



Forest managers' response to climate change science: Toward understanding the cognitive impacts of boundary objects at the management-research interface



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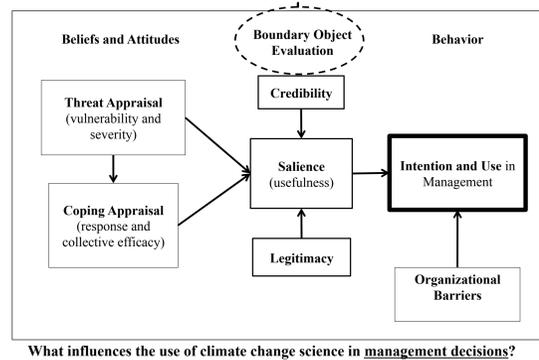
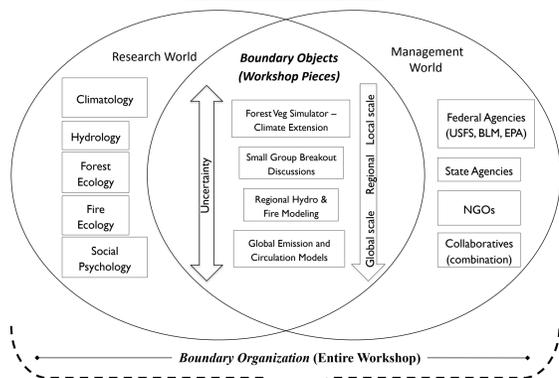
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OBJECTIVES

Objectives: Advance the exchange of climate change information across the research-management boundary. We sought to understand (1) how information transfer methods (i.e. boundary objects) influence willingness to integrate climate change research into management actions, and (2) what barriers limit the usefulness of climate science in forest management decisions.

CONCEPTUAL MODEL



Background: Land managers, policy makers, and community officials lack local-scale climate change science and are urgently calling for research to inform management decisions. Nevertheless, a substantial disconnect remains between emerging scientific information and its application in management decisions.

REFERENCES

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ACKNOWLEDGEMENTS

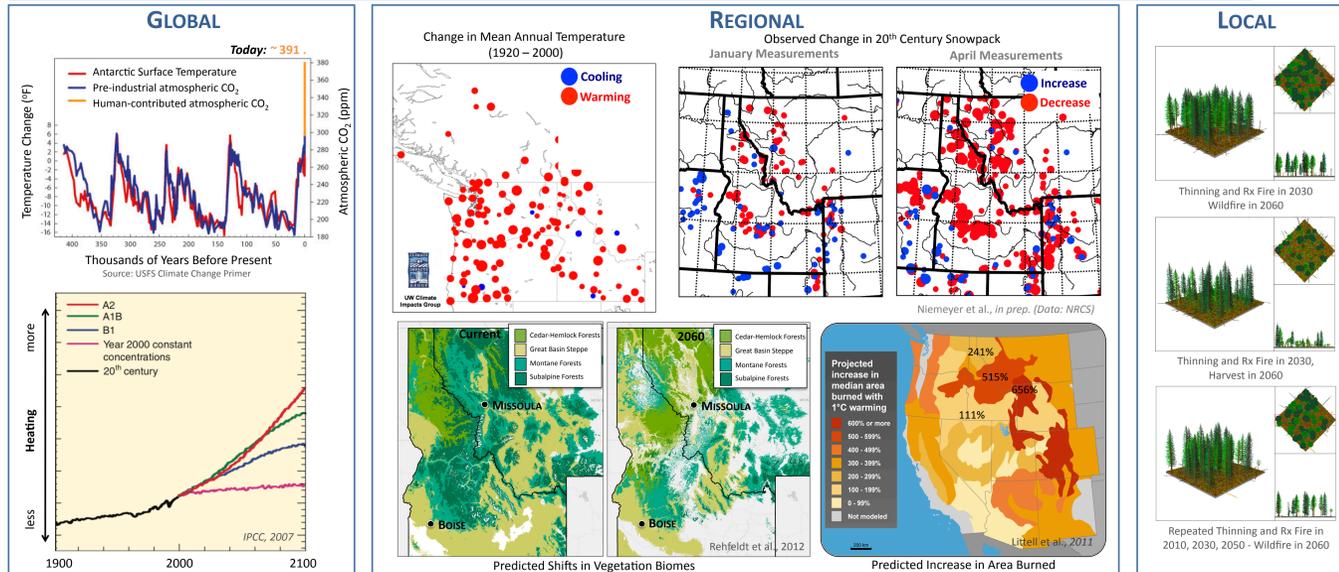
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METHODS

(1) **PRE- AND POST-WORKSHOP SURVEY:** Four main topics with 35 items ranked on a Likert-type scale (e.g.: -3 to +3)

- **Response Efficacy (RE):** How EFFECTIVE are different management actions for adapting to and mitigating climate change impacts?
- **Collective Efficacy (CE):** How likely is it that the organization/agency you work for WILL TAKE ACTION to reduce these potential impacts?
- **Credibility (CRED):** Is climate change information CREDIBLE (accurate/valid) enough to use in land-use planning and management projects?
- **Usefulness (USE):** How USEFUL is climate change science for land-use planning and management projects?

(2) **WORKSHOP PROCESS:** Three presentations focusing on different scales of information with small group discussions



(3) **BREAKOUT GROUPS:**

Participants were asked to reflect on the following questions:
1. What are the management implications of the information presented?
2. What gaps exist in current understanding of climate change and what barriers limit the usefulness of climate change information?



CONCLUSIONS

- Participants reported a **substantial increase** in their perceptions of the **effectiveness of management activities for climate change adaptation**.
- Managers are **reluctant to use fine-scale models** to guide specific decisions and rather, feel that climate science information is **most useful for broad-scale planning efforts**.
- **Funding, time, potential litigation, and support from supervisors** were cited as **barriers to adaptation**.
- Managers **desired additional public outreach from scientists** regarding climate-related forest changes.

INITIAL QUALITATIVE RESULTS

Table 1. Emergent themes from breakout group discussions. Themes are categorized under response efficacy (RE), collective efficacy (CE), credibility (CRED), or usefulness (USE).

MANAGEMENT IMPLICATIONS OF CLIMATE INFORMATION	BARRIERS TO USING CLIMATE INFORMATION
Describing recommendations for restoration or treatment projects (RE)	Organizational and agency support/funding/tools (CE)
Exploring options for increasing forest resilience (RE)	Accuracy of climate information and model assumptions (CRED)
Infrastructure considerations (RE)	Scale of climate information and failure to account for complexities of biophysical interactions (USE)
Help to gain public support for management actions (CRED)	Lack of appropriate information exchange between scientists and managers (USE)

INITIAL QUANTITATIVE RESULTS

PRE- & POST- SURVEYS

• Significant increase in response efficacy (RE; + 0.14, $p < 0.01$), credibility (CRED; + 0.50, $p < 0.001$), and usefulness (USE; + 0.18, $p = 0.03$) of the information (Fig. 1).

RESPONSE EFFICACY & COLLECTIVE EFFICACY (RE & CE):

• Infrastructure modifications and forest treatments were considered the most effective actions for adapting to climate change (RE, Fig. 2), while prescribed burning and forest treatments to reduce fire risk were considered most likely to occur (CE).

CREDIBILITY (CRED):

• Increased perceptions of the defensibility of climate science when challenged or appealed (+ 0.40, $p = 0.03$).

USEFULNESS (USE):

• Greatest utility was for long-term planning (2.44 ± 0.75), especially information on changes in regional water supply and climate (2.27 ± 0.66), vegetation distributions (2.21 ± 0.75), and fire patterns (2.21 ± 0.75).

PRE- & POST- SURVEYS

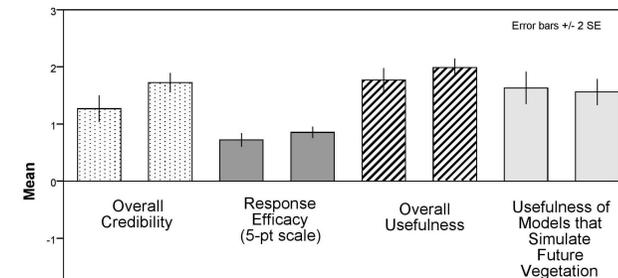


Figure 1. Mean pre- and post-workshop perceptions of the usefulness, credibility, and response efficacy of climate change science. Error bars denote ± 2 SE around the mean.

How EFFECTIVE would these actions be for adapting to climate change impacts? (RE)

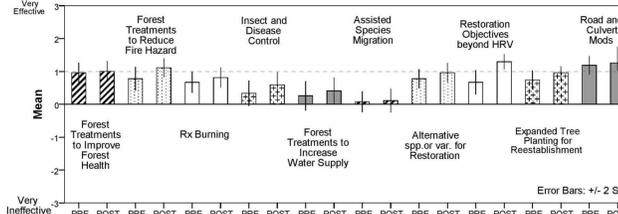


Figure 2. Mean pre- and post-workshop perceptions of the effectiveness of 12 different management actions for mitigating climate change effects on national forests. Error bars denote ± 2 SE around the mean.

WORKSHOP EVALUATIONS

