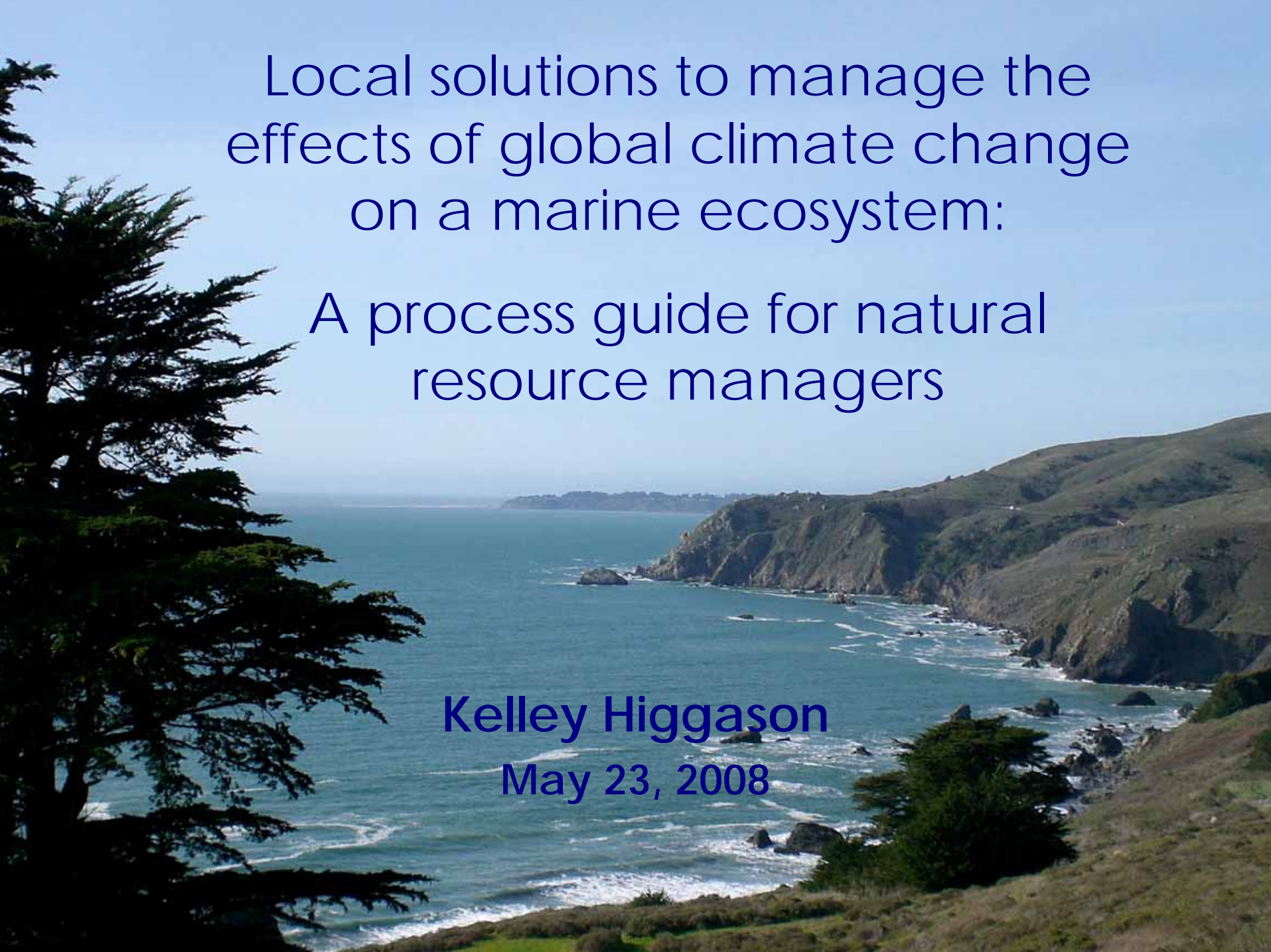


Local solutions to manage the  
effects of global climate change  
on a marine ecosystem:

A process guide for natural  
resource managers

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# Overview



- ◆ Natural resource managers
- ◆ Focus region
- ◆ Marine ecosystem response
- ◆ Public perception
- ◆ Process guide
- ◆ NOAA's Gulf of the Farallones NMS

# Natural Resource Managers

- ◆ Balance the needs of humans with ecosystem health
- ◆ Decisions based on ecosystems & public perception
- ◆ Climate change should be front line issue
- ◆ A collaborative effort is needed

Pacific

Coast



# Response to Climate Change: The Oceanic Carbon Sink

- ◆ 30% of all human-produced CO<sub>2</sub> since the Industrial Revolution
- ◆ Future emissions will exceed the amount of CO<sub>2</sub> the oceans can consume.
- ◆ Oceanic CO<sub>2</sub> uptake will continue to decline if atmospheric CO<sub>2</sub> continues to increase

# Response to Climate Change: Physical Effects

- ◆ Sea level rise
- ◆ Ocean acidification
- ◆ Changes in wind & upwelling regimes
- ◆ Increasing global sea surface temperatures

# Response to Climate Change: Biological Effects

- ◆ **Contraction and expansion of species' ranges**
- ◆ **Local shifts in species distribution**
- ◆ **Habitat loss**
- ◆ **Changes in the food web**
- ◆ **Changes in phenology**

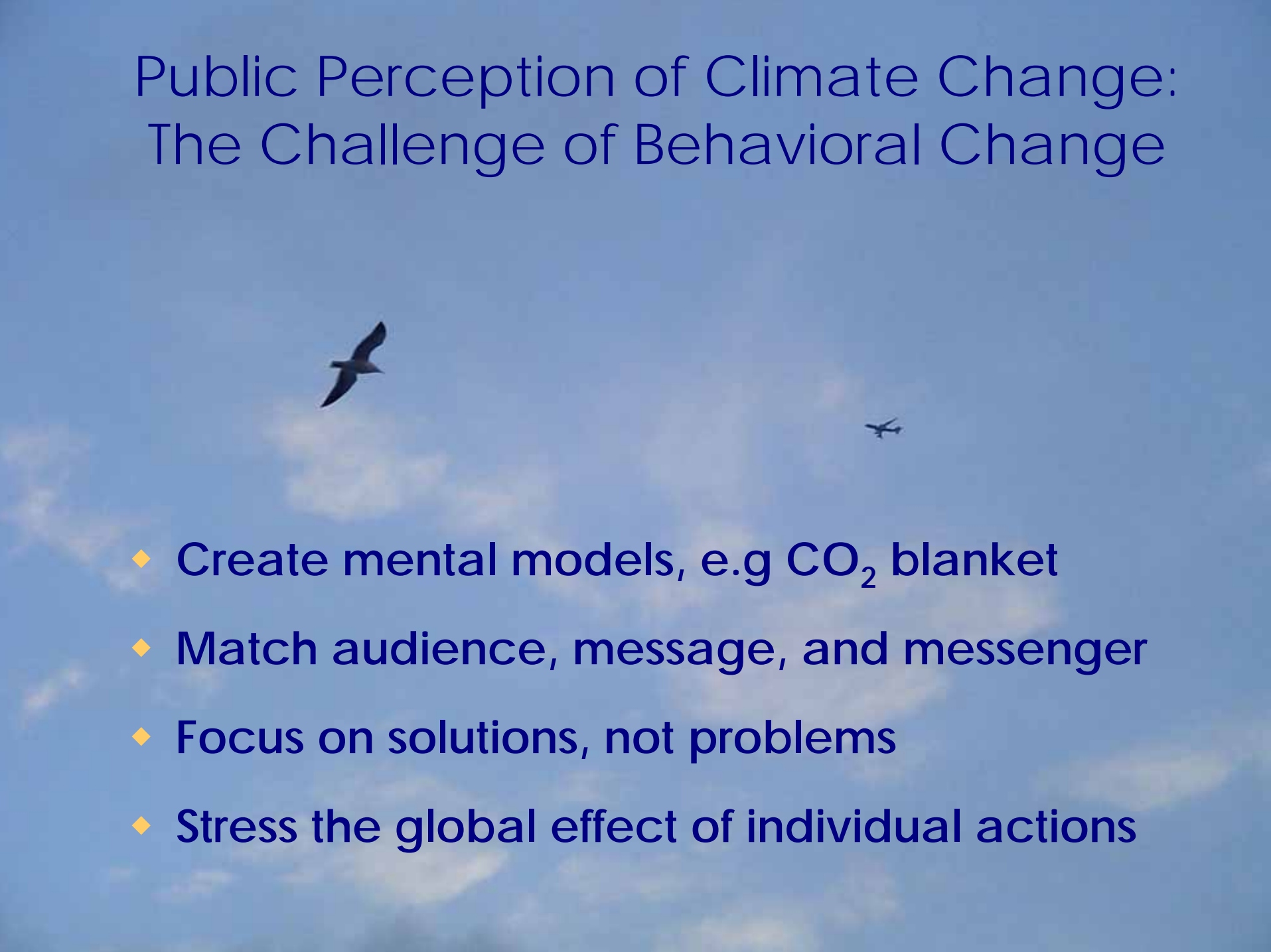
# Public Perception of Climate Change



- ◆ 1/3 of Americans say climate change is a serious threat in their lifetime
- ◆ 2/3 worry a “great deal” or “fair amount”
- ◆ Consistent with the avg across 10 polls since 1989
- ◆ We are still not convinced



# Public Perception of Climate Change: The Challenge of Behavioral Change

- 
- ◆ Create mental models, e.g CO<sub>2</sub> blanket
  - ◆ Match audience, message, and messenger
  - ◆ Focus on solutions, not problems
  - ◆ Stress the global effect of individual actions

# Process Guide for Managers: Indirect Ecosystem Benefits



Managers must make decisions that:

- ◆ Engage community leaders
- ◆ Facilitate communication between scientists and policy makers
- ◆ Change human behavior
- ◆ Reduce greenhouse gas emissions

# Process Guide for Managers: Direct Ecosystem Benefits

Managers must make decisions that:

- ◆ Prioritize areas for protection and restoration
- ◆ Reduce human-induced stressors
- ◆ Adopt ecosystem-based/adaptive management practices

# Applying the Process Guide

## Case Study: NOAA's Gulf of the Farallones National Marine Sanctuary

- 
- ◆ Planning Meeting
  - ◆ Regional Action Team
  - ◆ Ocean Climate Summit
  - ◆ Site Scenario
  - ◆ Working Groups
  - ◆ Action Plan
  - ◆ Green Team
  - ◆ Sustainability

# In Conclusion...

A photograph of a whale breaching the ocean surface, with a bird flying above it. The whale's dark, rounded back is visible above the water, and the bird is captured in mid-flight with its wings spread. The background is a vast, blue ocean under a clear sky.

*"Ecosystems are not only as complex as we think, but more complex than we can think."*

*Frank Eagler, Ecologist*

A photograph of a sunset over the ocean. The sun is a bright, glowing orb in the center of the horizon, casting a long, shimmering path of light across the water's surface. The sky is filled with soft, golden and orange hues, with some light clouds. The water in the foreground is dark blue with gentle ripples. In the bottom foreground, there are dark, silhouetted rocks. The text "Questions...?" is overlaid in the center of the image in a white, serif font with a thin black outline.

Questions...?