

Wetlands and Climate Adaptation in National Parks



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National Park Service was established in 1916



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Organic Act of 1916

The National Park Service must manage park resources and values “in such manner and by such means as to leave them unimpaired for the enjoyment of future generations”.



NPS Management Policies (2006)



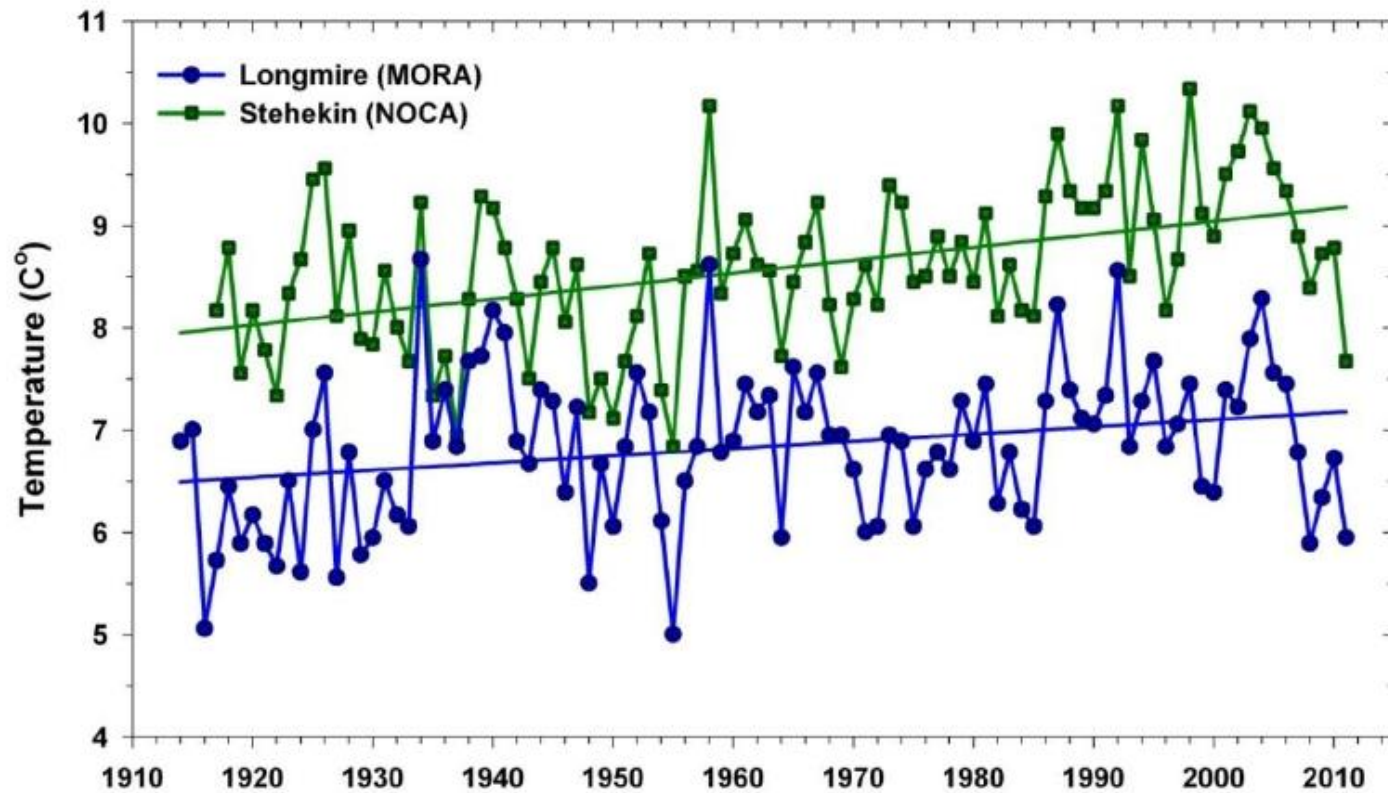
- Protect all components & processes of ecosystems
- Protect naturally evolving levels of biodiversity
- Natural change is an integral part of functioning ecosystems
- Specifically that we will protect wetlands

“Natural Condition”



is the condition of resources that would occur in the absence of human dominance over the landscape.

But, Climate Change....





What Are We Doing?

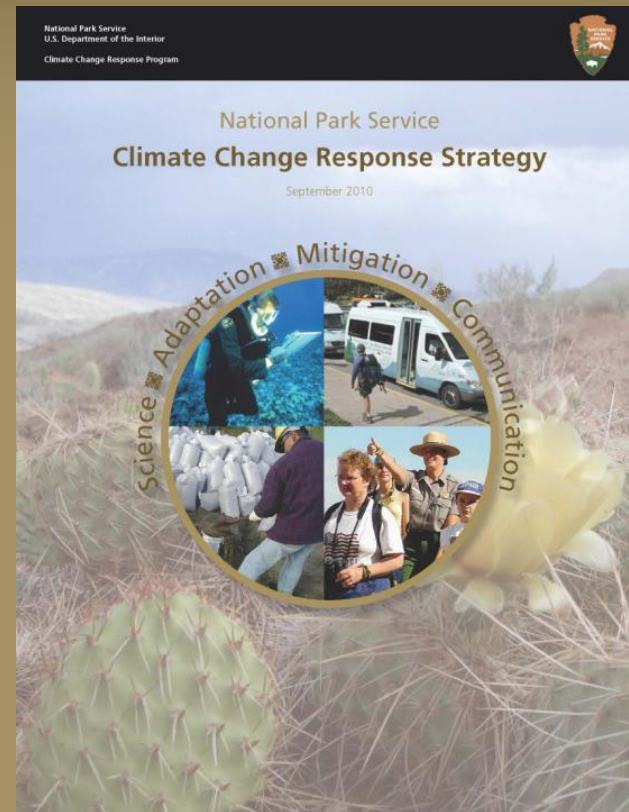
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NPS Climate Change Response Strategy & Action Plan

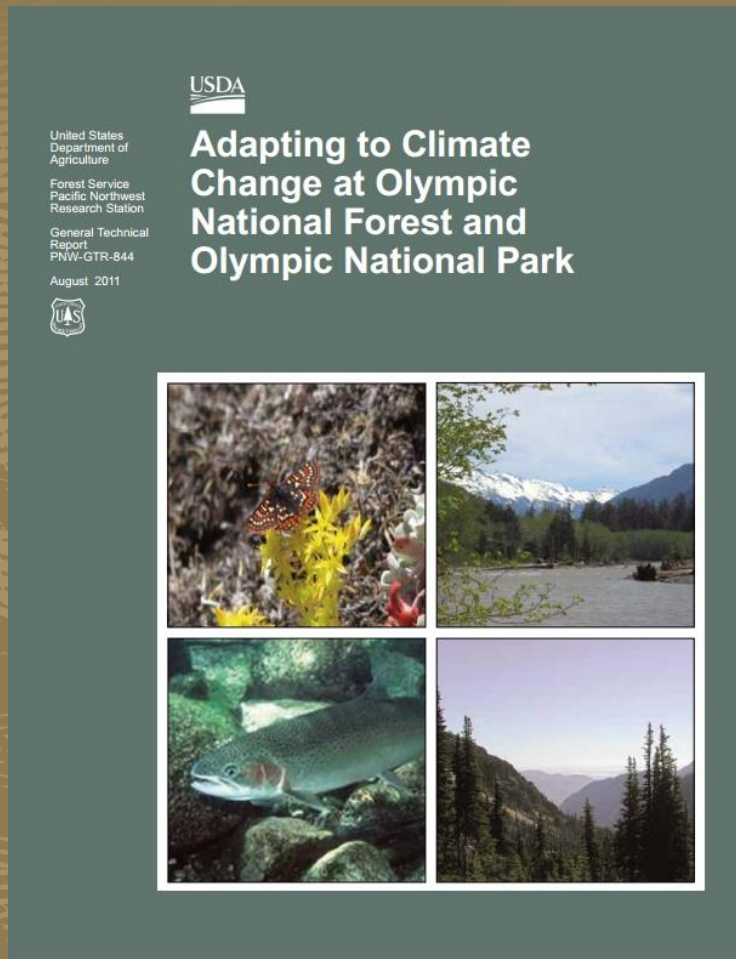
4 Key Elements

- Science
- Adaptation
- Mitigation
- Communication

Plus legal and policy considerations



Developing Adaptation Strategies



USFS GTR – Sept 19, 2014

adaptationpartners.org

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Adaptation Strategies

- **Climate change sensitivity:** Reduced embryonic and larval survival due to changes in breeding habitat
- **Strategy:** Increase population resilience and resistance.
 - Reduce nonclimatic threats.
 - Remove exotic fish.
 - Facilitate recovery from past management with habitat manipulation.
 - Relocate species as necessary.

Restoring Resilience of Wetland Ecosystems



Fish Removal In North Cascades National Park Complex

Restoring Resilience of Wetland Ecosystems



Exotic Plant Removal – Reed Canary Grass

Mitigating Effects of Development

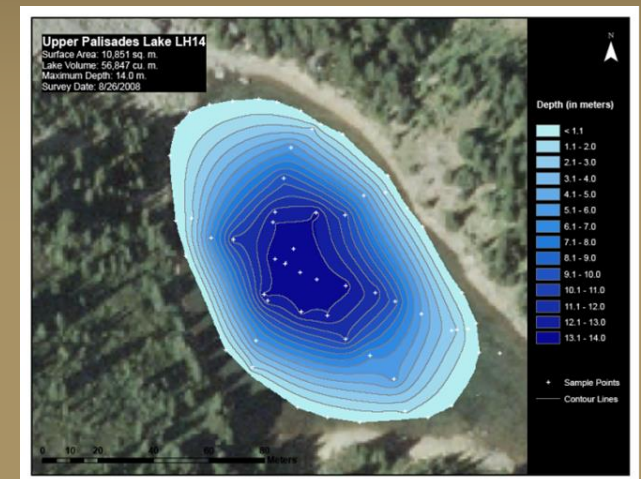


Compatible with climate adaptation strategies

Expanding Science Base

Long-term Monitoring of Mountain Lakes

- Mount Rainier, North Cascades & Olympic National Parks
- 20 lakes, annually
- Biotic, chemical, and physical monitoring parameters
- Amphibians at lakes & surrounding wetlands



Expanding Science Base

Mount Rainier – Citizen Science Crews
Monitor Western Toads



Expanding Science Base

Increase Understanding of other Stressors to Wetland Ecosystems

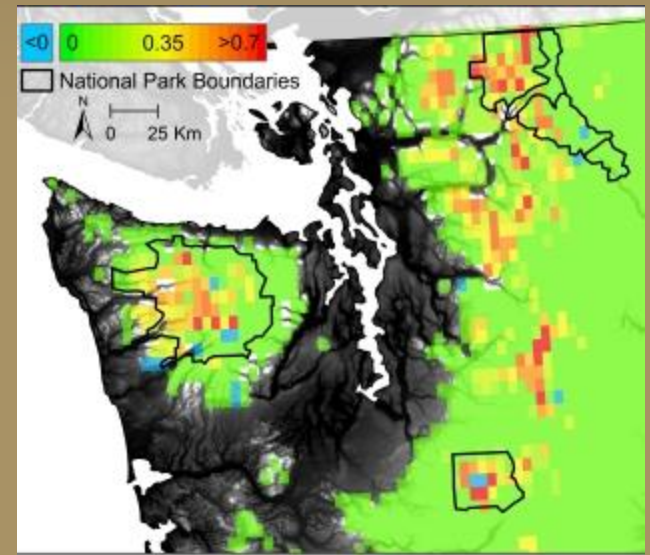
- Chytrid Fungus
- Mercury Bioaccumulation



Expanding Science Base

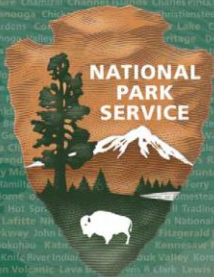
Collaborations with outside researchers
and other agencies

Maureen Ryan, UW & SFU
Se-Yeun Lee, UW
Meghan Halabisky, UW
Mike Adams, USGS
Wendy Palen, SFU
Amanda Kissel, SFU



Re-examining NPS Management Policies (2006)

Management Policies 2006



- NPS Policies support actions promoting resilience
- But guidance on applying these policies is not specific enough
- NPS has started to look into this

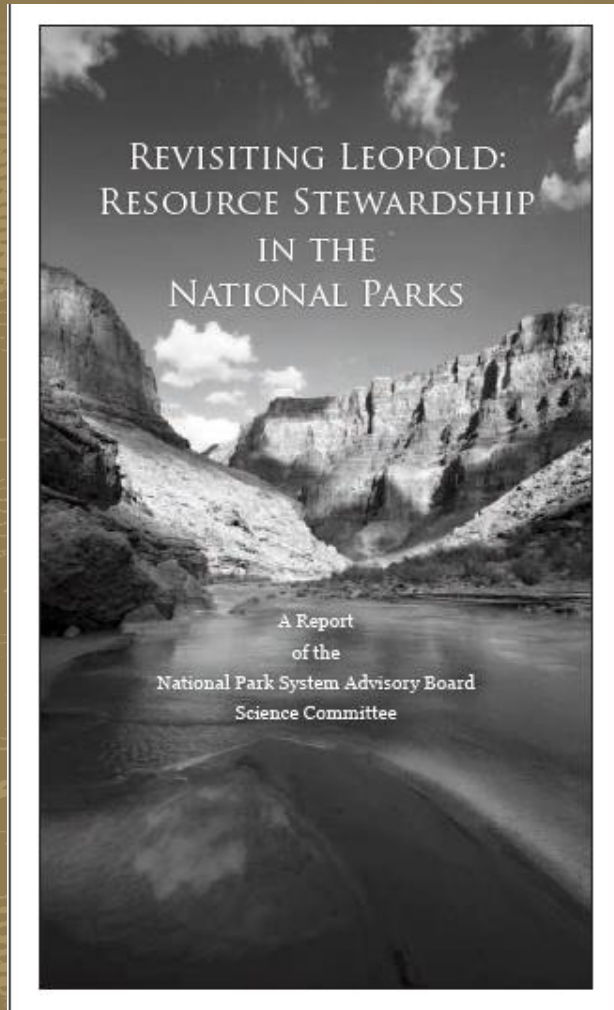
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Revisiting Leopold

- 2012 – NPS Director appointed a team to re-examine Leopold report

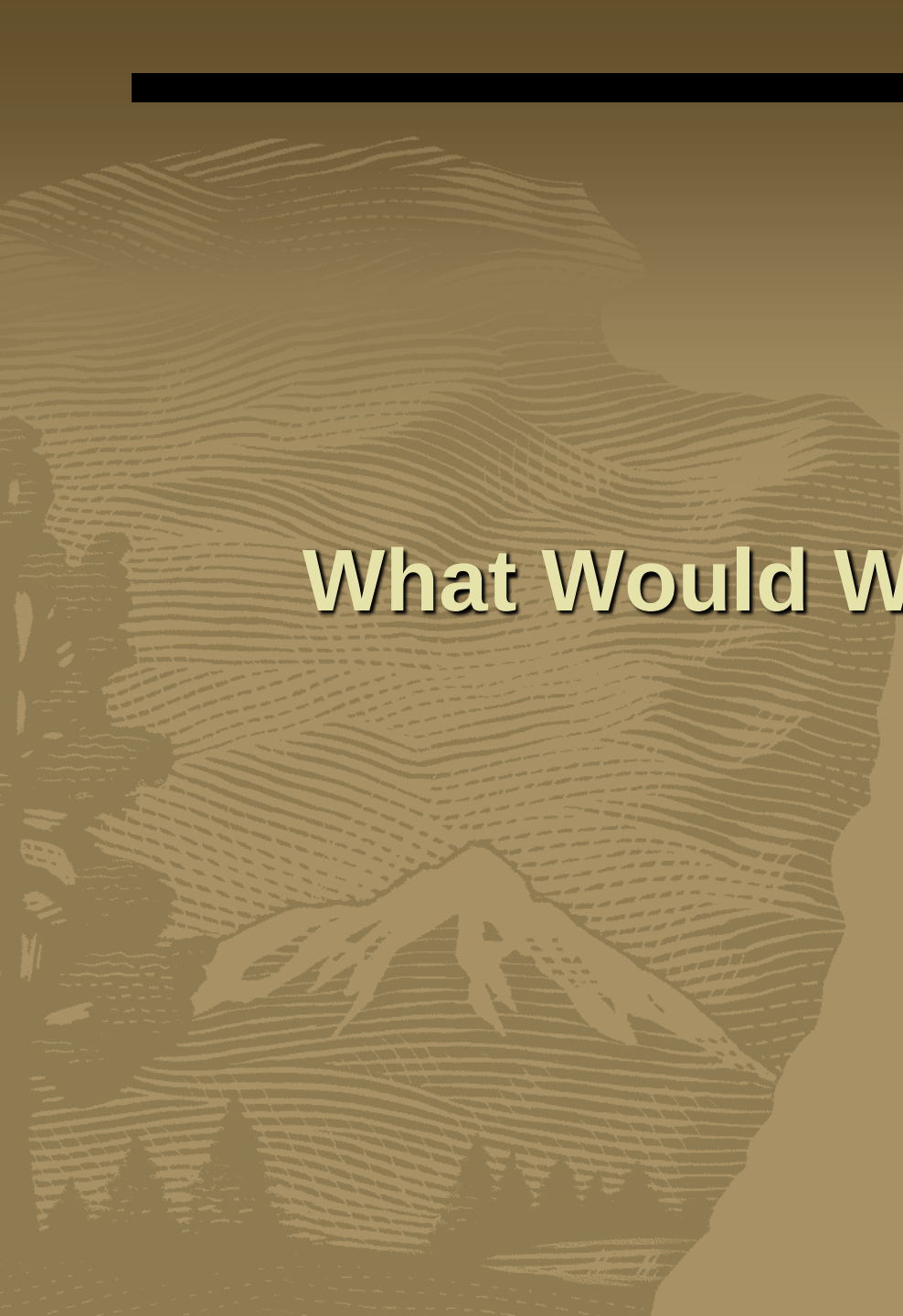
WHY?

- environmental change is widespread & severe
- ecosystem management is now a science-based activity



Revisiting Leopold Recommendation

“The overarching goal of NPS resource management should be to steward NPS resources for **continuous change** that is not yet fully understood, in order to preserve **ecological integrity** and **cultural and historical authenticity**, provide visitors with transformative experiences, and form the core of a national conservation land and seascape.”



What Would We Like to Do?

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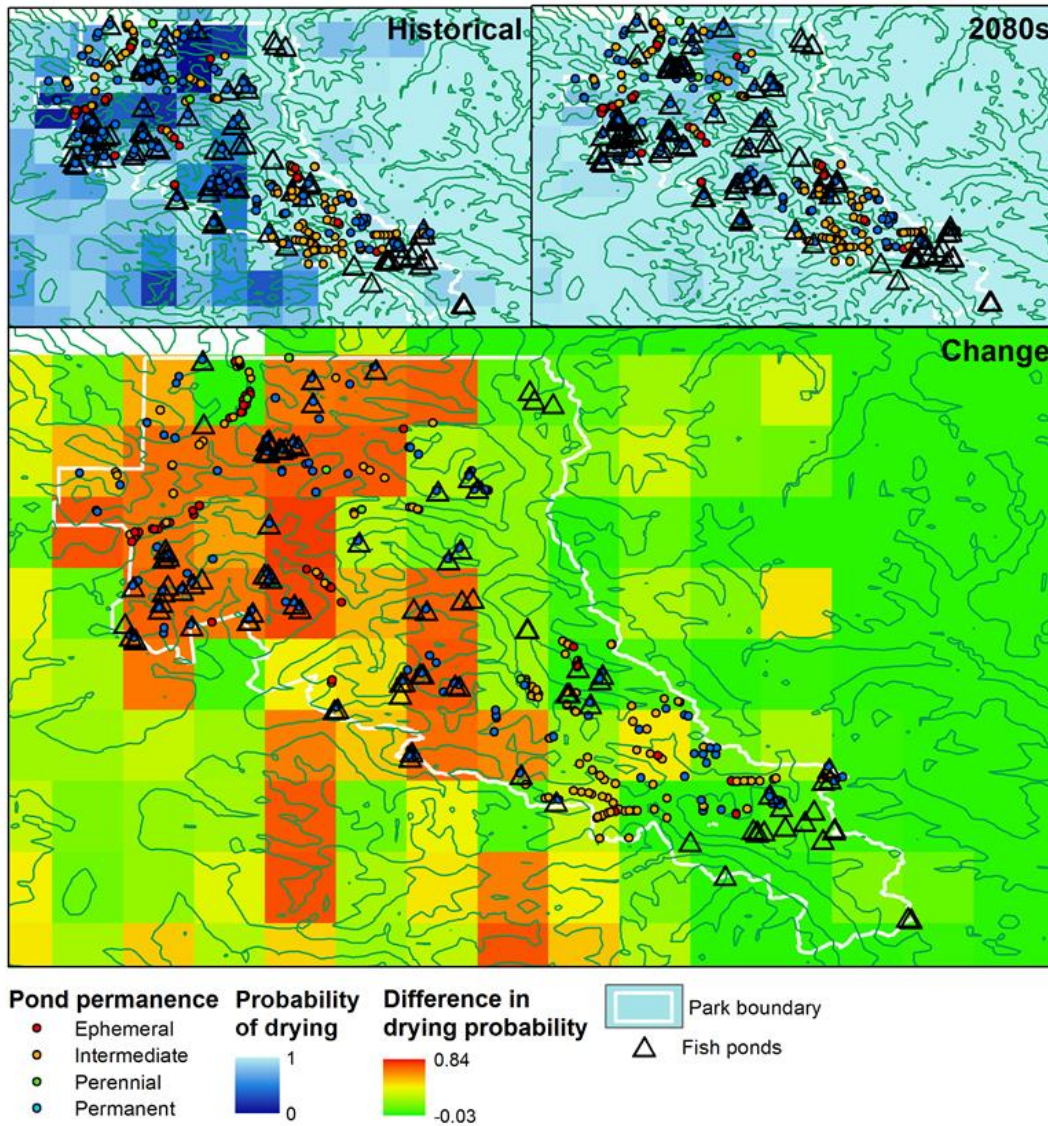
Increase Resolution of Data to Enable Application to Park Management

- Increase targeted climate science information
- Identify & articulate management questions
- Improve wetland delineations
- Identify refugia and vulnerable habitats
- Detect Changes & Attribute causes - increase frequency & spatial extent of monitoring



Re-examine Management Plans with the Lens of Climate Change







“ There is great urgency in the recommendations put forward in this report—accompanied with an exhortation to the NPS to act immediately, boldly, and decisively.”

Revisiting Leopold, p. 23