

# Use, needs, and views on climate information of water managers in Southeastern U.S.

Jessica Bolson and Chris Martinez

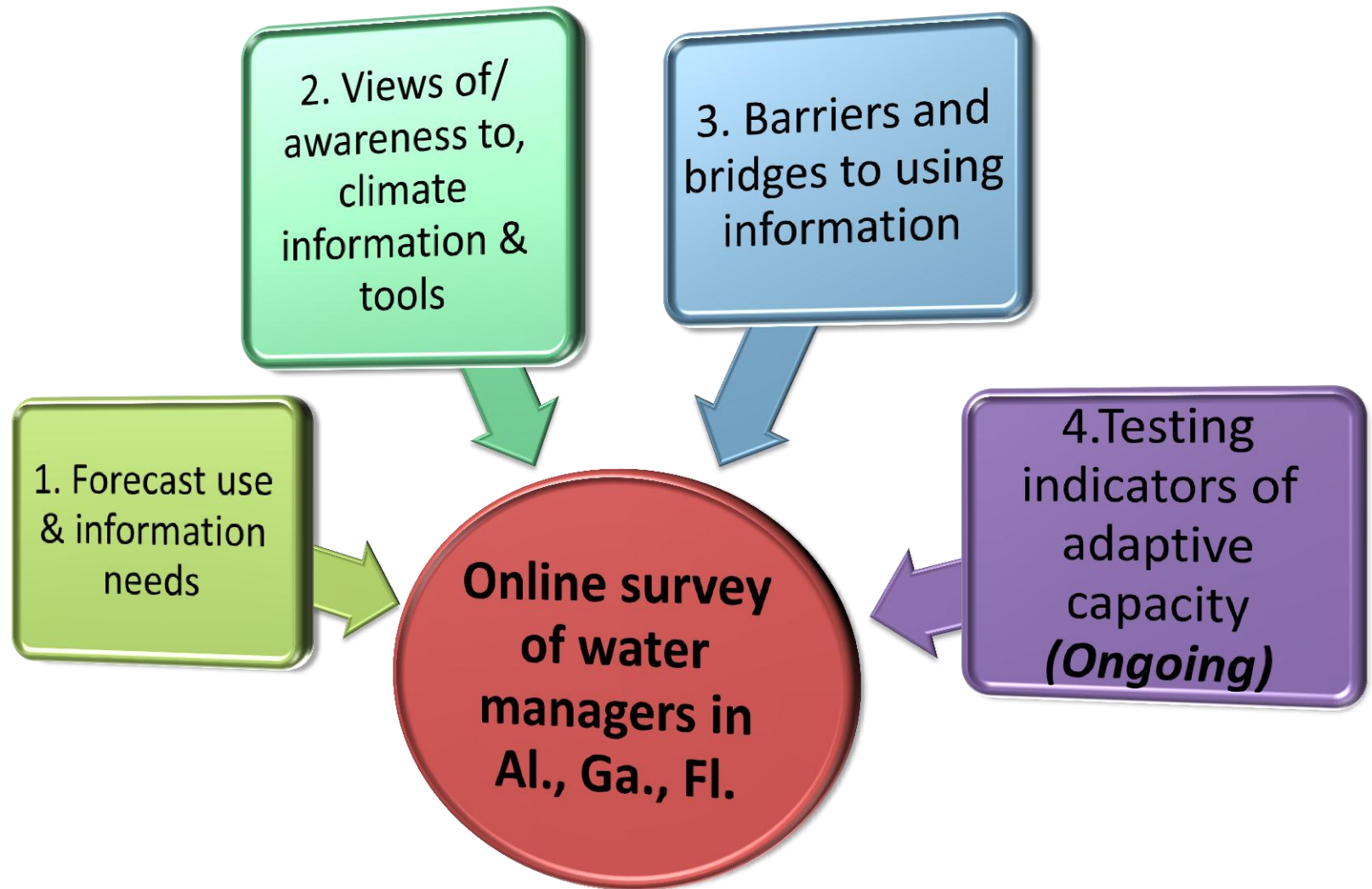
University of Florida

# Project Description

- 2 SARP Assessment Projects
  - Martinez et al.
    - Mid to large size water managers throughout Florida, Alabama, and Georgia
  - Srivastava et al.
    - Small water managers in ACF Basin
- Other SECC Collaborators:
  - Norman Breuer, Pam Knox, Tatiana Borisova



# -Objectives of assessment



# Motivation for research

Recent droughts cause for increased concern

Rainfall in SE is moderated by ENSO

## U.S. Drought Monitor Southeast

October 30, 2007  
Valid 7 a.m. EST

| Drought Conditions (Percent Area)    |      |       |       |       |       |      |
|--------------------------------------|------|-------|-------|-------|-------|------|
|                                      | None | D0-D4 | D1-D4 | D2-D4 | D3-D4 | D4+  |
| Current                              | 18.8 | 85.2  | 66.7  | 46.3  | 31.3  | 18.5 |
| Last Week (10/23/07 map)             | 13.6 | 86.4  | 73.6  | 44.3  | 50.0  | 31.4 |
| 5 Months Ago (6/01/07 map)           | 2.4  | 97.6  | 78.1  | 42.9  | 26.4  | 14.1 |
| Start of Calendar Year (1/01/07 map) | 52.2 | 47.8  | 10.2  | 1.5   | 0.0   | 0.0  |
| Start of Water Year (10/01/06 map)   | 95.1 | 89.9  | 77.9  | 63.8  | 45.2  | 24.0 |
| One Year Ago (10/31/06 map)          | 48.1 | 51.9  | 21.8  | 0.0   | 0.0   | 0.0  |



Conflicts for water, trans-boundary issues, and water resource scarcity are increasing

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The New York Times

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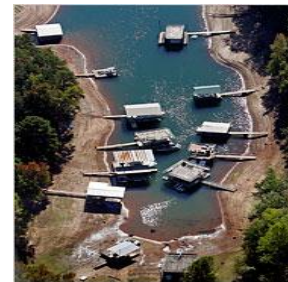
POLITICS WASHINGTON EDUCATION

## New to Being Dry, the South Struggles to Adapt



ATLANTA, Oct. 22 — For more than five months, the lake that provides drinking water to almost five million people here has been draining away in a withering drought. Sandy beaches have expanded into flats of orange mud. Tree stumps not seen in half a century have resurfaced. Scientists have warned of impending disaster.

Enlarge This Image



John Bazemore/Associated Press  
Low levels this month at Lake Lanier, which supplies water to Atlanta. The Southeast has been slow to respond to its drought.

And life, for the most part, has gone on just as before.

The response to the worst drought on record in the Southeast has unfolded in ultra-slow motion. All summer, more than a year after the drought began, fountains sprayed and football fields were watered, prisoners got two showers a day and Coca-Cola's bottling plants chugged along at full strength. On an 81-degree day this month, an outdoor theme park began to manufacture what was intended to be a 1.2-million-gallon mountain of snow.

By September, with the lake forecast to dip into the dregs of its storage capacity in less than four months, the state imposed a ban on outdoor water use.

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WORLD U.S. N.Y. / REGION BUSINESS TECHNOLOGY SCIENCE HEALTH SPORTS OPINION

POLITICS EDUCATION BAY AREA CHICAGO TEXAS

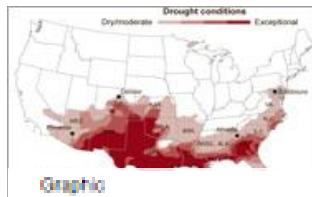
## Drought Spreads Pain From Florida to Arizona



Grant Blankenship for The New York Times

Buster Haddock, an agricultural scientist at the University of Georgia, in a field where cotton never had the chance to grow.  
[More Photos](#)

By KIM SEVERSON and KIRK JOHNSON  
Published: July 11, 2011



Dangerously Dry



# Motivation for research

## WEATHER FORECASTS ARE FOR WIMPS\*: WHY WATER RESOURCE MANAGERS DO NOT USE CLIMATE FORECASTS

STEVE RAYNER<sup>1</sup>, DENISE LACH<sup>2</sup> and HELEN INGRAM<sup>3</sup>

<sup>1</sup>*James Martin Institute of Science and Civilization, Saïd Business School, University of Oxford, Park End Street, Oxford OX1 1HP, U.K.*

*E-mail: steve.rayner@sbs.ox.sc.uk*

<sup>2</sup>*Oregon State University, Corvallis OR 97331-4501, U.S.A.*

<sup>3</sup>*School of Social Ecology, University of California Irvine, Irvine, CA 92697-7075, U.S.A.*

Rayner et al., 2005

**JOURNAL OF THE AMERICAN WATER RESOURCES ASSOCIATION**  
VOL. 35, NO. 6 AMERICAN WATER RESOURCES ASSOCIATION DECEMBER 1999

## WEATHER AND CLIMATE EXTREMES, CLIMATE CHANGE, AND PLANNING Views of Community Water System Managers in Pennsylvania's Susquehanna River Basin<sup>1</sup>

*Robert E. O'Connor, Brent Yarnal, Rob Neff, Richard Bord, Nancy Wiefek,  
Christopher Reenock, Robin Shudah, Christine L. Jocoy, Peter Pascale, and C. Gregory Knight<sup>2</sup>*

O'Connor et al., 1999



**JOURNAL OF THE AMERICAN WATER RESOURCES ASSOCIATION**

AMERICAN WATER RESOURCES ASSOCIATION

December 2008

## WHAT INFLUENCES INNOVATION ADOPTION BY WATER MANAGERS? CLIMATE INFORMATION USE IN BRAZIL AND THE UNITED STATES<sup>1</sup>

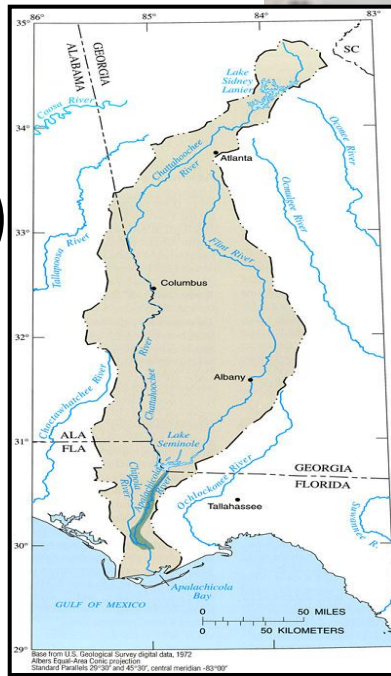
*Maria Carmen Lemos<sup>2</sup>*

Lemos, 2008

More recently there has been more focus on bridges that enable the integration of Seasonal climate information into decision making.



# Region (Al., Ga., Fl., & the ACF Basin)



## Context

Diverse systems

-Management structures and institutions

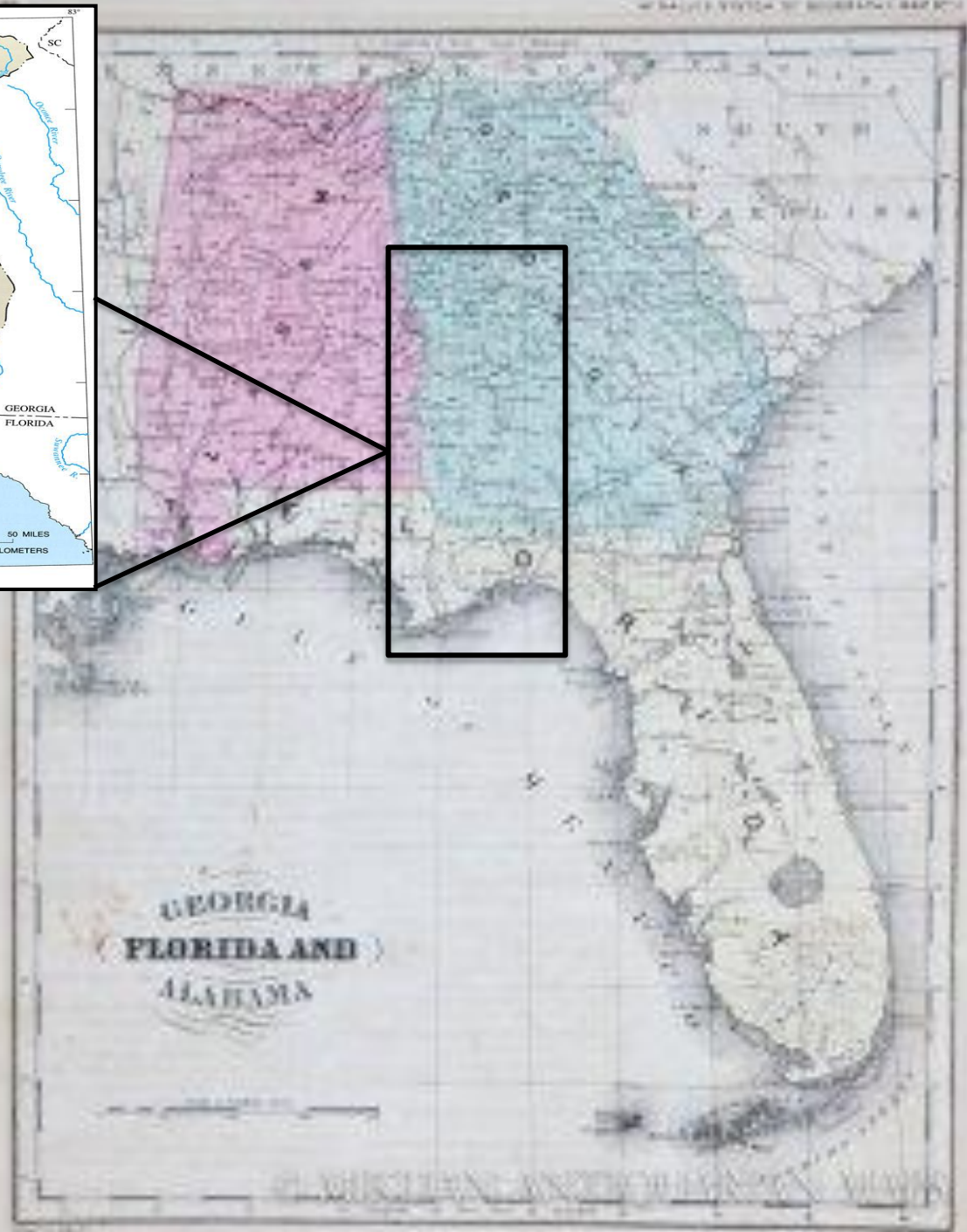
-Geographical contexts

-Water sources

-Stakeholders

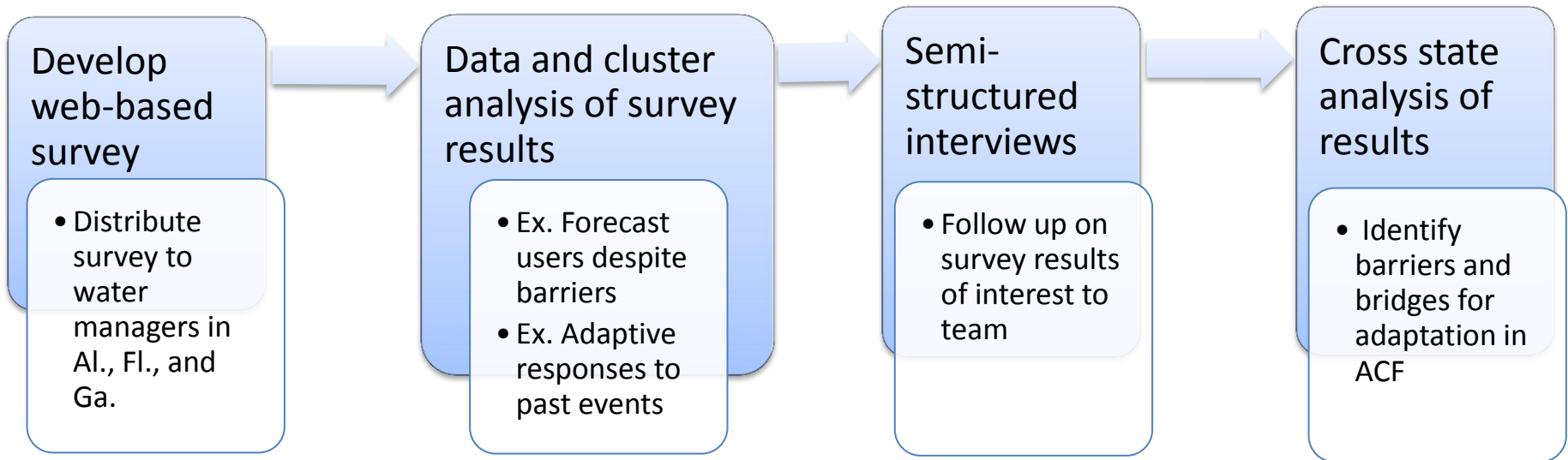
-Resources/Capacity

5/10/12



# Research Approach

Region- and sector-specific assessment of stakeholders is essential to providing useful and relevant forecasts and decision support



Ongoing iterative feedback using tools/forecasts currently under development

# Online survey

Assessing Southeast Water Man... x Qualtrics Survey Software x Southeastern U.S. Water Manage... x +

qualtrics.com https://uffred.qualtrics.com/SE/?SID=SV\_8eHX5ueL1nn6U3W

how to take a screen snapshot

qualtrics.com

1b. If one of your responsibilities is providing municipal water supply, what is the population you serve?

- ☐ 500 people or fewer
- ☐ 501-3,300 people
- ☐ 3,301-50,000 people
- ☐ 50,001-100,000 people
- ☐ 100,001-200,000 people
- ☐ 200,001-500,000 people
- ☐ more than 500,000 people
- ☐ Do not know
- ☐ Not applicable

0% 100%

<< >>

Survey Powered By Qualtrics®



# Findings

- Survey respondents
- Use of climate information
- Need for climate information
- Barriers to using climate information
- Opportunities to improve the integration of climate information
- Future directions

## Water managers surveyed

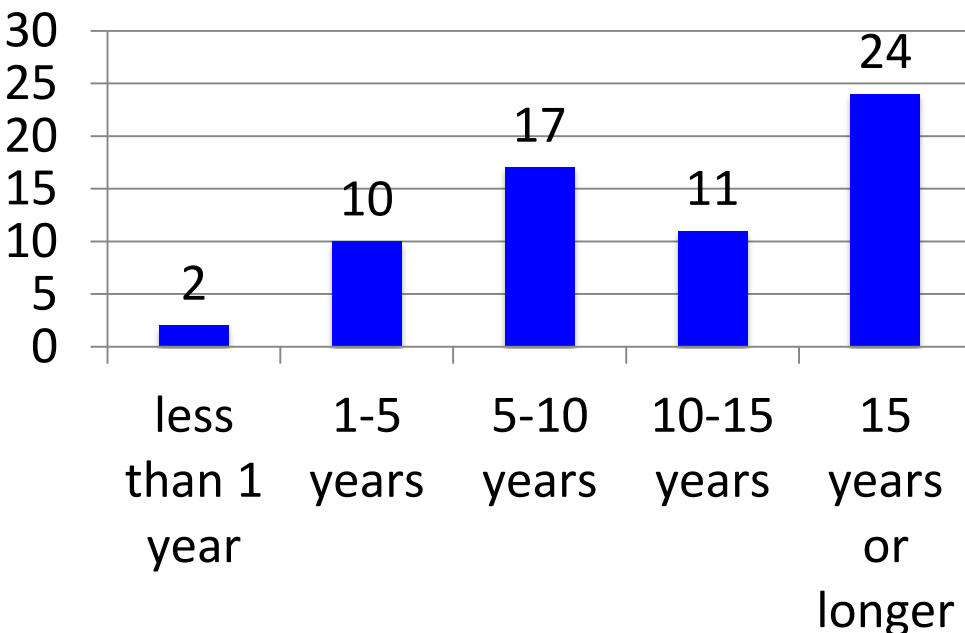
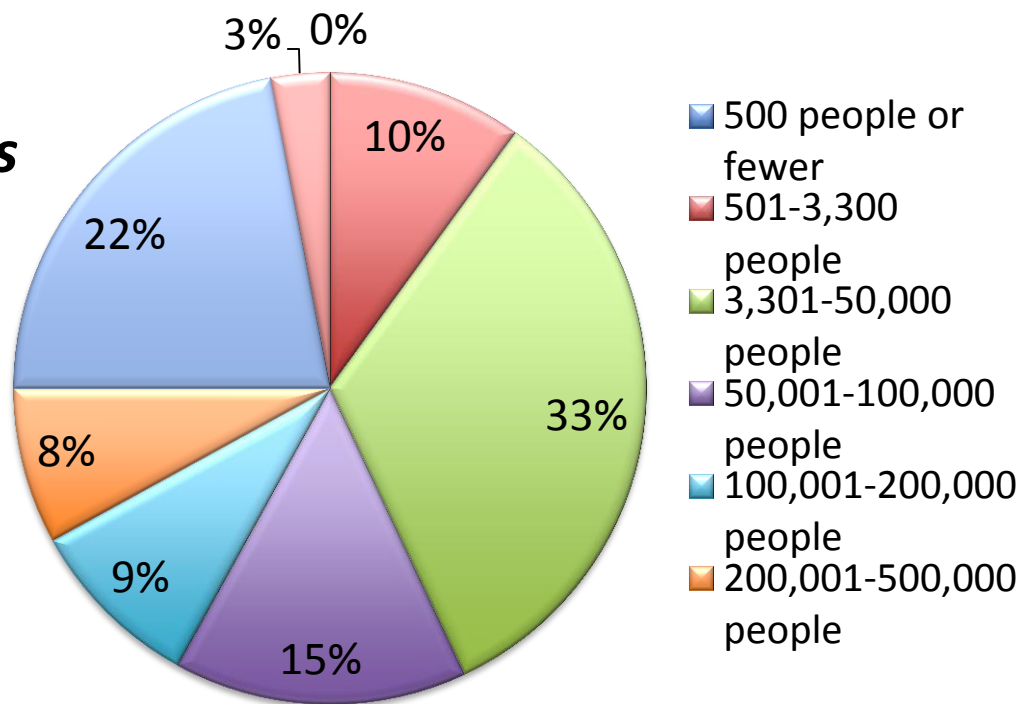
### Who responded to the survey?

| Surveys successfully emailed | Surveys completed | Response rate |
|------------------------------|-------------------|---------------|
| 850                          | 141               | 16.6%         |

|                         | Georgia | Alabama | Florida | Total |
|-------------------------|---------|---------|---------|-------|
| Water managers surveyed | 42      | 68      | 31      | 141   |

# Water managers surveyed

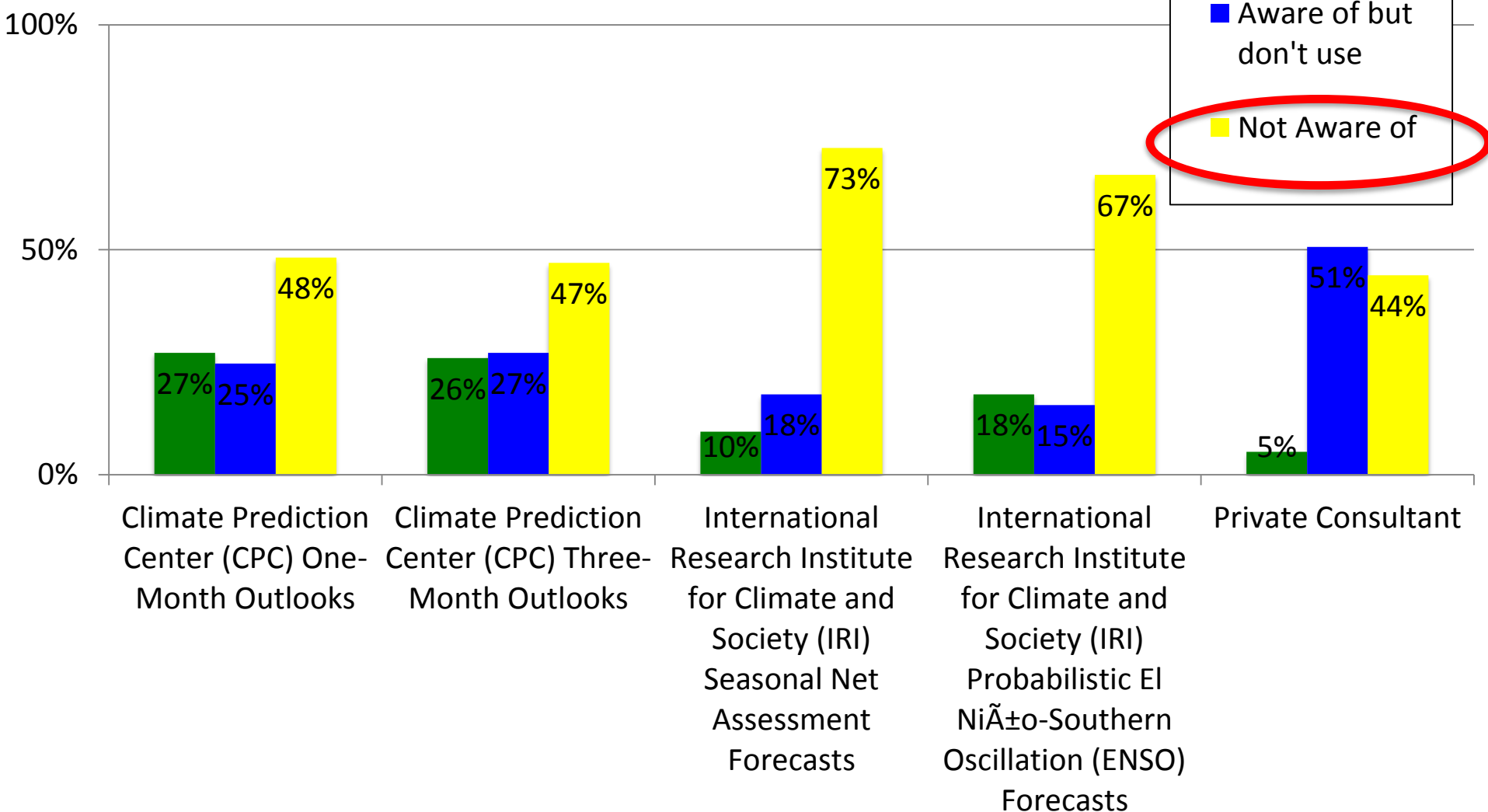
***“If one of your responsibilities is providing municipal water supply, what is the population you serve?”***



***“Years working in current water management agency”***

Use

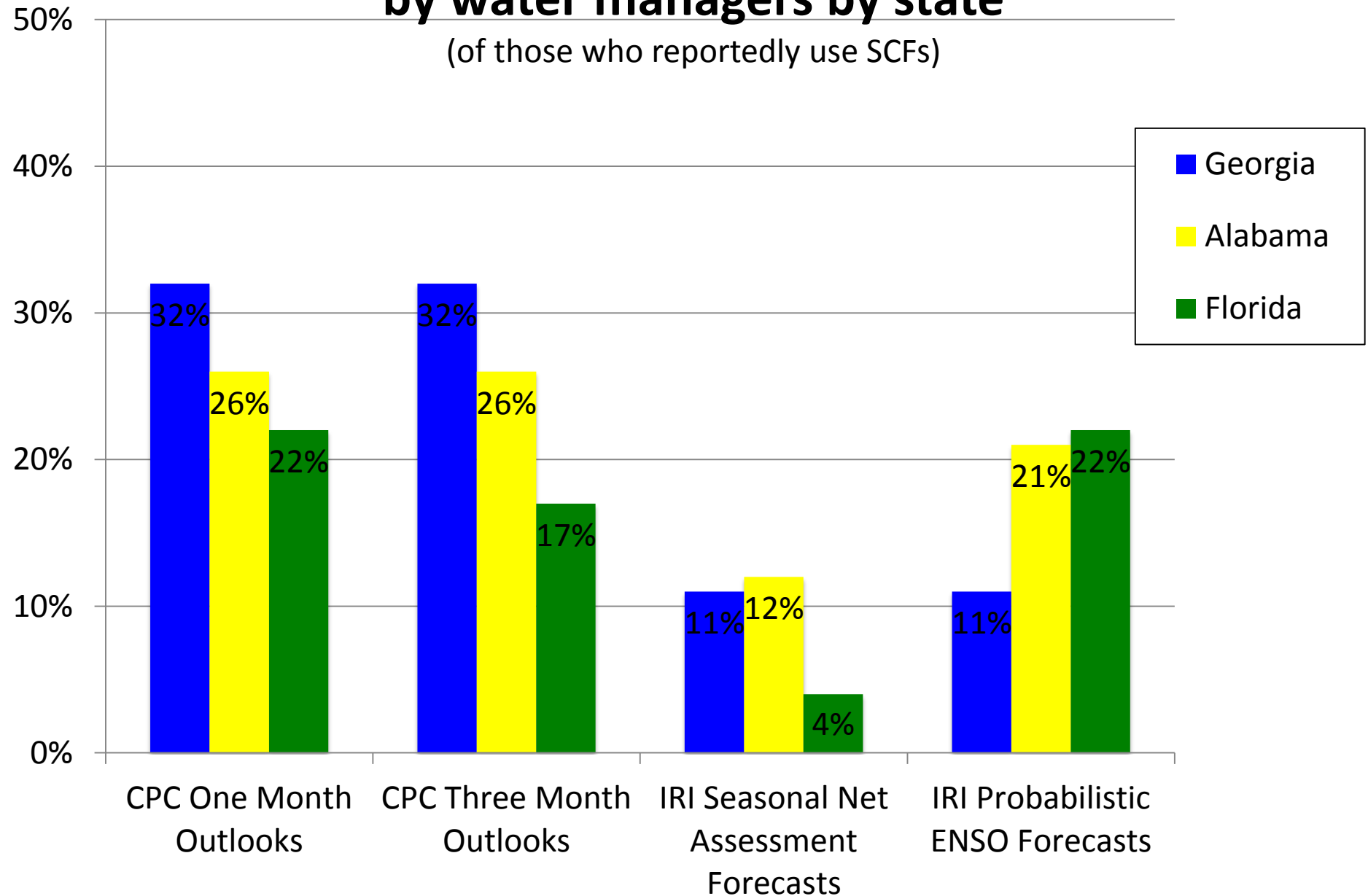
## Use of seasonal climate forecasts (n=85)



# Use of seasonal climate forecasts by water managers by state

Use

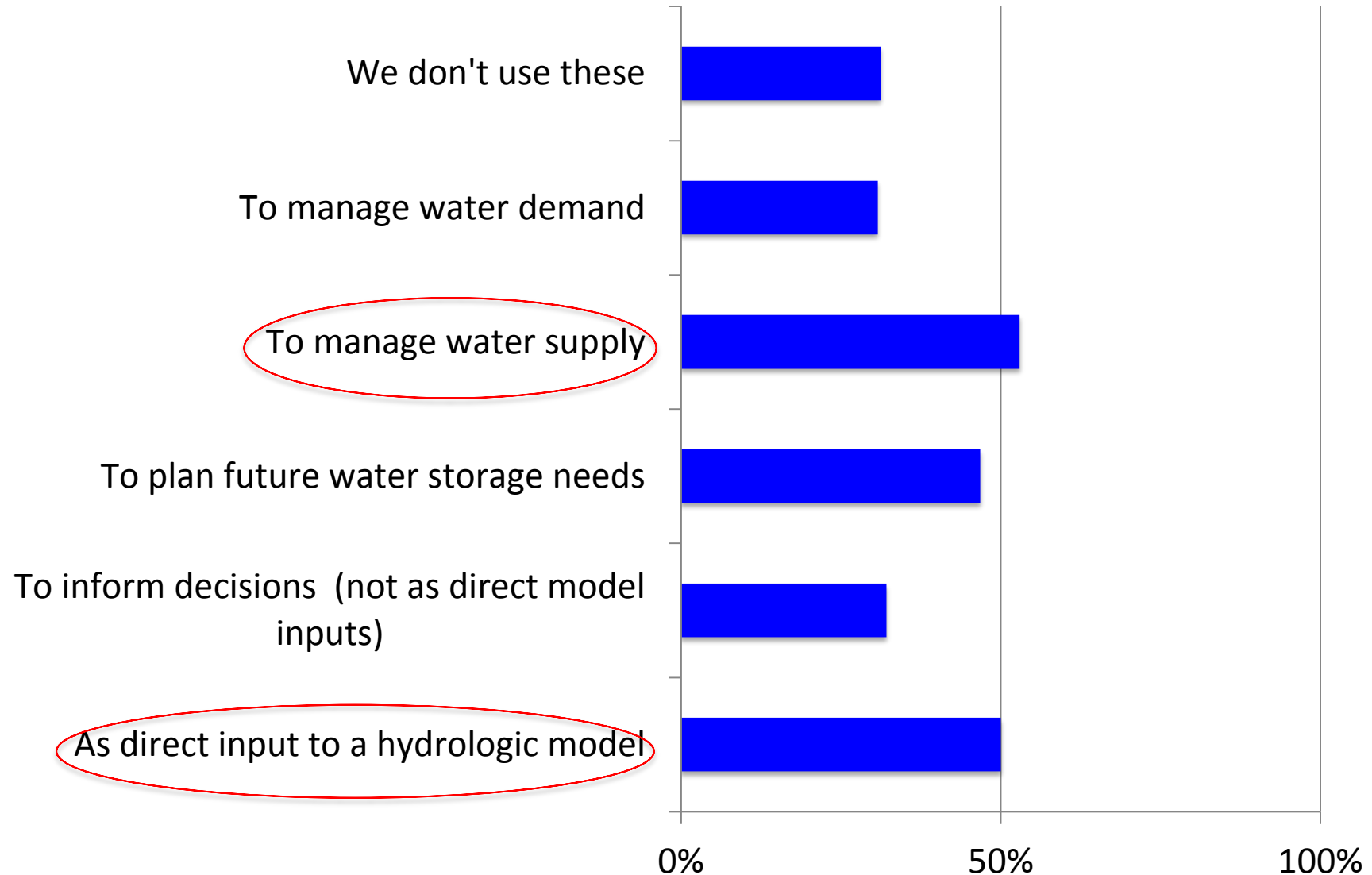
(of those who reportedly use SCFs)





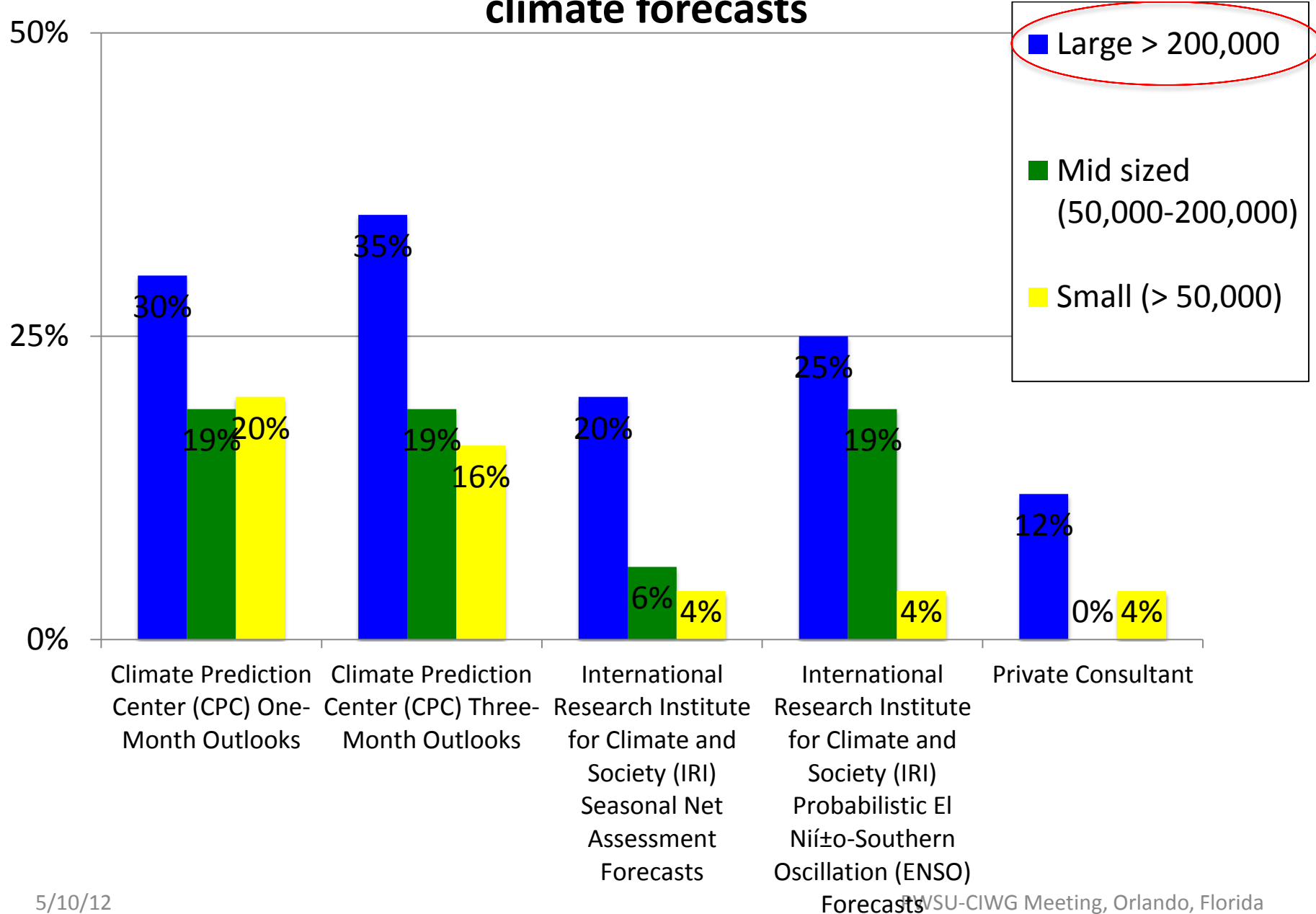
# Use

## How do water managers use seasonal climate forecasts? n=72



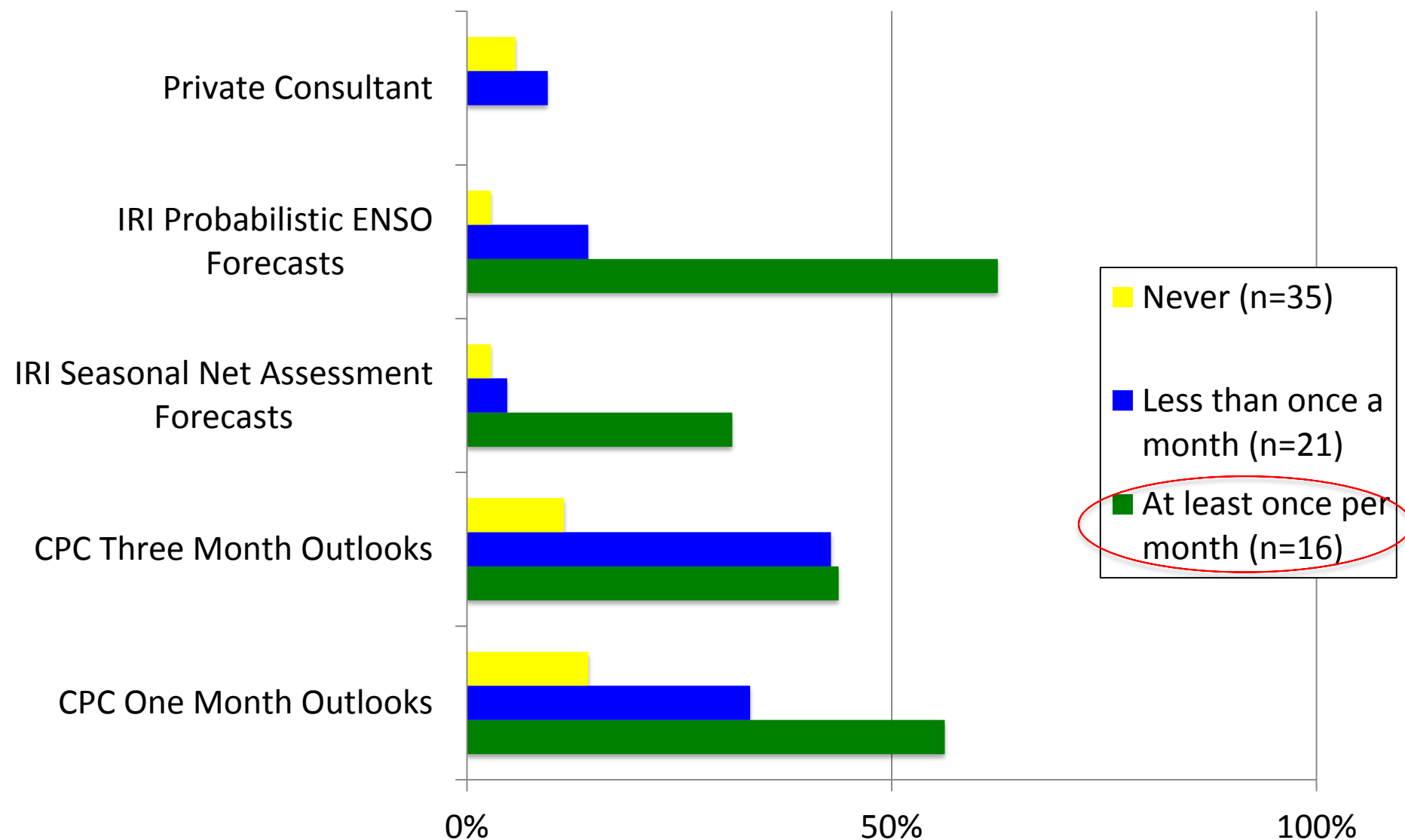
Use

# Size of agency and use of seasonal climate forecasts



Use

## Use of SCFs and interactions with climate scientists



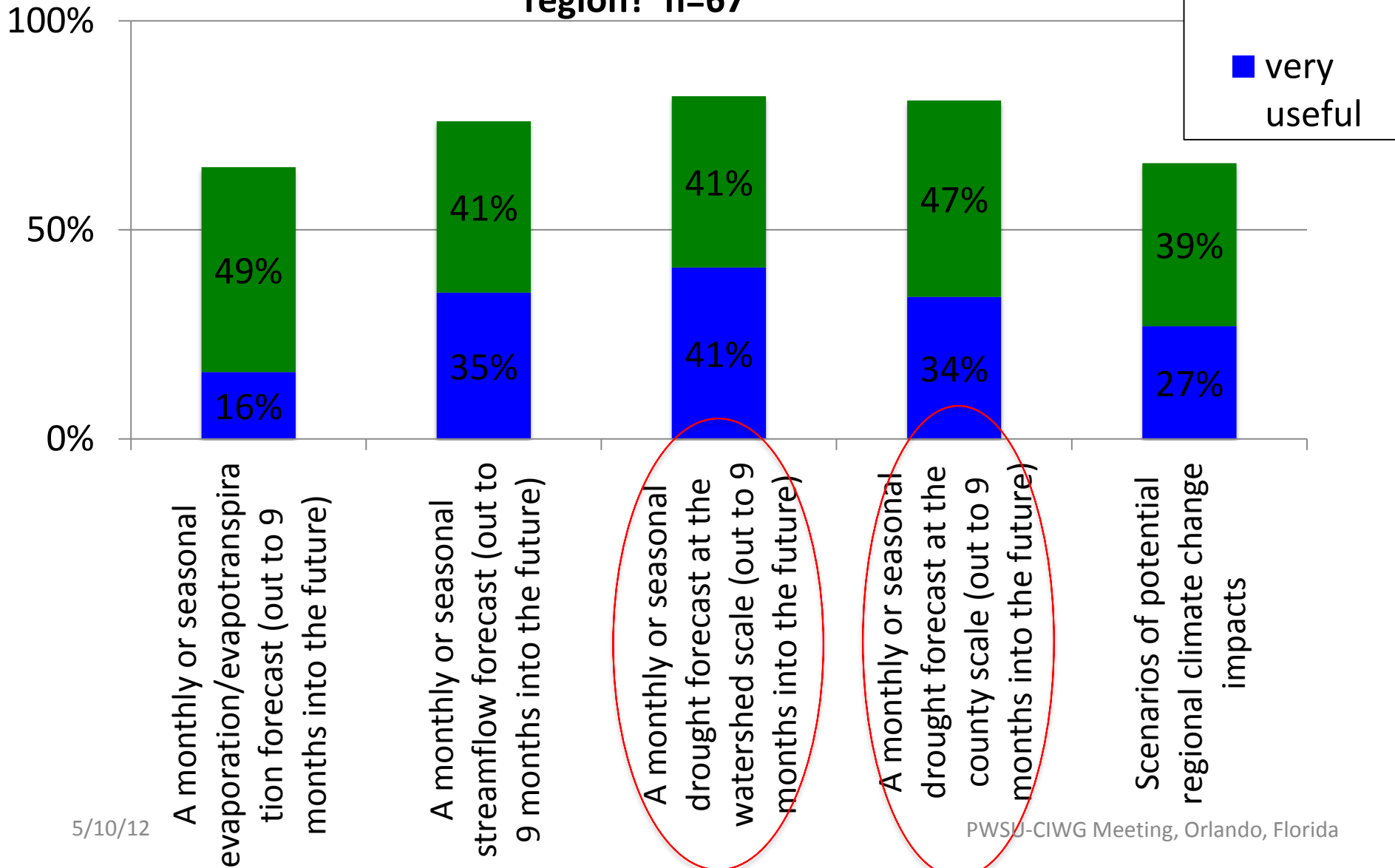
# Need

## Climate information desired by survey respondents

What types of information would you ideally like to have for your region? n=67

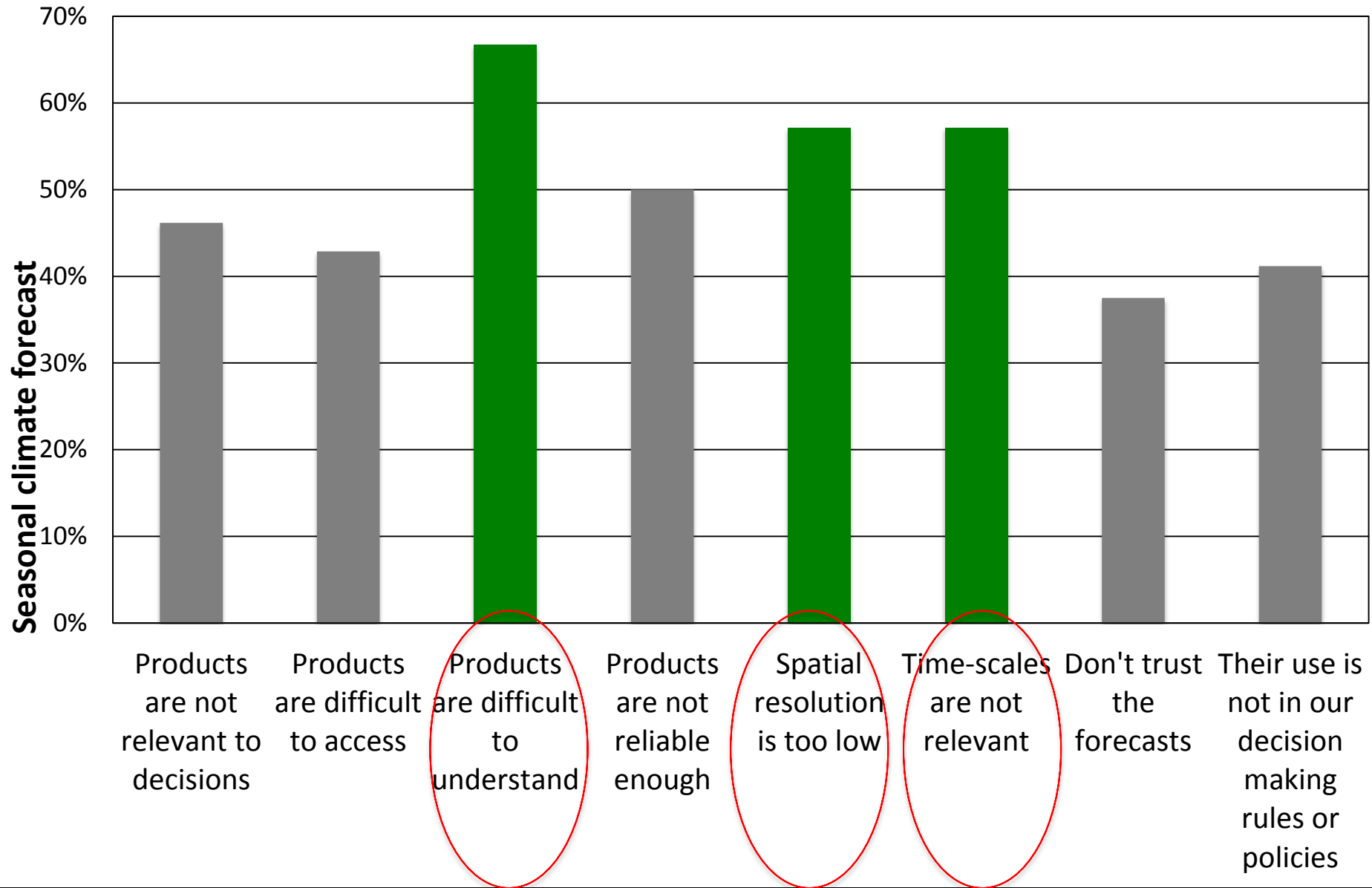
■ useful

■ very useful



# Barriers

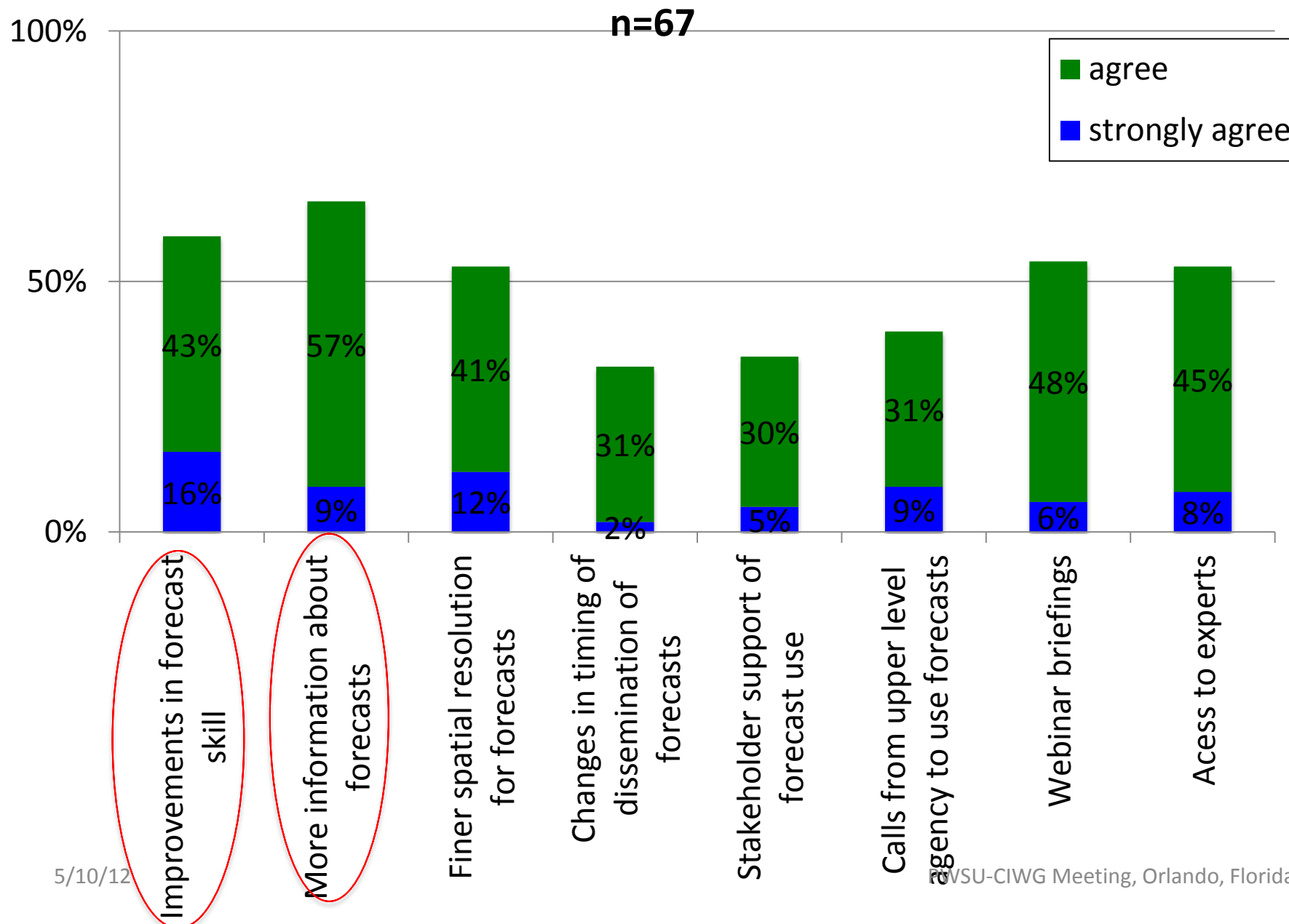
## Why don't you use seasonal climate forecasts?





# Barriers

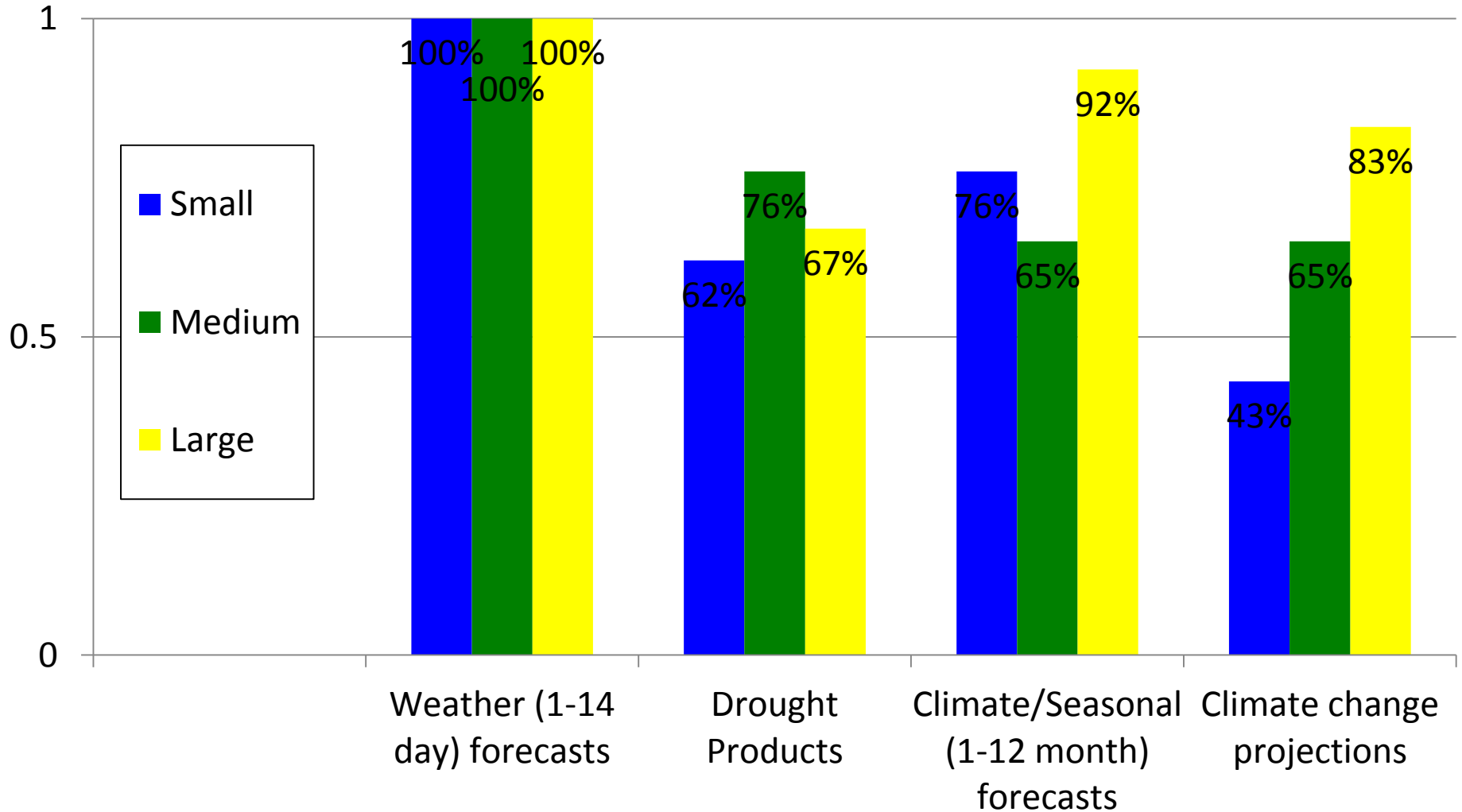
## What types of changes might enable you to use seasonal climate forecasts in decision making?



# Barriers

**Familiarity with information across agency size.**

***“How would you rate your awareness of sources of information on weather and climate?”***



# Barriers

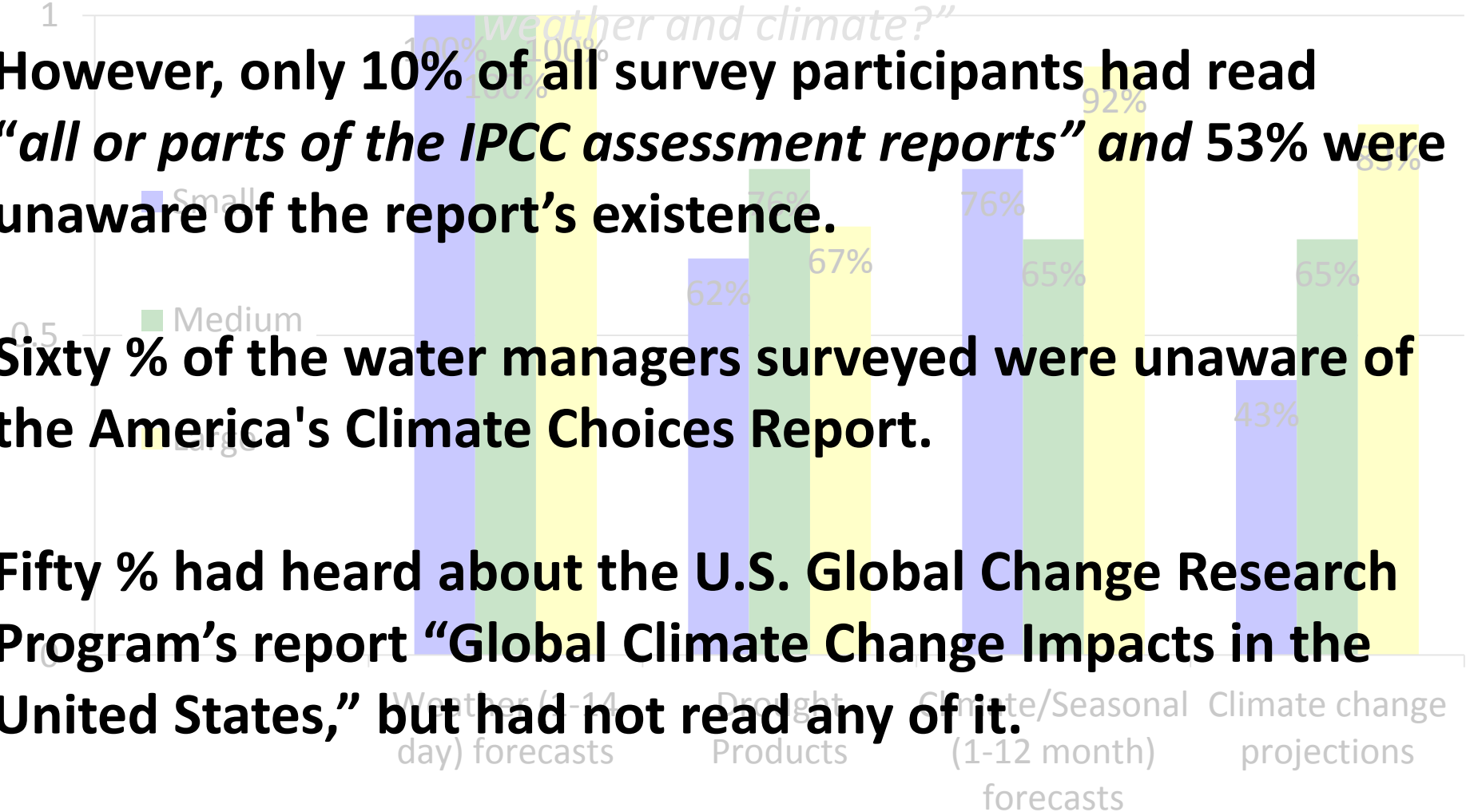
Familiarity with information across agency size.

*“How would you rate your awareness of sources of information on weather and climate?”*

However, only 10% of all survey participants had read “all or parts of the IPCC assessment reports” and 53% were unaware of the report’s existence.

Sixty % of the water managers surveyed were unaware of the America's Climate Choices Report.

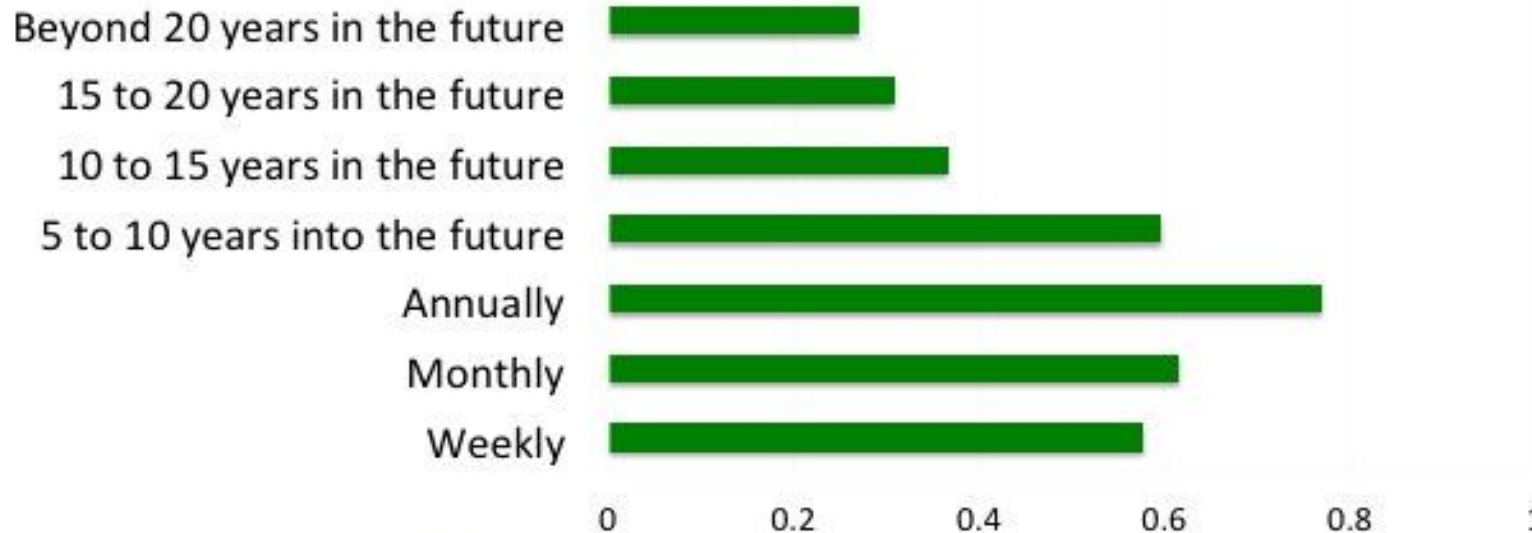
Fifty % had heard about the U.S. Global Change Research Program’s report “Global Climate Change Impacts in the United States,” but had not read any of it.



## Opportunities

## Opportunities to improve integration

What decisions are being made? At what time scales?



| Time Scale                    | Decisions  |
|-------------------------------|--|
| Weekly                        | operations, water quality, monitoring, storage, withdrawals                              |
| Monthly                       | treatment, drought management, updates & outlooks, forecasts, allocations, treatment     |
| Annually                      | financial, capital improvements  |
| 5 to 10 years into the future | strategic planning, land-use planning, budgetary, demand forecasts, capital improvements |
| 10 to 15 years in the future  | growth and capital improvements, long range planning                                     |
| 15 to 20 years in the future  | infrastructure planning, master planning, growth management                              |
| Beyond 20 years in the future | Land acquisition, master planning  |

# Opportunities

Coded responses to open ended question *“If you knew that an upcoming season would be very dry, would you have the ability to modify your operations to lessen potential impacts?”*

| Categories of open ended responses        | Number of mentions |
|---|--------------------|
| Reductions to releases                    | 3                  |
| Increased storage                         | 11                 |
| Buy additional water                      | 1                  |
| Produce more water                        | 2                  |
| Build additional wells                    | 2                  |
| Implement restrictions                    | 18                 |
| Rate adjustments                          | 1                  |
| Increase public awareness of conservation | 8                  |
| Implement water conservation measures     | 10                 |
| Alternative sources within system         | 5                  |
| Follow Water Ordinance/ Plan              | 3                  |

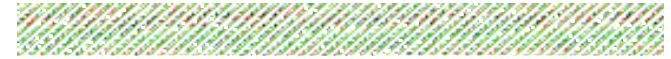


# Future directions

- Adaptive capacity and use of information
  - What have water managers learned from past events?
  - What determines the ability to change and respond to weather and climate events?

# Conclusions

- Use of SCFs is limited across states
- Awareness of products (SCFs and CC) is **VERY** limited across states
- Most wanted list includes:
  - Seasonal variability products at watershed scale
  - Drought forecasts at watershed scale
- The most common reason for limited forecast use: difficulty with understanding
- Opportunities to improve integration
  - Match info with decisions being made, timing, and responses
  - Interactions (translation) with decision makers



## SUMMONING THE RAINS TO GEORGIA

Published: June 10, 2008

PHOTO: A vigil for rain was held on Monday on the steps of the Georgia State Capitol in Atlanta. A man who introduced himself as Six Bears joined other American Indians in the ceremony. Last year, Gov. Sonny Perdue held a prayer vigil in the same spot seeking relief from drought. (PHOTOGRAPH BY JOHN BAZEMORE/ASSOCIATED PRESS)



PWSU-CIWG Meeting, Orlando, Florida

Or... we can continue  
to rely on past  
approaches...



# Thank you



Contact info: [jbolson@ufl.edu](mailto:jbolson@ufl.edu), 305-421-4874