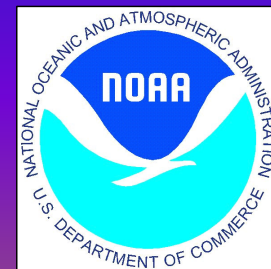


NCAR Societal Impacts Program and WAS*IS

Jeff Lazo, Julie Demuth, Rebecca Morss
NCAR Societal Impacts Program

NOAA ESRL & NCAR SIP/WAS*IS Seminar Series
February 25, 2008

WAS*IS	CULTURE CHANGE
weather & society * integrated studies	
www.sip.ucar.edu/wasis/	
Sponsored by the NCAR Societal Impacts Program	
Changing from what WAS to what IS the future of integrated weather studies	



Why do these seminars?

- Bring together 3 great communities in the Boulder area
 - NOAA ESRL
 - NCAR SIP
 - WAS*IS
- Exchange ideas, learn from each other, and explore potential future collaborations
- Outcome of a November 2007 meeting organized by Eve Gruntfest and Steve Koch

Outline

- NCAR Societal Impacts Program (SIP)
 - Origin, mission, activities
- Weather and Society * Integrated Studies (WAS*IS)
 - Vision, mission, workshops, activities
- Future NOAA ESRL & NCAR SIP seminars

Origins of SIP

- Very little is currently known about:
 - economic value of current and improved weather information
 - how weather information is communicated to and received by specific forecast end-users
 - how users respond to forecast information
 - best practices to deliver weather forecast uncertainty information
- Relevance to NOAA
 - crucial to fulfilling NOAA's vision and mission
 - NOAA has minimal capacity to address these issues
 - greater demands for NOAA to justify research and activities for budget decisions

Origins of SIP

- Collaborative Program on Societal and Economic Benefits of Weather Information
 - NOAA-NCAR collaboration
 - peer reviewed
 - unanimously accepted USWRP Interagency Working Group, July 2003
 - program commenced April 1, 2004, with hiring of a Director
- SIP as part of NCAR
 - independent non-federal
 - history of interdisciplinary research in the interactions between weather and society
 - unique within university community; tap extensive expertise in social sciences

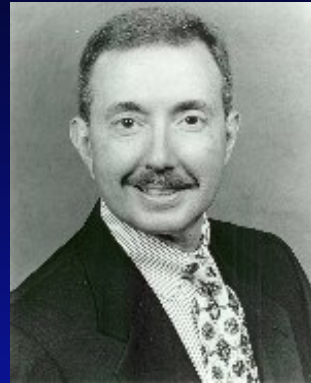
Scope of SIP

- Mission
 - To improve the societal gains from weather forecasting by infusing social science and economic research, methods, and capabilities into the planning, execution, and analysis of weather information, applications, and research directions
- Primary activities
 - Research
 - WAS*IS program
 - Information resources
 - Community development and support

SIP Advisory Board

Ray Ban

Executive Vice
President, Meteorology
Science and Strategy
The Weather Channel,
Inc.



Betty Morrow

Consulting Sociologist
Miami, Florida



Margaret Davidson

Director, NOAA Coastal
Services Center



Len Pietrafesa

College of Physical &
Mathematical Sciences,
North Carolina State
University



Bill Hooke

Senior Policy Fellow
and Director,
American
Meteorological Society
Policy Program



Rodney Weiher

NOAA Chief Economist,
Office of Program Planning
and Integration



SIP 7-yr research prioritization

	Hurricanes	Precipitation	High-Impact Wx Forecasts
Valuation	●	⊙	●
Communicating Uncertainty	●	●	○
Characterization Sources, Perceptions, and Uses of Weather Information	⊙	○	⊙
Developing or Facilitating Use of Forecasts and Forecasts Products	○	○	⊙
Legend: ● highest priority; ⊙ medium priority; ○ lower priority			

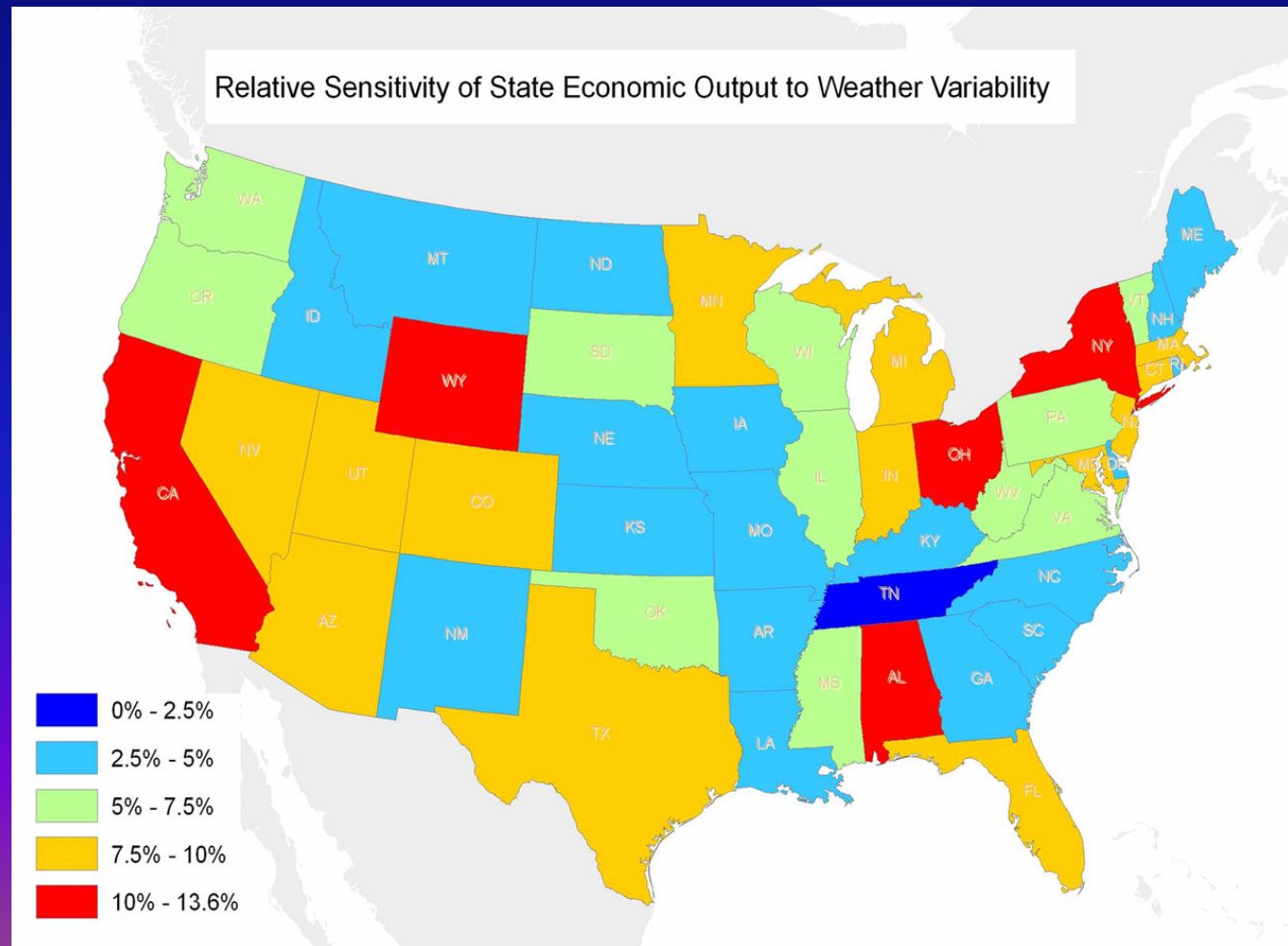
Current SIP research

- Will discuss in more detail
 1. Overall U.S. sector sensitivity assessment
 2. Individual sector sensitivity assessment-transportation
 3. Sources, perceptions, uses, and value of weather forecasts
 4. Communicating uncertainty in weather forecasts
 5. Warning decisions in extreme weather events
 6. Damage data
 7. Super Tuesday tornado outbreak: NWS service assessment
- Other research
 7. Hydrometeorological testbed
 8. Hurricane household valuation study
 9. User needs assessment
 10. Weather primer on economics

Overall U.S. Sector Sensitivity Assessment (OUSSSA)

- “...one-third of the private industry activities, representing annual revenues of some \$3 trillion, have some degree of weather and climate risk.” (Dutton, 2002)

- Evaluate sensitivity of 11 U.S. economic “super” sectors to weather variability
- Writing results for BAMS manuscript



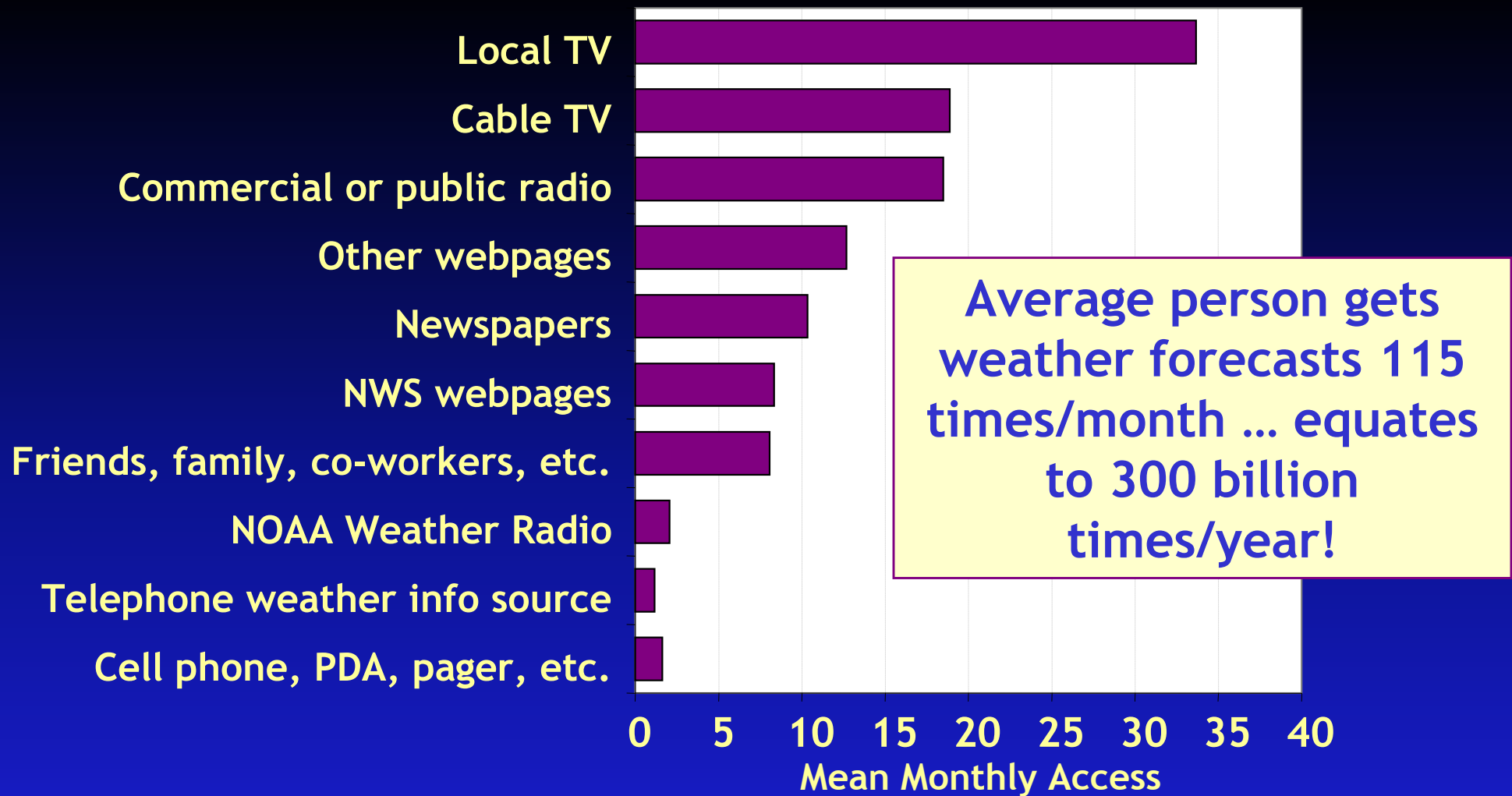
Individual Sector Sensitivity Assessment-Transportation (ISSA-T)

- Assess the transportation sector's use and value of current and improved weather information
 - 5 subsectors: air, rail, water, trucking/freight, pipeline
 - Interview experts (academia, private sector, and government) to elicit their expert judgments
- Develop valid and reliable socio-economic methods for assessing use and value in other sectors

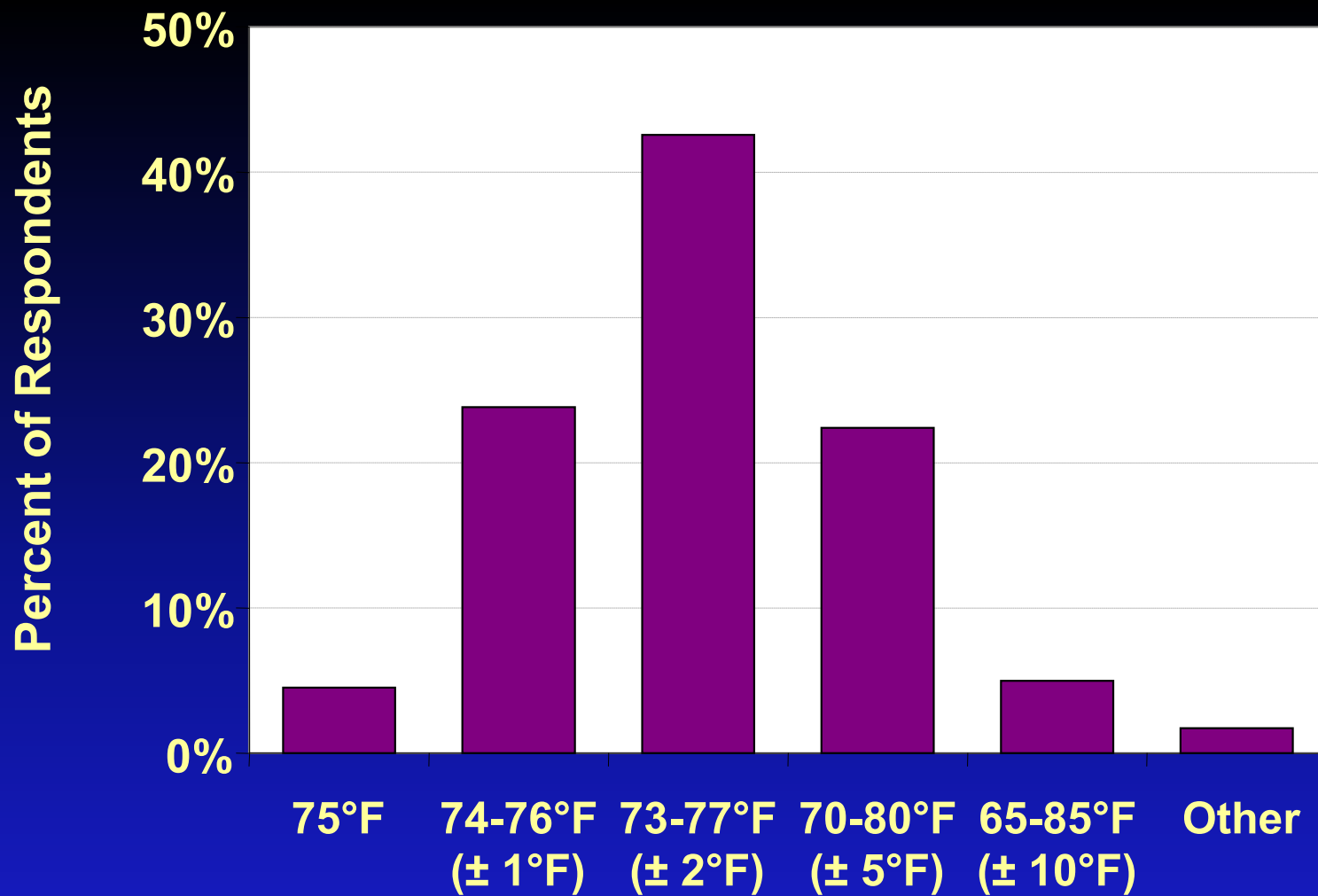
Planning to submit “proposal” to NOAA Commerce and Transportation Goal Team

SPUV & CoFU

- SPUV -- Assess people's sources, perceptions, uses, and value of weather forecast information
- CoFU -- Explore people's perception of, interpretation of, and preferences for weather forecast uncertainty information
- Methodology
 - Survey questions developed iteratively, pre-tested at several stages
 - Controlled-access, Internet-based survey of U.S. public
 - Analysis based on N=1465 responses



- Planned future work (with existing survey data)
 - Geographical analysis
 - Analysis of use of forecast uncertainty information for decision-making scenarios
 - Cross-analyses with demographics, other questions



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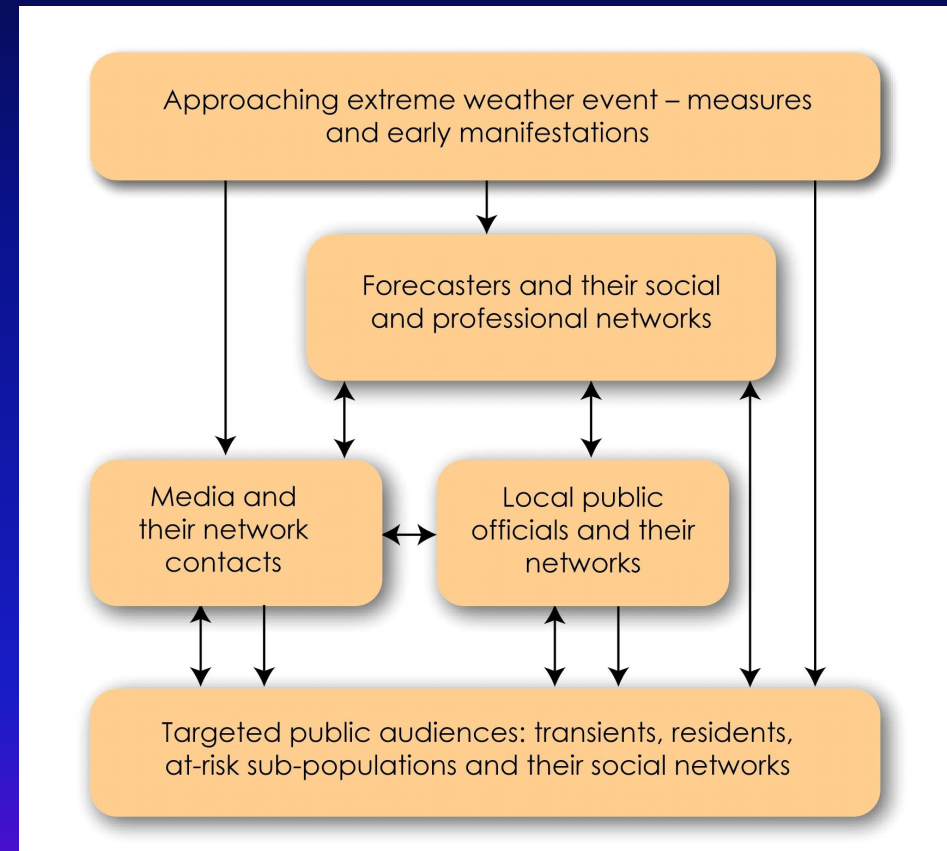
Warning decisions in extreme weather events

- How extreme weather warnings are communicated, interpreted, and used by different participants

- Explore interactions among 4 groups: forecasters, public officials, media, public
- Focus on hurricanes and flash floods; challenges for decision making in the face of risk and uncertainty
- NSF funded

- Collaborators

- Kathleen Tierney and Jeannette Sutton -- U. of Colorado, Natural Hazards Center
- Ann Bostrom -- U. of Washington, School of Public Affairs



Damage data

- Irregularities in estimating and reporting damages from weather data
 - damage estimates of the same event vary by 40% or more among different sources
- Damage data often used to explore changes in impacts of weather over time
 - Very little open discussion of the data quality
- Advocate effort to standardize collection, reporting, and archiving of damage data
- Collaborating with Brent MacAloney, NOAA HQ

Super Tuesday tornado outbreak

- NWS service assessment of February 5-6, 2008, tornado outbreak, 59 deaths
- Societal impacts was a key component of the assessment to help better understand the large loss of life
- 7 days in Tennessee, Arkansas, Kentucky, Alabama interviewing members of the public to explore:
 - what information people had about the severe weather situation and how they interpreted that information;
 - how people perceived the situation;
 - what decisions they made

Other SIP research

- Hydrometeorological testbed
 - Assess societal impacts and economic value for American River area in California
- Hurricane household valuation study
 - Assess use and value of improved hurricane forecasts to households
- User needs assessment
 - Summarize best practices for introducing weather decision-support technologies into new environments
- Weather primer (NOAA funded)
 - Increase understanding of economic methods in evaluating national meteorological and hydrological services (e.g., impacts, costs, benefits)

Information resources

- Extreme Weather Sourcebook
 - Updating to 2006, research on Storm Data
- Weather and Society Watch Newsletter
 - 2nd year, free subscription
 - reader satisfaction assessment
- WxSoc newsgroup
- Societal Aspects Page
- Digital Library
 - Pielke's bibliography
 - Integrate with NOAA Economics materials

Community development & support

- WMO
 - Public Weather Service Forum
 - CAS WWRP Societal and Economic Research and Applications Working Group (SERA WG)
- THORPEX
 - Societal and Economic Research and Applications (SERA) WG
 - NAT SERA (Opportunity Fund Workshop)
 - BAMS article forthcoming
- Hurricane Forecast Socio-Economic Working Group
 - Special issue Natural Hazards Review - summer 2007
 - BAMS Inbox article
 - joint NSF-NOAA funding opportunity

Community development & support

- AMS
 - Annual Partnership Topic on Hurricane Disasters
 - Board on Societal Impacts (Eve/Julie)
- NOAA
 - February 5-6, 2008, Tornados Service Assessment
 - Social Science Working Group
 - WW MGT Social Science Strategic Plan
 - Societal Impacts Program
- Economics Interest Group - proposal to NOAA
 - Other IGs: communication, decision making, user-relevant verification

WAS*IS

CULTURE CHANGE

weather & society * integrated studies

www.sip.ucar.edu/wasis/



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Sponsored by the NCAR Societal Impacts Program

Changing from what **WAS** to what **IS**
the future of integrated weather studies

WAS*IS Vision -- To change the weather enterprise by *comprehensively & sustainably* integrating social science into meteorological research & practice



WAS*IS mission

1. Build an interdisciplinary community of practitioners, researchers, & stakeholders -- from the grassroots up -- who are dedicated to the integration of meteorology & social science



Capacity building -- creating a community for lifelong collaboration & support!

WAS*IS mission

2. Providing opportunity to learn and examine ideas, methods, and examples related to integrated weather-society work
 - Tools - GIS, surveys, qualitative methods
 - Concepts - problem definition, speaking the same language, end-to-end-to-end process
 - Topics - risk perception, vulnerability, resilience



The WAS*IS adventure

- Originally envisioned as only 1 workshop
- Have now been 5 workshops ... and counting!
 - Original 2-part Boulder WAS*IS (Nov 2005 & Mar 2006)
 - Condensed 3-day Norman WAS*IS (April 2006)
 - 2006 Summer WAS*IS (July 2006)
 - Australia WAS*IS (January-February 2007)
 - 2007 Summer WAS*IS (July 2007)
- NOW accepting applications for 2008 Summer WAS*IS workshop, August 7-15, 2008

Grand total of 145 WAS*ISers, 20+ from NOAA!

Change is under way:
A small sample of WAS*IS-
related activities



WAS*IS Partnership Initiative

- Kevin Barjenbruch (WCM at SLC) & Melissa Tuttle Carr (The Weather Channel)
- Key messages
 - Improved communication, collaboration between govt and private sectors to benefit entire enterprise
 - Synergistic approach will lead to improved products and services and increased visibility
- Presentations to over 500 people
 - NWS Regional (Western, Central, and Eastern) and National Headquarters;
 - NWA and AMS Annual Meetings;



<https://apps.weather.gov/partners>

A NWS integrated services database

- Craig Schmidt (Public and dissemination program manager, WRH MSD)
- Standardize collection and utilization of different types of information to improve NWS efficiency and service -- emphasize “high-impact” weather
- Database to include
 - Searchable contact information for stakeholders in WFO/RFC area (e.g., customer needs, satisfaction, outreach/event information)
 - Weather information (e.g., surface obs, fire weather, marine weather)



A new conceptual model of warning accuracy

- Development of new metrics .. emphasis on societal relevance

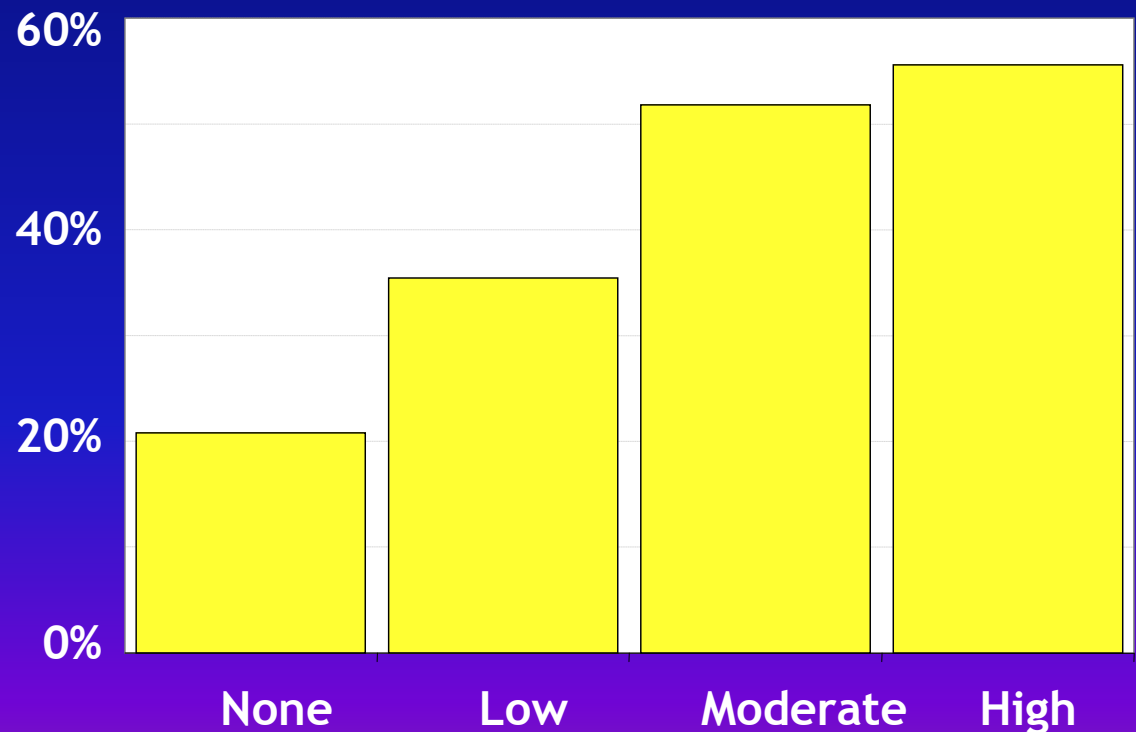
Unwarned Event		Perfect Warning		False Alarm
Warning was not issued but event occurred	Event occurred but was more severe than warning	Event followed warning as specified	Event occurred but was less severe than warning	Warning was issued but event did not occur
December 2004 Tsunami	Red River Flood 1997	1999 Oklahoma Tornadoes	Hurricanes Fran & Bertha	Connecticut False Evacuation

Barnes et al., October 2007 issue of *Weather and Forecasting*

Decision-making during a winter storm

- Survey of people's actual behaviors during the Dec 20-21, 2006, CO winter storm
 - Assessed people's sources of forecasts, factors influencing decision-making, and perceptions of forecast accuracy

% of respondents who stayed home based on self-reported fear or anxiety when driving during winter conditions



Sheldon Drobot, 2007:

www.colorado.edu/hazards/research/qr/qr192/qr192.html

Some projects in progress

- WAS*IS Partnership Initiative
 - Kevin Barjenbruch, Salt Lake City WFO, and Melissa Tuttle Carr, The Weather Channel
- Development of a NWS integrated services database
 - Craig Schmidt, WRH Meteorological Services Division
- Quick response grant to evaluate the Jan 4-6, 2008 winter storm along the Western U.S.
 - Craig Schmidt and Sheldon Drobot, University of Colorado

More projects in progress

- Evaluating communication between the NWS and emergency managers in tornado events
 - Ray Wolf, Quad Cities WFO and Jayant Deo, CIRA
- Public education and outreach based on historical weather events
 - Ernie Ostuno, Grand Rapids WFO
- Users' needs for and interpretation and use of flood inundation maps
 - Wendy Pearson, Central Region HQ and Jayant Deo, CIRA
- Vulnerability-based impacts forecasting using GIS
 - Mike Seaman and Kevin Barjenbruch, Salt Lake City WFO

What WAS*IS isn't

- Participating in WAS*IS doesn't make someone a social scientist
 - It teaches “sensibilities”
- WAS*IS as an entity doesn't do research
 - Some WAS*ISers have taken on research projects, bringing to bear their expertise and integrating with others

Other WAS*IS elements

- Current and future activities
 - Program evaluation
 - Edited compendium (NCAR assessment initiative funding)
 - Interaction with AMS Policy Program
 - Possible second Australia WAS*IS in early 2009
 - Proposal to NSF to fund future workshops (next 3-5 years?)
- Output
 - WAS*IS overview paper (Demuth et al., BAMS, November 2007)
 - Conferences and meetings
 - Networking and collaborations
- Outcome
 - NWS “Advanced” Workshop, October 24-25, 2007
 - New research and activities

Future monthly seminars

- Third Monday of every month at 2:00 at ESRL
- Next few dates
 - March 17, 2008
 - April 21, 2008
 - May 19, 2008
 - June 16, 2008
 - July 21, 2008

Opportunity to start building collaborations for integrating social science into NOAA research and operations!

Seminar content

- Possible topics
 - Communication of Forecast Uncertainty (CoFU)
 - Sources, Perceptions, Uses, and Values of Weather Forecasts (SPUV)
 - Research agenda for North American THORPEX Societal and Economic Research and Applications
 - An ethical analysis of prediction and decision making
 - The use of predictions in flood decision making
 - Individual Sector Sensitivity Assessment - Transportation
 - Assessment of the validity and reliability of weather damage data
 - Assessing people's knowledge, perceptions, and actions during the Super Tuesday tornado outbreak

Seminar content

- More possible topics
 - Declining Arctic sea-ice and the 2008 forecast of sea-ice extent
 - Integrating meteorological and societal data using GIS
 - Climate/weather and vector-borne diseases
 - User relevant verification
 - Communication and the hurricane cone of uncertainty
 - Natives' perceptions of climate change in Tuvalu
 - Communicating climate and weather information to communities in India and Nepal
 - Warning project
 - Motorists' vulnerability to flash floods in France

Thank you!

- SIP (www.sip.ucar.edu)
 - Jeff Lazo, SIP Director (lazo@ucar.edu)
 - Rebecca Morss (morss@ucar.edu)
 - Julie Demuth (jdemuth@ucar.edu)
 - Emily Laidlaw (laidlaw@ucar.edu)
- WAS*IS (www.sip.ucar.edu/wasis)
 - Julie Demuth (jdemuth@ucar.edu)
 - Eve Gruntfest (ecg@uccs.edu)



NCAR

Societal Impacts Program

A dramatic photograph of a thunderstorm at night or dusk. The sky is dark with several bright, jagged lightning bolts striking down. The foreground shows a dark silhouette of a city or town with some lights visible. The overall color palette is dominated by dark blues, purples, and oranges from the lightning and sky.