



***What do we think?***  
**An international survey on  
restoration and climate change**

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# *Paradigm Shift*

# Project goal:

- Understanding how people conduct or support restoration is crucial to engaging in discussions that move our field forward in the face of changing environments.
- Identify areas of agreement and disagreement

# Survey Methods

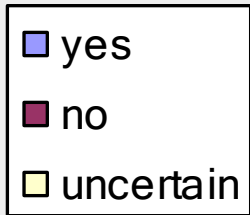
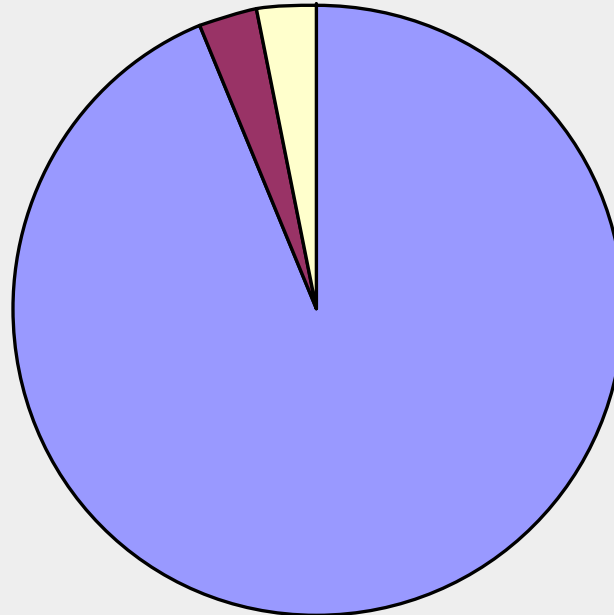


- Survey conducted on-line mid-December 2009 through February 2010
- 1,112 survey respondents
- Through professional society email lists and newsletters:
  - Ecological Society of America
  - Society for Ecological Restoration
  - The Wildlife Society
  - Plant Conservation Alliance
  - Australia Greening
  - Government Agencies (BLM, USFS)
- Answer options random-ordered where possible
- Uncertainty <3%

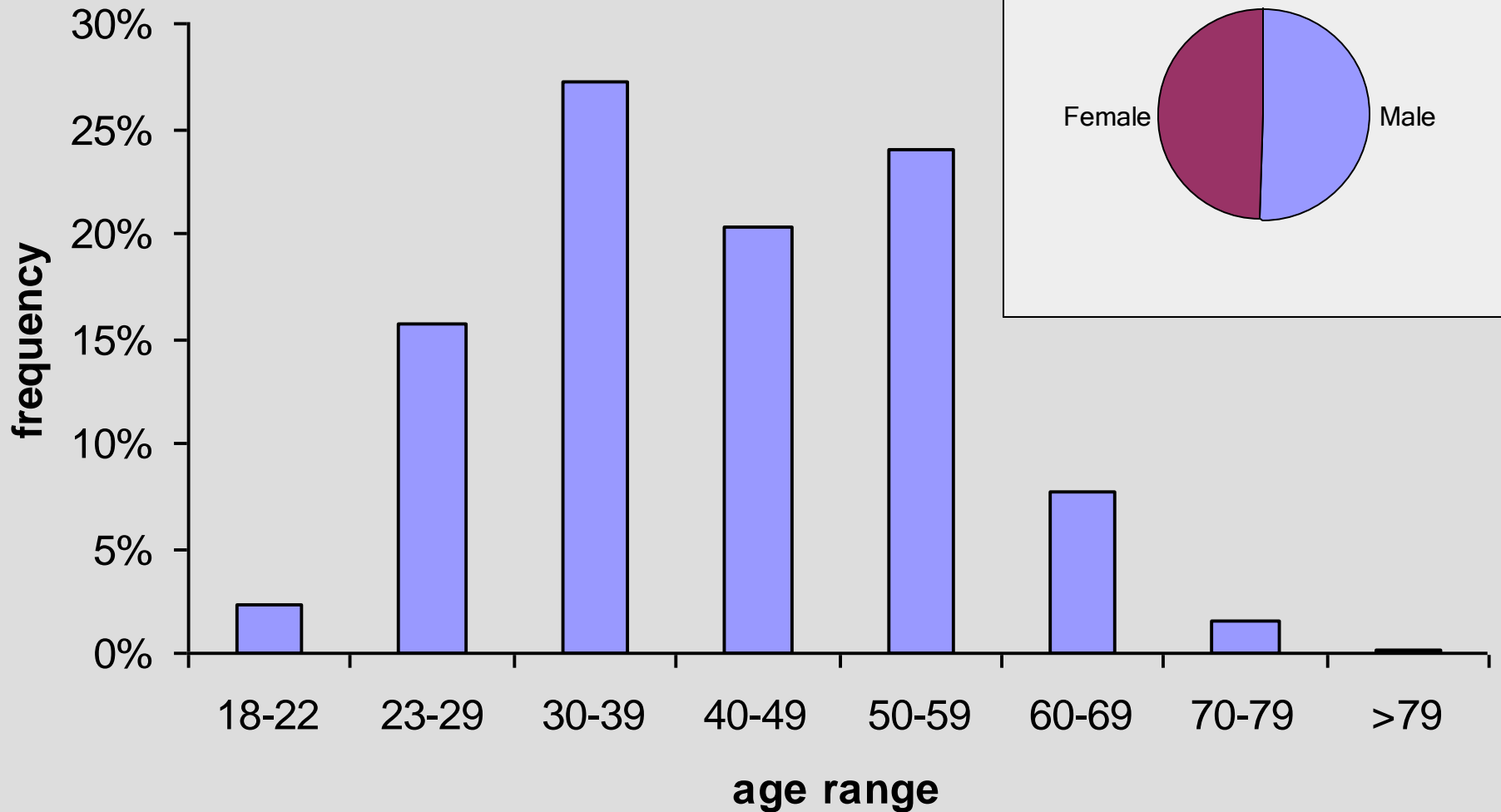
# Survey Population



Do you consider your work (professional or volunteer) to be associated with or contributing toward habitat or species restoration in any way?

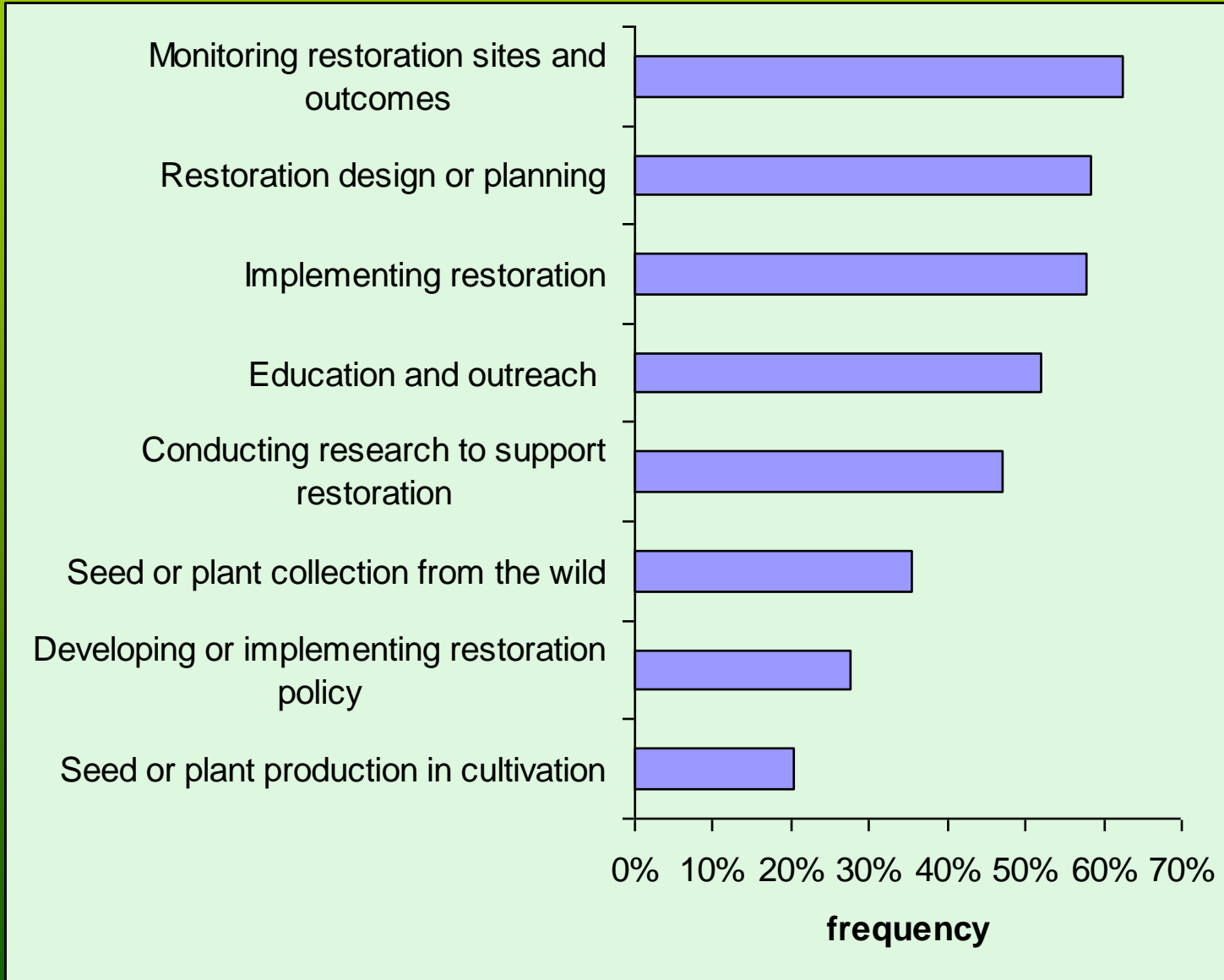


# Survey Population



# Survey Population

## Roles in restoration



# Survey Population



- **Most respondents from USA (86%)**
  - Australia (6%)
  - Canada (3%)
  - 30 other countries!
- **Within USA, all states represented.**

## **Top states:**

- Oregon (17%)
- California (9%)
- Washington (6%)
- New York (4%)
- Montana (4%)



# Feedback

- *“Poor survey design...”*
- *“Best survey I have ever taken”*
- *“Good questions. Hard ones.”*
- *“Surveys of this kind are very difficult to design, perhaps impossible. Given the odds, you've done pretty well...”*



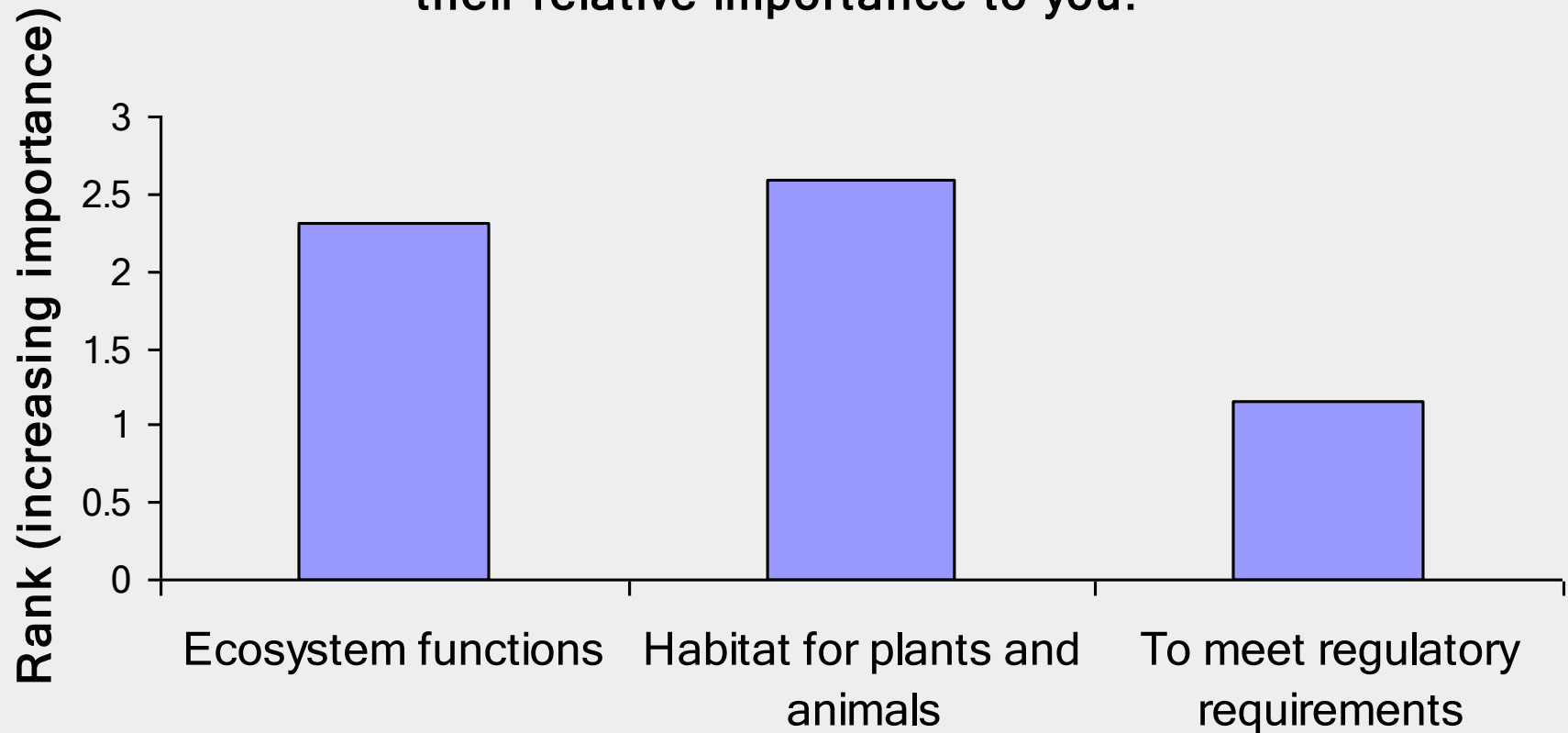
# Restoration Process



# Restoration Process Objectives



Please rank these restoration objectives in terms of their relative importance to you.

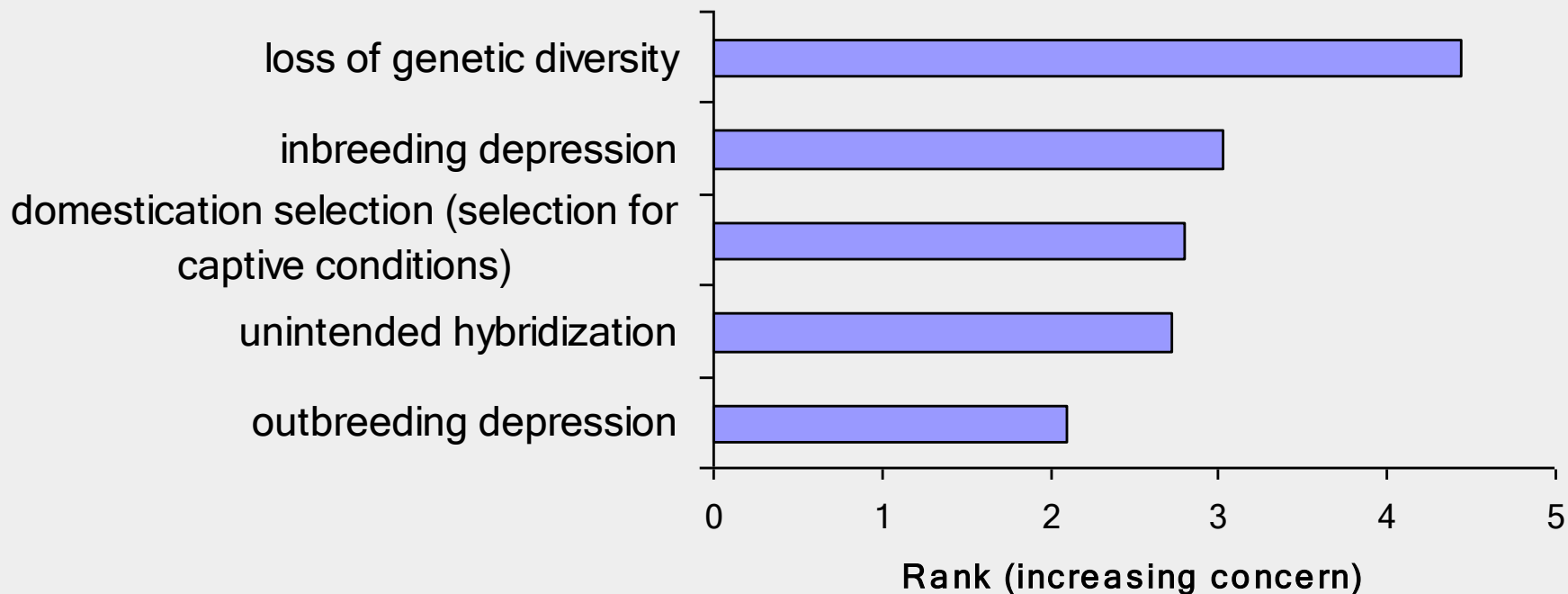


# Restoration Process

## Production concerns



Please rank your level of concern about the following issues in the production process:

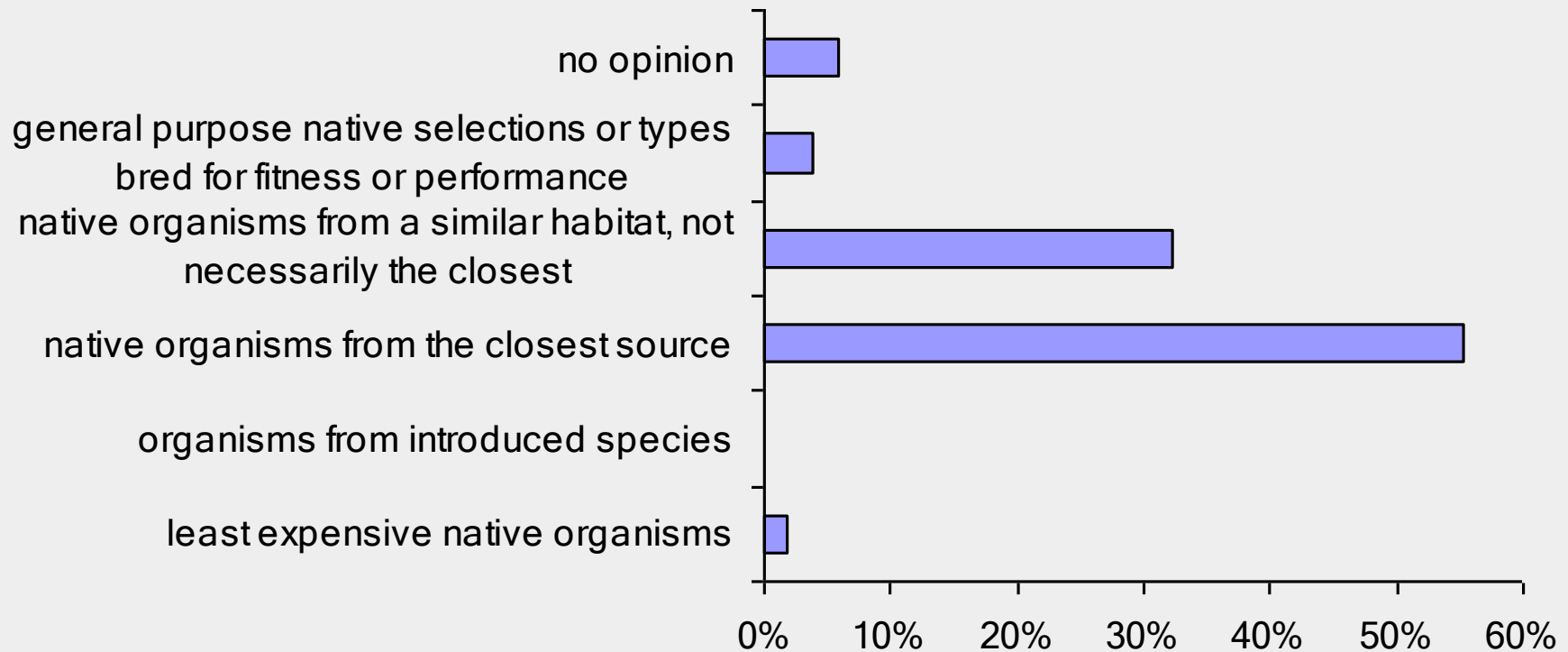


# Restoration Process

## Sources of Organisms



When obtaining organisms for use in restoration, which do you most prefer (select one):

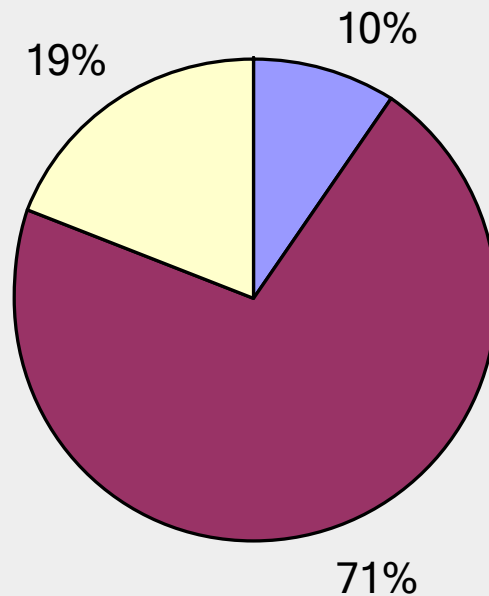


# Restoration Process

## Sources of Organisms (SOMS Debate)

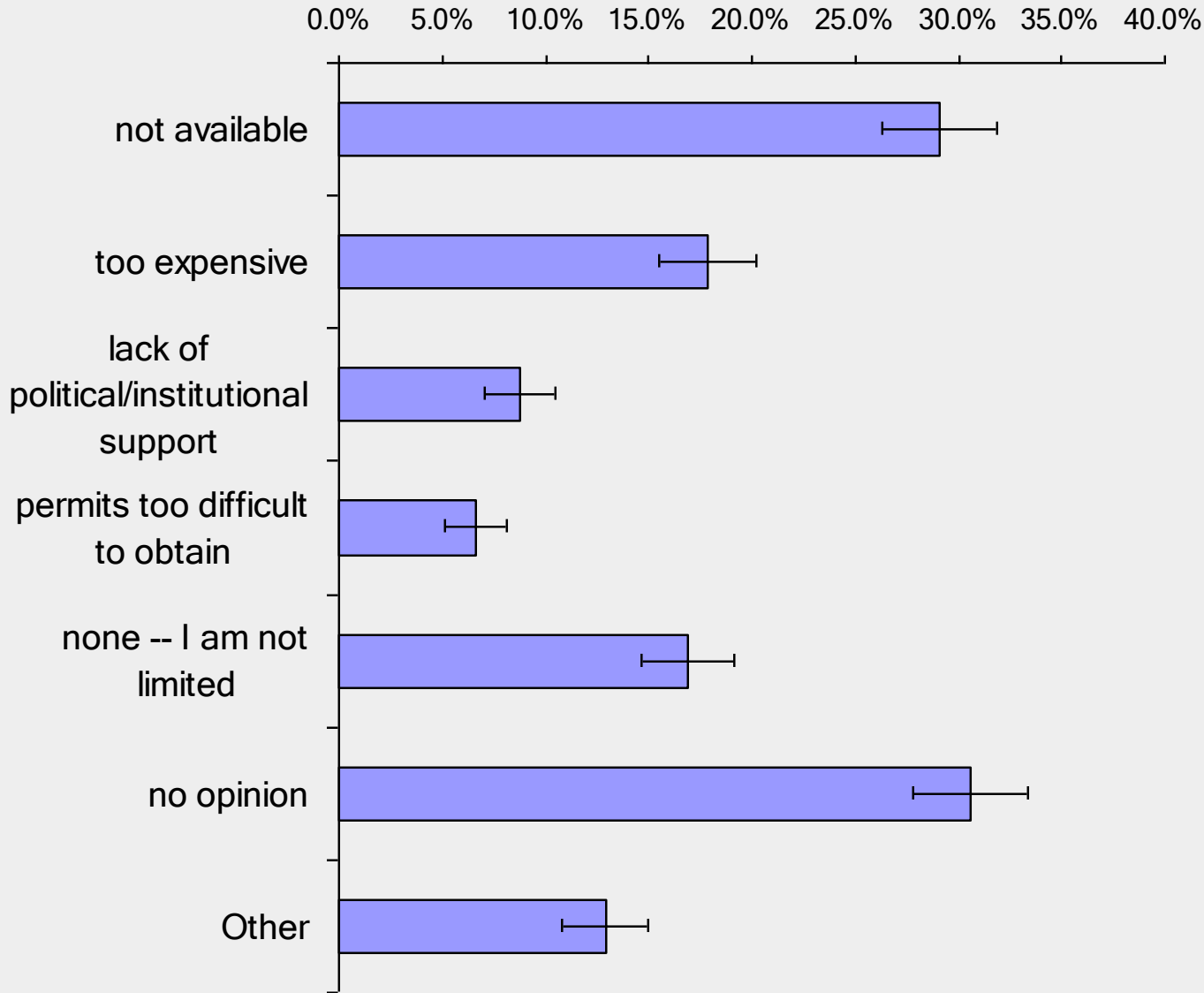


During restoration, which do you prefer, in general  
(select one):



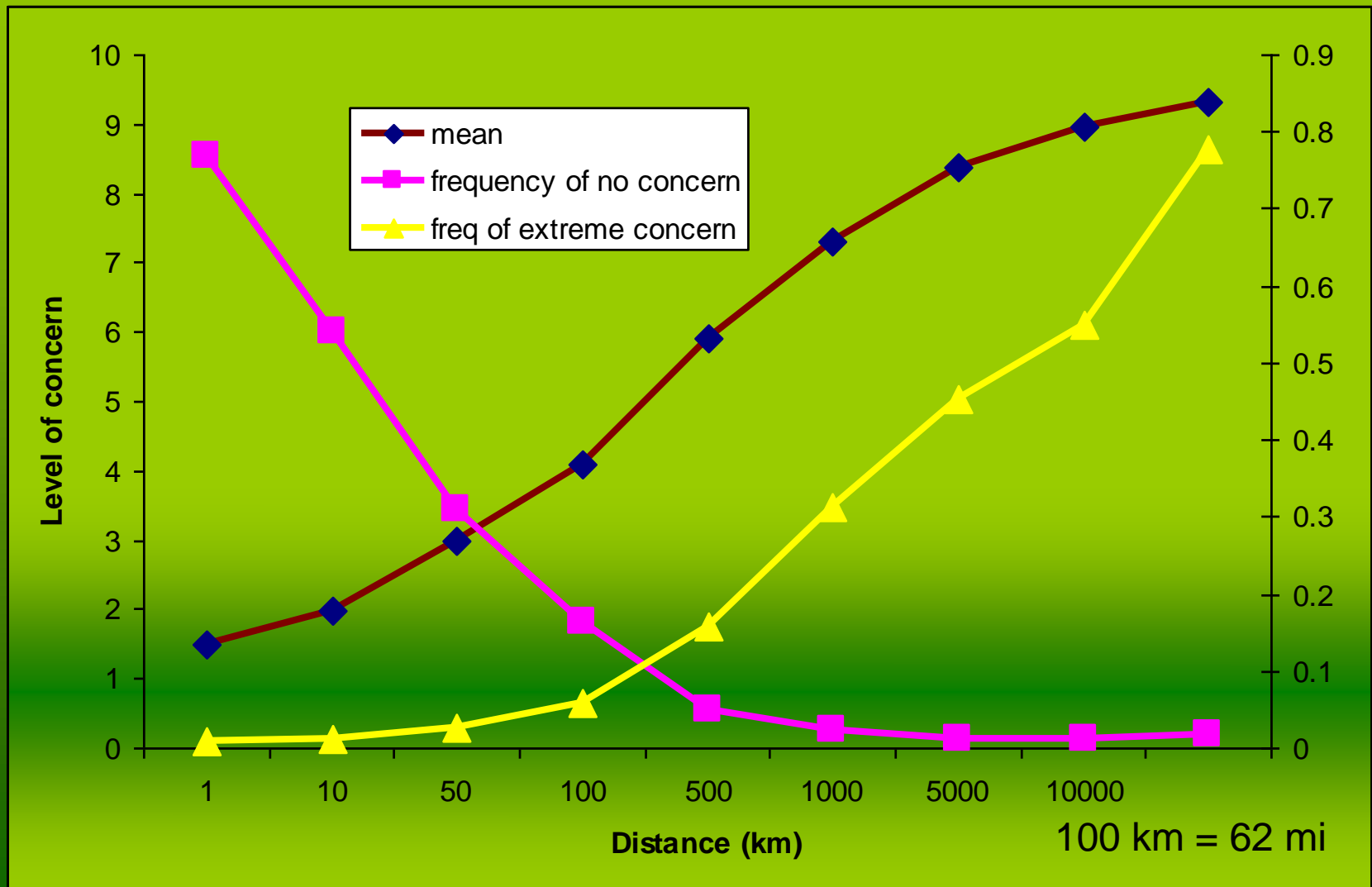
- single population source for each species
- mix of population sources for each species
- no opinion

The greatest limitation(s) I face to acquiring organisms  
(e.g., seeds or animals) for restoration projects is  
(select all that apply):



# Restoration Process

Moving Organisms: How does your concern with moving species change with distance?



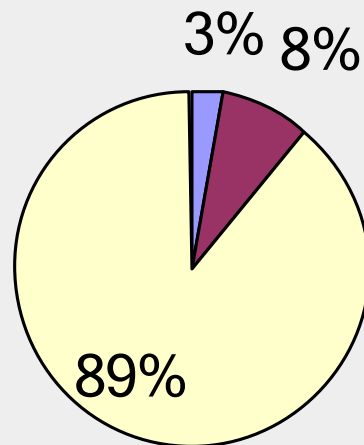
# Restoration and Climate Change



# Restoration and Climate Change



Are you convinced that global climate change is underway?

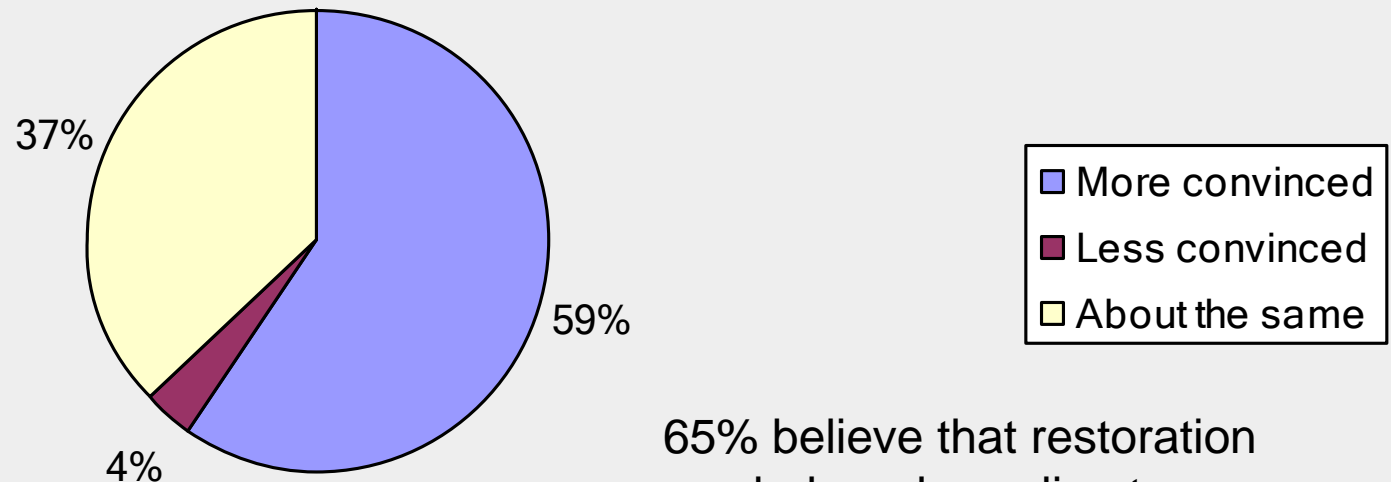


- no
- I'm still evaluating the issue
- yes

# Restoration and Climate Change



Are you more or less convinced about climate change than you were 5-10 years ago?

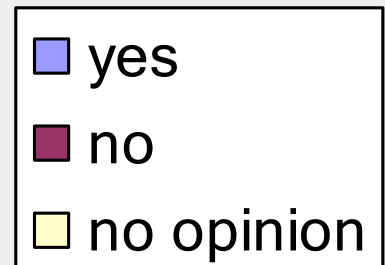
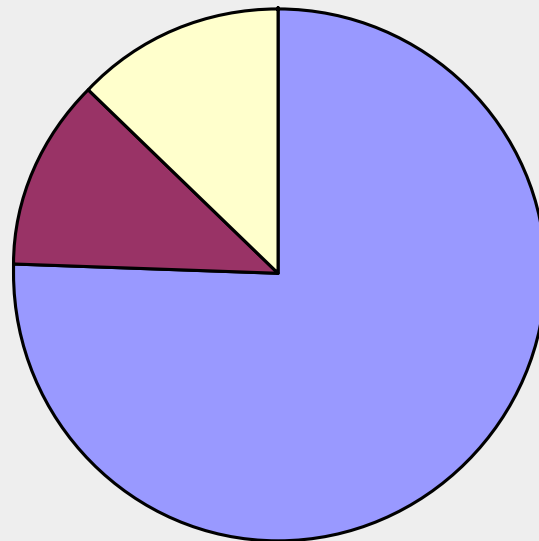


65% believe that restoration can help reduce climate change directly

# Restoration and Climate Change

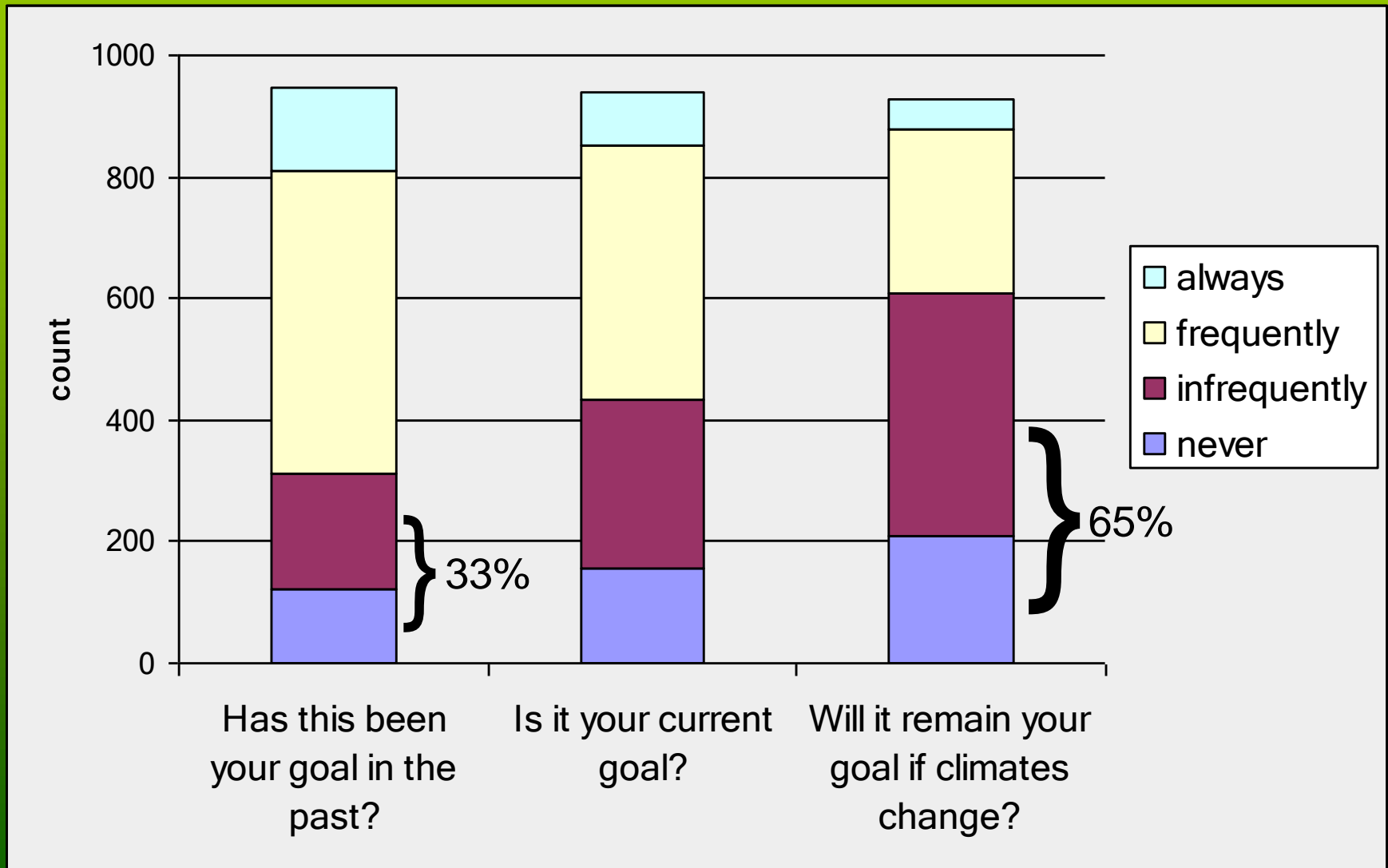


Should habitat restorationists plan for climate change and modify their practices to anticipate it?



# Restoration and Climate Change

## Matching goals to historic conditions

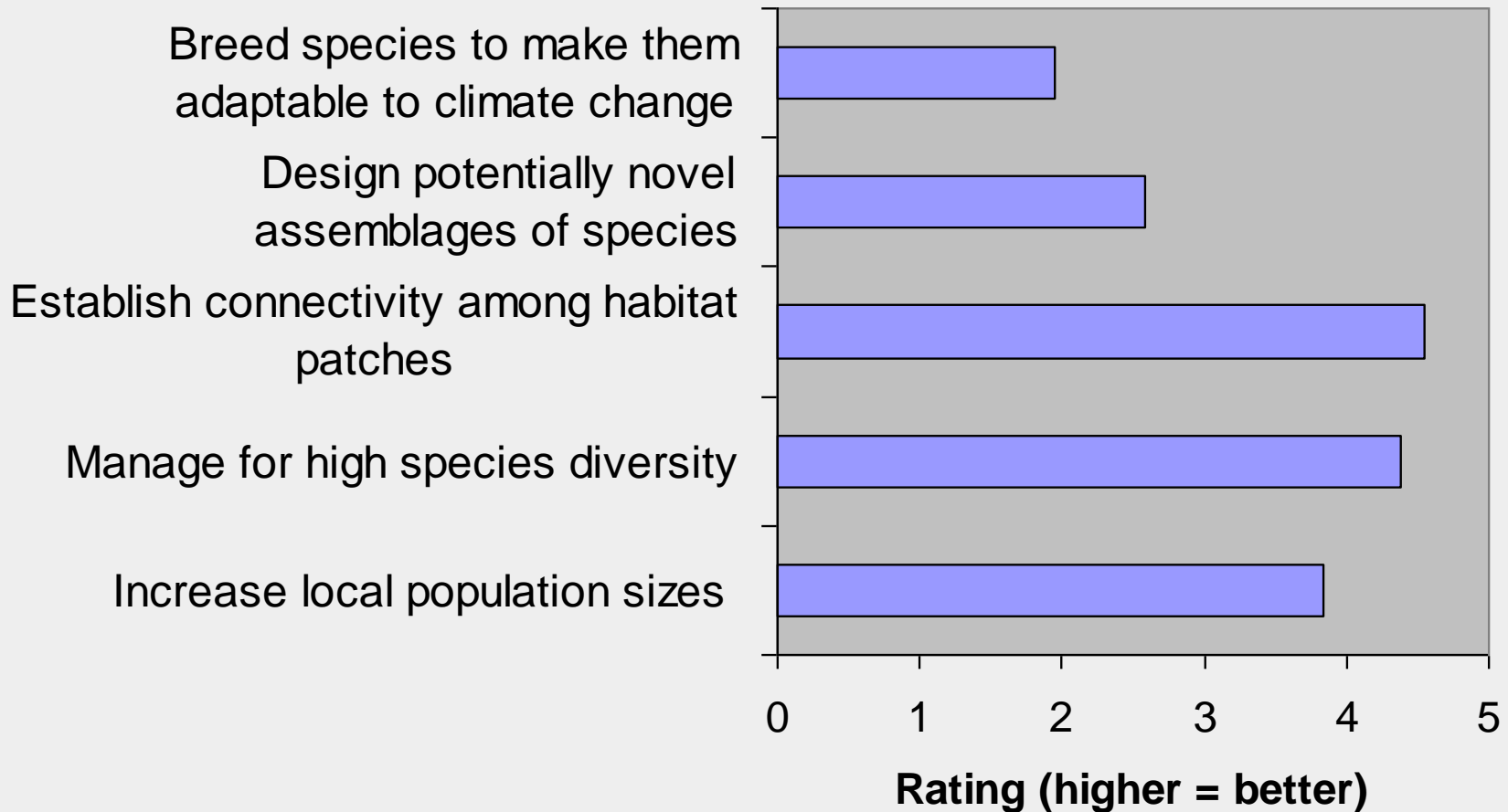


# Restoration and Climate Change

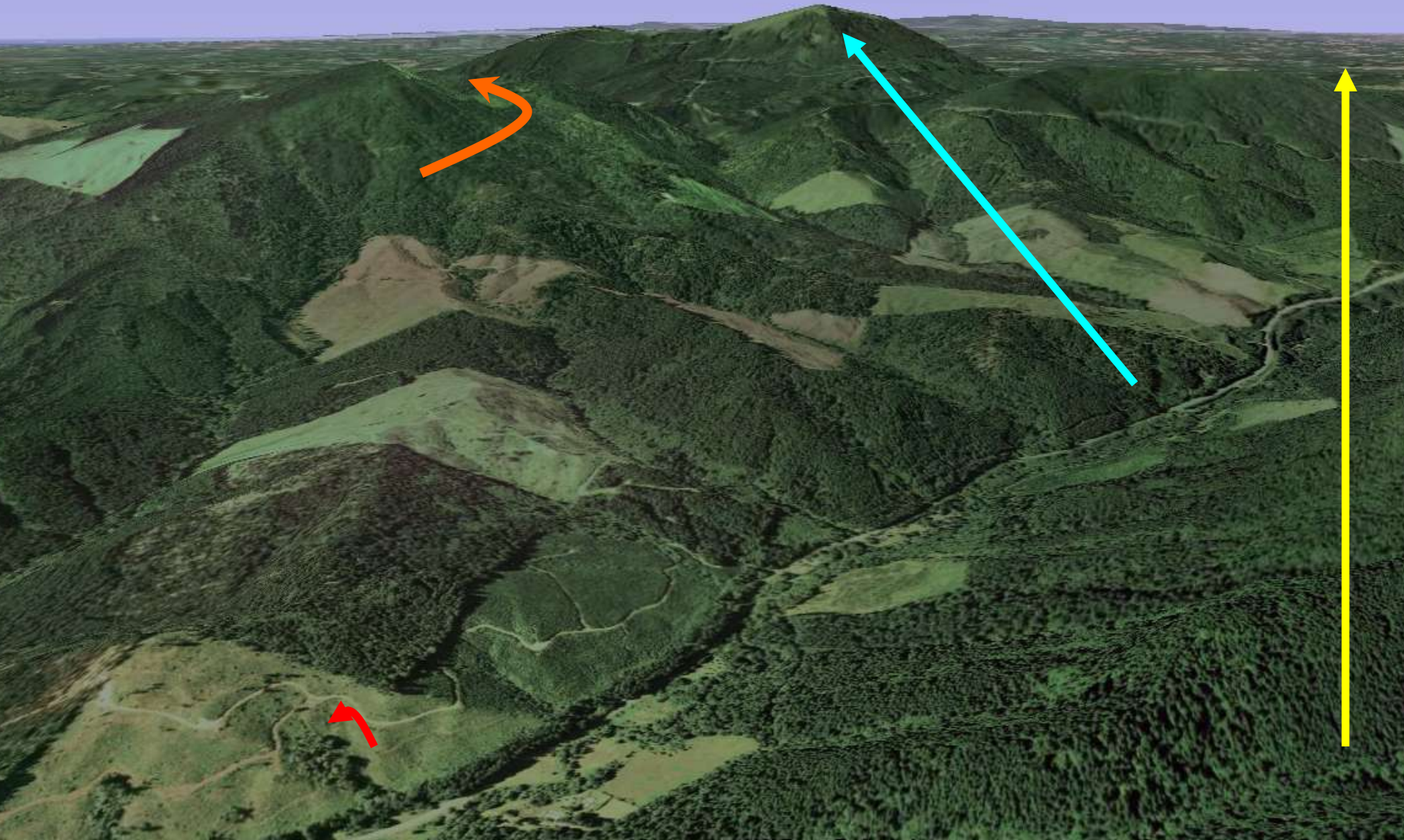
## Restoration strategies



Rate each of the following restoration strategies based on manipulating species or communities



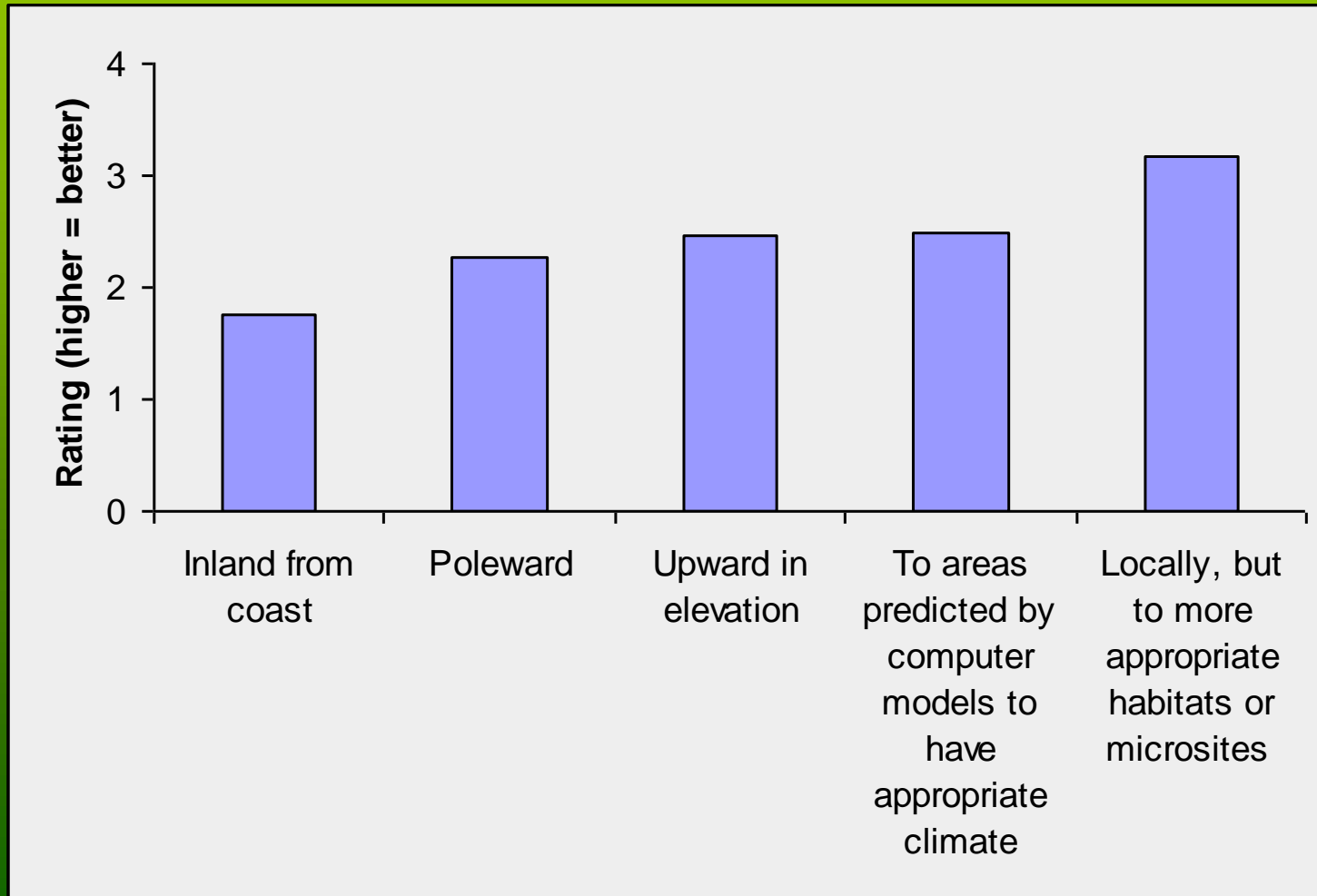
# Moving Species in Response to Climate Change



# Moving Species in Response to Climate Change



## Ranking strategies for moving species

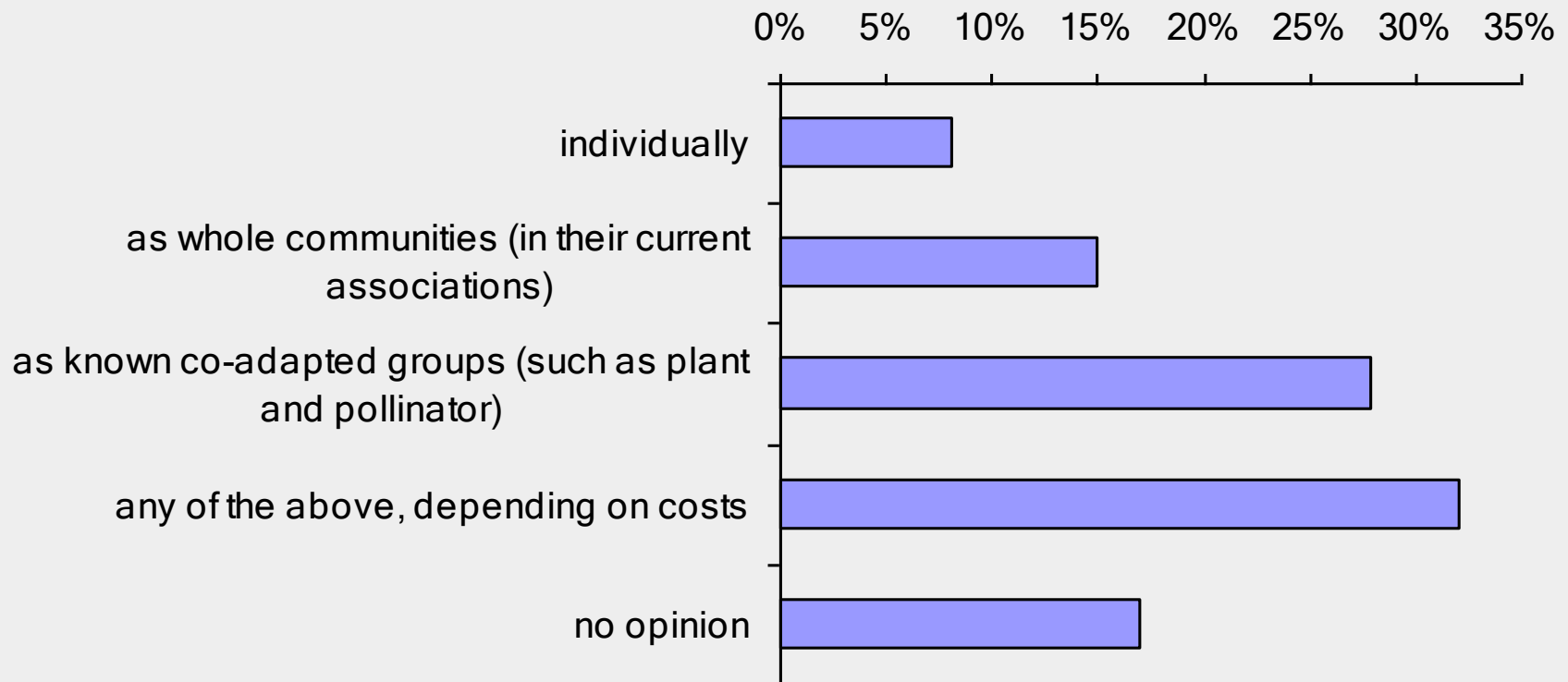


# Moving Species in Response to Climate Change



## Ranking strategies for moving species

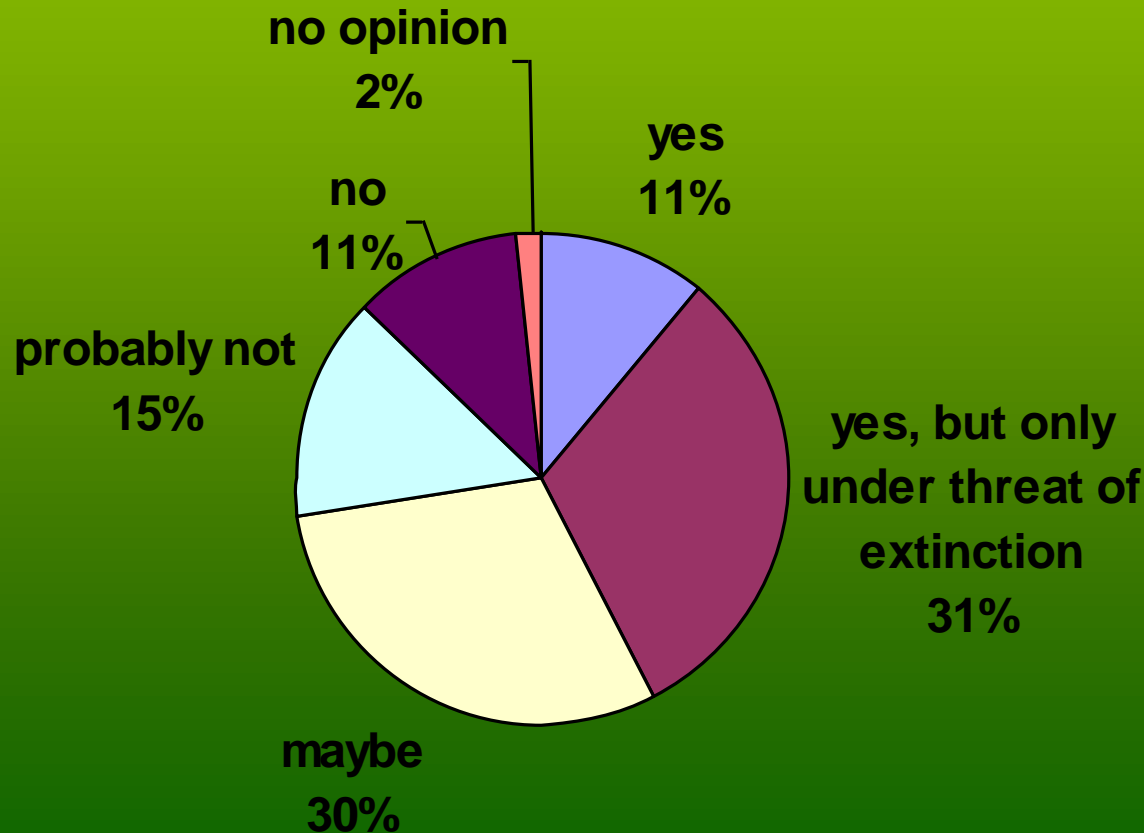
If species are deliberately moved in response to climate change, should restorations move species (pick one):



# Moving Species in Response to Climate Change



Given what you know about climate change and what is forecasted for different parts of the world, would you support moving species beyond their historic range?

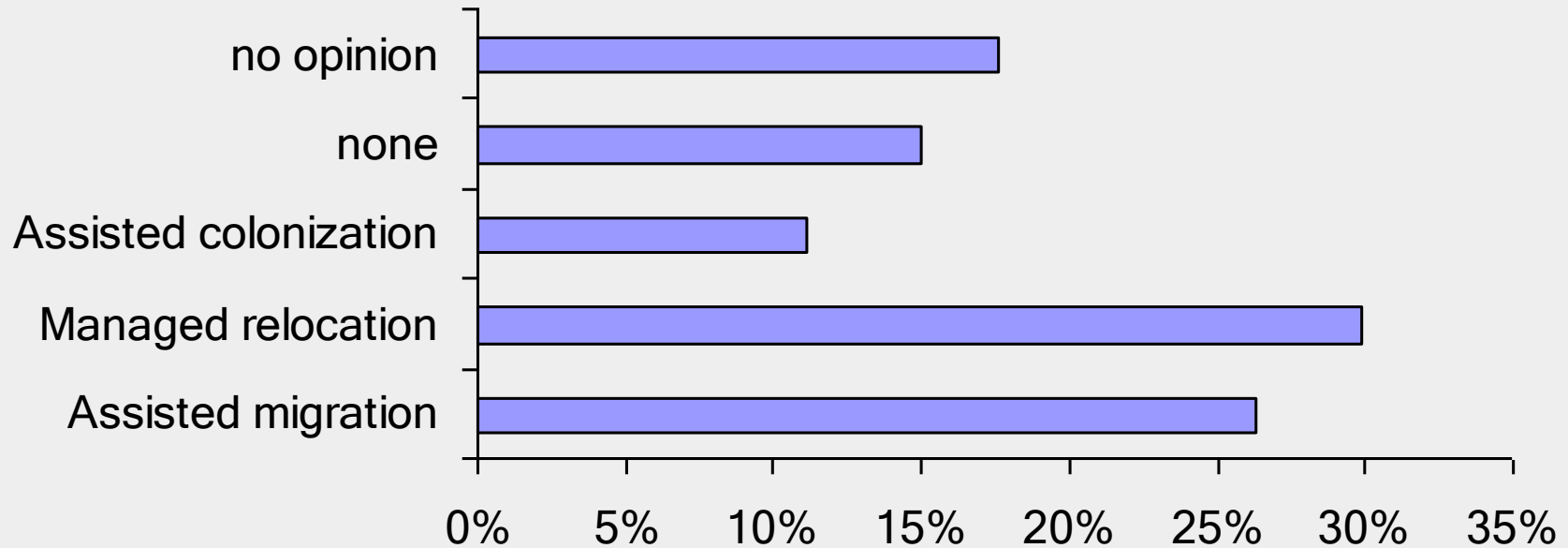


# Moving Species in Response to Climate Change



## Terminology

Which of these terms proposed in the scientific literature for moving species in response to climate change do you prefer?

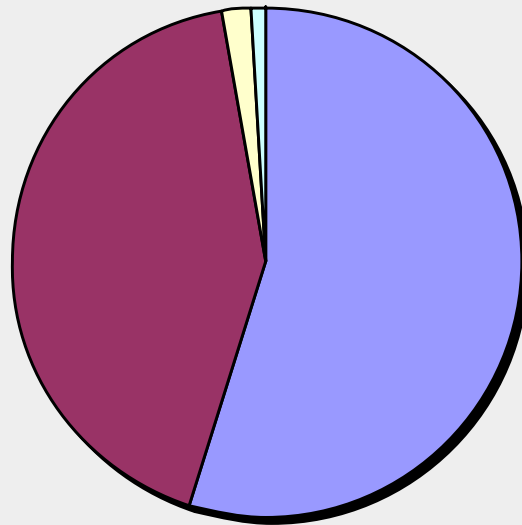


# Moving Species in Response to Climate Change



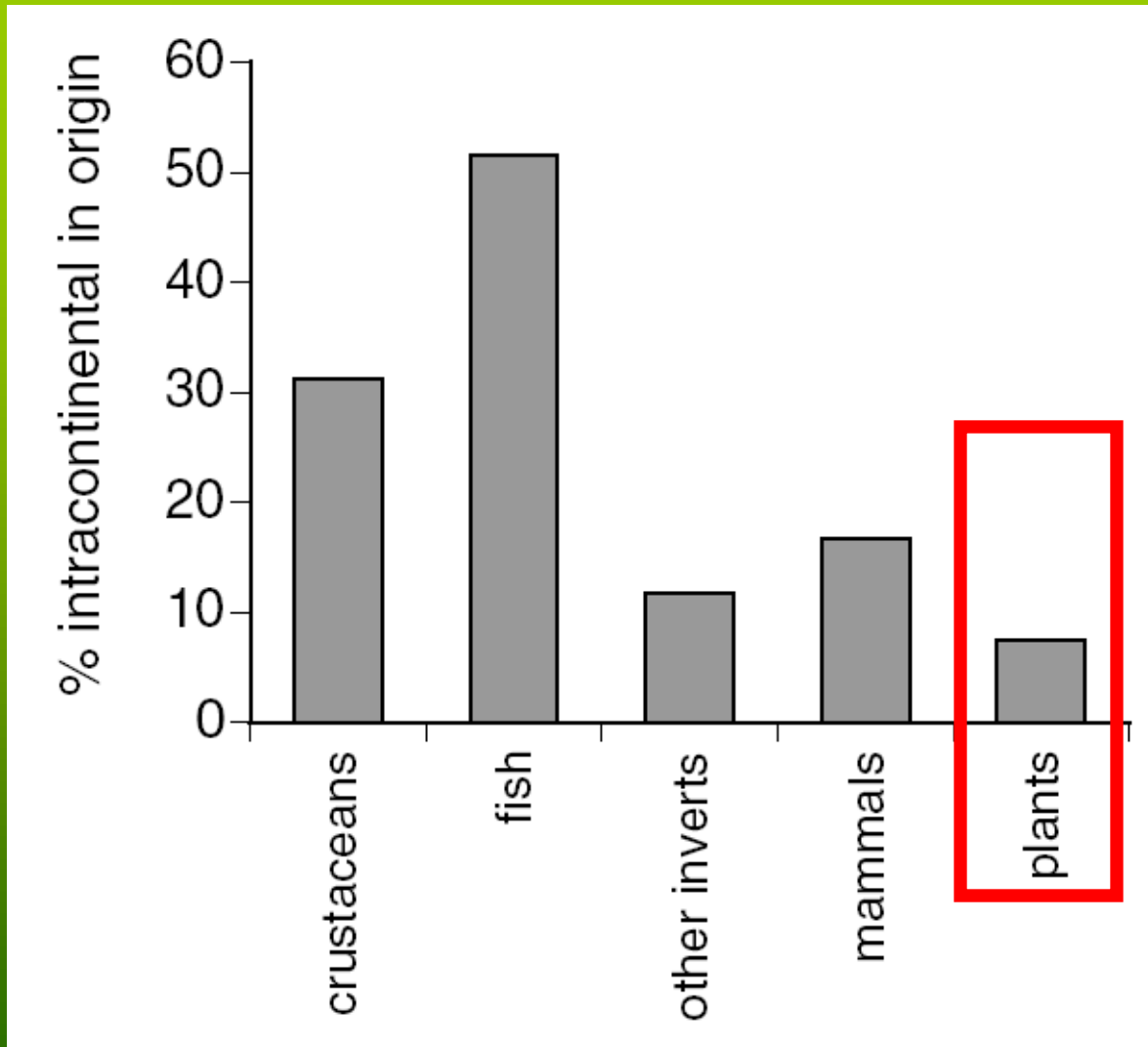
## Concerns for creating new invaders

Are you concerned that if species are intentionally moved in response to climate change that they may become invasive in a new area?



- very concerned
- somewhat concerned
- not concerned
- no opinion

# Invasive species by taxonomic group



Mueller and Hellman, 2010, *Conservation Biology*

# Moving Species in Response to Climate Change



## Miscellaneous movement thoughts

- **If a species migrates beyond its current range as climates change but without human assistance, would you consider that species native to the new area?**
  - Yes = 66%, No = 21%, ? = 13%
- **On a scale of 1-5, how comfortable are you moving species from your geographic area to another?**
  - 3.6
- **On a scale of 1-5, how comfortable are you moving species from another geographic area to yours?**
  - 3.8

# Summary



- Restoration process:
  - Use source material that is either from the closest source or most similar habitat
  - Use source materials from a mix of populations
  - Greatest limits to obtaining organisms is availability and cost
  - Caution about moving materials distances >500 km

# Summary



- Responding to Climate change:
  - Strong agreement that climate change is underway
  - General agreement that restoration may be able to help and that our practices should be modified in response.
  - Trend towards relaxing historic condition as goal for restoration
  - Acceptance of standard conservation recommendations
  - Caution about novel approaches

# Summary



- Moving Species in Response to Climate change:
  - Widespread concern that moved species may become invasive
  - Can't agree on terminology, but top pick was “Managed Relocation” (favored by animal biologists)
  - No clear choice for how to move species (individually or in groups)
  - Diversity of opinions about what direction and how far to move species



The paradigm is shifting, but to  
what?

What do *YOU* think?