

Integrating future climate data into natural resources management decisions

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Outline

- ◆ Finding future climate data
- ◆ Using future climate data
- ◆ An example of applying climate data to management plans

Finding Future Climate Data: Starting Questions

1. What management challenge are you dealing with?
1. What question(s) do you need to answer to make decisions about that challenge or opportunity?
1. At what spatial scale are you making this management decision?
1. What future timeframe do you need information for?

Finding Future Climate Data: Starting Questions

1. What management challenge are you dealing with?
 - ◆ Managing for endangered species food, water, or shelter
 - ◆ Managing for plant biodiversity
 - ◆ Managing for structural diversity in a plant community
 - ◆ Managing for wildfire risk
 - ◆ Managing for transitions from one ecosystem to another

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Finding Future Climate Data: Starting Questions

2. What question(s) do you need to answer to make decisions about that challenge or opportunity?

- ◆ How will temperatures affect different species in the ecosystem?
- ◆ How will precipitation change over the course of the year?
- ◆ What's going to happen to the growing season?
- ◆ How will changes in temperature or precipitation interact with invasive species?
- ◆ What plants will be well-suited to this area in the future?

Finding Future Climate Data: Starting Questions

3. At what spatial scale are you making this management decision?

- ◆ A site the size of Tingley Beach?
- ◆ An entire wildlife refuge?
- ◆ A single reach of the Rio Grande?
- ◆ The Upper, Middle, or Lower Rio Grande?
- ◆ The entire Rio Grande (or the bosque along it)?

Finding Future Climate Data: Starting Questions

4. What future timeframe do you need information for and at what time-step?

- ◆ Mid- or late-century?
- ◆ Next year?
- ◆ Annually?
- ◆ Seasonally?

Finding Future Climate Data: Starting Questions

4. What future timeframe do you need information for and at what time-step?

- ◆ Mid- or late-century?

- ◆ **Next year?**

If this is your answer, you're looking for weather, not climate

- ◆ Annually?

- ◆ Seasonally?

Future Climate Data Resources

US Climate Resilience Toolkit - Climate Explorer

- ◇ Spatial resolution: ~7km
- ◇ Seasonal and annual time-steps

USGS National Climate Change Viewer

- ◇ Spatial resolution: 800m
- ◇ Monthly, seasonal, and annual time-steps

Future Climate Data Resources

Climate Toolbox Climate Mapper

- ◇ Spatial resolution: 4km
- ◇ Seasonal and annual time-steps

South Central Climate Adaptation Science Center Downscaled Projections

- ◇ Spatial resolution: 10km
- ◇ Annual, seasonal, and monthly time-steps

Using Future Climate Data

Things to consider:

- ◆ Models being used (and what they do well—or not)
- ◆ Downscaling methods being used, if any
- ◆ Data availability for your purpose
- ◆ Appropriateness of the data for your intended use

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You do not necessarily have to answer these questions yourself!

Using Future Climate Data

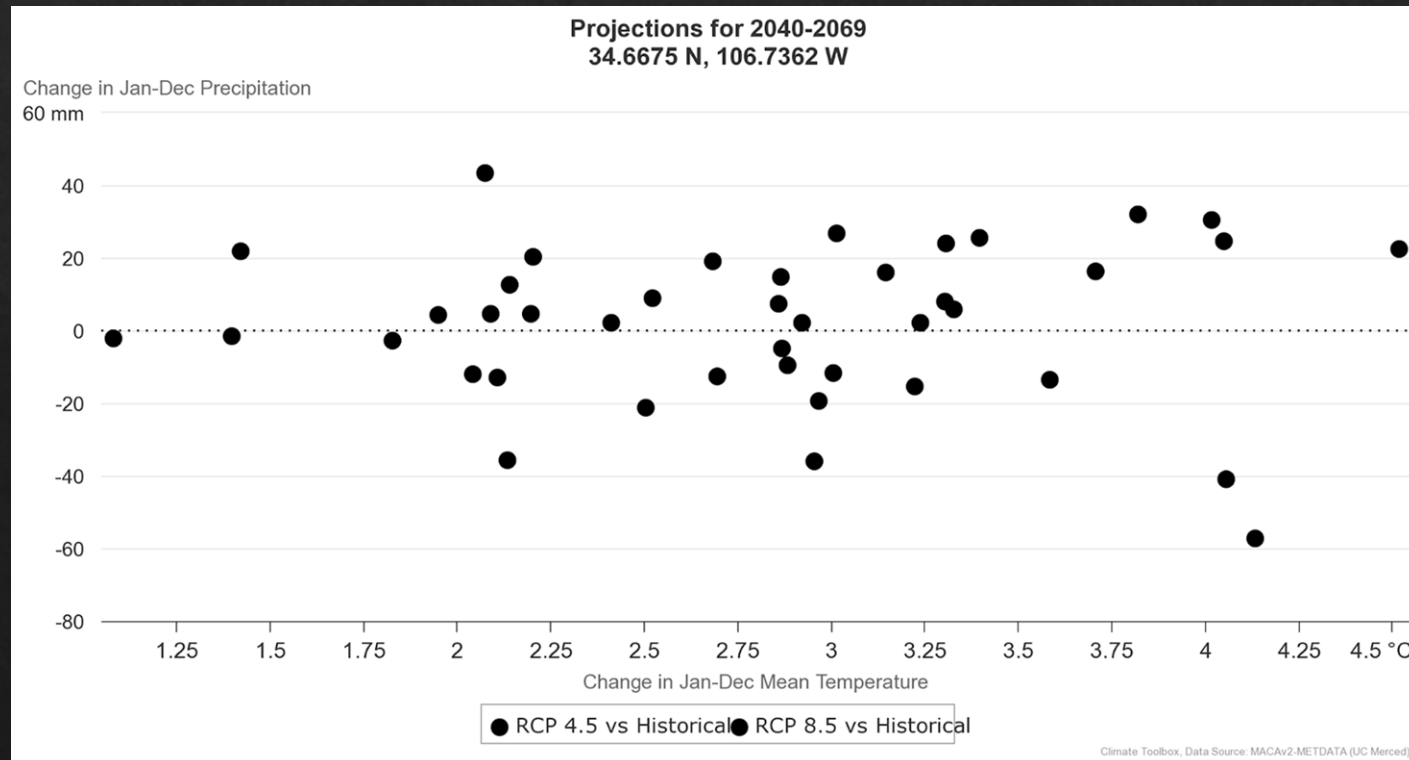
There are resources to help you choose the right data!

- ◆ The South-Central CASC (primarily related to natural and cultural resources)
- ◆ The Southwest Climate Hub (primarily related to agriculture)
- ◆ The Southern Climate Impacts Planning Program (primarily communities, including urban and suburban areas and rural communities)
- ◆ Other climate services organizations
- ◆ Within-organization climate scientists or climate specialists

Example application: Scenario planning at the National Park Service

- ◆ Climate Futures Scenario Planning: a framework for understanding the range of potential future climate conditions and exploring options for adapting resource management to account for future conditions

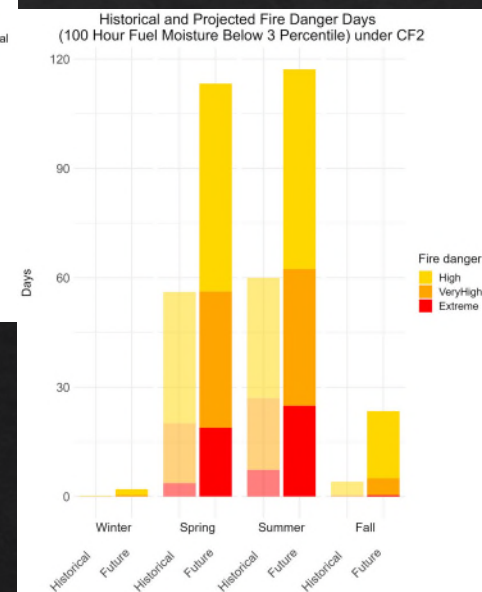
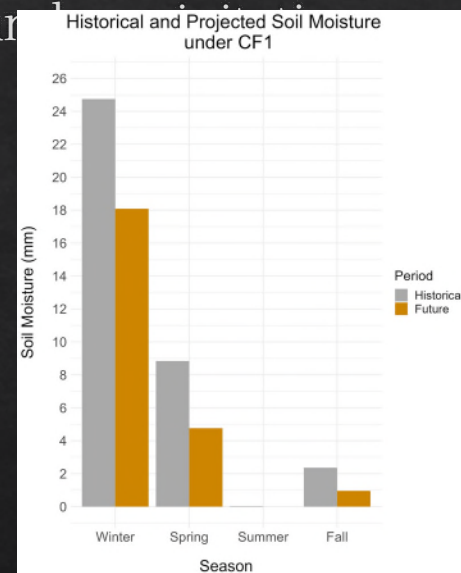
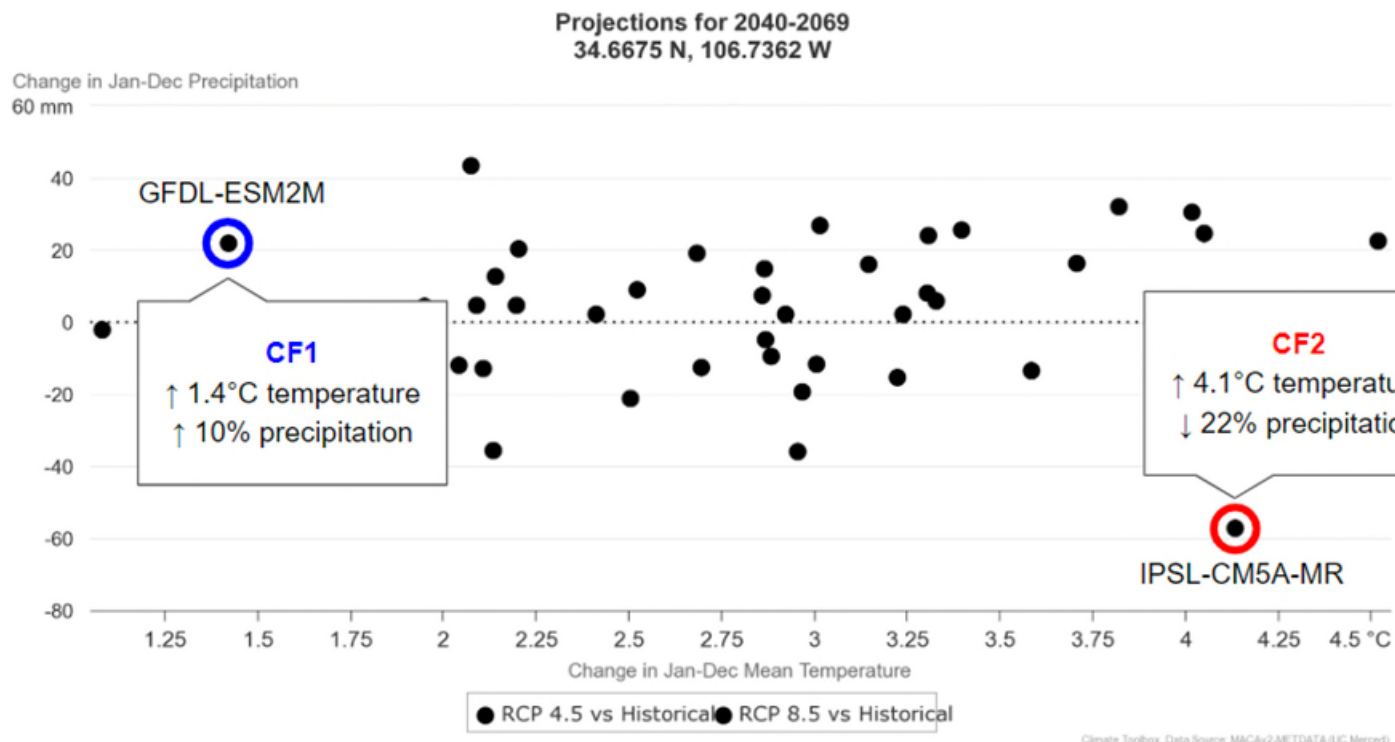
Step 1: Plausible future climate conditions generated using different climate models



Example application: Scenario planning at the National Park Service

Step 2: Most divergent model outputs chosen for use in developing climate-resource scenarios

- Often represent the plausible extremes of temperature and precipitation



Example application: Climate futures scenario planning at the National Park Service

Step 3: Each of the plausible futures then incorporated into an exercise to explore the effects of the given climate future on something of management interest

- ◆ National Park infrastructure
- ◆ Seasonal precipitation requirements for a plant species of interest
- ◆ Water availability or quality during crucial stages of fish lifecycles

- ◆ Potential management options identified

- ◆ Additional data or research needs identified



Example application: Climate futures scenario planning at the National Park Service

Takeaway:

By planning for the extremes of plausible, potential climate futures, solutions are developed that can be used as-is or with slight modifications when dealing with less extreme, but equally plausible futures

This method lays the groundwork for incorporating climate change information into management decisions that must be made in the present, but will affect future conditions and decisions

The framework provides a process for developing climate adaptation strategies before they're needed, allowing for proactive, rather than reactive, decision-making

Questions?

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