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George Mason University
Center for Climate Change Communication

Communicating Risks of Sea-Level Rise: The CAUSE Model

Katherine E. Rowan
krowan@gmu.edu

Southern Association of Marine Laboratories
Virginia Institute of Marine Science
Gloucester Point, VA
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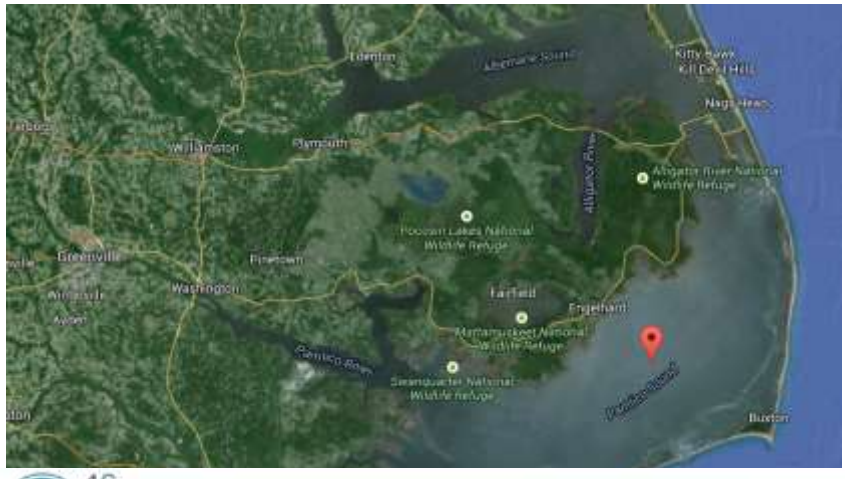
Your Thoughts

- ***Dr. Valentine, Dauphin Sea Island Lab, AL***: Sea-level rise ***not viewed as a real issue***, but there is interest in *flood insurance rates & projected SLR*
- ***Dr. Rabalais, Louisiana Universities Marine Consortium***: South Louisiana residents see lands eroding before them…They want answers that allow them to keep the same lifestyle.

Your Thoughts, 2

- **Dr. Burnett, Grice Marine Lab, College of Charleston**: Look at *real estate* in Charleston. Selling of homes in flood-prone areas will be our beacon on public perception of SLR.
- **Dr. Eggleston, NC State Center, Marine Sciences, Tech**: Interesting situation: NC's Nature Conservancy team [along with partners]… fill-in ditches and plant vegetation along western shore of Pamilico Sound. www.coastalresilence.org

North Carolina's Pamlico Sound



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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

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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.



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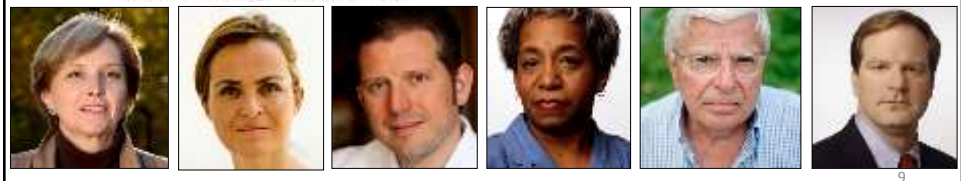
Global Warming's "Six Americas"

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



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Yale/George Mason, March 2012; N=992

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?"

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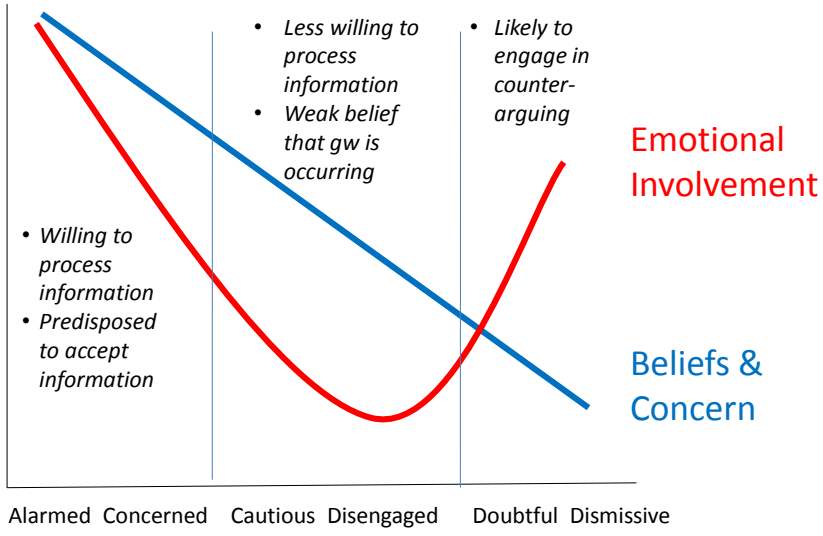
Yale & George Mason, June 2010

Primary Differences between the Six Groups



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WHY COMMUNICATING SLR IS TOUGH

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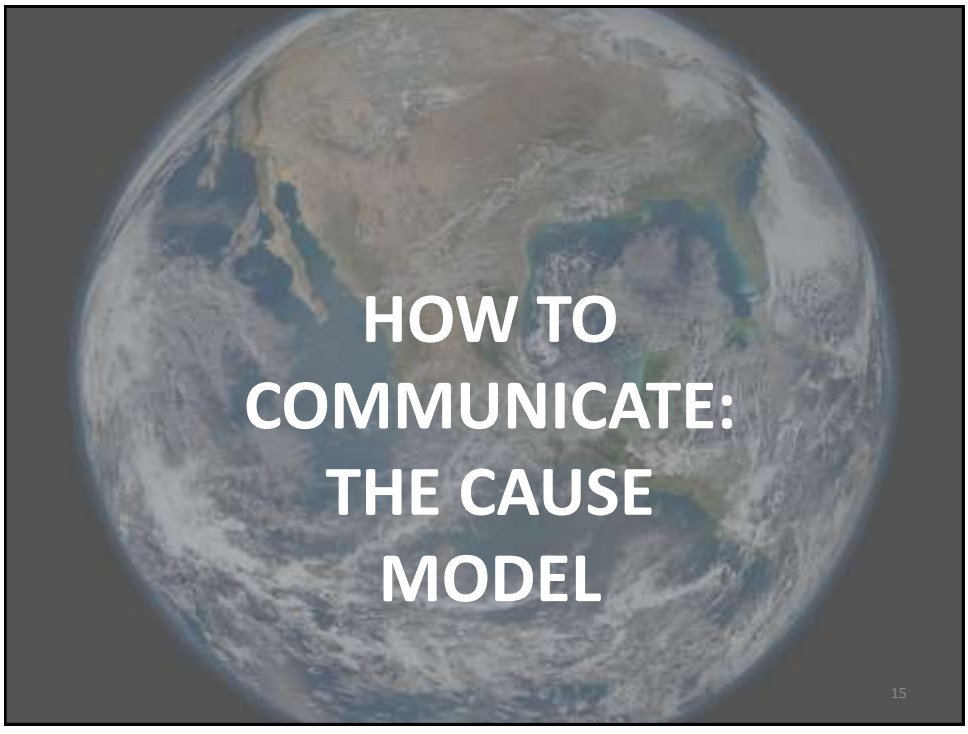
Scientists: Media Coverage Frustrating

- Cynicism, frustration, anger
  - Understandable feelings among scientists
  - Life's work may be distorted or trivialized
  - Vital information goes unreported
  - What ARE best practices for gaining
    - Attention
    - Understanding
    - Agreement
    - Action?

More Frustrations

- Garnering community attention for environmental hazards is difficult
  - Environmental hazards often *chronic*, not acute
  - Media, community focus on *acute* matters.
- Science is *a lot of work*.
- So is communication.



"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

Obstacle to Earning Confidence: Paternalism

- On the one hand, society itself is principally an exercise in protection or risk management (Douglas).
  - Protection against starvation, 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 (Pidgeon & Fischhoff; MacGeorge).
  - Therefore, *create conditions where advice welcomed*

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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
    - Post photos of flooding, fire ants.

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Earn Confidence, 2: 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.

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Earn Confidence, 3: Build Capacity, Infrastructure

- Baruch Fischhoff at Carnegie Mellon has worked for years on risk communication
- Fischhoff says natural scientists should partner with
  - Social scientists
  - Communication professionals
    - Journalists whom you respect
    - PR professionals
  - Community leaders (Pidgeon & Fischhoff).

Fischoff

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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)*
  - *Lack of emotional relevance*
    - We address risks we *feel* (Weber).
- Consider our response to *immediate, "feel-able"* risk:

Immediate Risk

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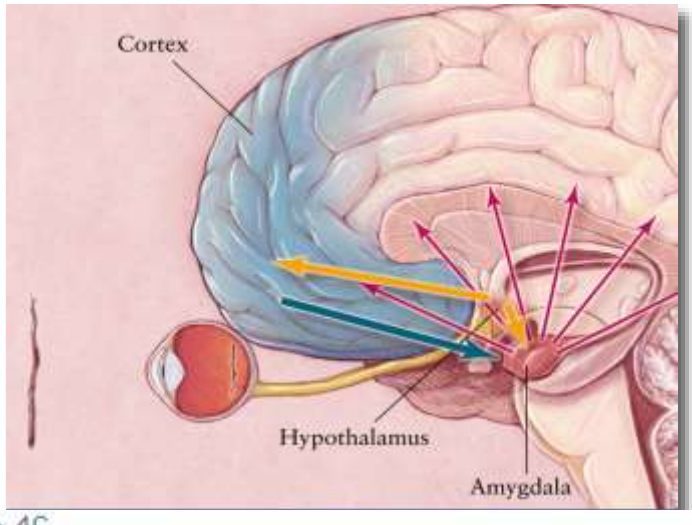
Processing Immediate Risk



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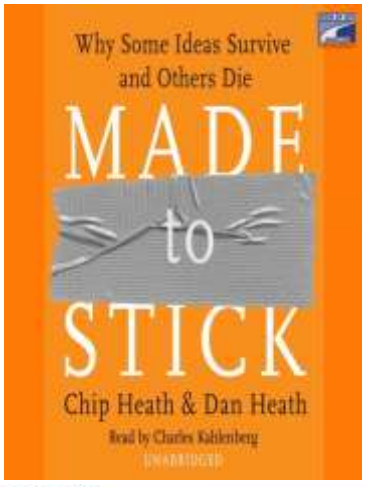
Create Awareness of SLR, 1: Make it Concrete



Create Awareness with

- **S**imple
- **U**nexpected
- **C**oncrete
- **C**redible
- **E**motional
- **S**tories
  - *Make slow-onset risk as concrete, precise, and emotional as possible.*
  - ***Stories <u>people tell you</u> may be especially effective**.*

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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 I storm may have Category 3 storm surge.*"
    --Robb Braidwood, Emergency Manager, Chesapeake, VA
- Develop interactive tools for detecting flood, inundation risk.
  - For for all residents?
  - Are these tools in hands of home buyers in your region?
- *Naval station [in Norfolk area] has a noise map and noise levels are required to be disclosed to home buyers. Why would flood risk not be under similar requirements?*"

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

- "Try measuring storm surge where people live." (Braidwood, emergency manager)
  - 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.
- Since sea-level rise is not an immediate risk, but instead a *slow-onset one*, we especially need human-scaled metrics to detect it.

Awareness versus 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

Deepen Understanding, U in CAUSE: Locate contexts where learning sought

- *Informal* science learning is ***voluntary***.
  - Hiking, cooking, Internet, television, fishing
  - Museums, science centers

Raleigh, NC, Natural History Museum

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An Informal Science Learning Environment: Facebook

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Sample Climate Science Education Blog Entry from Denver TV Meteorologist

- "We are now seeing trends that are consistent with a warming of the Earth. Experts at the National Center for Atmospheric Research (NCAR) feel that 90 to 95% of what we see in the wide variety of weather is due to natural variability. The remaining 5 to 10% is due to the warming of the planet due to an increase in various greenhouse gases. . . .
-

Denver's Mike Nelson Blog entry, cont'd

- "Of course, 5 to 10% of the change may not seem like much, but consider what that can mean in terms of tangible measurements. A 5 to 10% drop in crop yields over the long haul would have a huge impact on agri-business in our state and across the nation. A 5 to 10% drop in snowpack in future decades would be a major concern for Colorado …….

Entry by Mike Nelson,
Meteorologist, KMGH TV Denver
Re-posted by Dan Satterfield, Meteorologist, Salisbury, MD

http://blogs.agu.org/wildwildscience/2013/04/12/denver-meteorologist-mike-nelson-climate-change-guest-post/

The U in CAUSE

- **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 "uncertainty," try *range*.

Source: Hassol, *Eos*, 2008

- **Diagnose the principal source of confusion:**
  - **Hard word? Hard to picture? Hard to believe?**

Source: Rowan, 1999, 2003

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Explain Key Terms with Four Steps

- 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.
  - An aquifer is *not* an underground river.
- Say what it DOES mean.
  - Climate refers to regional weather averaged over time.
  - Wetlands have distinct vegetation that filters impurities.
  - Aquifers are underground layers of rock saturated with water that can be surfaced through natural springs or by pumping.

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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.
  - Aquifers may be water-saturated rock, sand, clay or other materials.
- 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.

TV Meteorologist Mike Nelson Enacting these Four Steps

"It's actually not a difficult stretch to go from weather to climate. . . **[Step 1 & 2, what x is not, what it is]** Well, weather first being a short term, fast changing, then climate of course being much longer term. I'll use an analogy here. This time of year, football season, that weather is to climate as to one play in a football game to the entire season for all the teams.

And so you can't decide that just because . . .[of] this weather event . . .we're having global warming . . . That's absolutely not correct.

Nelson Explaining Key Term (cont'd)

[**Steps 3 & 4: Give a range of examples and illustrate concept's correct and false use**] . . . Just because the greatest player in the league struck out, or threw an interception, doesn't mean they're not the greatest player in the league over the long term. . . .

Too often . . . people [wrongly] say, well how's it climate change? It was 10 below zero this morning. it can't be global warming."

Interview: Mike Nelson

Chief Meteorologist, KMGH TV Denver

Step 5:
Preview to help build mental models

Virginia Sea Grant Fellow
Mark Stratton on what affects fish.

Nelson helping audiences build mental models

- "A good analogy for this is to consider the impact of steroid use by a professional athlete. The talent and work ethic of the athlete is responsible of 90-95% of what we witness on the playing field. The added "juice" of the steroid accounts for that extra power that can result in faster times or more home runs.....

Deepen Understanding, 6: Use Visuals to Build 'Mental Models'

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Deepen Understanding, 7: Use simple diagrams

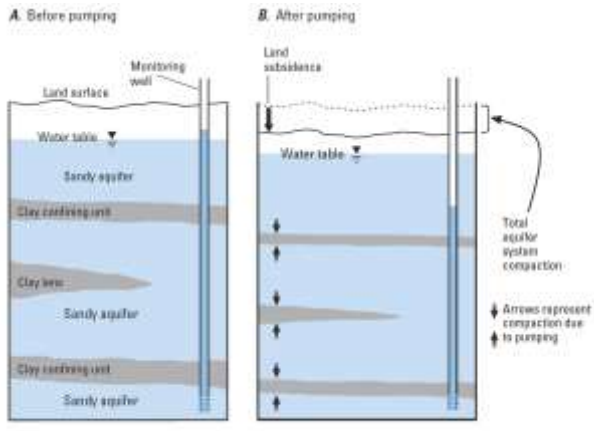

Figure 10. Aquifer-system compaction caused by groundwater withdrawals *A*, before and *B*, after pumping. Modified from Galloway and others (1999).

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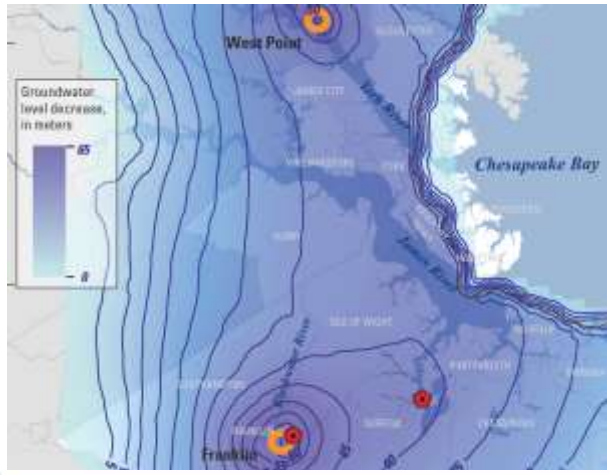
Visualizing groundwater decrease & land subsidence, Eggleston & Pope, 2013



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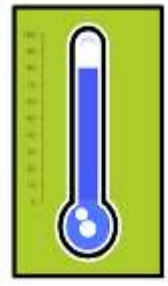
Help Audience Envision How Heat-Trapping Gases Cause SLR

- Heat-trapping gases raise the temperature of surface waters.
- When heated, surface waters expand.
- Recall an old-fashioned thermometer. When placed near heat, the mercury in the thermometer expands and rises.
- This process is called thermal expansion.



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The S in CAUSE

- S (satisfaction with solutions):
  - Communicating climate change is a *values discussion*, *not principally a science lesson or a scientific debate* (Herring).
  - Support communities in coming to consensus about *<u>their</u>* priorities.
  - Offer a variety of solutions, e.g.,
    - Ban development on coasts
    - Encourage inland development
    - Plant trees on coasts.

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The S in CAUSE, 2: Locate 'Positive Deviants'

- Consider a study to locate 'positive deviants'
  - *Positive: Thoughtfully manage, cover*
  - *Deviant: Not normative*
- Locate communities where hazard managed well
  - *Pamlico Sound, North Carolina*
  - Locate environmental journalists whose coverage you admire or your media office admires
- Consider alumni who know relevant science

The S in CAUSE, 3

Focus on what's ***right*** about climate-management in your region

- When science becomes politicized, the emotions scientific words evoke may hinder progress.
- Dan Kahan at Yale says the best step is to support the normal, day-to-day work of communities
  - Kahan: Make sea-level rise and climate change mundane everyday matters like garbage collection.
  - Kahan: Focus on community's concerns, not the words "climate change" or "sea-level rise."
  - See "Kahan, cultural cognition, Yale" for information.

The E in CAUSE

- E stands for *enactment* or moving people from agreement to action.
- Recommend *simple* next steps for audiences.
  - Encourage key stakeholders to seek information.
  - Put reports, information on convenient websites, in grocery stores, and other accessible places.
  - Invite colleagues to campus to speak or listen.
  - Support planting trees in community, coastal settings.
  - Encourage involvement in sharing information, in scientific research.

Motivating Enactment

Partner:

- Identify colleagues eager to attend community meetings
- Support extension agents (land grant, Sea Grant)
- Work with the Nature Conservancy
- Tap public relations and journalism students
- Support journalists you respect.
  - Place information on a website for easy access.
  - Work with journalists & communities on
    - Drinking water and flood management
    - Savvy, local solutions to environmental challenges.

In Summary, to Communicate Sea-Level Rise

- Embrace Fischhoff's team approach
  - Partner with communication scholars
  - Partner with your institution's media relations office
  - Partner with your state's Sea Grant extension offices.
- To reduce the chances that your message is sensationalized, ignored, or rejected, use C – A – U –S – E to identify challenges and research-backed approaches.
- With these steps, you increase your opportunities to communicate se-level rise and other coastal hazards effectively.

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