


7-10-2013

Earning Trust and Explaining Complexities as You Communicate Climate Science: The CAUSE Model

Katherine E. Rowan
George Mason University

Follow this and additional works at: https://digitalcommons.odu.edu/hraforum_03

 Part of the [Climate Commons](#), [Communication Commons](#), [Public Affairs Commons](#), and the [Public Policy Commons](#)

Repository Citation

Rowan, Katherine E., "Earning Trust and Explaining Complexities as You Communicate Climate Science: The CAUSE Model" (2013). *July 10, 2013: Best Practices and Communications Strategies for Adapting to Sea Level Rise and Flooding*. 3.
https://digitalcommons.odu.edu/hraforum_03/3

This Presentation is brought to you for free and open access by the Hampton Roads Sea Level Rise/Flooding Adaptation Forum at ODU Digital Commons. It has been accepted for inclusion in July 10, 2013: Best Practices and Communications Strategies for Adapting to Sea Level Rise and Flooding by an authorized administrator of ODU Digital Commons. For more information, please contact digitalcommons@odu.edu.



4C

George Mason University
Center for Climate Change Communication

***Earning Trust and Explaining Complexities
As You Communicate Climate Science:
The CAUSE Model***

Katherine E. Rowan
krowan@gmu.edu

Hampton Roads Sea Level Rise/Flooding Adaptation Forum
Old Dominion's Regional Higher Education Center
Virginia Beach, VA
July 10, 2013

Your Communication Challenges

- Wanting ALL the facts before we communicate about sea level rise
- Increasing talk in Hampton Roads region about sea level rise by listening, a lot, locally.
- Providing computerized tools for residents to learn their flood and inundation risk.
- Encouraging the Commonwealth to provide guidance on sea level rise planning.
- “Showing people a future” – to avoid fatalism when they realize some areas will be under water.



4C

Your Challenges, 2

- Discussing how local government will pay for adaptation needed
- Understanding when billboards and PSAs **do** equal effective SLR communication and when they do **not**
- Developing and making accessible visuals of flood, inundation risk to help decision makers
- Helping people personalize flood, inundation risk: “5 to 10 feet above what? My driveway?”



What We Will Cover

Who – Why – How

- *Who are your audiences?*
- *Why communicating sea level rise (SLR) is tough*
- *How to use the CAUSE MODEL to communicate*





**WHO ARE YOUR
AUDIENCES?**

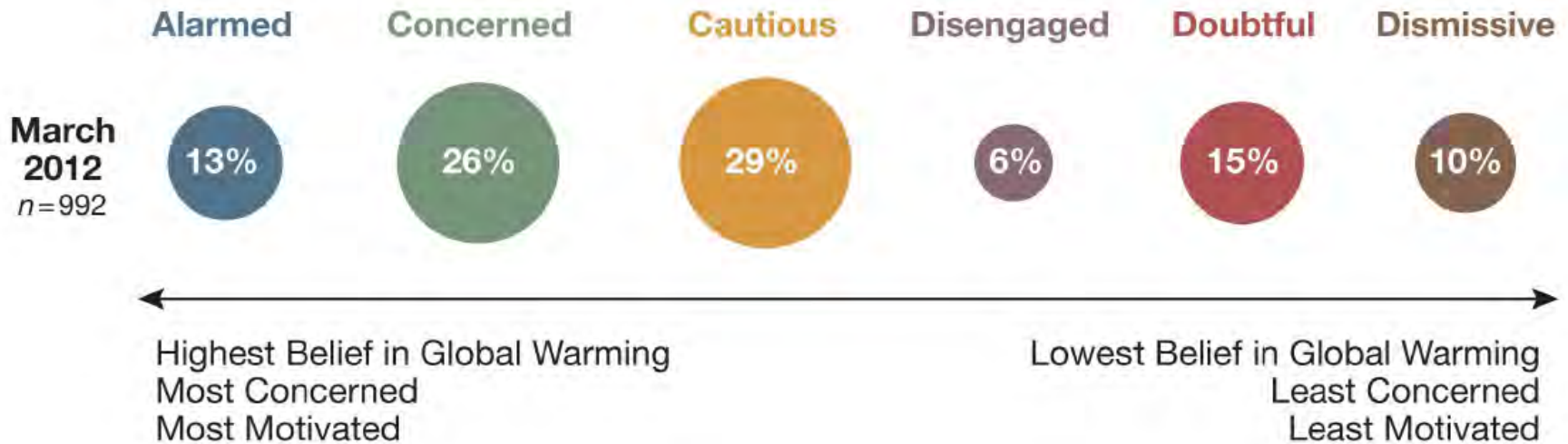
Americans Differ in Beliefs, Concerns about Global Warming

- They fall into six distinct groups.
- Each group has a set of beliefs, values, opinions and actions.
- Understanding the differences is vital to effective engagement.
- When we know what our audiences think & how they feel, we can speak to their concerns more directly.



Global Warming's "Six Americas"

Figure 1: Proportion of the U.S. Adult Population in the Six Americas, March 2012



Proportion represented by area

Source: Yale / George Mason University



Provide People with Answers to Their Questions

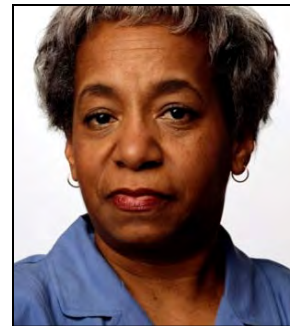
Message content should be determined by the needs and interests of your audience, not by what you are most eager to say

“If you could ask an expert on global warming one question, which question would you ask?”

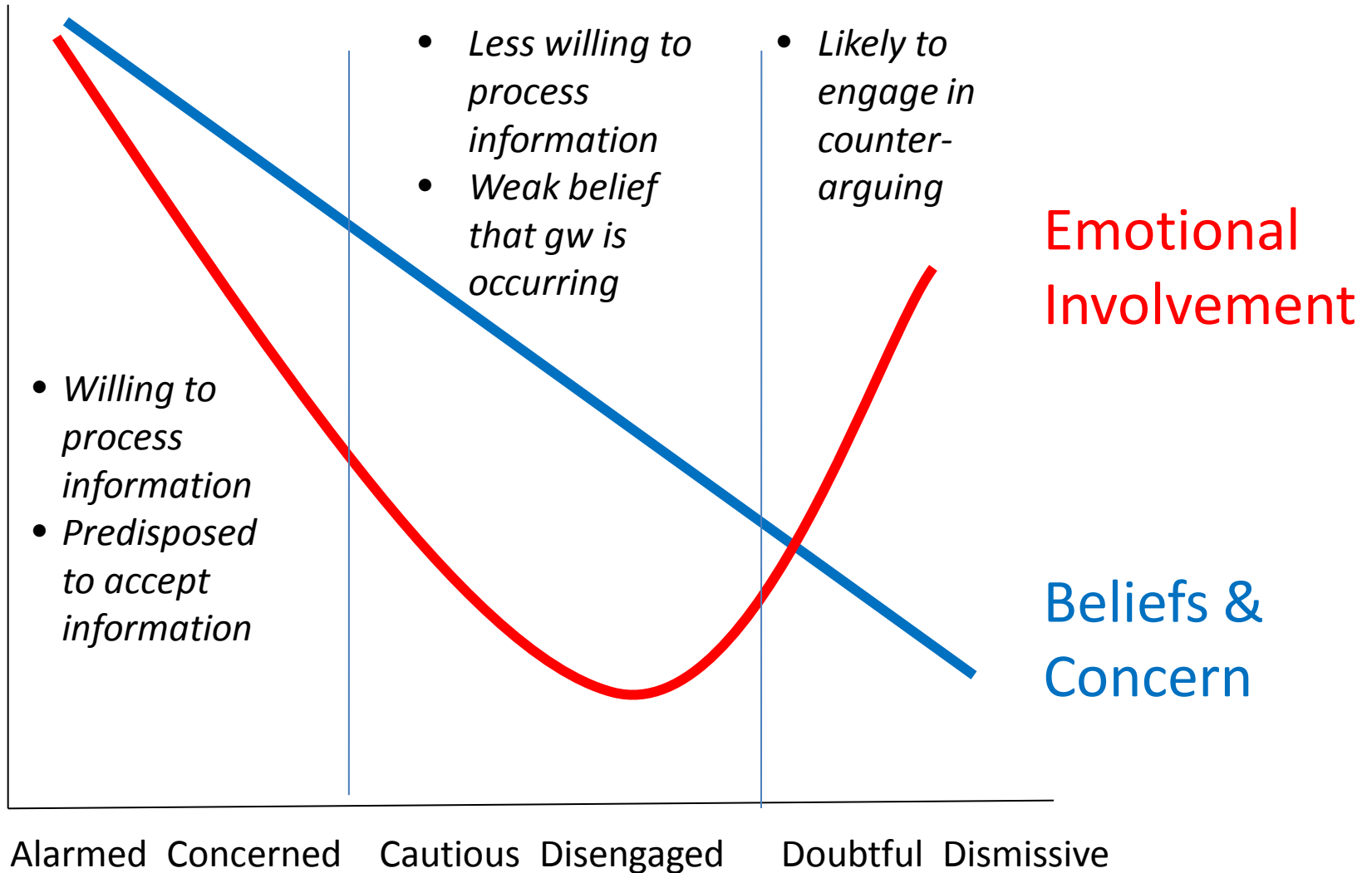
What can the US do to reduce global warming?

What harm will global warming cause?

How do you know that global warming is occurring?



Primary Differences between the Six Groups



Your Distinctive Audiences

- Private sector professionals affected by SLR (e.g., Realtors, architects, bankers, engineers; see Borberg et al.)
- Eastern shore versus southern Virginia
- Audiences affected by fire ant infestations
- Audiences affected by inundation
- Rural audiences (*“That’s where we used to have a house. Now it floods.”*)

Skip Stiles, Wetlands Watch



4C

Your Distinctive Audiences, 2

- Transient populations, e.g., military, (also student, tourist, temporary workers)

Sample challenge:

“Ninety nine percent of the time your street is dry, but it is still flood-prone because it is near X inlet, river, coast....”

Robb Braidwood, EM, Chesapeake



A satellite view of Earth showing the Americas and surrounding oceans. The text is overlaid in the center.

**WHY
COMMUNICATING
SLR IS TOUGH**

Communicating about ANY Physical Hazard: Tension-Filled

- People perceive danger through the lenses of their own experiences and values.
- Classic example: bicycle and automobile accidents kill vastly more people than do the operations of nuclear power plants.
- Many are more concerned about nuclear power plants than they are about traffic accidents.
- “Experts” and “lay” audiences view danger differently.

--Fischhoff, Slovic, & Lichtenstein, 1981



4C

Education is *Part* of the Solution

- About 20% of the public can read and understand the science section of *The New York Times* (Miller).
- About half understand probability (Miller).
- Many have not read or written the technical reports you generate.



But Respecting Community Values is Also Essential



“We often can’t just ‘educate’ our way out of science-society tension. The problem is not just lack of understanding. People do understand much of what we’re saying or want to do. They don’t like it. The conflict with their core **values** trumps their view of societal benefits.”

— Alan Leshner

American Association for the Advancement of Science,
CEO, National Academy of Science, 2013



Why Hazard Communication is Especially Difficult *for Government*

- On the one hand, society itself is principally an exercise in protection or risk management (Douglas).
 - Protection against starvation
 - Protection against dangerous animals
 - Development of agriculture in Babylon = risk management
- On the other, people do not appreciate UNSOLICITED advice on running their lives, managing their property.
 - Requested advice IS welcomed (MacGeorge).
 - What are the implications? How do you communicate SLR?





**HOW YOU
COMMUNICATE:
THE CAUSE
MODEL**

“CAUSE” Model for Risk Communication: Identifies Tensions, Goals, Options

- Lack of Confidence (in communicators)
- Lack of Awareness (of danger)
- Lack of Understanding (of danger)
- Lack of Satisfaction (with solutions)
- Lack of Enactment (of solutions)
 - Address these tensions in order. *Typically don't start with the U.*

--Rowan, 1991, 2003, 2009



The C in CAUSE

- C in CAUSE = confidence in communicators
- WHO is communicating about rising sea levels and dwindling wetlands in my community?
- What encourages talk and question asking when someone's motives are unknown?
 - Monitor-ability
 - Likeability.



Earn Confidence, 1: Listen, Respect, Create Conditions that Lead to Questions

- Listen to learn your audiences' views, concerns.
- Locate audience values you respect.
- How? ***Skip Stiles of Wetlands Watch says :***
 - “If you start with greenhouse gases, your SLR message gets fuzzed.”
 - Instead, conduct “listening sessions.”
 - Create conditions where audience asks you SLR questions.
 - Consider having skilled meeting facilitators.
 - Karen Akerlof can describe her work with facilitators.



Earn Confidence, 2: Listening Sessions

- ***Wetlands Watch*** worked with ODU to develop social marketing approach for listening sessions.
- ***Stiles***: “*I take pictures where I will be speaking to get people talking. ‘Oh, that is where Dad had his house. Now it floods.’”*
- You show people the evidence, local photos.
 - Fire ant infestations in Southern Virginia—evidence.
 - Photos encourage talk and then questions arise.
 - Have questions that encourage discussion of shared values.



Earn Confidence, 3: Respect Options, Include Stakeholders Early

- Publics have a right to know their options for managing hazards.
- Communicate where *you're* effective. *Photo: VA Beach listening session.*
- City of Virginia Beach invited public input in developing comprehensive plan.
- Also consider:
 - Coastal planning districts
 - “Sunday” pieces with reporters.



Earn Confidence, 4: Respond to Skeptics Respectfully

David Herring, NOAA science communicator:

- Don't panic. Defuse anger by asking them questions about themselves.
- If they persist, say you'll gladly address all concerns but, to be fair, you want to allow time for all.
- Invite them to write down their questions so you can follow up.
- Remember the other 75 percent of the audience is listening, watching you respond.
- See Herring's slides and presentation in the references.



The A in CAUSE

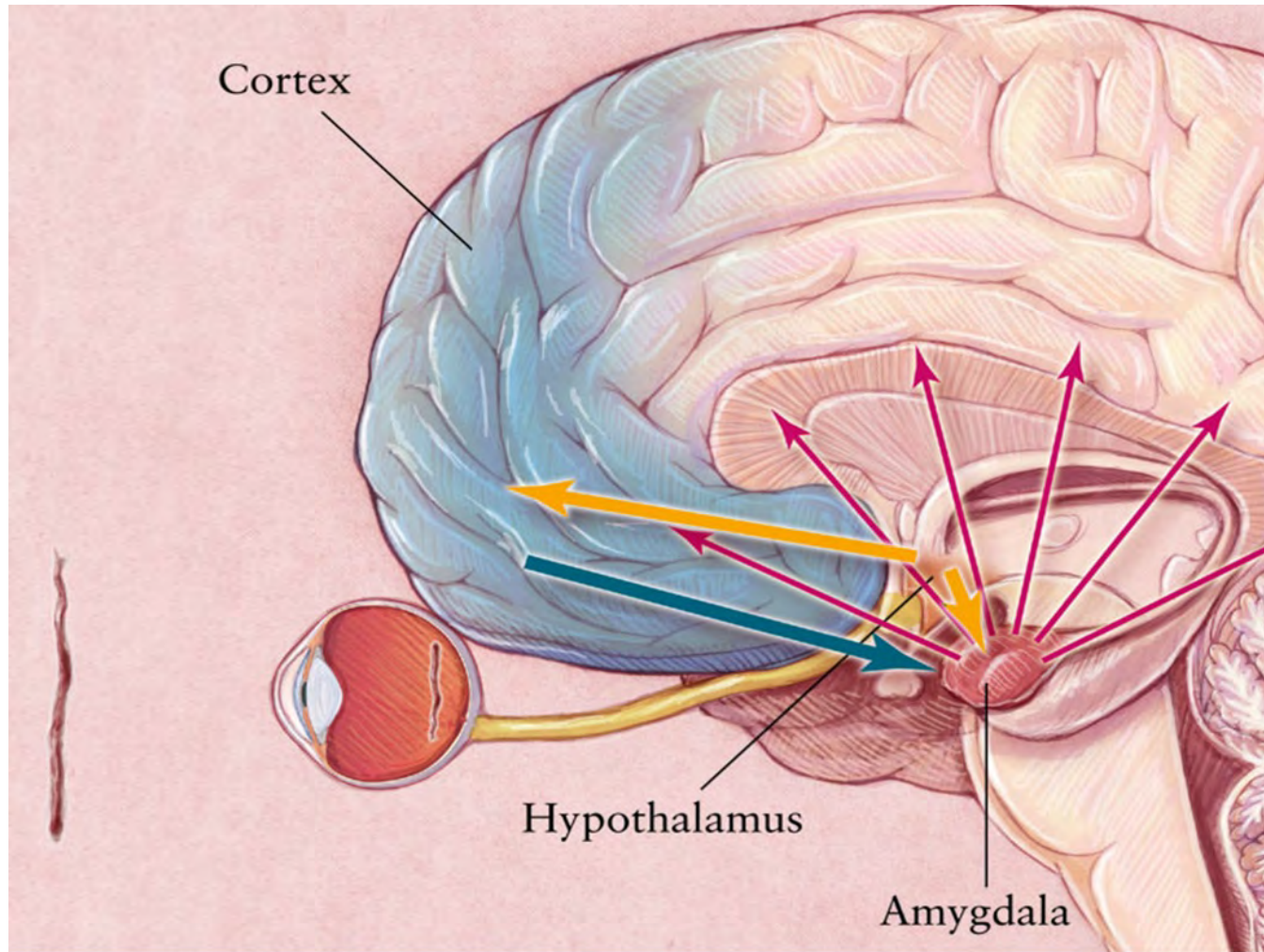
- A = awareness or “detectability” of the hazard
- Obstacles to detection
 - *lack of training*
 - *psychological inertia (prefer to focus on our chosen agenda, not the emergency or others’ priorities)*
 - *Wrong channel (print, social media, word of mouth)*
 - *Inconsistency: flooding on a blue-sky day*
 - *Lack of emotional relevance*
 - We address risks we *feel* (Weber).
- Consider our response to *immediate, “feel-able”* risk:



Immediate Risk



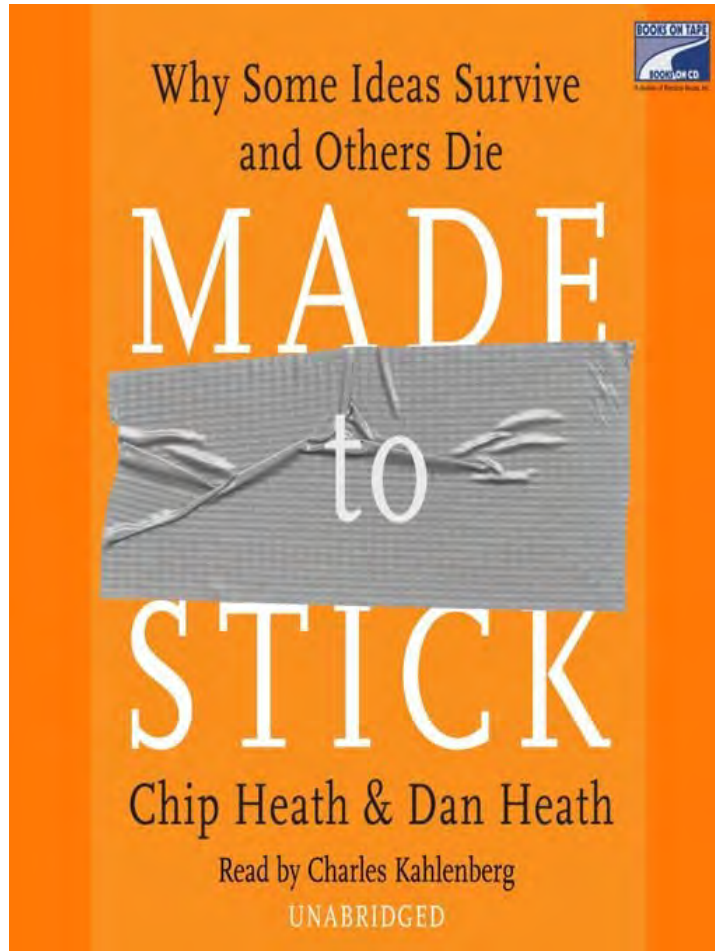
Processing Immediate Risk



4C



Create Awareness of SLR, 1: Make it Concrete



Create Awareness with

- Simple
- Unexpected
- Concrete
- Credible
- Emotional
- Stories
 - *Make slow-onset risk as concrete, precise, and emotional as possible.*
 - ***Stories people tell you may be especially effective.***



Create Awareness, 2: Enhance Detection with Signs, Maps

- Create awareness of the need for storm surge information, not just wind information when storms are predicted.

– *“Category 1 storm may have Category 3 storm surge.”*

--Robb Braidwood, EM, Chesapeake

- Develop interactive tools for detecting flood, inundation risk. For for all residents?

- *“Naval station has a noise map and noise levels are required to be disclosed to home buyers. Why would flood risk not be under similar requirements?”*

--Whitney McNamara, Planning, Environmental Sustainability, City of Virginia Beach



4C

Create Awareness, 3: Promote Visualization with Human-Scaled Metrics

- “Try measuring storm surge where people live.” (Braidwood)
 - Question: Should we measure storm surge on driveways or roads outside homes to make the height of the surge emotionally vivid?
- We should test the effectiveness of messages of this sort, especially in areas where transient populations live.



4C

Create Awareness, 4: Questions

- *When* should you use public service announcements, text alerts, and billboards?
 - To *remind* people be alert to storm surge warnings – **yes**.
 - To *teach* what storm surge means – **no**.
 - To *remind* people to get flood-risk information before buying property – **yes**.
 - To *teach or explain* why there is flood and inundation risk in certain areas—**no**.



Awareness versus Understanding

- Awareness differs from understanding
- Awareness = detect, recognize, recall, but **not** mastery
- Understanding comes closer to mastery, or the ability to use knowledge to solve novel problems
- Obstacles
 - Have participants chosen to learn?
 - Challenging words
 - Information hard to picture
 - Information hard to believe



The U in CAUSE:

Select Contexts Where Education is Sought: Some Blogs, Museums, Field Trips, In-Depth News

- Jim Gandy
- WLTX
- Columbia, SC



SETTING THE WEATHER STRAIGHT
JIM GANDY, CHIEF METEOROLOGIST
WLTX HOME WEATHER NEWS JIM'S BIO P

Global Warming = More Rain? Not Exactly

5 October 2009

The idea for this blog came from two sources. The first source was a comment on an earlier story posted in the Earth, Science, and Technology section ([to see the story click here](#)).

In the comment section, donnielex wrote:

"By the way, the article above does not inform you that global warming does not cause droughts or dry weather. Global warming would mean MORE RAIN. I would defer to Mr. Gandy on that though. Am I correct Mr. Gandy, wouldnt global warming mean more evaporation of surface water and snow

All of Jim's Blogs:

- Global Warming = More Rain? Not Exactly
- Hugo: Twenty Years Later
- Weather Now
- SNOW OR BUST
- THE SPRING 2009 OUTLOOK
- A WINTER AND DROUGHT UPDATE
- WILL IT BE A COLD WINTER?
- CLIMATE CHANGE: THE GREATEST CHALLENGE OF OUR AGE
- FEAST OR FAMINE
- THE CHANGING FACE OF BROADCAST METEOROLOGY
- WILL IT BE A HOT SUMMER?
- CLIMATE CHANGE: A PROPOSAL
- CLIMATE CHANGE: A RESPONSE
- NEW ORLEANS: THE BATTERED CITY RECOVERS
- HURRICANE SEASON 2008: 25 YEARS OF FORECASTING
- CLIMATE CHANGE: LIBERALS ARE MORONS, BUT CONSERVATIVES ARE IDIOTS
- THE TORNAIDO OUTBREAK OF SATURDAY, MARCH 15
- PIGS CAN'T FLY, BUT MOBILE HOMES CAN
- THE THRILL OF THE CHASE
- IN PURSUIT OF A TORNAIDO

wltx.com
PALMETO
BUD



Deepen Understanding, 1:

- **Substitute accessible terms, or words with appropriate associations, for scientific ones:**
 - Instead of anthropogenic, try *human-caused*
 - “Contributes” sounds minor, instead say “*Most of the change comes from human causes*”
 - Instead of “debate,” try the “*urgent challenge of climate disruption*”
 - Instead of “uncertainty,” try *range*.

Source: Hassol, *Eos*, 2008



Deepen Understanding, 2:

- Explain ideas often misunderstood
 - **Terms not well understood**
 - flooding vs. inundation
 - what counts as a wetland
 - land subsidence
 - **Complexities hard to envision**
 - How it is that my usually dry driveway could flood
 - Why and where land subsidence occurs
 - **Ideas hard-to-understand because counter-intuitive**
 - That a “normal” gas like CO₂ could be harmful at certain levels.
 - That humans could affect entities as vast as oceans.

Sources: Hassol, 2008; Rowan, 1999, 2003a,b, 2009



4C

Deepen Understanding, 3: Explain Key Terms

- Say what a word does NOT mean
 - Climate does *not* equal weather.
 - Humanly caused climate change is *not* the same as natural climate variability.
 - Wetlands are *not* just any wet land.
- Say what it DOES mean.
 - Climate refers to the weather of a region averaged over some period of time.
 - Wetlands have distinct vegetation that filters impurities.



Deepen Understanding, 4: Explain Key Terms (cont'd)

- Give a *RANGE* of examples, not just one.
 - Some say climate is the difference between Boston and the Bahamas or the difference between Alaska and Alabama.
 - Wetlands are found in inland and coastal areas.
- Discuss a *false example*, and explain why it is false.

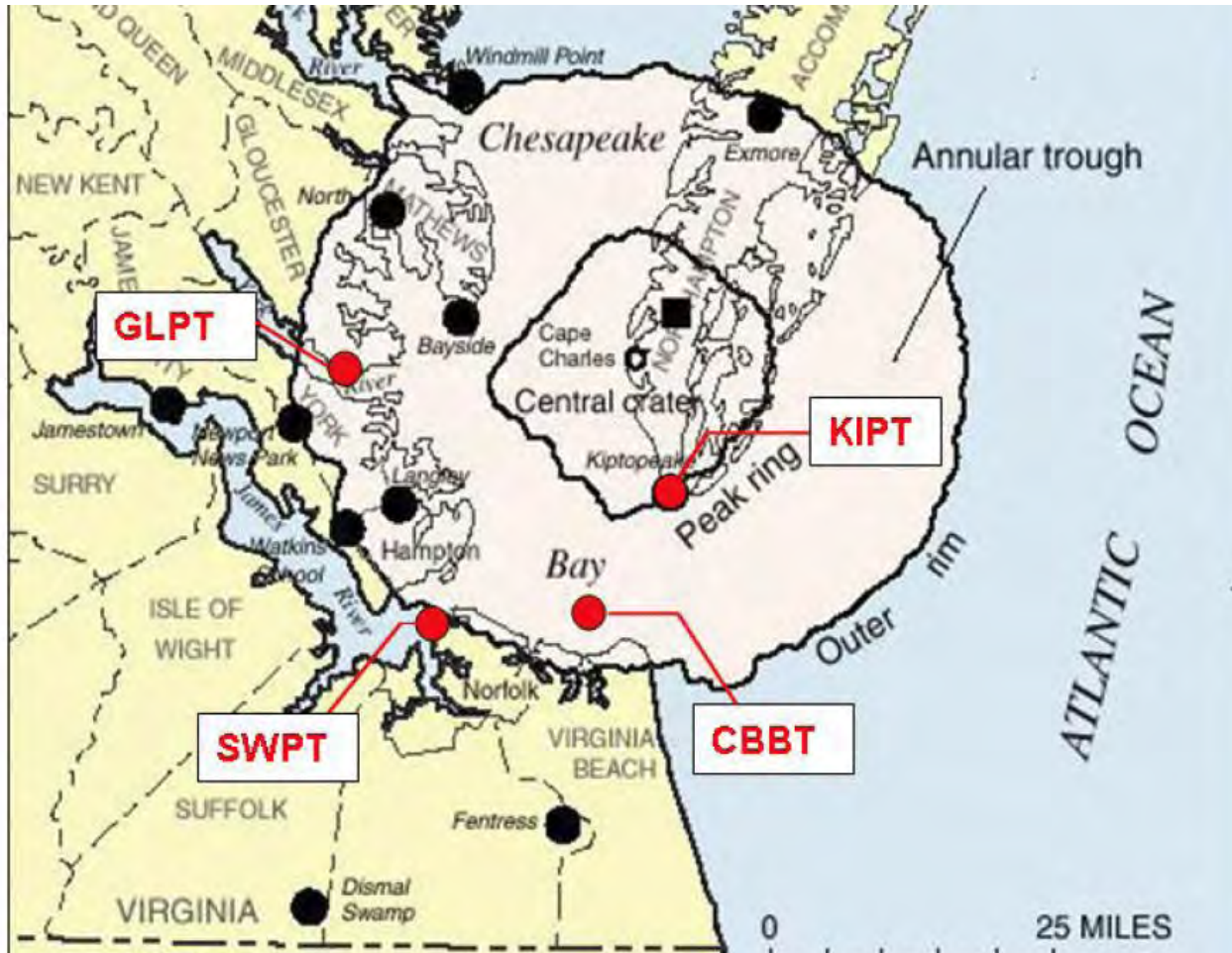
Some wonder if land simply moistened by rainfall could count as wetland. That cannot be because the distinct forms of vegetation that allow wetlands to filter impurities, just as kidneys filter impurities for animals, would not exist on such land.



Deepen Understanding, 5: Use Visuals to Build 'Mental Models'



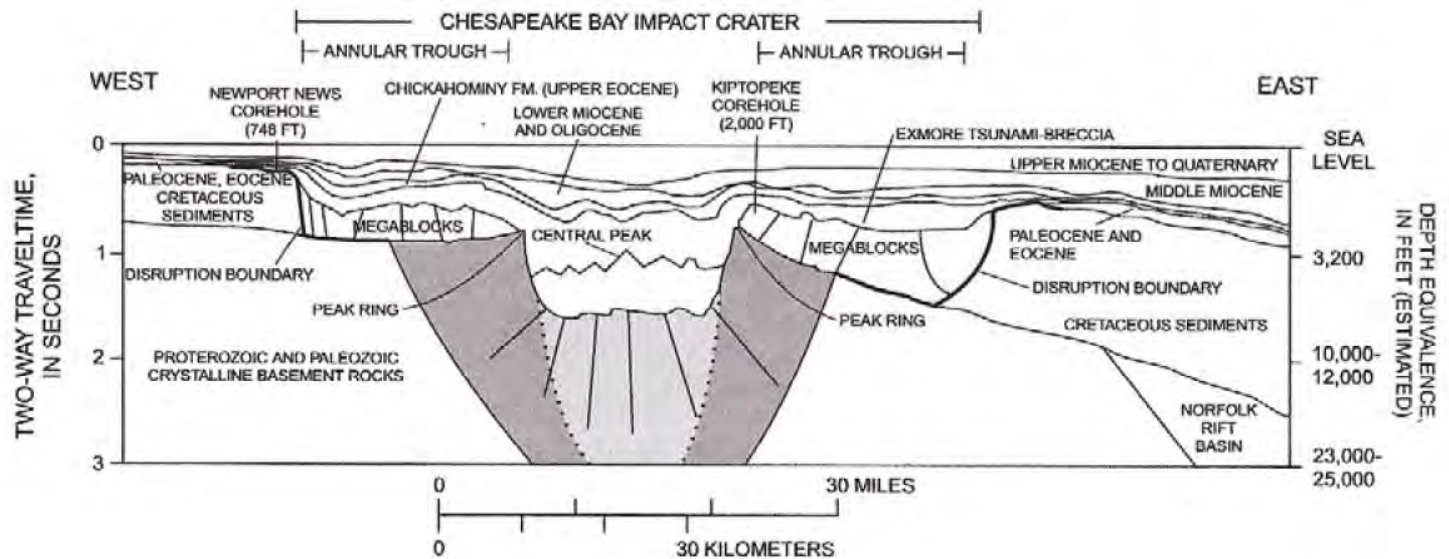
Deepen Understanding, 6: Near-Generalist Graphic Impact Crater



4C



Deepen Understanding, 7 Specialists' Graphic of Impact Crater



4C

Deepen Understanding, 8: Use Model-Evoking Language

- Linger over the graphics to assist audiences in building their “mental models” (Morgan, Mayer).
- Find analogies and other “*model building language*” to answer likely questions:
 - Likely question: How do they know the crater is there?
 - *Possible answer:*
 - Geologists take core samples.
 - Core samples are like the layers in a “layer cake”:
 - Layers have distinct features.



Deepen Understanding, 9: Address Hard-to-Believe Notions

- People have “lay theories” about familiar aspects of life: weather, disease, etc.
- Research on lay theories in physics education
- Possible examples of erroneous lay theories:
 - Since carbon dioxide is natural, it must be good.
 - The ocean is too vast for humans to alter.
 - Since I am allowed to build here, someone has carefully determined that it is wise to do so.



Deepen Understanding, 9: Address Lay Theories

- State the lay theory and acknowledge its apparent reasonableness
 - Some have not personally experienced flood damage so it may seem there is no danger.
- Create dissatisfaction with the lay theory
 - We are learning more about the impact crater and other geologic forces causing the Hampton Roads coast to sink. Take a look at this graphic of the crater. See how close it is to you.
- Explain the orthodox science
 - The impact crater is just one reason why sea level rise is a concern in this area. By taking core samples, scientists learn about land in this area. That work is showing there are several reasons why the land is sinking.



4C

The S in CAUSE

- S (satisfaction with solutions):
 - Communication with communities about sea-level rise is principally a *values discussion, not a science lesson or a scientific debate* (Herring).
 - Therefore, we should support communities in coming to consensus about their priorities (McComas).
 - Obstacles:
 - Peers' beliefs
 - Perceived consistency of plan with my values, views.



Gain Satisfaction

- Research says people are satisfied when
 - They believe the hazard is SEVERE
 - They believe the hazard affects THEM (local)
 - They believe they CAN OVERCOME the hazard
 - They believe the recommended action will work.

--Witte



4C

Gain Satisfaction, 2:

- Focus on solutions feasible in your community.
 - Ban development along coasts?
 - Entice development away from coasts?
 - Plant more trees along coasts?
 - See Akerlof's www.FutureCoast.info for materials to guide citizens in considering sea-level rise management options.
 - The “Issue Book” on this site is a useful tool.



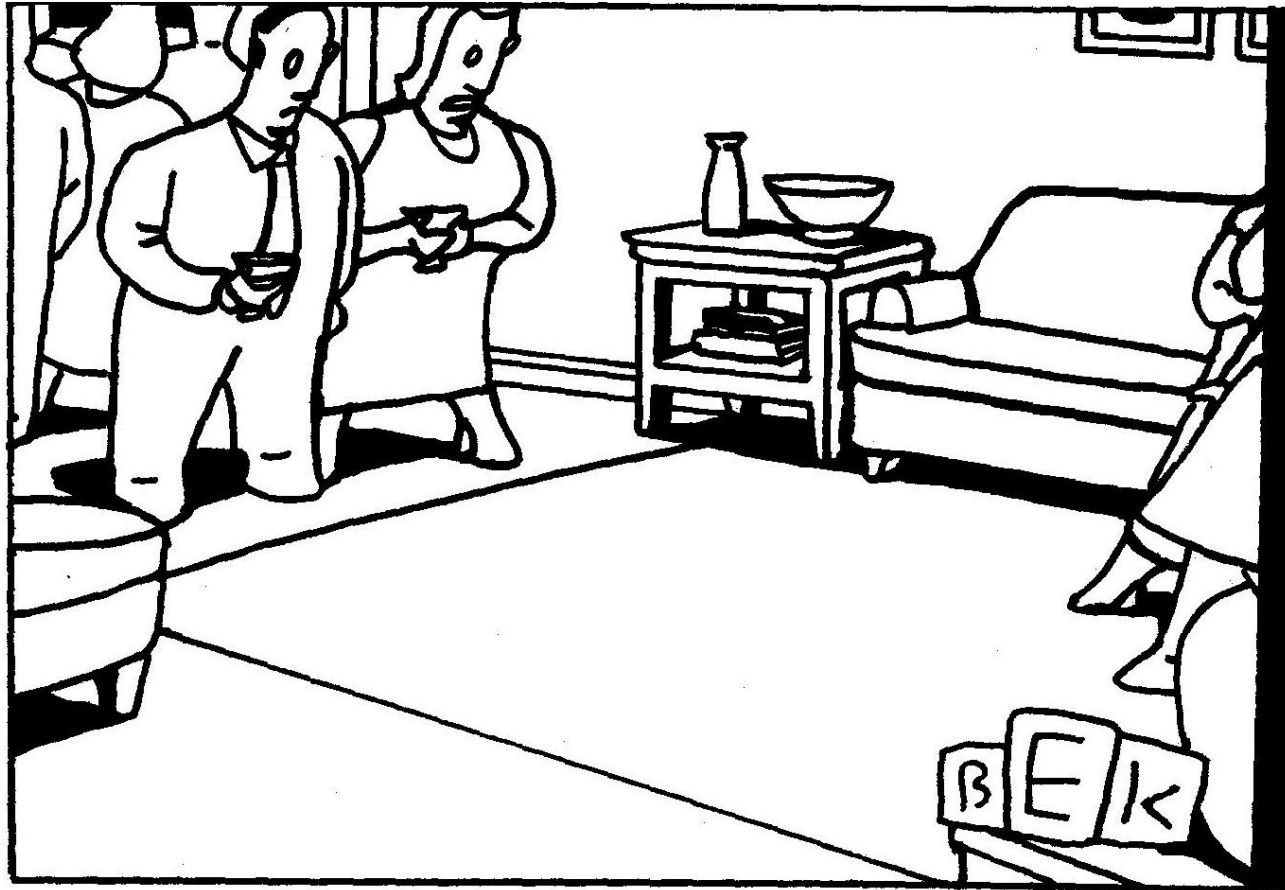
Gain Satisfaction, 3: Build New Social Norms

- *Emphasize prevalence*: “Many are doing the right thing.”
- *Show approval*: “Trusted sources believe it’s the right thing to do.”
- Messages that say many take the wrong steps extinguish the behaviors you want to increase.
- One person’s actions may influence 1,000 others (Fowler, 2009)



Gain Satisfaction, 4:

Suggest that environmentally friendly beliefs and behaviors are prevalent and trendy.



“Oh God, here they come—act green.”

The E in CAUSE

- E stands for *enactment* or moving people from agreement to action.
- Obstacles: new habits take months to build, even when desire to adopt behavior exists.
- A habit to build: accept speaking engagements.
 - Waiting for all facts to communicate about sea level rise seems dangerous.
 - Instead, find ways to have listening sessions as well and accessible explanations.
- Habits for others to build: Make them *simple*.
 - Encourage key stakeholders to seek SLR information.
 - Put SLR reports, information on convenient websites, in grocery stores, and other accessible places.



Motivating Enactment

- Act by partnering on communication. Tap
 - Universities
 - TV Meteorologists
 - Local professionals.
- Act by supporting journalists you respect.
 - Invite them to coastal planning district meetings.
 - Place information on a website for easy access.
 - Suggest a series on sea level rise.



Overall, Create discussion.

Consider. Is it a C-A-U-S or E situation?

***“If you could ask an expert on sea level rise one question,
which question would you ask?”***

What can we do to
reduce sea level rise?

What harm will sea
level rise cause?

How do you know that
sea level rise is
occurring?



Summary

- Consider the challenges raised in this presentation.
- Are they the main SLR communication challenges for your region?
- How might you use the CAUSE Model to think about communicating sea level rise?
- How can you benefit from the expertise in this region and in this room for effective sea level rise communication?



4C

References

CAUSE Model, Risk Communication, Science Communication

- Akerlof, K. L., Rowan, K. E., Fitzgerald, D., & Cedeno, A. Y. (2012). Communicating climate projections in U. S. media: Politicization of model uncertainty. *Nature Climate Change*, 2, 648-654.
- Graduate Programs in Science Communication at Mason: <http://communication.gmu.edu>
- Mayer, R. E. (1983). What have we learned about increasing the meaningfulness of science prose? *Science Education*, 67, 223-237.
- Miller, J. (2004). Public understanding of, and attitudes toward, scientific research. *Public Understanding of Science*, 13, 273-294.
- Rowan, K. E. (1991). Goals, obstacles, and strategies in risk communication: A problem-solving approach to improving communication about risks. *Journal of Applied Communication Research*, 19, 300-329.
- Rowan, K. E. (1999). Effective explanation of uncertain and complex science. In S. Friedman, S. Dunwoody, & C. L. Rogers (Eds.), *Communicating New and Uncertain Science* (pp. 201-223). Mahwah, NJ: Erlbaum.
- Rowan, K. E. (2003a). Informing and explaining skills: Theory and research on informative communication. In J. O. Greene & B. R. Burleson (Eds.), *The Handbook of Communication and Social Interaction Skills*. Mahwah, NJ: Erlbaum.
- Rowan, K. E., et al. (2003b). The "CAUSE" model: A research-supported guide for physicians communicating cancer risk. *Health Communication: Special Issue on Cancer Communication*, 15, 239-252.
- Rowan, K. E., et al. (2009). Risk communication education for local emergency managers. In R. Heath & D. O'Hair (Eds.), *Handbook of Risk and Crisis Communication*. NY: Taylor & Francis.



References

Climate Change and Communicating Climate Change

- Hassol, S. (2008, March). Improving how scientists communicate about climate change. *Eos*, 89, 106-107.
- Herring, David.
(http://www.nws.noaa.gov/om/csd/index.php?section=seminar&page=semserContent&speaker=semser_20130626_herring_david).
- Maibach, E. W., Roser-Renouf, C., & Leiserowitz, A. (2008). Communication and marketing as climate change—Intervention assets. *American Journal of Preventive Medicine*, 35, 488-500.
- [IOM] Institute of Medicine (2008). *Global climate change and extreme weather events: Understanding the Contributions to Infectious Disease Management*. Washington, DC: National Academies Press.
- Sommerville, R. C. J., & Hassol, S. J. (2011, October). Communicating the science of climate change. *Physics Today*. www.physicstoday.org
- Weber, E. U. (2007). Experience-based and description-based perceptions of long-term risk: Why global warming does not scare us yet. *Climate Change*, 77, 103-120.



References

Communication and Health Psychology

- Fowler, J. H.; Christakis, N. A (3 January 2009). "[Dynamic Spread of Happiness in a Large Social Network: Longitudinal Analysis Over 20 Years in the Framingham Heart Study](#)" (PDF). *British Medical Journal* **337** (768): a2338. doi:10.1136/bmj.a2338. PMC 2600606. PMID 19056788.
- Heath, C., & Heath, D. (2007). *Made to Stick: Why Some Ideas Survive and Others Die*. New York: Random House.
- MacGeorge, E., et al. (2004). Understanding advice in supportive interactions. *Human Communication Research*, 30, 42-70.
- Witte, K., et al. (2001). *Effective Health Risk Messages*. Thousand Oaks, CA: Sage.

Deliberating with Stakeholders about Priorities, Preparedness

- Besley, J. & McComas, K. (2005). Framing justice. *Communication Theory*, 15, 414-436.
- McComas, K. A., Arvai, J., & Besley, J. C. (2009). Linking public perception and decision making through risk communication. In R. Heath & D. O'Hair (Eds.), *Handbook of Risk and Crisis Communication*. New York: Routledge.



References

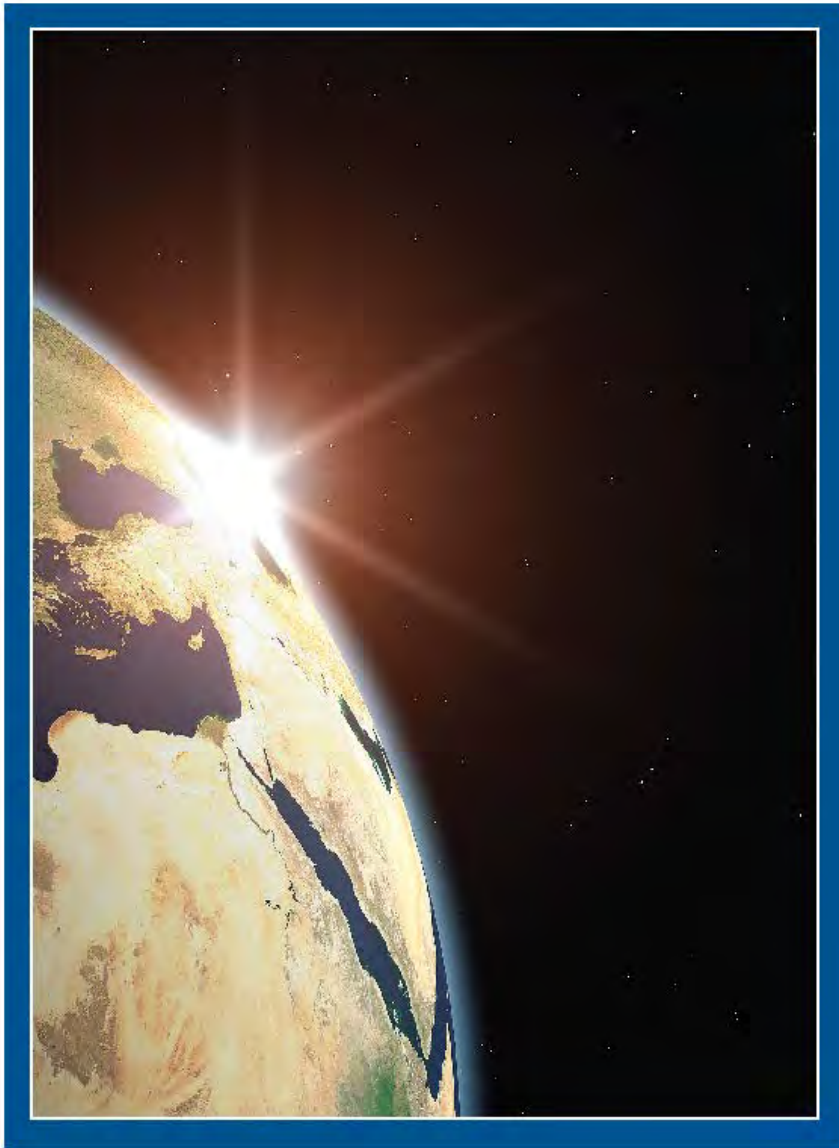
Risk Communication: Classic Approaches and Overviews

- Douglas, M. (1985). *Risk and acceptability*. NY: Routledge.
- Fischhoff, B., Slovic, P., & Lichtenstein, S. (1981). Lay foibles and expert fables in judgments about risk. In T. O’Riordan & R. K. Turner (Eds.), *Progress in Resource Management and Environmental Planning*. New York: John Wiley.
- Morgan, M. G., Fischhoff, B., Bostrom, A., & Atman, C. J. (2002). *Risk communication: A mental models approach*. Cambridge: Cambridge University Press.
- Pidgeon, N., Kasperson, R. E., & P. Slovic (Eds.), *The Social Amplification of Risk*. Cambridge, UK: Cambridge.
- Ripley, A. (2008). *The Unthinkable*. New York: Crown.
- Rowan, K. E. (2010), Risk, an overview. In S. H. Priest (Ed.), *Encyclopedia of Science and Technology Communication*. Thousand Oaks, CA: Sage.
- Sandman, P. (1993). *Responding to Community Outrage*. Fairfax, VA: American Industrial Hygiene Association.

Sea Level Rise, the Science

- Boon, J.D., Brubaker, J.M., & Forrest, D. R. (2010). *Chesapeake Bay land subsidence and sea level change: An evaluation of past and present trends and future outlook*. Virginia Institute of Marine Science, Gloucester Point, VA. [source for graphics in slides 38, 39]





Katherine E. Rowan
Karen Akerlof
Connie Roser-Renouf
Teresa Myers
Edward W. Maibach, Director
George Mason Center for Climate
Change Communication

Anthony Leiserowitz
Nicholas Smith
Yale Project on Climate Change
Communication

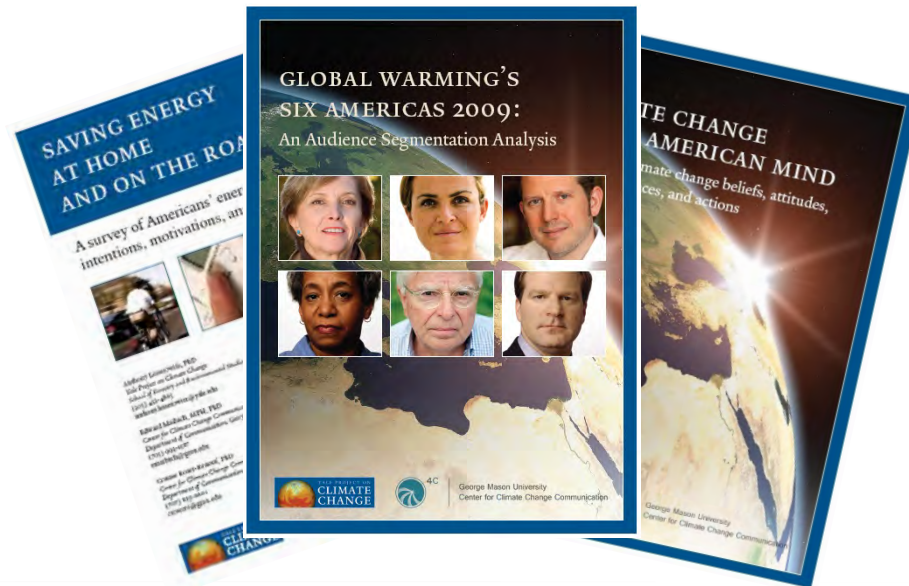
Many thanks to all generous
funders of this research.

<http://climatechange.gmu.edu>

<http://research.yale.edu/environment/climate>

All 4C reports can be downloaded at:

Climatechangecommunication.org



4C

George Mason University
Center for Climate Change Communication