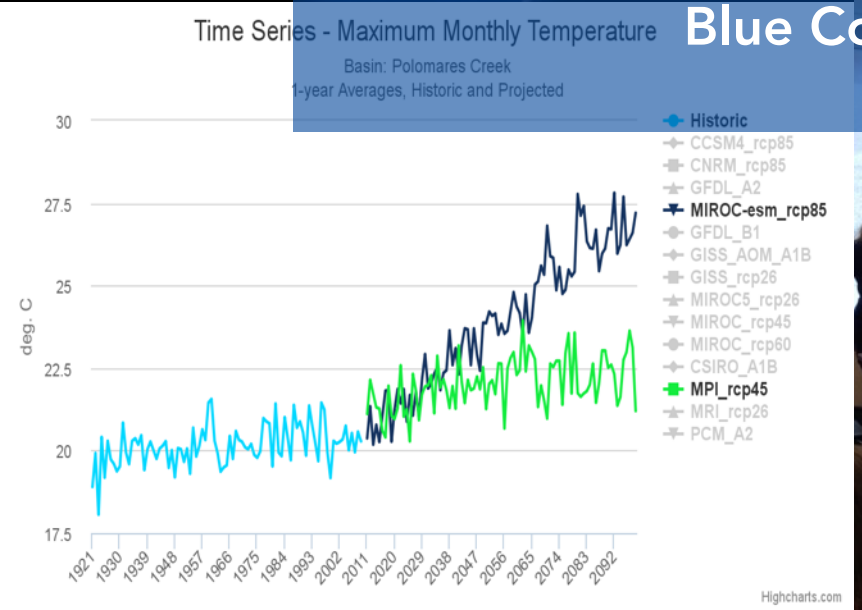
Scenario planning and incorporating uncertainty into management decisions

Sam Veloz, Climate Adaptation Group Director, Point Blue Conservation Science

10/18/2016



"Long range planning does not deal with future decisions, but with the future of present decisions."

Peter F. Drucker

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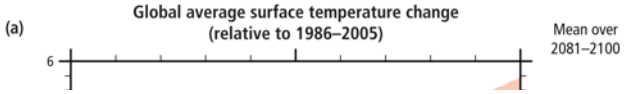
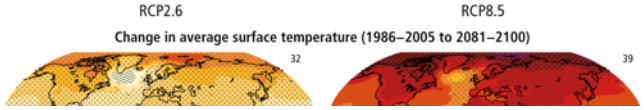
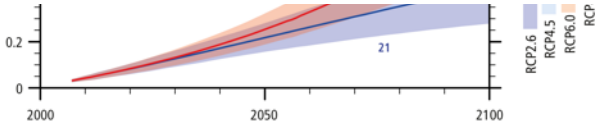




None of these models accurately & precisely predict the future!



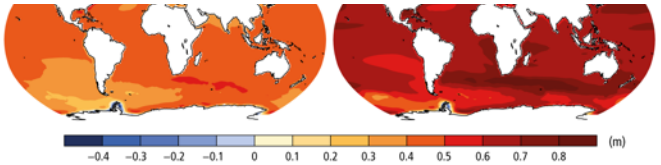
Time Series - Minimum Monthly Temperature

Basin: Polomares Creek

1-year Averages, Historic and Projected

16

Historic



Climate model projections are still <u>essential</u> and <u>useful</u> for planning for the future!

Highcharts.com

White-breasted Nuthatch

Photo (c) Peter LaTourrette

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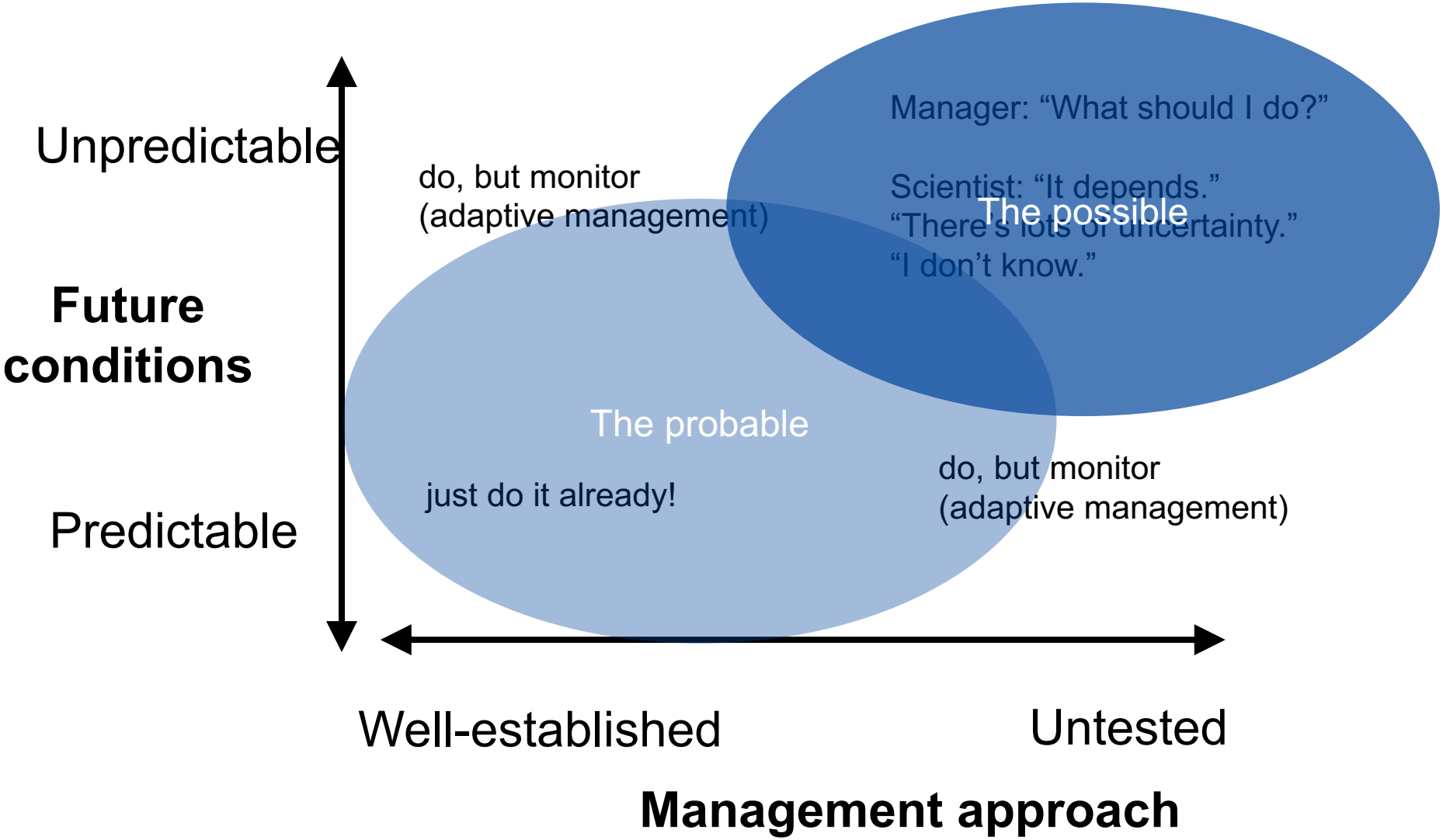
How do we plan for the future?



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What version of the future should I consider?

Which future is more likely?

vs

How would I manage differently in each scenario?

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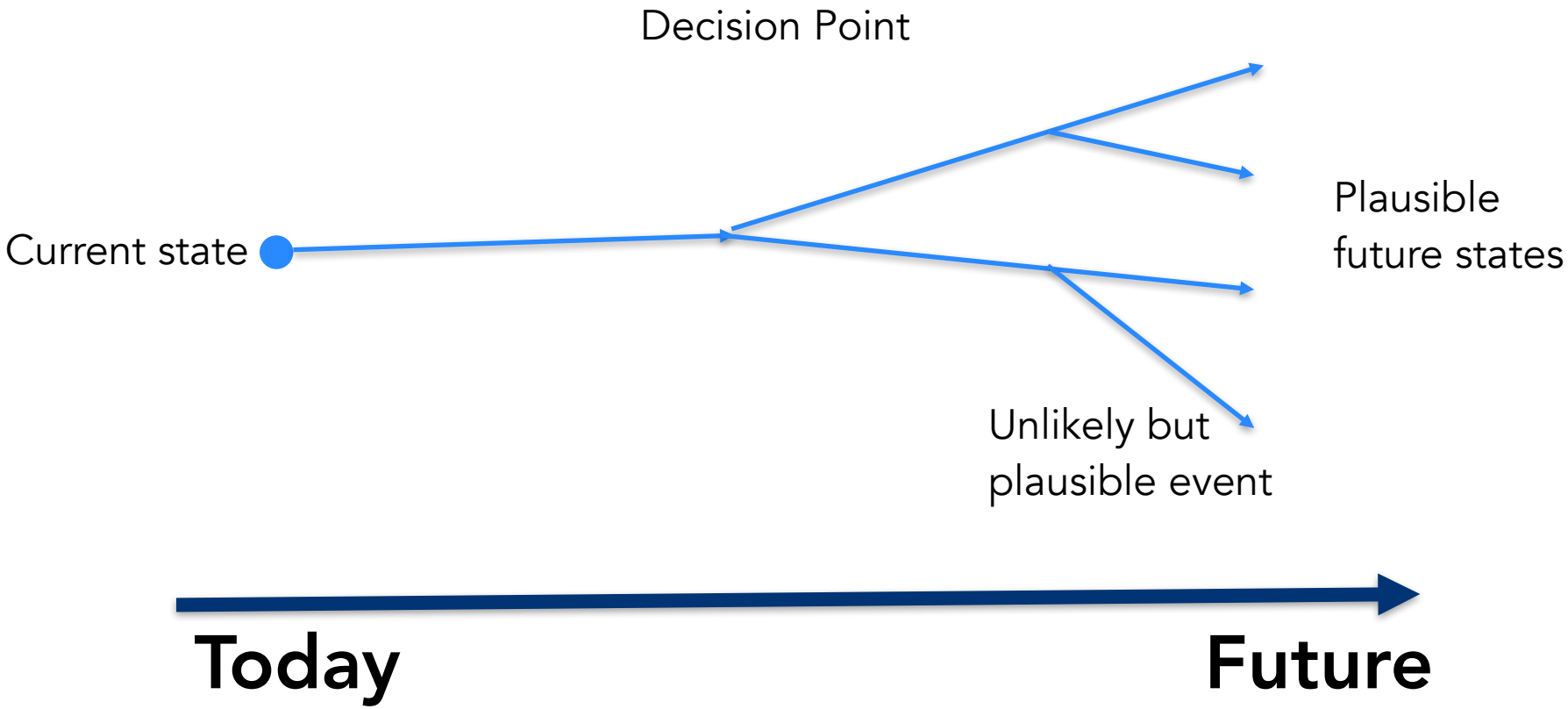
USGS science for a changing world

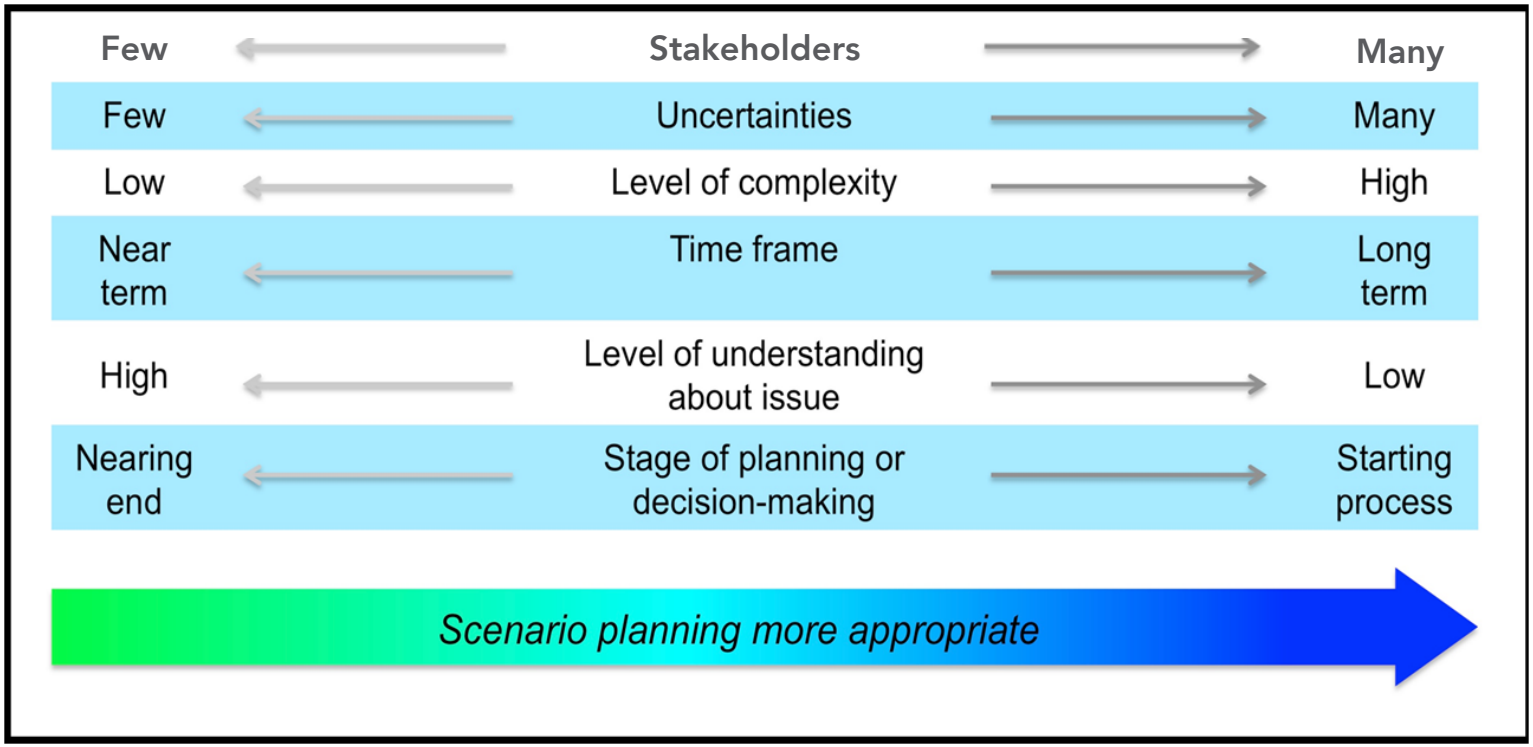
Pepperwood PRESERVE
Inspiring conservation through science

What is scenario planning?

…Considering multiple, plausible futures in planning and decision making



When is scenario planning most useful?



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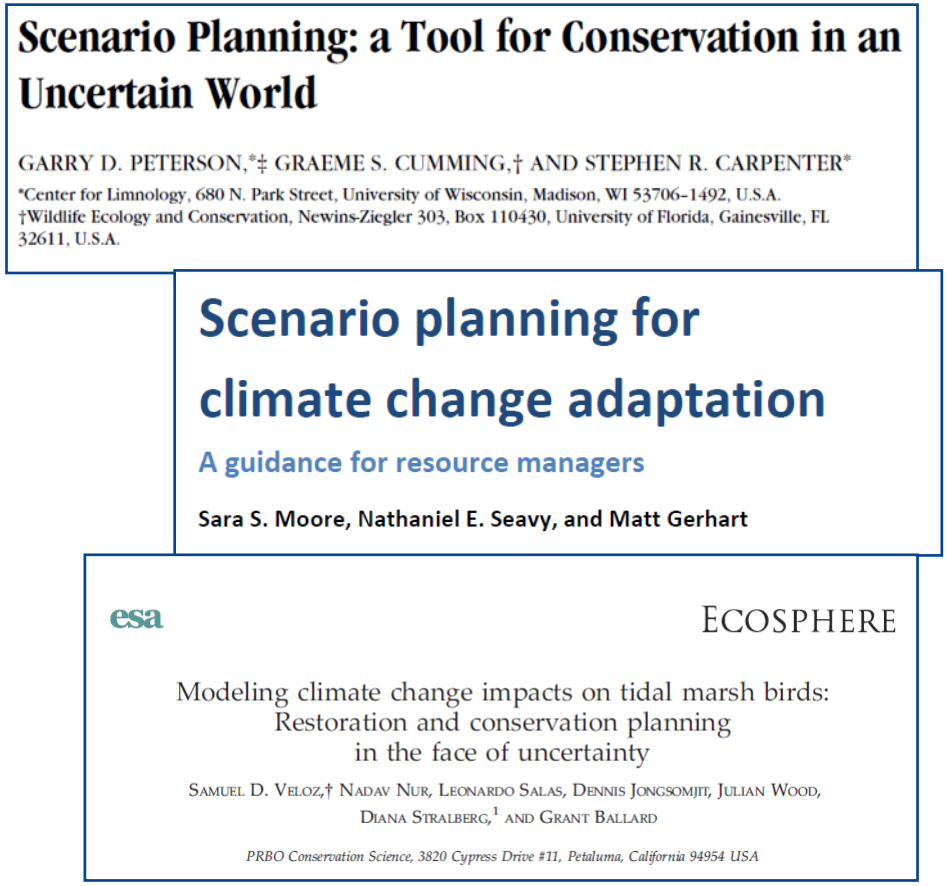
What scenario planning can do:

- ✓Foster creativity
- ✓Enable participants to view the system differently & offer new insights
- ✓Broaden perspectives on outcomes of future conditions
- ✓Develop triggers that align with particular scenarios for quick recognition of a specific trajectory and recommended actions

What it cannot do: Make a decision

The general scenario planning work flow

1. Identify a focal issue
2. Assess the system
3. Identify alternatives
4. Build scenarios
5. Test scenarios
6. Screen policy alternatives



Scenario Planning: a Tool for Conservation in an Uncertain World

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*Center for Limnology, 680 N. Park Street, University of Wisconsin, Madison, WI 53706–1492, U.S.A.
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Scenario planning for climate change adaptation

A guidance for resource managers

Sara S. Moore, Nathaniel E. Seavy, and Matt Gerhart

esa ECOSPHERE

Modeling climate change impacts on tidal marsh birds: Restoration and conservation planning in the face of uncertainty

SAMUEL D. VELOZ,† NADAV NUR, LEONARDO SALAS, DENNIS JONGSOMJIT, JULIAN WOOD, DIANA STRALBERG,[1] AND GRANT BALLARD

PRBO Conservation Science, 3820 Cypress Drive #11, Petaluma, California 94954 USA

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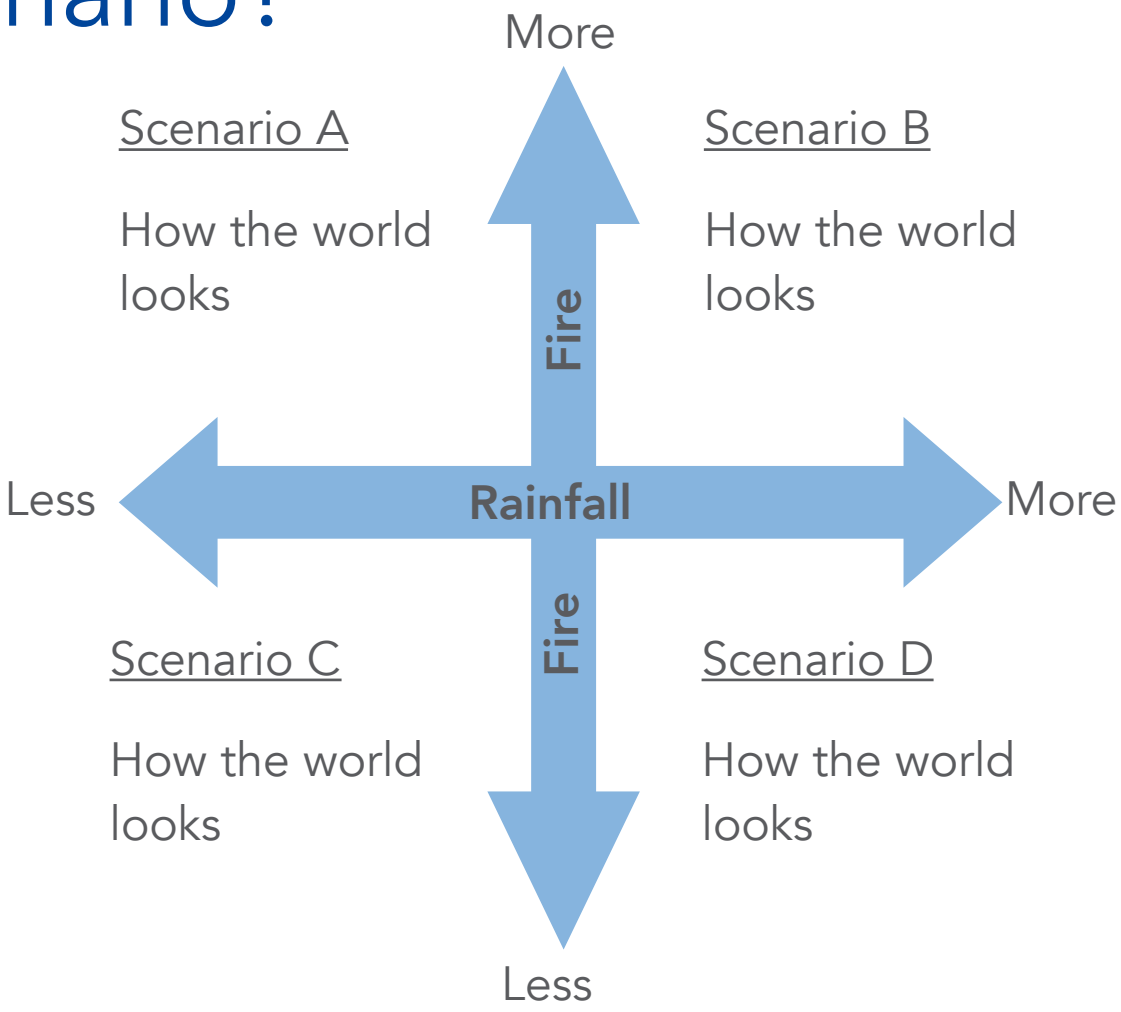
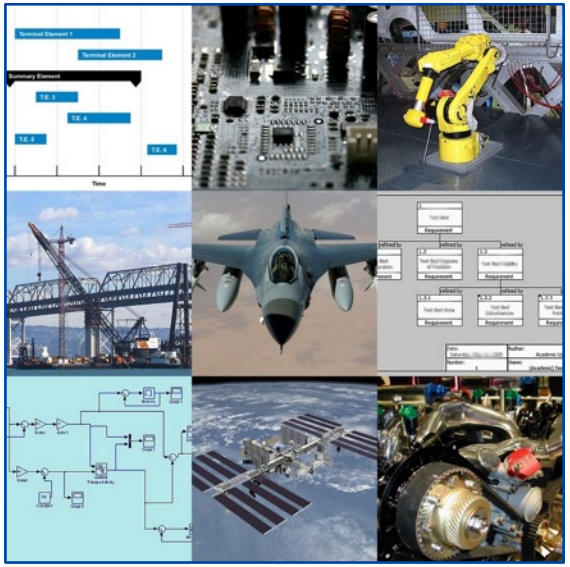
What is a scenario?

Quantitative or qualitative descriptions of plausible futures that allow you to envision and evaluate the outcomes of potential decisions in the context of different conditions.



"A scenario is a coherent, internally consistent and plausible description of a possible future state of the world. It is not a forecast; rather, each scenario is one alternative image of how the future can unfold."—IPCC 2008

Scenario planning can emphasize different processes/products



Generate a technical answer

Generate shared understanding

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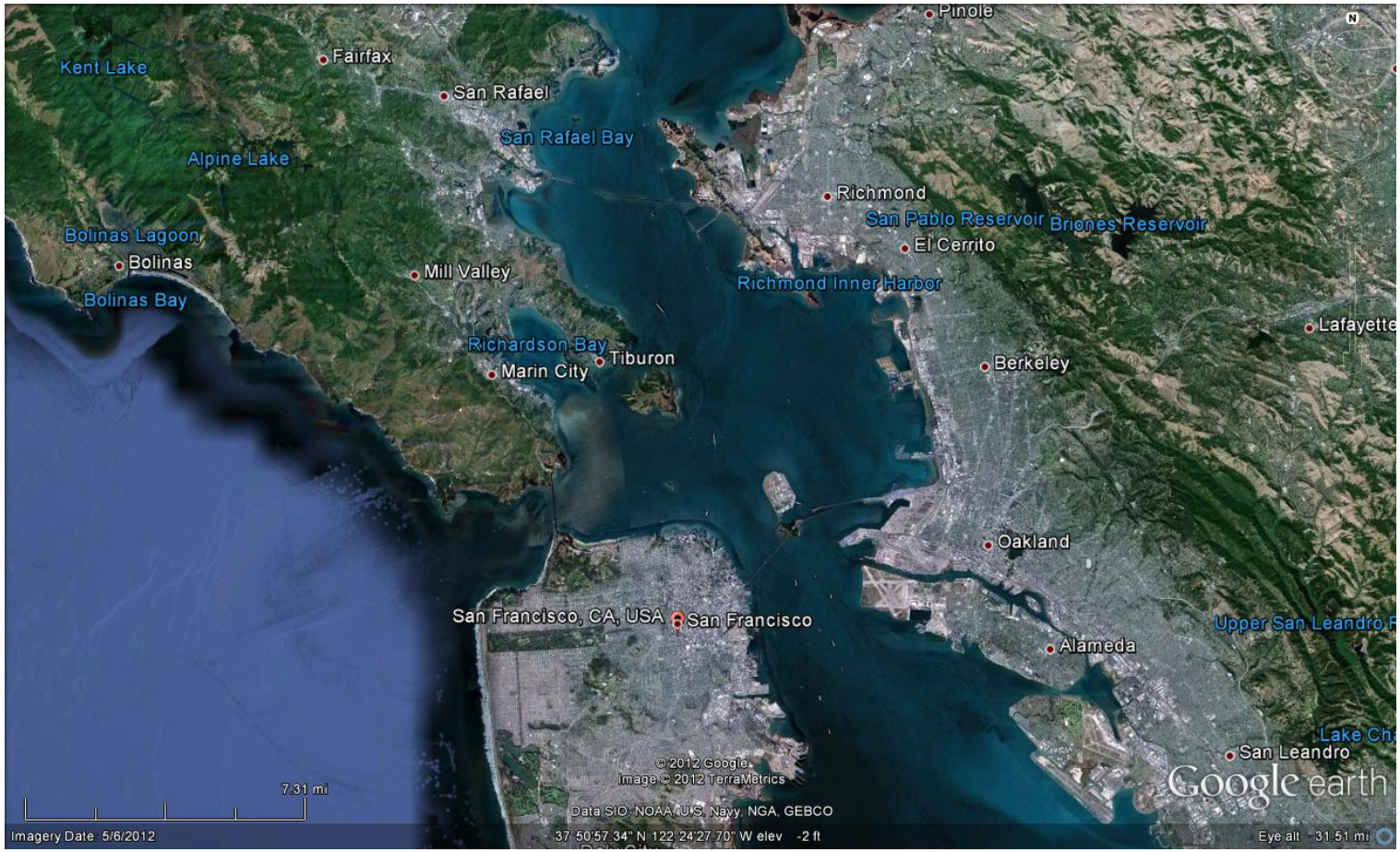
Example: San Francisco Bay tidal marsh restoration



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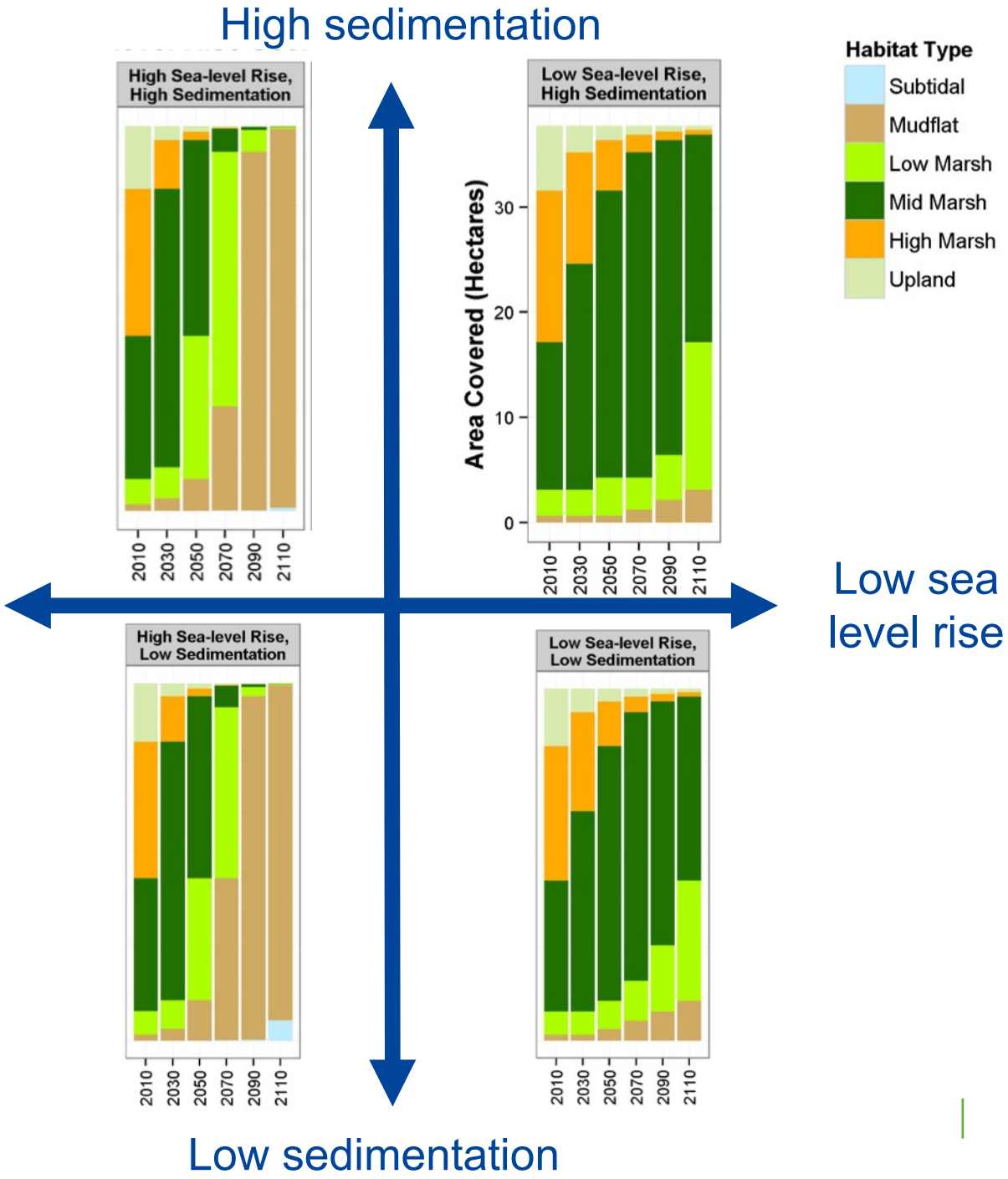
Example: San Francisco Bay tidal marsh restoration



System assessment: Marsh sustainability sensitive to sediment and rate of SLR

Policy screen: If you could restore 1000 acres, which would generate the most bird habitat?

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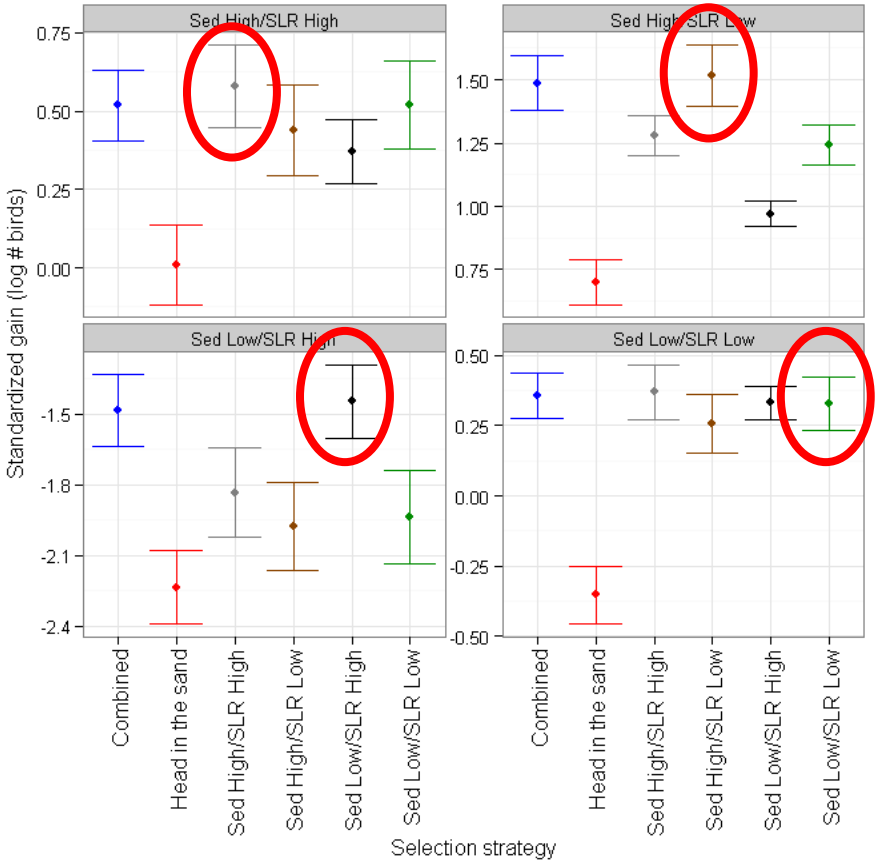
Example: San Francisco Bay tidal marsh restoration

What restoration strategies generate the most bird habitat?

The best strategy is to consider them all.

None of the scenarios are right but together they can frame robust decisions.



Veloz et al. Ecosphere 2013

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Example

Scenario Planning for Climate Change at TomKat Ranch

A Report from Point Blue and TomKat Ranch Educational Foundation

April 2014

Goal: produce high quality animal products for consumers, restore ecological processes, increase biological diversity, sequester carbon, and inspire sustainable ranch practices

Time frame: 35 years in the future

System assessment: Climate change is a major uncertainty, especially precipitation

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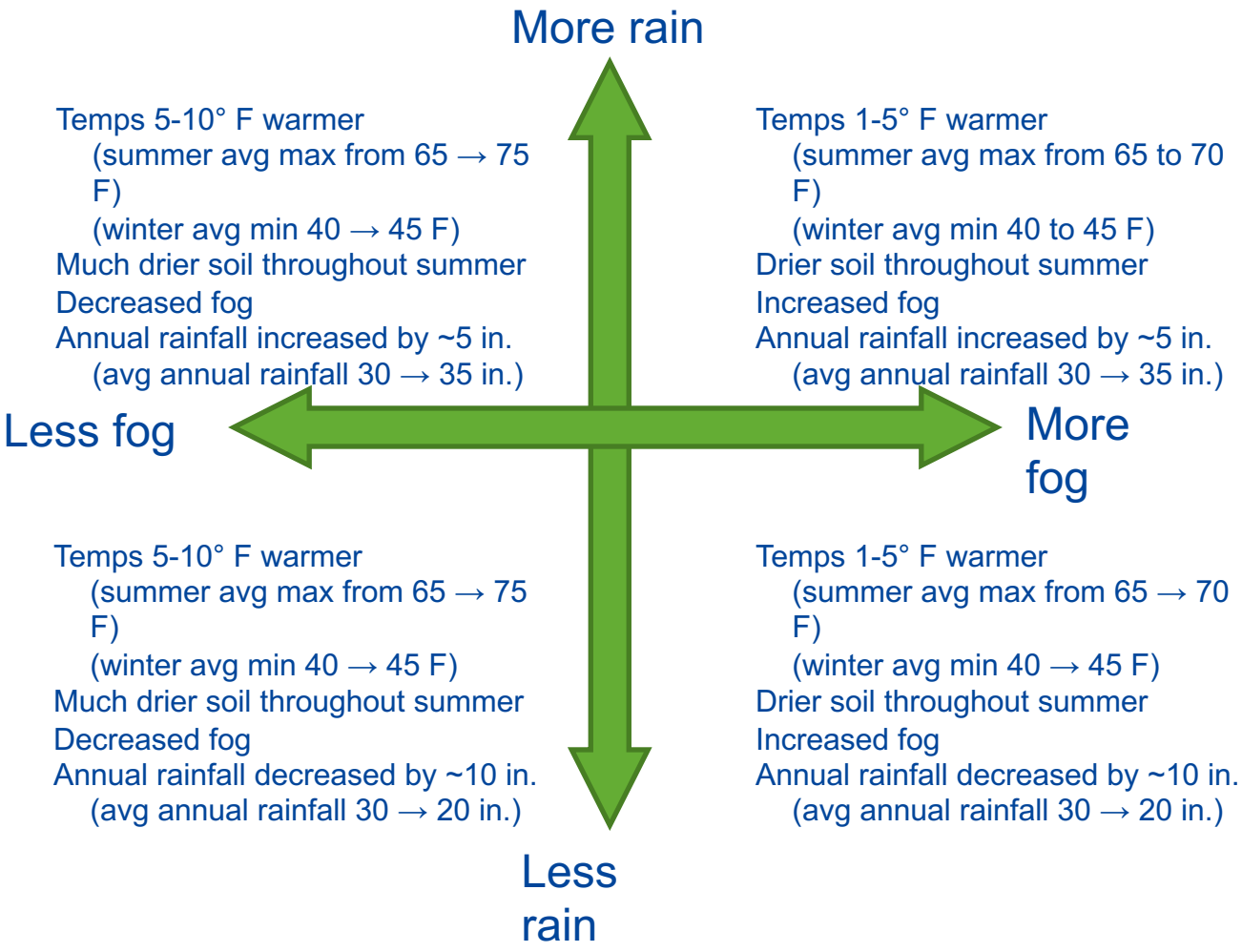
System alternatives: the TomKat Ranch Climate in 2050



Scenarios built by the
TomKat Ranch staff

More rain

Wet and Wild!
Heavy rains and runoff cause erosion, threaten water quality.
Steelhead and redwoods persist.
More forage, better soil, but many ranch roads impassable.
LeftCoast thriving
Road through Pescadero flooded.
Thrush and abscesses cause problems for horses.

Less fog

More fog

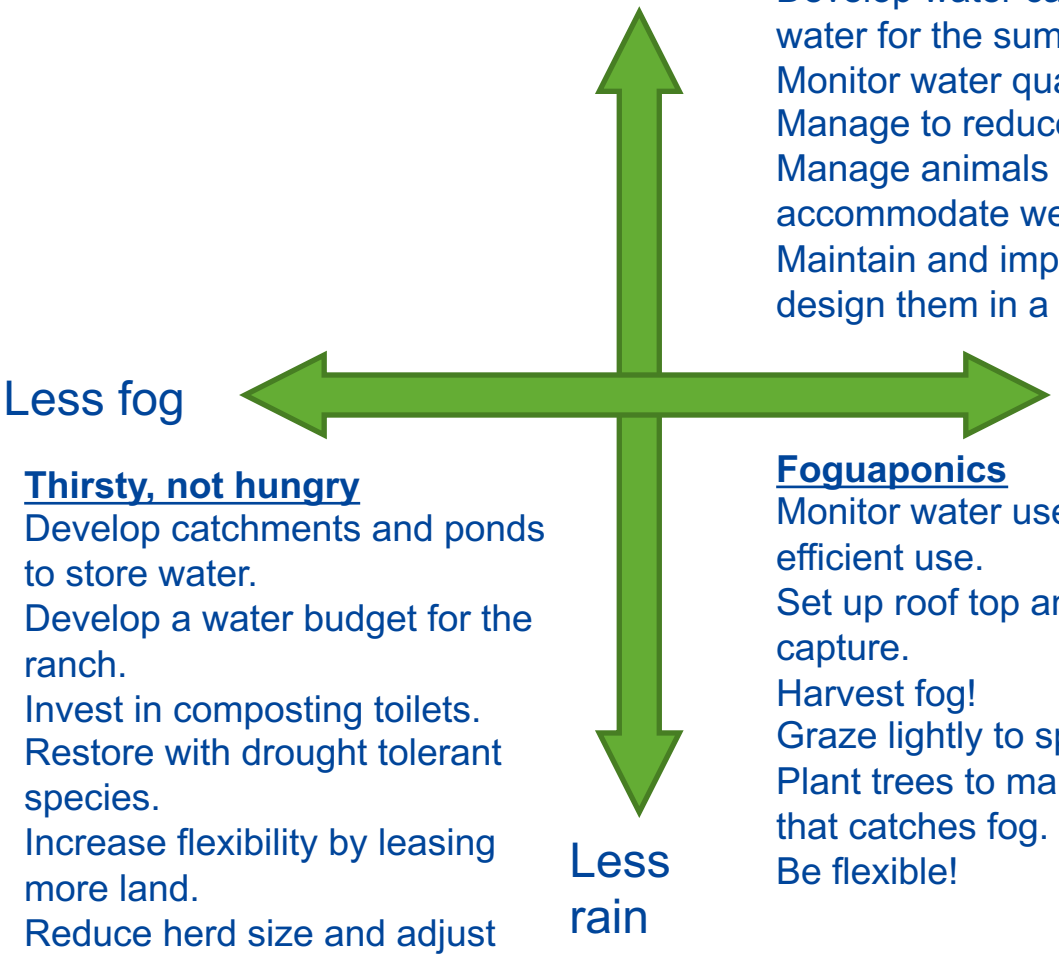
Thirsty, not hungry
Streams, wells, and springs go dry.
Redwoods and steelhead gone.
Grasslands productive, but depends on when the rain comes.
Roads in great shape.
Local ranchers compete for land.
Local farmers drill new wells to replace creek irrigation water.
More time and energy to move water to horses and cows.

Foguaponics
Streams, wells, and springs go dry.
Redwoods still here, steelhead gone.
Grasslands convert to coastal scrub.
Roads are in great shape.
Farmers focus on b-sprouts, artichokes and leeks.
No grass for horses, and hay is expensive.

Less rain

Background conditions

Policy screen by TomKat Ranch Staff



Wet and wild!
Create check dams to slow water and trap sediment.
Develop water catchments to save water for the summer.
Monitor water quality.
Manage to reduce bare ground.
Manage animals carefully to accommodate wet conditions.
Maintain and improve roads, and design them in a way to capture run-off.

Thirsty, not hungry
Develop catchments and ponds to store water.
Develop a water budget for the ranch.
Invest in composting toilets.
Restore with drought tolerant species.
Increase flexibility by leasing more land.
Reduce herd size and adjust business model.

Foguaponics
Monitor water use to help develop efficient use.
Set up roof top and terrain water capture.
Harvest fog!
Graze lightly to spare the vegetation.
Plant trees to make a savanna-scape that catches fog.
Be flexible!

Actions for the future

Example: Alameda Creek Watershed

Management objectives:

1. Maintain water supply and quality
2. Control vegetation weed abatement, fire control
3. Maintain/ increase biodiversity
    1. Populations of listed species
    2. Prevent spread of invasive
4. Maintain the resilience of grazing operations
5. Prevent the spread of pathogens

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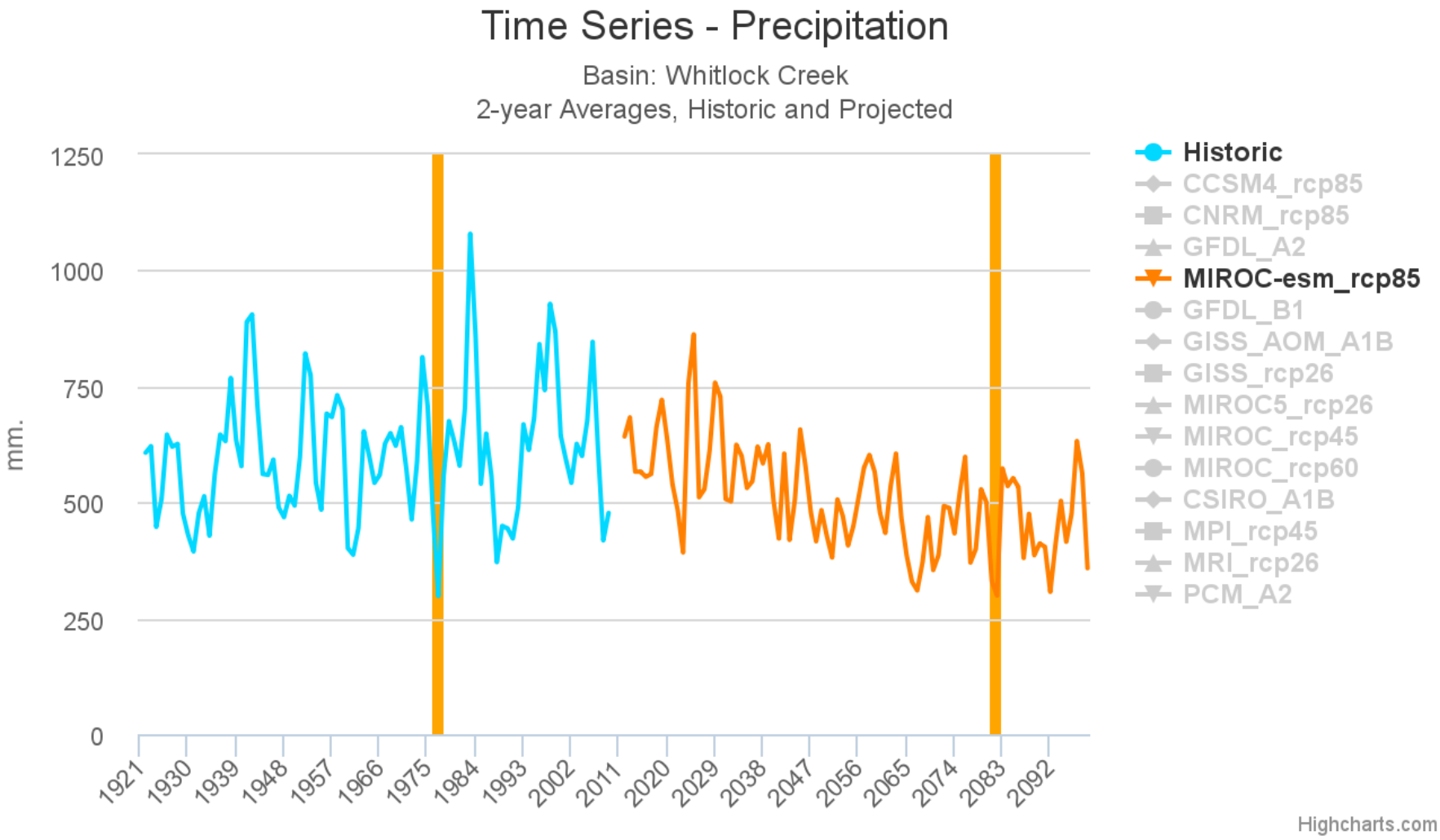
San Francisco Water Power Sewer
Services of the San Francisco Public Utilities Commission

CONSERVATION PARTNERSHIP
ACRCD • NRCS

BAY AREA ECOSYSTEMS CLIMATE CHANGE CONSORTIUM

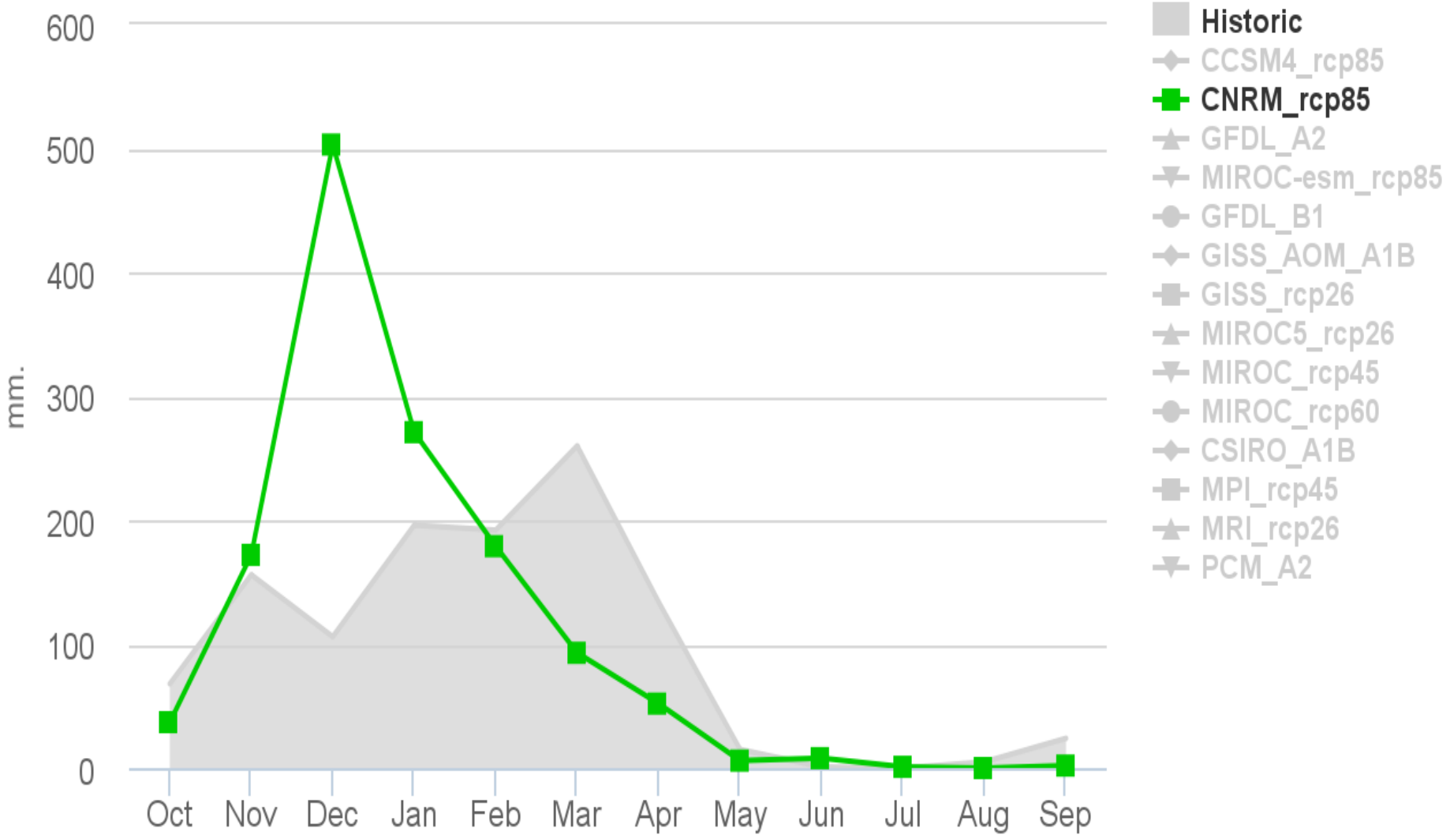
Frequency of 2 year droughts: Five over 90 years: No wet years

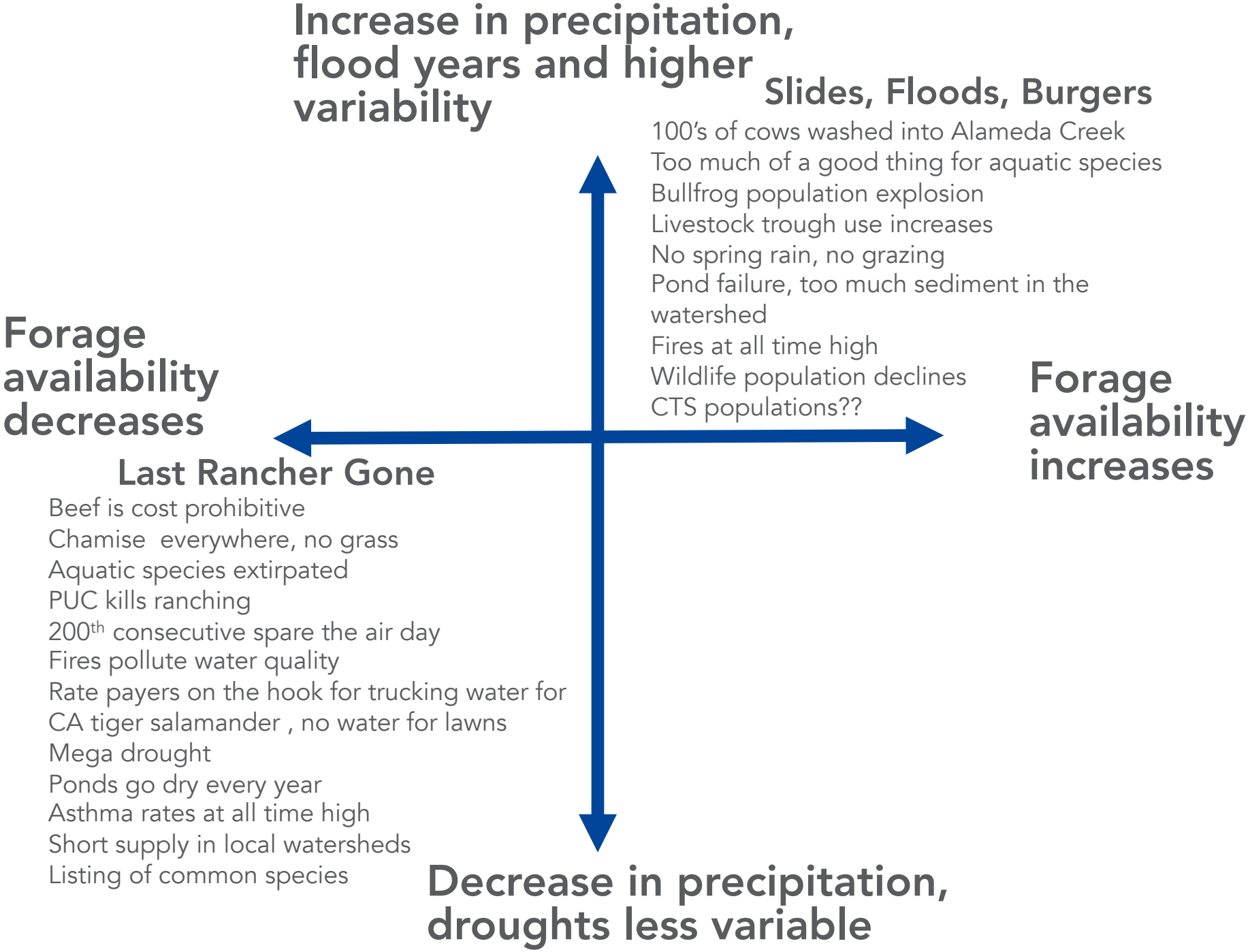


Seasonal Patterns - Precipitation

Basin: Whitlock Creek

1-year Averages, Historic (WY 1983 - 1983) and Projected (WY 2075 - 2075)




Increase in precipitation, flood years and higher variability
Slides, Floods, Burgers
100's of cows washed into Alameda Creek
Too much of a good thing for aquatic species
Bullfrog population explosion
Livestock trough use increases
No spring rain, no grazing
Pond failure, too much sediment in the watershed
Fires at all time high
Wildlife population declines
CTS populations??
Forage availability decreases
Forage availability increases
Last Rancher Gone
Beef is cost prohibitive
Chamise everywhere, no grass
Aquatic species extirpated
PUC kills ranching
200th consecutive spare the air day
Fires pollute water quality
Rate payers on the hook for trucking water for
CA tiger salamander , no water for lawns
Mega drought
Ponds go dry every year
Asthma rates at all time high
Short supply in local watersheds
Listing of common species
Decrease in precipitation, droughts less variable

No regrets actions

- Form partnerships with independent science groups to research impacts of adaptation actions on listed species
- Management strategies that reduced runoff in wet scenarios also increased recharge, resilience for drought years
- Partnering with multiple stakeholders to raise funds for implementing high priority strategies

"…when people place themselves in somewhat of a fictional context, they are more able step outside of what they know or believe, be more imaginative and, importantly, listen to the ideas of others. Science benefits from this kind of letting go."

Camie Bontaites
Osblog (oslabwest.blogspot.com/)

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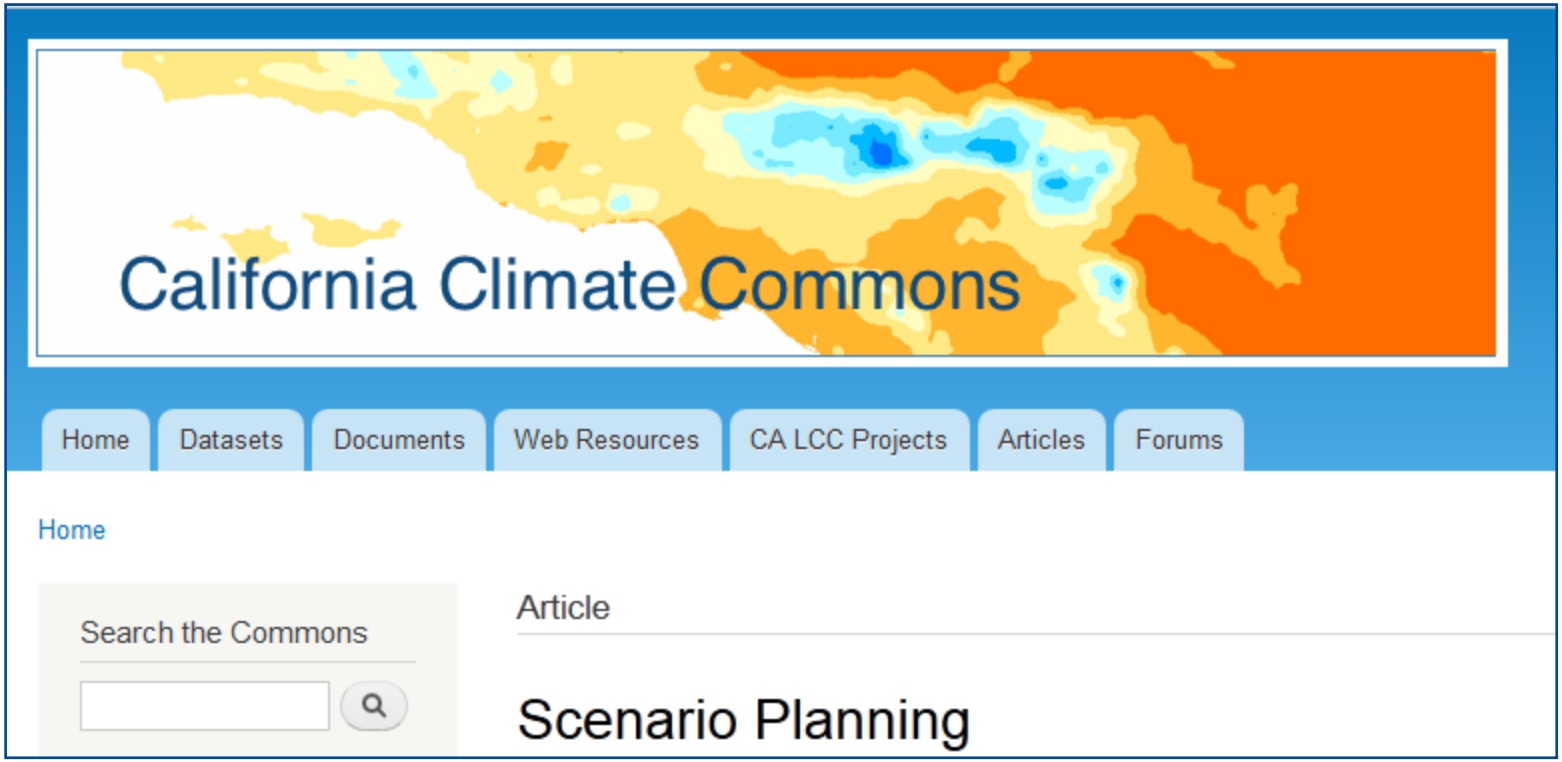
Learn more

http://climate.calcommons.org/articlenx/scenario-planning



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Thank you!

Funding: Coastal Conservancy, CA LCC, Gordon and Betty Moore Foundation

Conservation Input: Coastal Conservancy, SF Bay Joint Venture, BCDC, USFWS, Sonoma Land Trust, Sonoma Open Space District, Audubon California, The Nature Conservancy

Scientific & Technical Input: USGS, TBC3

Questions:

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Title

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Conservation science
for a healthy planet.

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Color Palette Reference Guide

Please use this page as a visual reference only for choosing colors from your custom color palette. This page is not editable.

Primary Palette

Bright Blue | Green | Dark Blue

Bright Blue, Green, and Dark Blue are
the primary colors and take priority over the secondary palette.

Secondary Palette

Lichen | Poppy | Light Grey | Dark Grey

Lichen, Poppy, Light Grey, and Dark Grey are used minimally and when you need more colors than the Blues and Green.

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