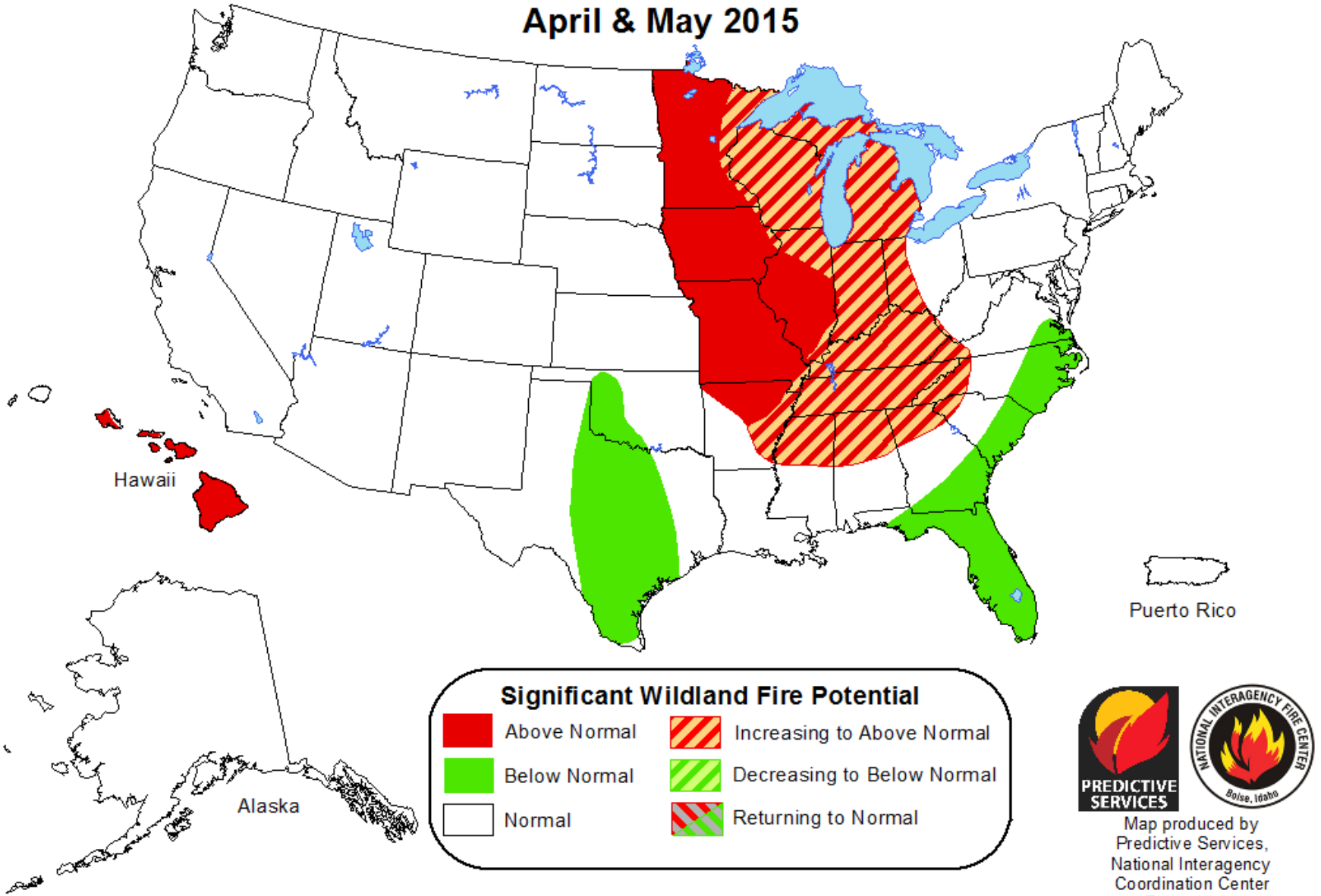

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NATIONAL INTERAGENCY FIRE CENTER Boise, Idaho

Map produced by
Predictive Services,
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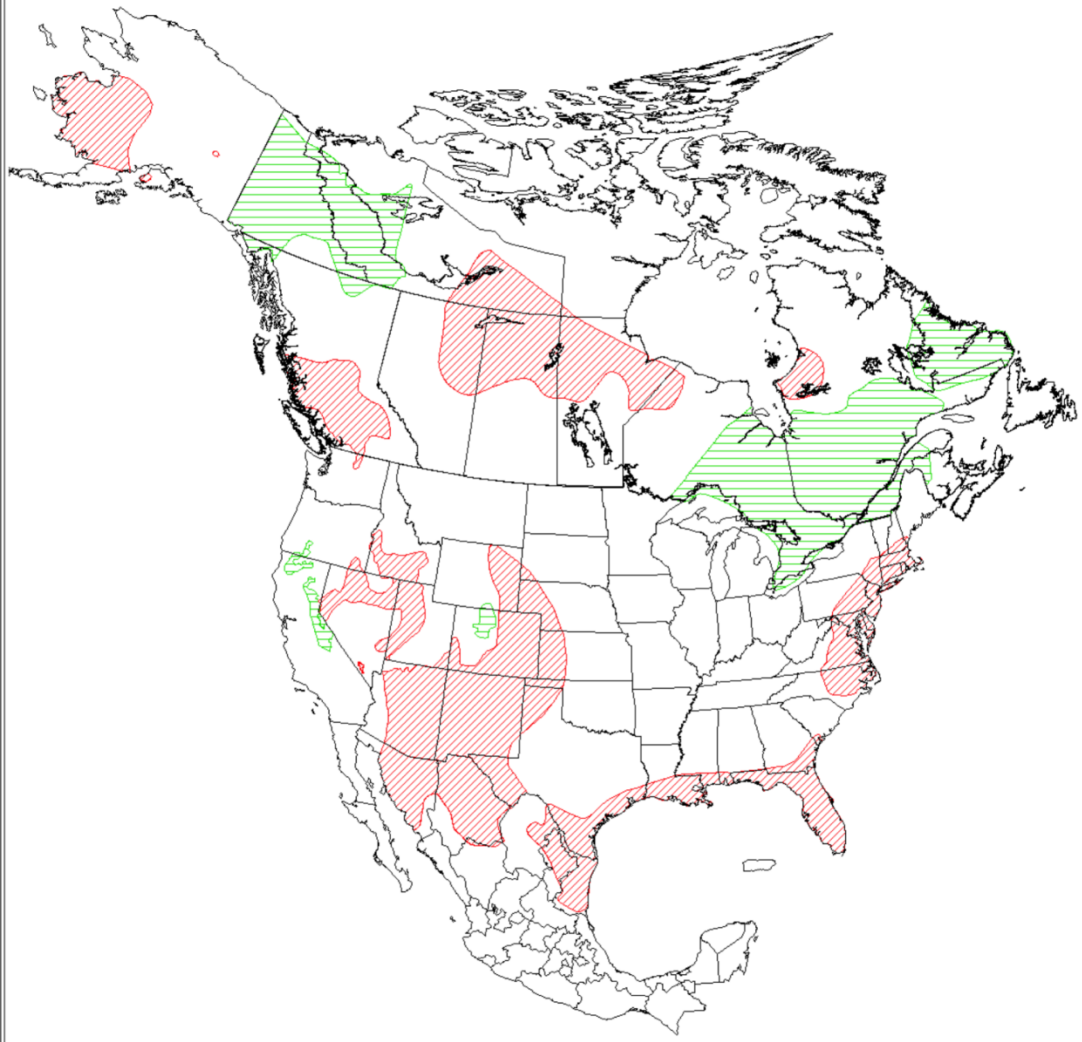
Next issuance March 1, 2015

Seasonal Wildland Fire Potential Outlook for North America
April 12 through August 31, 2006



Map produced by the Intelligence-Predictive Services Section at the National Interagency Coordination Center, Boise, Idaho
Issued April 12, 2006

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Strategy for Facilitating Interactions Between US CLIVAR and Climate Intermediaries

Andrea Ray
Gregg Garfin

Climate Science Intermediaries

- DOI CSC
- DOI LCC
- NOAA RISA
- USDA Regional Hubs
- IRAP/IRI
- SERDP?
- EPA?
- Private Sector/NGO?
  - Riskybusiness.org

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Facilitating Interactions

- Opportunities to address applications and climate services audiences
  - Co-development of research and research plans
  - Build on assessment of US CLIVAR science that is ready to be applied regionally, or in specific contexts
  - Opportunities through USGCRP/OSTP – guidance to funding agencies for 2017 – Food-Energy-Water Nexus

NSF Food-Energy-Water

National Science Foundation
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NSF 15-040

Dear Colleague Letter: SEES: Interactions of Food Systems with Water and Energy Systems

February 2, 2015

Dear Colleagues:

NSF established the Science, Engineering, and Education for Sustainability (SEES) investment area in 2010 to lay the research foundation for decision capabilities and technologies aimed at mitigating and adapting to environmental changes that threaten sustainability. SEES investments advance a systems-based approach to understanding, predicting, and reacting to stress upon and changes in the linked natural, social, and built environments. In this context, the importance of understanding the interconnected and interdependent systems involving food, energy, and water (FEW) has emerged. Through this Dear Colleague Letter (DCL), the NSF aims to accelerate fundamental understanding and stimulate basic research on systems that extend beyond the interests of the SEES Water Sustainability and Climate (WSC) program to include couplings to energy and food systems where the NSF already has established presence.

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NSF Food-Energy-Water

- SEES (science, engineering and education for sustainability)
  - advance a systems-based approach to understanding, predicting, and reacting to stress upon and changes in the linked natural, social, and built environments.
- Many factors - including changing land-use practices; increased urbanization; population growth and distribution; changing demand…and **climate variability** - create stresses on water, energy, and agriculture resources and systems in multiple and sometimes unexpected ways.

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NSF Food-Energy-Water

- The NSF requests innovative proposals in the form of (1) **supplements, to build upon existing NSF-funded research activities**; or (2) **workshops** of typically 30-80 attendees that stimulate debate, discussion, visioning and collaboration across research communities.
- These proposals should address the coupled nature of the food, energy, and water system and the interdisciplinary dimensions of physical, natural, biological, cyber, and social/behavioral processes of relevance.

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NSF Food-Energy-Water

- Division of Chemical, Bioengineering, Environmental, & Transport Systems
- Division of Earth Sciences
- Division of Environmental Biology
- Division of Behavioral and Cognitive Sciences
- Experimental Program to Stimulate Competitive Research
- Division of Chemistry
- Division of Computer and Network Systems
- Division of Undergraduate Education

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Thank You

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Connecting Priorities

- Managing expectations: Risk management in the face of forecast uncertainty
- Identifying audiences for prediction and projection science
  - Detection and attribution
- What does US CLIVAR need to learn from audiences, in order to prioritize Prediction and Projection science for application? Is there a needs assessment activity ? What details will help US CLIVAR scientists determine when and whether the activity is worth investment of time?
- Internally: what are the common priorities for Prediction and Projection science and Communicating Climate Information?

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Facilitating Interactions

- What are elements of the strategy?
  - US CLIVAR research prospectus: identifying and conveying research useful to intermediaries and back to info providers
  - Develop a schedule of interactions
  - Develop feedback indicators – How do we know the relationship is worth US CLIVAR effort?
- How does US CLIVAR facilitate interaction ? What unique aspect does US CLIVAR bring to the interaction?
- What are the goals of the interactions?
  - Determine which US CLIVAR research is ripe for use ?
    - 2-pager assessment papers
  - Assess needs of the intermediaries for US CLIVAR research?
  - Establish enduring relationships for future collaboration?

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NSAW Attributes	Bales et al. (2004) [37]	Jacobs et al. (2005) [5]	NRC (2005) [38]
Process co-managed by NICC and RISA partners; Adaptive learning and sharing of techniques; Workshop organization that is responsive to participant needs and requests; Decreased time necessary to develop forecast reports, as a result of improved preparation and enhanced understanding of workshop process	Number and frequency of quality scientist-stakeholder interactions; Evidence of team integration	Process was representative; Process was credible; Solutions were implementable;	Process metrics measure the course of action taken to achieve a goal: planning, strategy, leadership, promoting partnership
Funding commitment from partner agencies; Increased commitment by climate forecast agencies to provide training, tailor	No equivalent metric	Stakeholders invested staff time or funding; Costs and benefits were equitably distributed	Input metrics are tangible quantities put into a process: intellectual foundation, commitment

Stakeholders acknowledge use of information for pre-season resource allocation and funding decisions	No equivalent metric	No equivalent metric	Output metrics measure services delivered: peer-reviewed broadly accessible results, stakeholder judgment of results for decision-making, communication of results to an appropriate range of stakeholders

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