



1. Climate Smart approaches to riparian restoration
2. Funding programs and ranking criteria with climate change considerations
3. Potential future funding directions

The top section contains three small landscape photos showing different riparian restoration sites. The bottom section features a large landscape photo of a green valley with a blue sky.

### Climate Change Challenge for Riparian Restoration: Uncertainty

- Increased temperatures
- More rain, less snow
- Overall precipitation?

A cartoon showing two people sitting in armchairs watching TV. The top person is watching a news report about Texas with a house on fire. The bottom person is watching a news report about California with a cactus in a desert. The cartoon is titled 'CLIMATE CHANGE: THE UNCERTAIN FUTURE'.

### Climate Change Implications for Riparian Restoration Design

- Streamflow
- Hydrograph
- Plant and animal species

A photograph of a riparian stream flowing through a lush green landscape with mountains in the background.

### Uncertain hydrograph

- Design for more frequent extreme events
- Design for lower summer flows and flashier hydrograph


A cartoon showing a person under a yellow umbrella in the rain. The person says, 'I CAN'T BELIEVE IT'S RAINING IN AUGUST!'. The person then says, 'I THOUGHT GLOBAL WARMING WAS GOING TO MAKE HOT DRY SUMMERS?'. The person then says, 'FASTER, DAMN IT!'. The cartoon is titled 'SUNNIE'.

### Shifting Species Ranges

- Include a variety of species in planting plan
- Point Blue's riparian restoration design database for Marin and Sonoma:  
[www.pointblue.org/restorationtools](http://www.pointblue.org/restorationtools)

A logo for 'SPECIES ON THE MOVE' featuring a green circle with the text 'SPECIES ON THE MOVE' and several small icons of animals (butterfly, bird, fish, elephant, etc.) around it.

### Resilient Plantings



- Plant early successional colonizer species adapted to moister conditions together with later successional species that may grow better on drier sites.
- Source plant materials from further south or lower in elevation, especially for long-lived trees
- Others say that local populations have sufficient genetic diversity for climate change



### Resilient Approaches

- Process-based restoration
- Maximize room for system to evolve



### Process-based Restoration

- Sediment Transport
- Floodplain connectivity
- Wood loading and transport



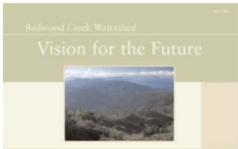
### Maximize Room for System to Evolve

- Wide Riparian Corridor and Buffer (Napa R.)
- Management Plan and community buy-in that allows for dynamic system



### Watershed approach

- Physical habitat restoration at a site is great, but not enough
- Projects are much stronger if there is a plan/awareness for addressing related issues upstream and downstream



### Example: Lower Redwood Creek at Muir Beach





### Napa River: Maintenance

- Debris removal
- Downed tree stabilization/relocation
- In-channel vegetation management
- Planting native vegetation
- Invasive and Pierces's Disease host plant removal
- Repairing instream habitat structures

### 400 ac Sonoma Creek Marsh with 260 ac inundated dead zone

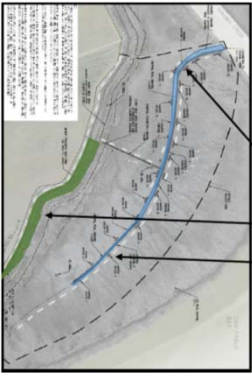
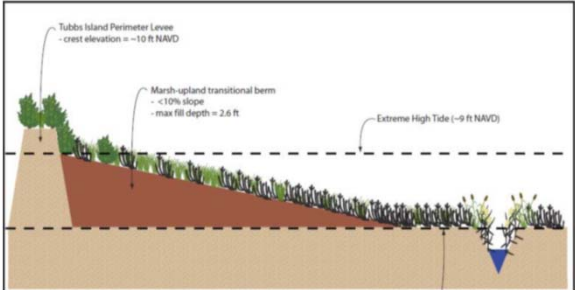



Figure 3. The three main features of the Sonoma Creek Enhancement Project include the 1) 4,560ft long main channel, 2) twenty marsh mounds, 3) 2,600ft long transition ramp (full length not shown in this image). Seven lateral channels and the access road channel were also constructed.


- 1) SCEP Main Channel
- 2) Transition Ramp
- 3) Marsh Mounds

### Sonoma Creek Enhancement Transitional Berm



### Conservancy Funding

- Universal project selection criteria and Strategic Plan goals
- Current funding: Prop 1
- Past funding: Climate Ready program



### Conservancy Project Selection Criteria

- **Sea-level rise vulnerability** (Executive Order S-13-08: New projects located in areas vulnerable to future SLR, shall plan for a range of SLR scenarios to assess project vulnerability and reduce risks and increase resiliency to SLR.)
- **Vulnerability from climate change impacts other than sea-level rise** (project objectives, design and siting consider and address vulnerabilities from climate change impacts other than sea-level rise)

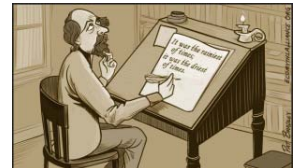
### Conservancy Strategic Plan Prioritizes Climate Change Resiliency Projects

- OBJECTIVE 7C: Conduct site-specific, regional and landscape-level vulnerability assessments of uplands and **waterways**, and develop adaptation plans to address predicted climate change impacts to natural resources, biodiversity, and critical habitat.
- OBJECTIVE 7D: Implement adaptation pilot projects that reduce hazards from sea level rise and **extreme storm events**, and which protect natural resources and maximize public benefits.
- OBJECTIVE 7E: Implement adaptation pilot projects that address climate change impacts to uplands natural resources, biodiversity and critical habitat.



### Conservancy Proposition 1

- Not specifically climate change oriented
- 5th round closes 10/3/16
- Four priorities
  - Water sustainability
  - Anadromous fish habitat enhancement
  - Wetland restoration
  - Urban greening
- \$100M to SCC



### Purposes of Chapter 6 of Prop 1

- Implement watershed adaptation projects in order to reduce the impacts of climate change on California's communities and ecosystems.



### Conservancy Climate Ready

- Future funding uncertain. Park Bond?
- Past funding: 3 rounds, 42 projects, \$7.3M
- Many adaptation plans and vulnerability assessments
- A few implementation projects- not many proposals for these



### SCC Climate Ready Programmatic Priorities

- Focus on future climatic and ecological conditions rather than the past.
- Design actions from a landscape, ecosystem, watershed or regional perspective to factor in significant natural processes.
- Account for a high degree of uncertainty by developing and implementing strategies that provide the greatest benefits across a range of possible future climate scenarios.

### Other key funding sources for climate resilient riparian restoration

- NOAA
  - Coastal Ecosystem Resiliency
  - Coastal Habitat Restoration
- California Department of Fish and Wildlife
  - Prop 1 Restoration Grants (\$285M outside Delta)
  - Wetlands Restoration for Greenhouse Gas Reduction
  - Fisheries Restoration Grant Program
- WCB
  - Prop 1 Instream Flow grants (\$200M)
  - Riparian program

### More funding sources



- Resources Agency's Urban Rivers grants
  - Projects must meet two of five statutory objectives, which include: "Increase Regional and Local Resiliency and Adaptability to Climate Change"
  - Eligible projects include:
    - Providing habitat connectivity to allow species a better chance to adapt and habitats to survive.
    - Expanding the urban forest to reduce heat island effects and provide air, water and public health benefits.

### Urban Rivers Proposal Questions

- One of the major challenges facing the biodiversity sector that is being exacerbated by climate change includes the accelerated spread of invasive species. Describe how the project addresses invasive and non-native plant species.



### Urban Rivers Proposal Questions

Describe how the project reduces climate change vulnerability with respect to:

- Water Supply, Reliability
- Energy demand
- Infrastructure
- Sea level rise
- Increased temperatures and extreme events (wildfires, flooding, etc.)
- Urban heat island effects

### Urban Rivers Proposal Questions

Just as different regions of California will experience the impacts of climate change differently, so will the diverse populations of California. Will the project benefit disadvantaged communities already coping with drinking water quality and supply problems?



### Future Funding Sources

- Cap and trade unlikely source for riparian
- Greenhouse Gas Reduction Funds possible
- Future Park Bond is possible
- Future Climate Resilience fund is possible



### Questions?

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