

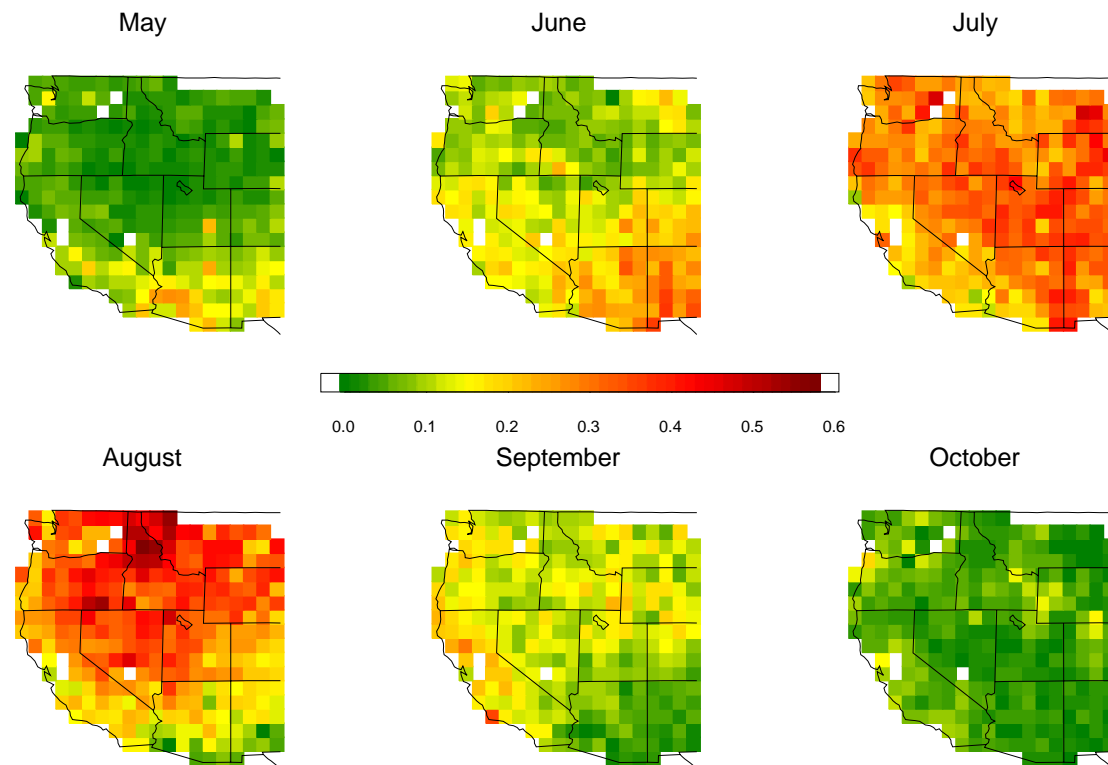
Evolving Partnerships for Integrating Climate and Forecast Information into Fire Management Planning in the Western United States

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Wildfire Management & Climate

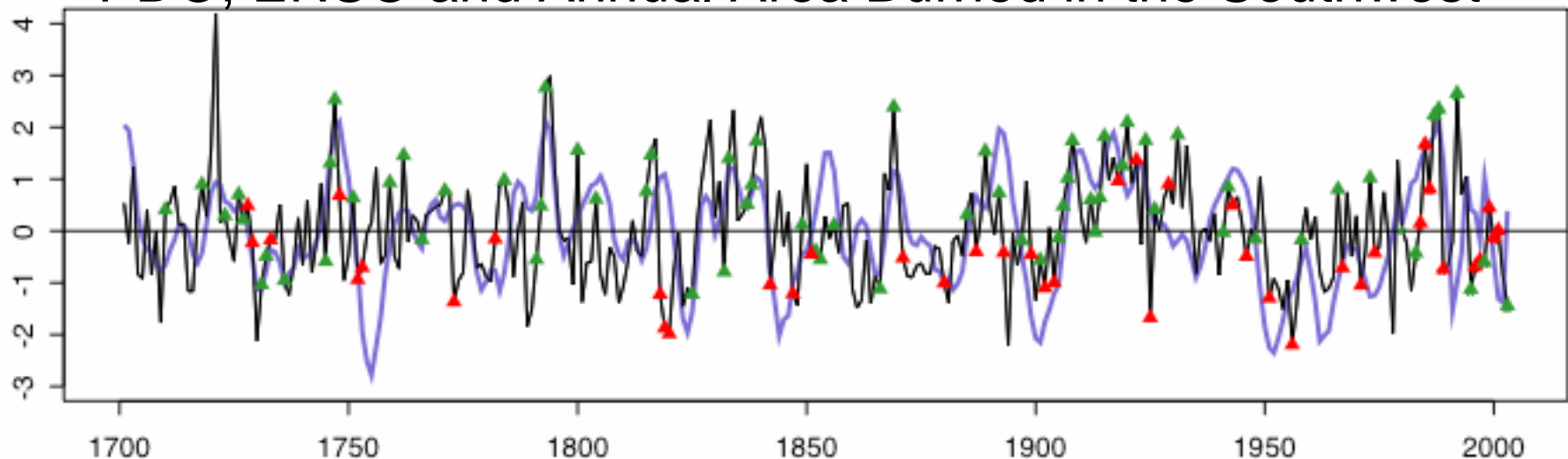
- Wildfire risks driven by climate on regional scales



Wildfire Management & Climate

- Time scales: Hours to Days, Seasonal to interannual variability, decadal variability

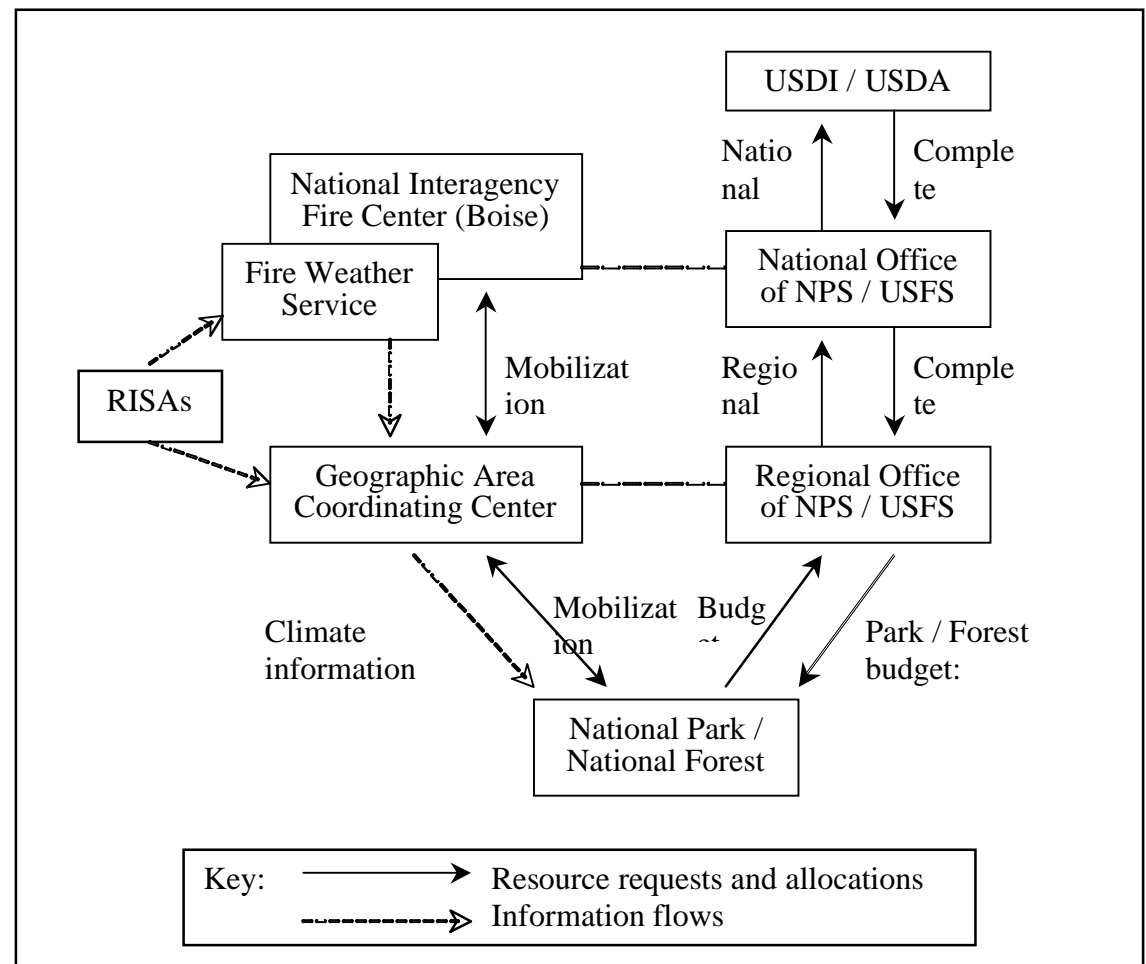
PDO, ENSO and Annual Area Burned in the Southwest



Wildfire Management & Climate

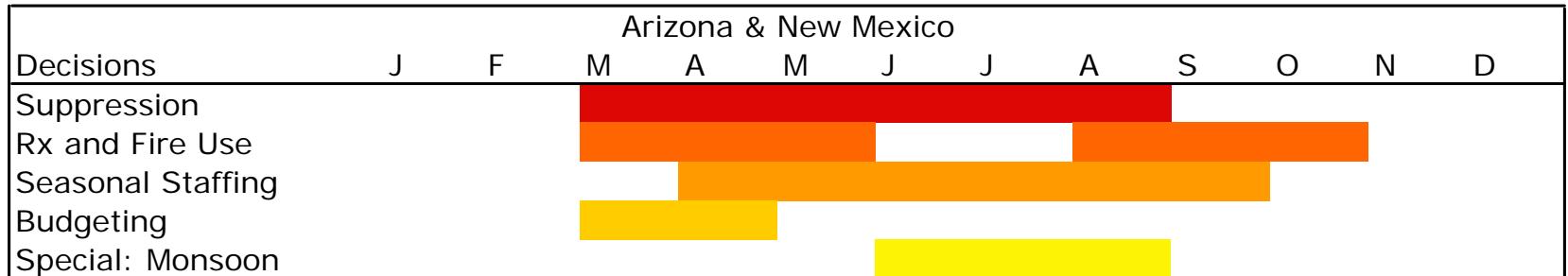
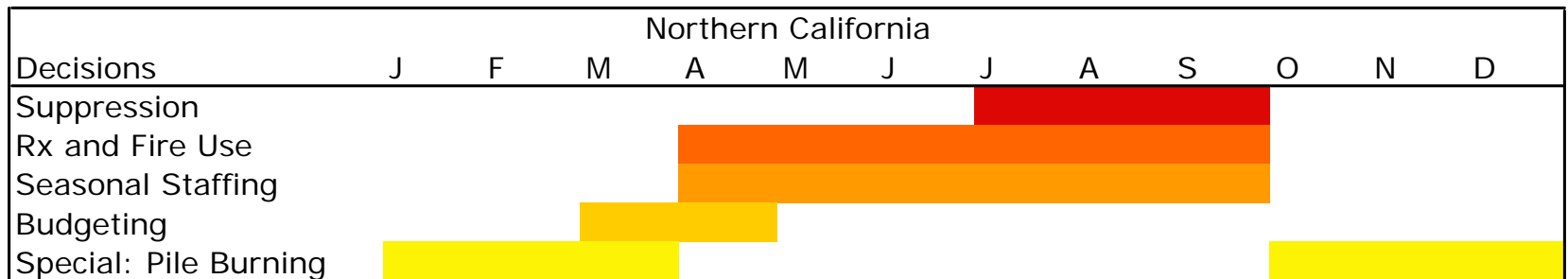
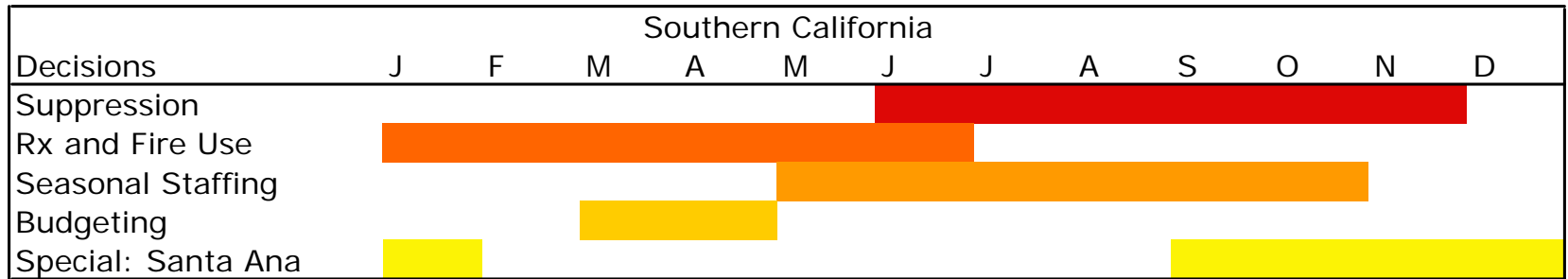
- Complex institutional structure

Figure 2: Wildland Fire Management Organizational Flowchart



Wildfire Management & Climate

- Multiple opportunities / applications



Role of CLIMAS Workshops

- Interaction with scientists and managers in workshops
 - Structured
 - Designed to elicit manager's views on forecast tools (skill, confidence, resolution, timing, etc)
 - Contact with diverse audience
 - USFS, NPS, BLM
 - Operations, Management/Planning, Science
 - Diverse levels of capacity, interest

Some Benefits

- Ideas for applications
- Establish relationships with multiple potential partners
 - Fire management (forecasting, operations and planning), Federal researchers, Academia

Taking the Initiative

- Entrepreneurship
 - Us: we developed data sets, tested models, developed prototype forecasts
 - Price of entry - demonstrated value
 - Them: NIFC predictive services identified our work through conference proceedings abstracts, interaction in workshops and conferences

How do we get from research to operational applications?

- Resources
 - Shouldn't stakeholders contribute resources at some stage?
 - Challenge: (our) research-to-applications too applied for their research program, too esoteric for operations?
 - Not formally funded as transition project, but USFS is a big organization...

How do we get from research to operational applications?

- Predictive Services identified our research as being of value for specific applications
- Encouraged collaborations from within
 - Resources
 - Partnerships
 - Data
 - Applications
 - Competition?
- Unofficial imprimatur?
 - Gradual transfer of research and forecast technology to multiple Forest Service researchers (RMRS, SRS, Northwest GACC)
 - Eventually it wont be my product that they use
 - But elements of my research will be incorporated

It's a Two-way Street

- “They” are learning from us
 - Data sets
 - Forecast methods
 - Forecast limitations
- “We” are learning from them
 - Data sets
 - Applications
 - Forecast methods
 - Forecast limitations

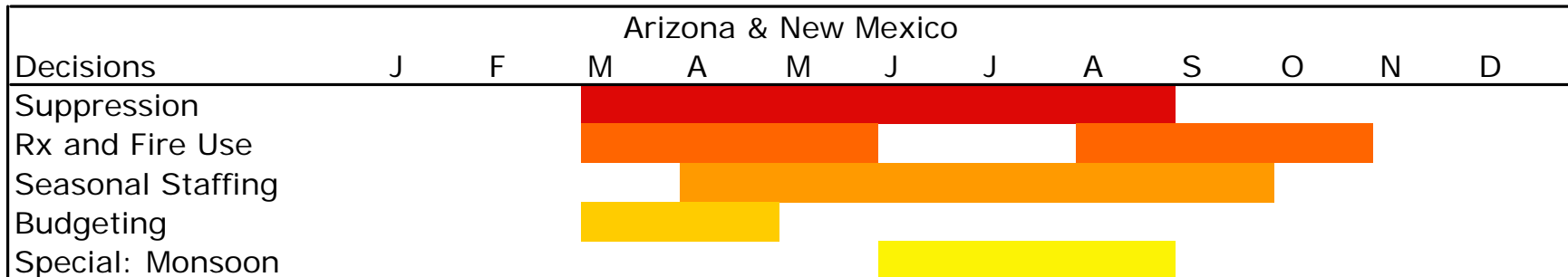
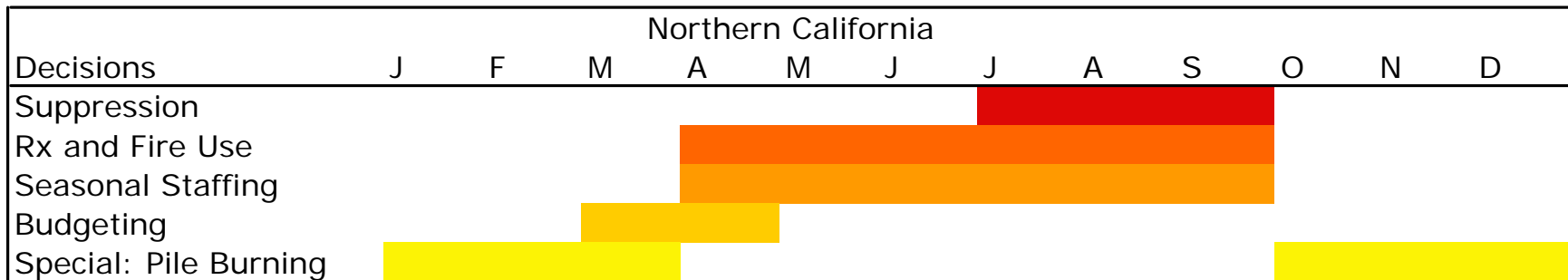
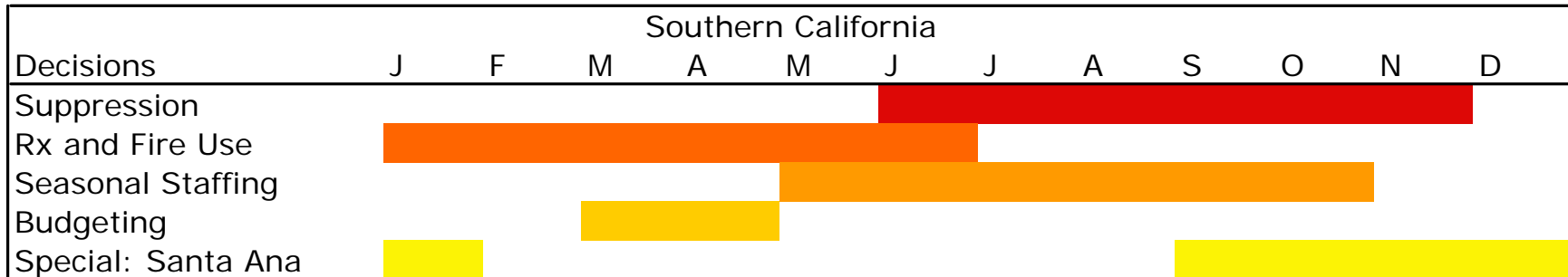
Defining Characteristics

- Public Stakeholders are large Federal Agencies
- Diverse Resources and Capacities
- Lead Agency
 - USFS has considerable resources:
 - research bureaucracy
 - Cross-cutting, centralized.
 - NPS research infrastructure based in individual parks
- Multiple, overlapping (competing?) research collaborations
- Entrepreneurship
- Inter/Intra agency Coordination

USFS Forecast Development & Assessment

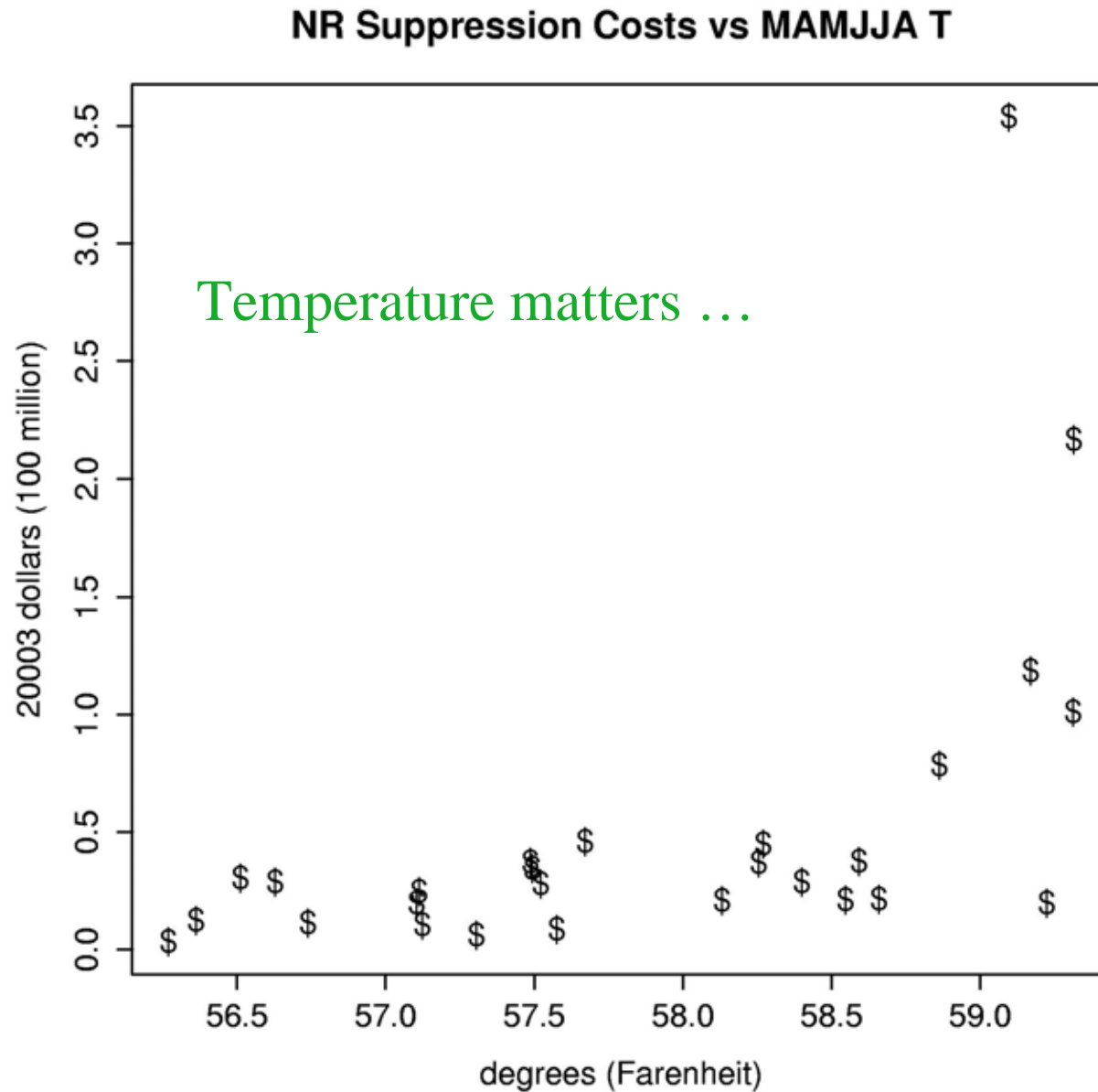
- USDA Forest Service
- Budgeting
- 2yr Fiscal cycle
- Wanted: Longer lead times, custom area
- Reallocation across activities, regions
- Suppression budget variability dominated by temperature sensitive forest wildfire regimes
- T forecasts -> improved seasonal forecasts
- Challenge: A categorical forecast
- Challenge: Timing

Decision Calendars for Wildfire Management



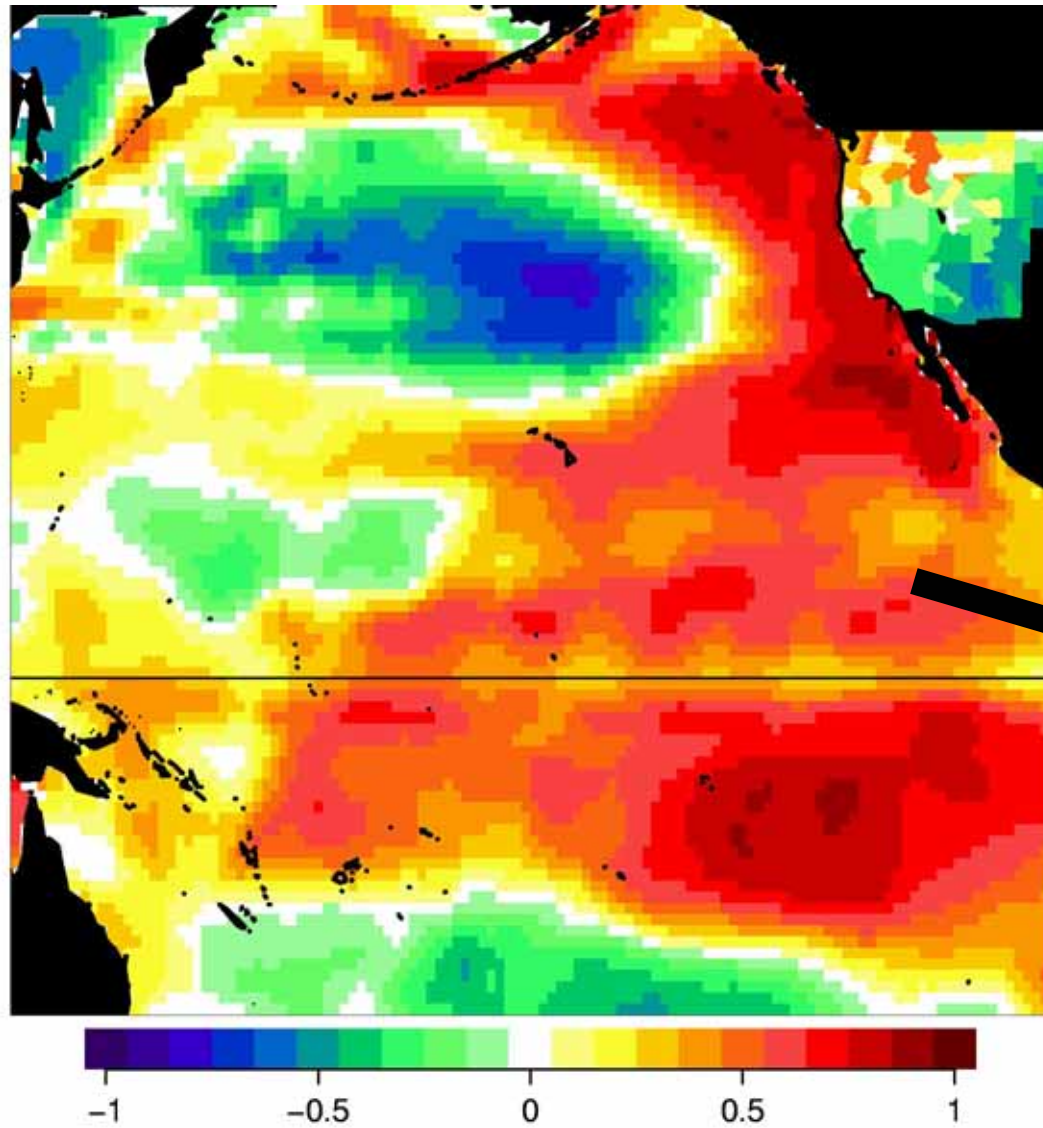
With B. Morehouse and T. Corringham

Application: Forecasting for Forest Service Suppression Budgeting

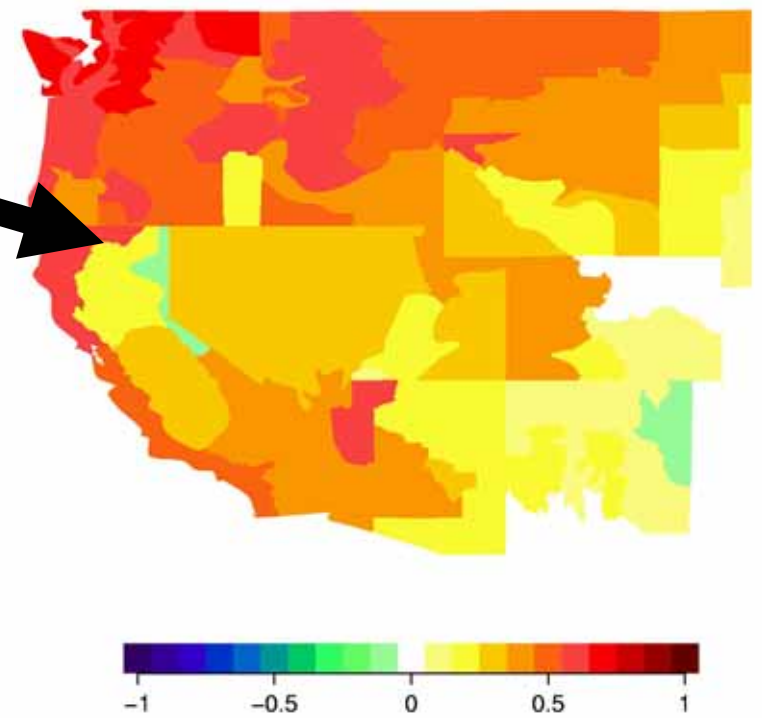


... But it's really only good for a *categorical* forecast

We Use Patterns in March Sea Surface Temperature and PDSI



to forecast patterns in
spring and summer
temperatures

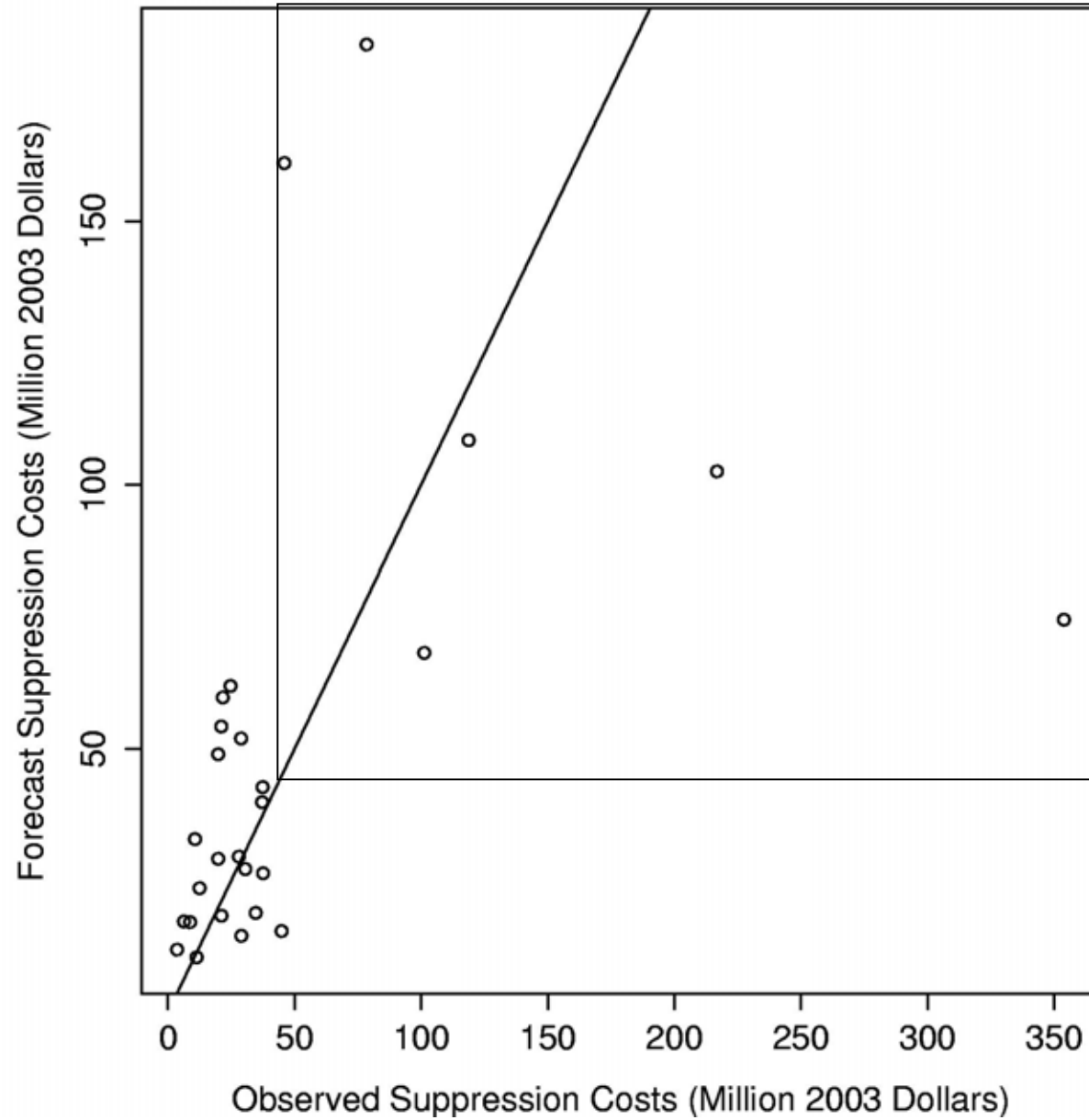


after Alfaro, Gershunov and Cayan 2005

Table 2: Northern Rockies Contingency Table: Observations versus Forecasts of Extreme Fire Years' Suppression Costs

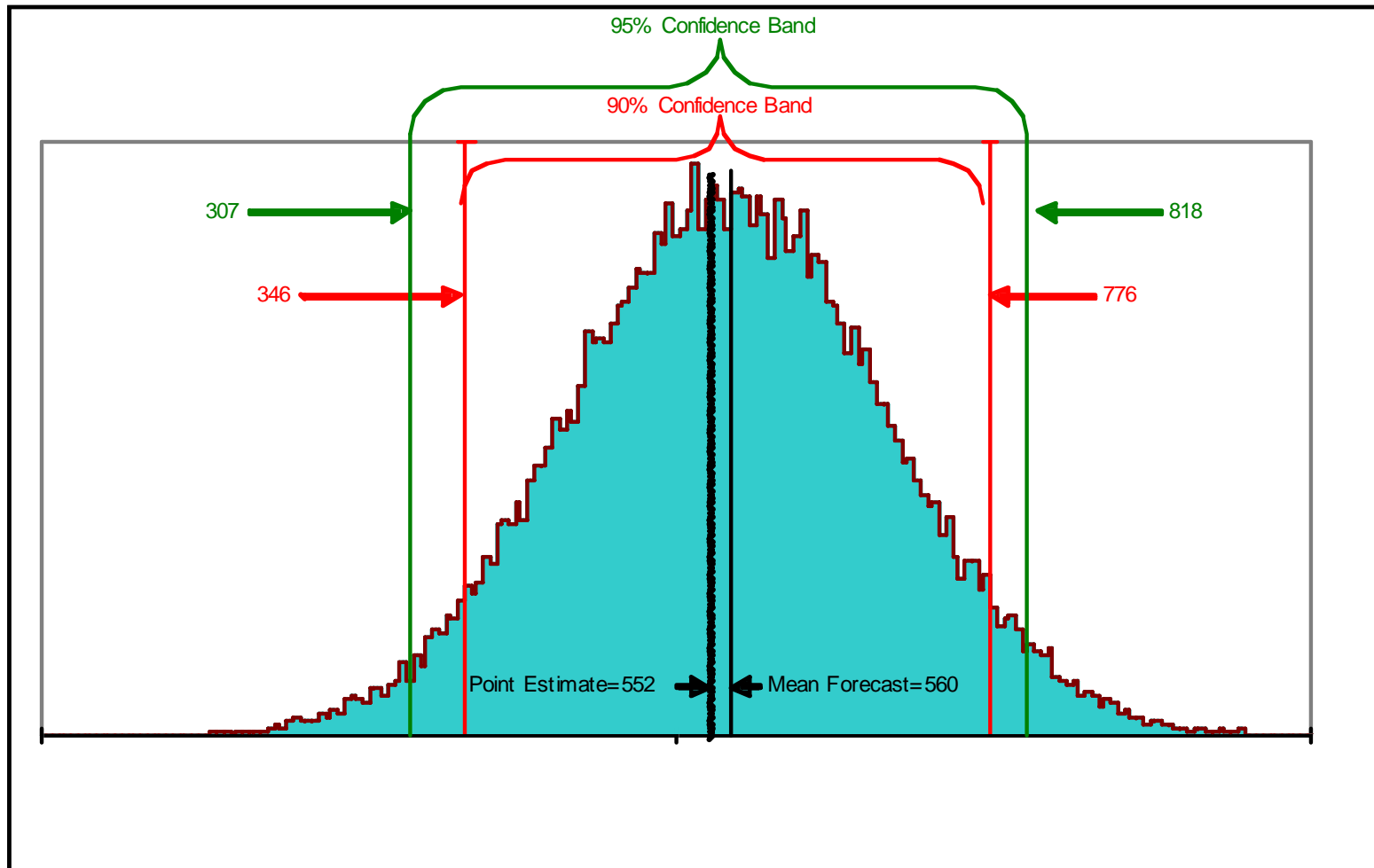
	Forecast	
Observed	< \$65 Million	> \$65 Million
< \$65 Million	21	1
> \$65 Million	0	5

Really is a categorical forecast....



But somehow...

2005 Forest Service “Early Warning” Suppression Cost Forecast and Confidence Bands



QuickTime™ and a
TIFF (LZW) decompressor
are needed to see this picture.