

# DFG Climate Stakeholders Meeting

## February 21, 2012

Amber Pairis and Whitney Albright

Climate Science and Renewable Energy Branch



# Climate Science Program

## *Unity-Integration-Action*

---

### Unity

Creating and maintaining vital partnerships & collaborative efforts

### Integration

Integrating climate change into DFG programs and policies

### Action

Products and projects that are meeting our conservation objectives



# Four years ago.....

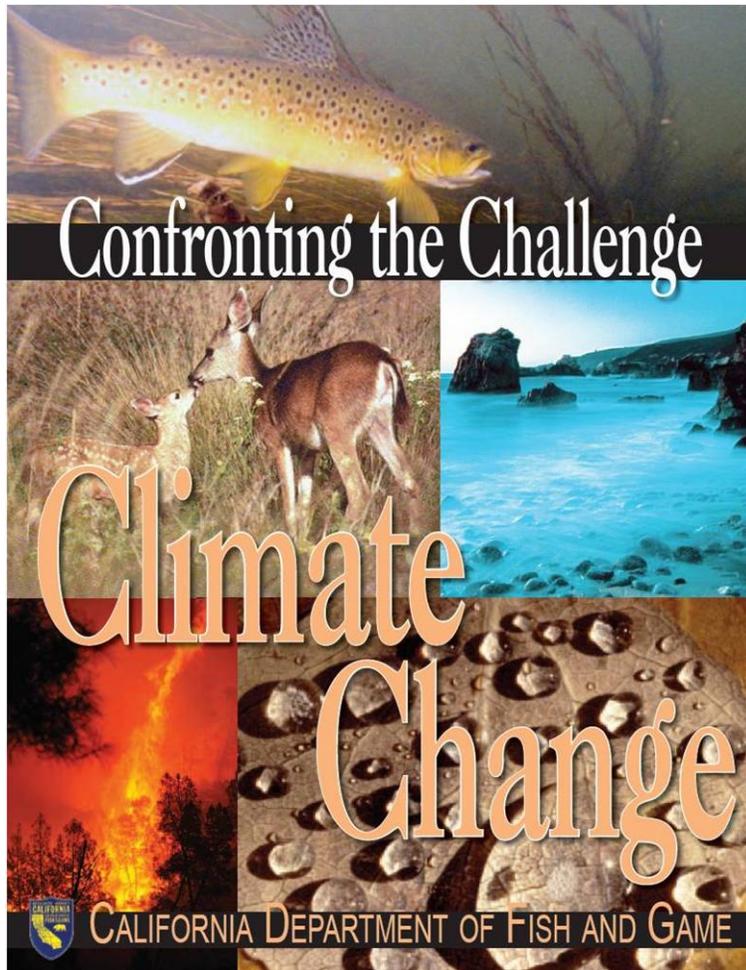


- **April 2008** 1st CC Stakeholder Meetings
- **June 2008** DFG Climate Workshops
- *<insert child>*
- **December 2008-09** CAS
- **September 2009:** CC Stakeholder Meeting
- **Dec 2009-Nov 2010:** Thematic work groups
- **February 2010:** S. CA Stakeholders
- **Feb-April 2010:** CAT-Biodiv (BioCAT)
- **Sept-Nov 2010:** Workgroup products!
- *<insert child>*
- **June 2010:** Climate Associate position

# Celebrate our Success!

---

## □ Climate change magazine



- Gold award for excellence in government communications
  - State Information Officers Council's 2010 competition

# Celebrate our Success!

---

- Climate Change magazine
  
- **Downscaling workshop**
  - “Bridging the Gap: Downscaling Climate Models to Inform Management Actions”
  - 75 in-person/50 online participants
  - Archived on web
  - Next steps/Science panel

## Statistical Downscaling for the State of California

Mike Dettinger & Dan Cayan  
US Geological Survey, La Jolla, CA

CDFG/USGS/USFWS Downscaling Workshop,  
CSU Sacramento, Nov 3, 2010



## Climate change and biodiversity: implications for Bay Area conservation

California State Univ., Nov. 3, 2010

- Bay Area climate: historical patterns and future changes
- Climate impacts on Bay Area vegetation
- Climate heterogeneity and biodiversity
- Management in the face of change

## A framework for assessing adaptation strategies for plants threatened by climate, land use, and altered fire regimes

Alexandra Syphard<sup>1</sup>, Helen Regan<sup>2</sup>,  
Janet Franklin<sup>3</sup>, Rebecca Swab<sup>2</sup>,  
Paul Zedler<sup>4</sup>

<sup>1</sup> Conservation Biology Institute

<sup>2</sup> U.C. Riverside

<sup>3</sup> Arizona State University

<sup>4</sup> University Wisconsin - Madison

## Applying Downscaled Data To Large-Scale Wildlife Corridor Planning

Healy Hamilton  
Center for Applied Biodiversity Informatics  
California Academy of Sciences



# Celebrate our Success!

---

- Climate Change magazine
- Downscaling workshop
- **Collaborative climate change research**
  - Vulnerability assessments
  - Ocean Acidification
  - DFG Research reports

# Celebrate our Success!

---

## □ National/regional coordination and collaboration

- National Fish, Wildlife, and Plants Climate Adaptation Strategy
- Southwest Climate Science Center
- LCCs: California, Desert, North Pacific, Great Basin
- National Climate Assessment
- Western Association of Fish and Wildlife Agencies (WAFWA)
- Association of Fish and Wildlife Agencies (AFWA)

# Adaptation in Action:

*DFG Climate Science Program highlights*

---

- **Website overhaul**

Unity-Integration-Action: DFG's Approach to Confronting Climate Change - Windows Internet Explorer

File Edit View Favorites Tools Help

Share Browser WebEx

http://www.dfg.ca.gov/Climate\_and\_Energy/Climate\_Change/

Unity-Integration-Action: DFG's Approach to Confront...

Go to: [Mobile Content](#) | [Content](#) | [Footer](#) | [Accessibility](#)

Search  GO

This Site California

**CA.GOV FISH AND GAME**

DEPARTMENT OF CALIFORNIA

Home Recreation Resource Management Enforcement Marine Spills Education Publications Data & Maps

Wildlife Invasive Species Lands Fish Hatcheries Environmental Review Conservation Planning Water Programs

**CLIMATE SCIENCE PROGRAM**

Home → [Climate and Energy](#) → [Climate Change](#)

## Unity-Integration-Action: DFG's Approach to Confronting Climate Change

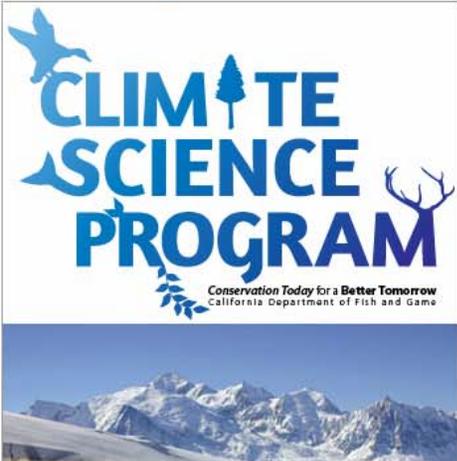
In keeping with its mission, DFG is committed to minimizing to the maximum extent practical, negative effects of climate change on the state's fish, wildlife, and habitats through the development of adaptation and mitigation measures, policies, and practices that provide clear benefits to terrestrial and marine ecosystems and recognize the uncertainty associated with future climatic states. Through an approach that embodies the theme Unity-Integration-Action, DFG is laying the ground work for a proactive, adaptive, and collaborative approach to safeguarding California's fish, wildlife, and habitats for years to come. DFG staff and leadership recognize that emerging climate change science brings uncertainty and are committed to addressing this uncertainty through the use of a variety of planning tools and strategic initiatives. We also recognize the importance of developing and maintaining partnerships to more effectively address the broad scope of climate change issues. By working together and taking actions today we can better anticipate the effects of future climate change and fulfill our responsibility to conserve fish, wildlife and the places they live for future generations to enjoy.

- **Save the Date!** -- Public meeting on the draft National Fish, Wildlife, and Plants Climate Adaptation Strategy  
January 31, 2012, 9:00 a.m. - 12:00 p.m., at Sacramento State University, Modoc Hall, Sacramento, CA
- **Save the Date!** -- DFG Climate Change Stakeholder meeting  
February 21, 2012, 10:00 a.m. - 12:00 p.m., at the Natural Resources Building Auditorium, 1416 9th St., Sacramento, CA

[DFG Climate Stakeholder Agenda Feb21](#)

[Unity, Integration, and Action: DFG's Vision for Confronting Climate Change in California](#)

[DFG's Role: Climate Change Confronting the Challenge \(Outdoor California article\)](#)  
*This special climate change issue of DFG's Outdoor California magazine received a gold award in the State Information*



Conservation Today for a Better Tomorrow  
California Department of Fish and Game

start Novell GroupWise - M... CLIMATE Microsoft PowerPoint ... Unity-Integration-Act... Internet 100% 2:32 PM

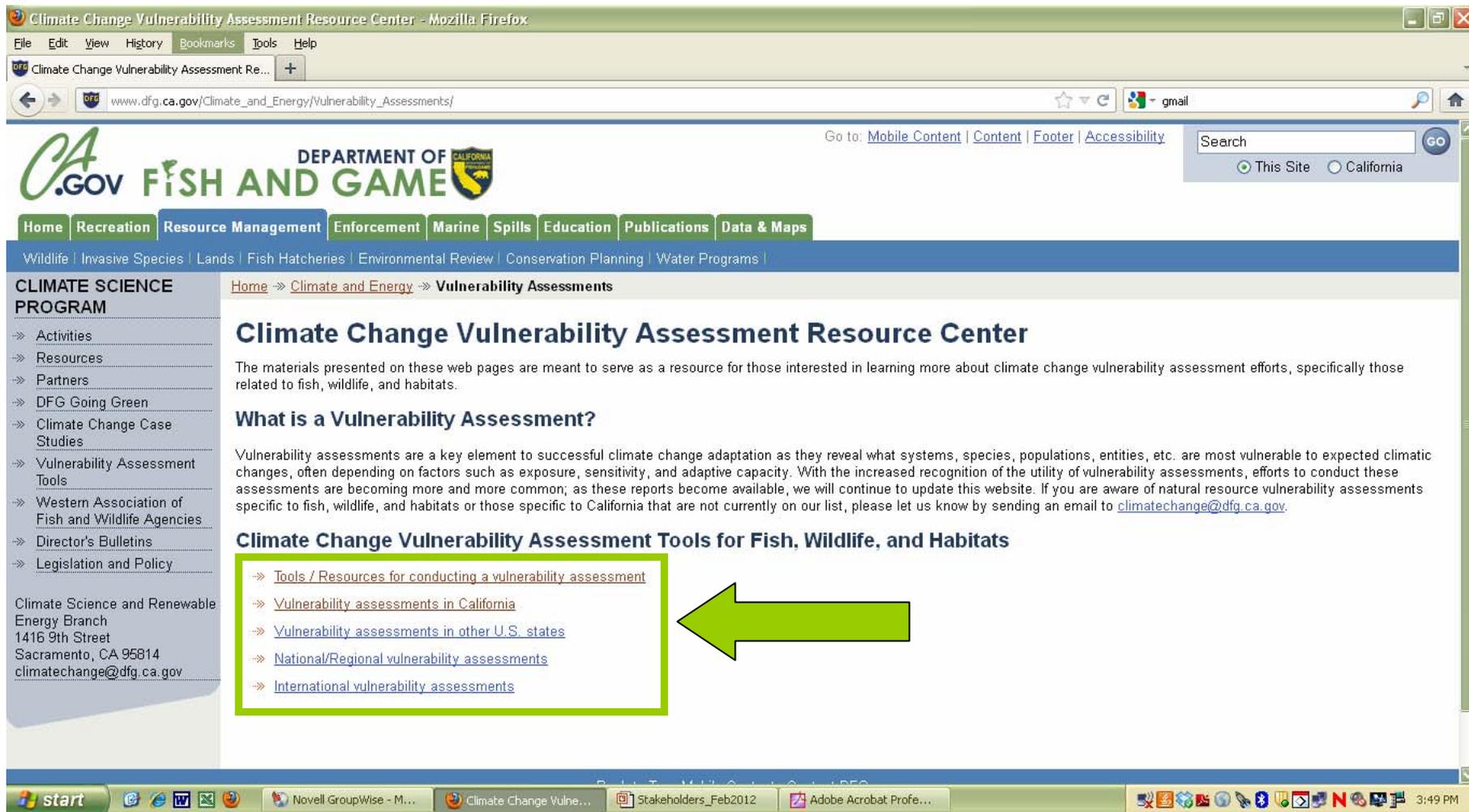
[http://www.dfg.ca.gov/Climate\\_and\\_Energy/Climate\\_Change/](http://www.dfg.ca.gov/Climate_and_Energy/Climate_Change/)

# Adaptation in Action:

*DFG Climate Science Program highlights*

---

- Website overhaul
- **Vulnerability Assessment Resource Center**



[http://www.dfg.ca.gov/Climate\\_and\\_Energy/Vulnerability\\_Assessments/](http://www.dfg.ca.gov/Climate_and_Energy/Vulnerability_Assessments/)

# Adaptation in Action:

*DFG Climate Science Program highlights*

---

- Website overhaul
- Vulnerability Assessment Resource Center
- **Climate change adaptation case studies**

## Unity, Integration, and Action: Climate Change Adaptation Case Studies



California Department of Fish and Game  
August 2011

### Objective 3: State-wide System of Conservation Areas

An important objective of the Department's climate change adaptation planning efforts is the need to maintain and create where needed a network of terrestrial and marine reserves (conservation areas) that builds on existing conservation investments. Proactive planning efforts that identify, improve, and connect conservation areas will help maintain and increase ecological integrity and provide habitat and refuge areas to help species persist in a changing environment. A periodic reexamination of this kind of conservation area network will be needed, and modifications made, as more is learned about the full impacts of climate change and species migration/movement in response to these changes.

California has a legacy of proactive conservation planning and any future efforts to create or connect habitat areas to help species respond and persist in a changing climate will easily build on existing conservation investments. For example, the current reevaluation and redesign of the system of Marine Protected Areas (MPAs) mandated by the Marine Life Protection Act (MLPA) and other terrestrial landscape scale planning efforts such as the Natural Communities Conservation Planning (NCCP) program are important models for conservation, restoration, and acquisition efforts.



#### *The Natural Community Conservation Planning Program*

[The Natural Community Conservation Planning program](#) (NCCP) takes a broad-based ecosystem approach to planning for the protection and perpetuation of biological diversity. The NCCP program is one of the few programs in existence that is designed to facilitate the adaptation of wildlife to climate change. These plans build ecological resilience by creating landscape-scale interconnected reserve networks that are based on the major tenets of conservation biology, including representativeness, multiplicity, and redundancy of large habitat blocks and natural communities. NCCP reserve networks typically occupy hundreds of thousands of acres across the entire range of environmental gradients in a planning area, and because of this and their high level of connectivity, NCCP reserve systems readily provide for the natural movement of individual organisms, and species and habitat distributional shifts, in response to climate change. In addition, where possible, NCCP reserves and linkages also provide interconnections to large blocks of federal and other publicly-owned lands to help ensure that species and habitats on public lands have access to the broadest range of ecological gradients over which to adapt. NCCPs also require protection and restoration of key ecological processes which

# Adaptation in Action:

## *DFG Climate Science Program highlights*

---

- Website overhaul
- Vulnerability Assessment Resource Center
- Climate change adaptation case studies
- **Climate change vulnerability assessments**
  - Rare plant vulnerability assessment (CA LCC)



# Climate Change Vulnerability Index

Brian Anacker, Krystal Leidholm, Melanie Gogol-Prokurat, Steve Schoenig  
California Department of Fish and Game, Biogeographic Data Branch  
1807 13<sup>th</sup> Street, Suite 202, Sacramento, CA 95811  
(916) 324-5198; [sschoenig@dfg.ca.gov](mailto:sschoenig@dfg.ca.gov); <http://www.dfg.ca.gov/biogeodata>



## Introduction

- Climate change impacts on biodiversity need to be addressed in resource management decisions and included in revisions of key planning documents.
- The *climate change vulnerability index* (CCVI) was developed to assess potential impacts of climate change to individual species based on their life history characteristics and distributions.
- The output will guide monitoring, management, and conservation plans for sensitive plant and animal species.

## Objectives

- Evaluate climate change assessment methodology.
- Assess 156 rare plant species using the climate change index.
- Create future plant species distribution models and maps to aid in the assessment of vulnerability.
- Make management recommendations.



© 2011 John J. Davis

## Methods

- Assess 156 rare plant species in California based on CCVI factors:
  - Predicted exposure to climate change
    - Use Climate Wizard data and Maxent to create climate models
  - Climate change sensitivity
    - Indirect exposure to climate change
      - Land conversion
      - Development
    - Species specific factors
      - Dispersal ability
      - Habitat restrictions
  - Documented response to climate change
    - A2 emissions scenario
    - Predicted for the year 2080



© 2011 Quinn G. Jones

## Preliminary Results

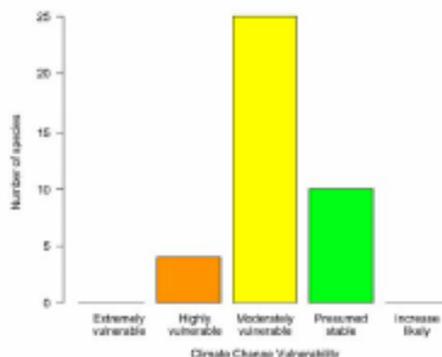
- We have assessed 50 species to date (Figure 1).
- Most species fall into the moderately vulnerable to climate change category, followed by presumed stable, and highly vulnerable.
- Overall, climate models indicate a decrease in climate suitability for most of the species we have assessed to date.



© 2011 John J. Davis

## Species Vulnerability

Figure 1. Climate change vulnerability index (CCVI) results for 50 species assessed to date



## Example: *Brodiaea orcuttii*

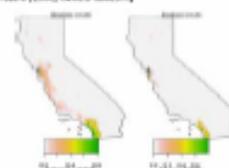
### Preliminary result: highly vulnerable

- Prefers vernal moist grasslands and is dependent on a seasonal flood regime.
- Predicted climate change exposure is + 2.2-2.4 C for half of the *B. orcuttii* occurrences and + 2.5-2.7 C for the other half of the *B. orcuttii* occurrences (Figure 2).
- Anthropogenic barriers: Development and construction are major threats; the majority of its range is surrounded by high density urban interface.
- Renewable energy production within the species range also threatens the species, decreasing its ability to shift range and, therefore, increasing its susceptibility to climate change.



Copyright © 2011 Eric Peterson & Ted Crowley

Figure 2. Maxent's predicted historical (1951-2080) and future (2080) climate suitability



## Ongoing work

- Consulting expert opinions to improve scoring accuracy of ranks for species with little or no life history data.
- Critiquing distribution models and their sensitivity to climate variables.
- Continuing research and climate vulnerability assessment for the remaining 100 rare and endemic plant species.

## Collaborators

- US Fish and Wildlife Service/LCC (Primary funding)
- NatureServe (Bruce Young, Anne Frances)
- DFG (Roxanne Bittman, Todd Keeler-Wolf)
- UC Davis (Robert Hamans, Susan Hamson, Jim Thorne, Nick Jensen, Robin Thorpe)
- California Native Plant Society (Aaron Sims)

# Adaptation in Action:

## *DFG Climate Science Program highlights*

---

- Website overhaul
- Vulnerability Assessment Resource Center
- Climate change adaptation case studies
- **Climate change vulnerability assessments**
  - Rare plant vulnerability assessment with CA LCC
  - Bird species of special concern vulnerability assessment with PRBO Conservation Science



# California Bird Species of Special Concern

Home Maps Resources About Partners

## Climate Change Vulnerability Species Scores

To download this report select your preferred format next to "copy table to:" below

copy table to: CSV HT

1 of 37

CommonName	ScientificName	Habitat Suitability	Confidence	Food Availability	Confidence	Extreme Weather	Confidence	Habitat Specialization	Confidence	Physiological Tolerances	Confidence	Migratory Status	Confidence	Dispersal Ability	Confidence
Abert's towhee	Pipilo aberti	1	0.5	1	0	3	1	1	1	2	1	1	1	3	1
Alameda song sparrow	Melospiza melodia pusillula	3	1	1	0	3	0.5	3	1	1	0.5	1	1	3	1
Alaska marbled godwit	Limosa fedoa beringia	2	0.5	2	0	1	0.5	2	1	1	0.5	2	1	1	1
Aleutian cackling goose	Branta h. leucopareia	2	0.5	1	0.5	1	1	2	1	1	0.5	2	1	1	1
Allen's hummingbird	Selasphorus sasin	2	1	1	0	1	1	1	1	1	0.5	3	1	1	1
American avocet	Recurvirostra americana	2	0.5	1	0.5	1	0.5	2	1	1	0.5	2	1	1	1

# Adaptation in Action:

## *DFG Climate Science Program highlights*

---

- Website overhaul
- Vulnerability Assessment Resource Center
- Climate change adaptation case studies
- Climate change vulnerability assessments
  - Rare plant vulnerability assessment with CA LCC
  - Bird species of special concern vulnerability assessment with PRBO Conservation Science
  - ***Climate change effects on inland fishes, mammals, and herps***
- **DFG's Going Green initiative**



California Department of Fish and Game

Sustainability  
Guidelines

Paperless office  
project

DFG Bikes!  
committee and  
website



# GOING GREEN

California Department of Fish and Game



# Adaptation in Action:

## *DFG Climate Science Program highlights*

---

- Website overhaul
- Vulnerability Assessment Resource Center
- Climate change adaptation case studies
- Climate Change Vulnerability Assessments
- DFG's Going Green initiative
- **DFG's climate change vision**
  - **Implementing the 2009 CA Climate Adaptation Strategy**

EXECUTIVE SUMMARY

# 2009 CALIFORNIA CLIMATE ADAPTATION STRATEGY

A Report to the Governor of the State of California  
in Response to Executive Order S-13-2008

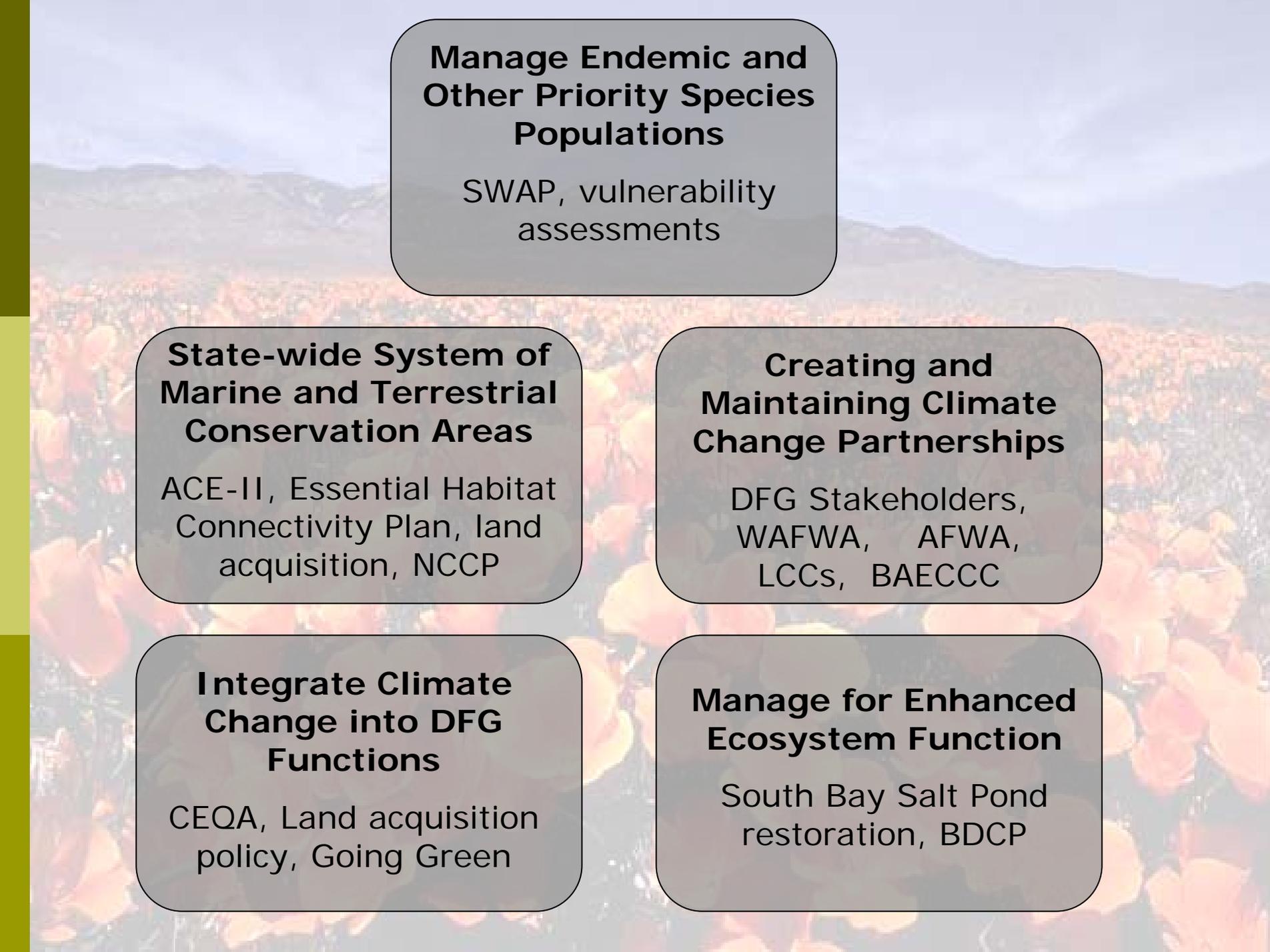


## Unity, Integration, and Action:

### DFG's Vision for Confronting Climate Change in California



California Department of Fish and Game  
September 2011



**Manage Endemic and  
Other Priority Species  
Populations**

SWAP, vulnerability  
assessments

**State-wide System of  
Marine and Terrestrial  
Conservation Areas**

ACE-II, Essential Habitat  
Connectivity Plan, land  
acquisition, NCCP

**Creating and  
Maintaining Climate  
Change Partnerships**

DFG Stakeholders,  
WAFWA, AFWA,  
LCCs, BAECCC

**Integrate Climate  
Change into DFG  
Functions**

CEQA, Land acquisition  
policy, Going Green

**Manage for Enhanced  
Ecosystem Function**

South Bay Salt Pond  
restoration, BDCP

# Eyes on the Prize:

## *DFG's Goals for 2012*

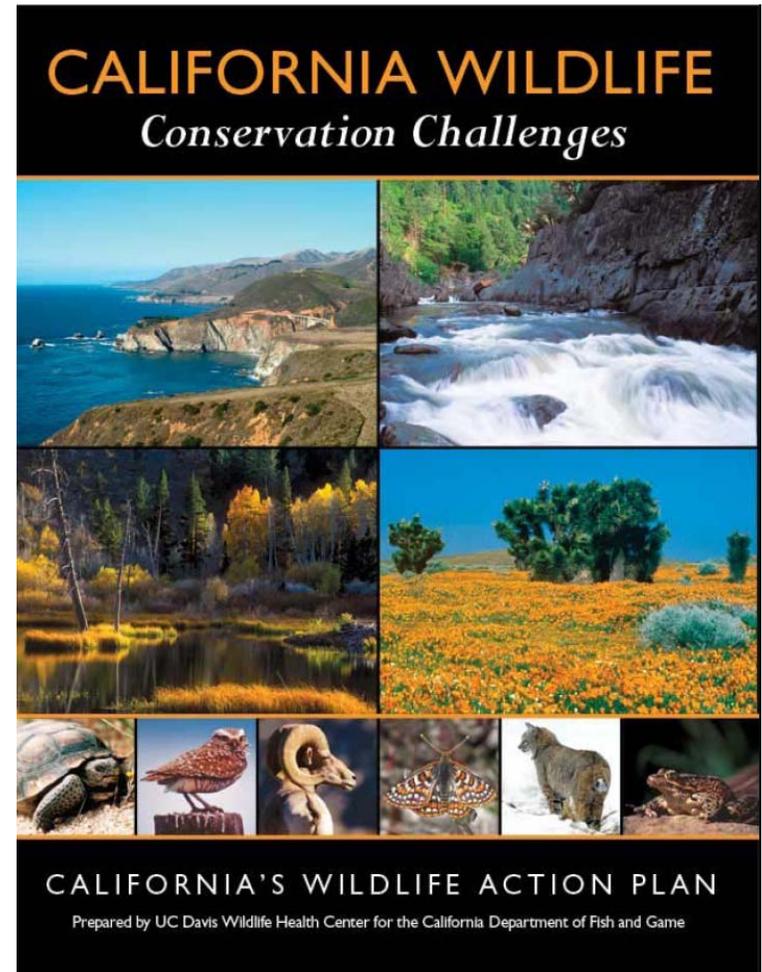
---

- Maintaining and increasing partnerships
- State Wildlife Action Plan revision
- Climate Training Course

# SWAP Update: Objectives

---

- ❑ Create a collective vision
- ❑ Incorporate cc impacts & adaptation strategies
- ❑ Update species at risk, vulnerable spp, & SGCN
- ❑ Conservation actions consistent with other agencies



# SWAP Update: Key Changes

---

- Use of Ecoregional Boundaries
- Climate Change Adaptation Focus
- New Analytical Tools (ACE, CEHC)
- Broader Treatment of Marine & Enforcement
- Measurable Goals and Actions
- Companion Plans

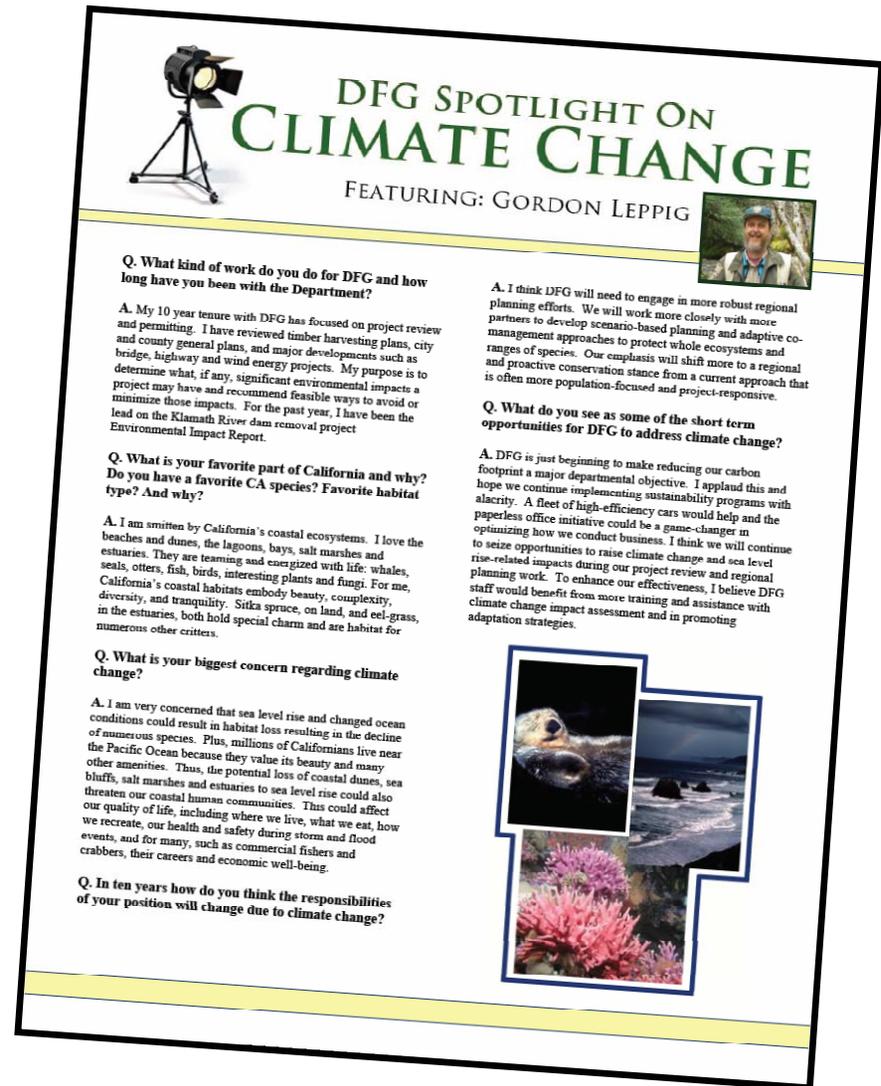
# SWAP Update- Next Steps

---

- DFG internal teams by ecoregions identified
- Open Standards Process: Defenders of Wildlife
- March: “Train the Trainers” workshop
- March: Meeting with CA Tribes
- April-Aug: Ecoregional assessments with partners
- September: Draft state wide assessment
- September: Public outreach (15)
- 2013: Final draft & companion plans

# DFG Climate Training Course

- Training course structure
  - Monthly speakers
  - Required readings
  - Forum participation
  - Final project



**DFG SPOTLIGHT ON CLIMATE CHANGE**  
FEATURING: GORDON LEPPIG



**Q. What kind of work do you do for DFG and how long have you been with the Department?**

*A. My 10 year tenure with DFG has focused on project review and permitting. I have reviewed timber harvesting plans, city and county general plans, and major developments such as bridge, highway and wind energy projects. My purpose is to determine what, if any, significant environmental impacts a project may have and recommend feasible ways to avoid or minimize those impacts. For the past year, I have been the lead on the Klamath River dam removal project Environmental Impact Report.*

**Q. What is your favorite part of California and why? Do you have a favorite CA species? Favorite habitat type? And why?**

*A. I am smitten by California's coastal ecosystems. I love the beaches and dunes, the lagoons, bays, salt marshes and estuaries. They are teeming and energized with life: whales, seals, otters, fish, birds, interesting plants and fungi. For me, California's coastal habitats embody beauty, complexity, diversity, and tranquility. Sitka spruce, on land, and eel-grass, in the estuaries, both hold special charm and are habitat for numerous other critters.*

**Q. What is your biggest concern regarding climate change?**

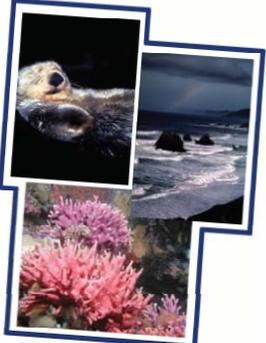
*A. I am very concerned that sea level rise and changed ocean conditions could result in habitat loss resulting in the decline of numerous species. Plus, millions of Californians live near the Pacific Ocean because they value its beauty and many other amenities. Thus, the potential loss of coastal dunes, sea bluffs, salt marshes and estuaries to sea level rise could also threaten our coastal human communities. This could affect our quality of life, including where we live, what we eat, how we recreate, our health and safety during storm and flood events, and for many, such as commercial fishers and crabbers, their careers and economic well-being.*

**Q. In ten years how do you think the responsibilities of your position will change due to climate change?**

*A. I think DFG will need to engage in more robust regional planning efforts. We will work more closely with more partners to develop scenario-based planning and adaptive co-management approaches to protect whole ecosystems and ranges of species. Our emphasis will shift more to a regional and proactive conservation stance from a current approach that is often more population-focused and project-responsive.*

**Q. What do you see as some of the short term opportunities for DFG to address climate change?**

*A. DFG is just beginning to make reducing our carbon footprint a major departmental objective. I applaud this and hope we continue implementing sustainability programs with alacrity. A fleet of high-efficiency cars would help and the paperless office initiative could be a game-changer in optimizing how we conduct business. I think we will continue to seize opportunities to raise climate change and sea level rise-related impacts during our project review and regional planning work. To enhance our effectiveness, I believe DFG staff would benefit from more training and assistance with climate change impact assessment and in promoting adaptation strategies.*



# DFG Climate Course: Outcomes

## Opportunity for True Institutional Change

- ❑ Provides a foundation of climate change knowledge for ALL staff
- ❑ Provide tools and resources to empower staff
- ❑ Promotes general knowledge of evolving responsibilities for staff

## Opportunity to Foster Teamwork

- ❑ In-house science/technical course that promotes networking across branches/regions
- ❑ Promotes networking with other partners
- ❑ Displays to senior leadership interest from staff in climate change

# Collaborative Work Groups

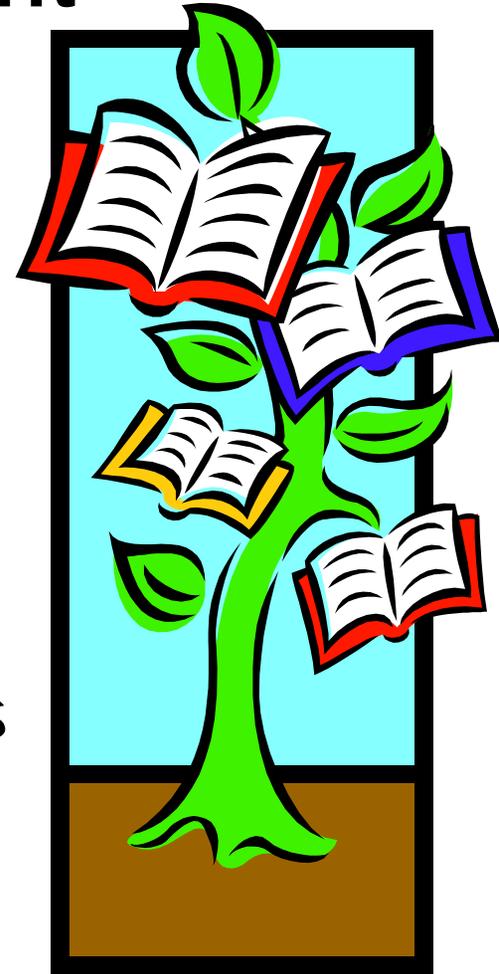
- 1. Climate training network**
- 2. SWAP revision science panel**
- 3. Climate change menu**

# 1. DFG Climate Training Course

---

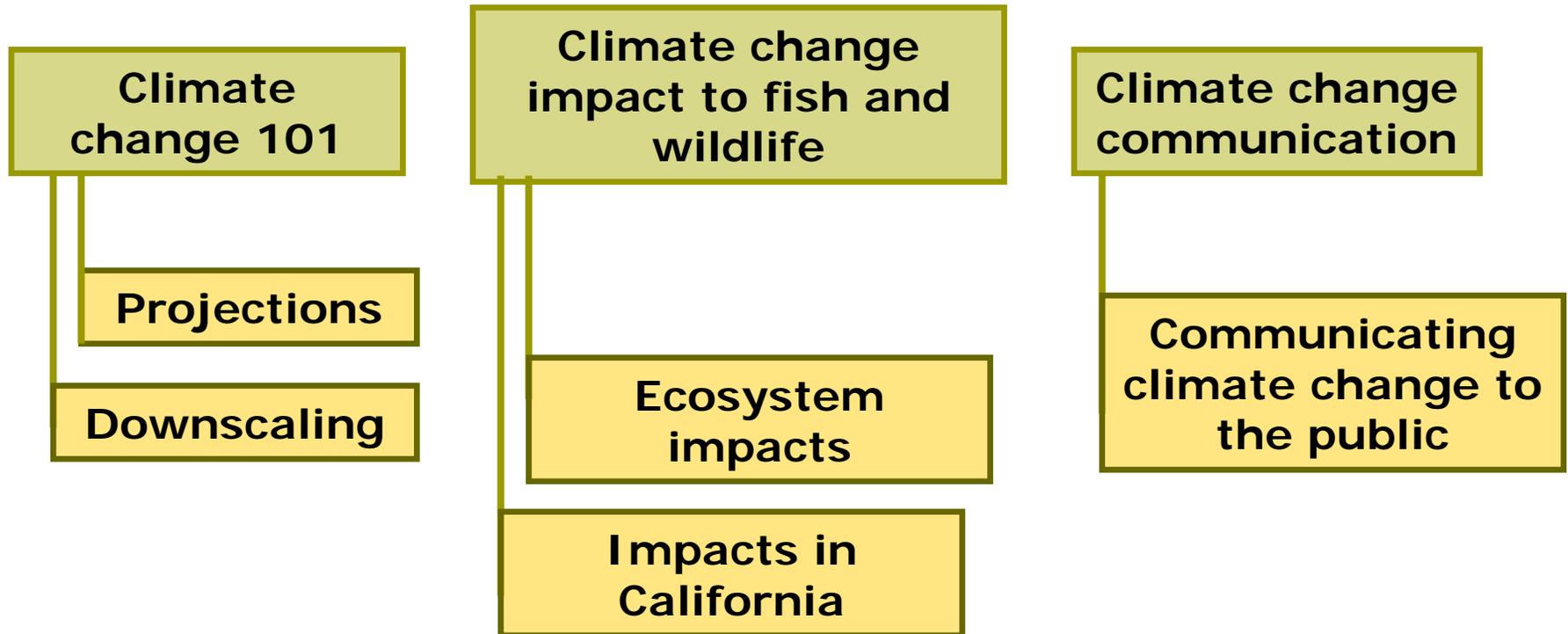
## Partner input on design & content

- Identify speakers
- Finalize content
- Identify key readings
- Design effective and engaging forum
- Design range of final project
- Promote networking with partners



# 1.1 Climate Training Network

---

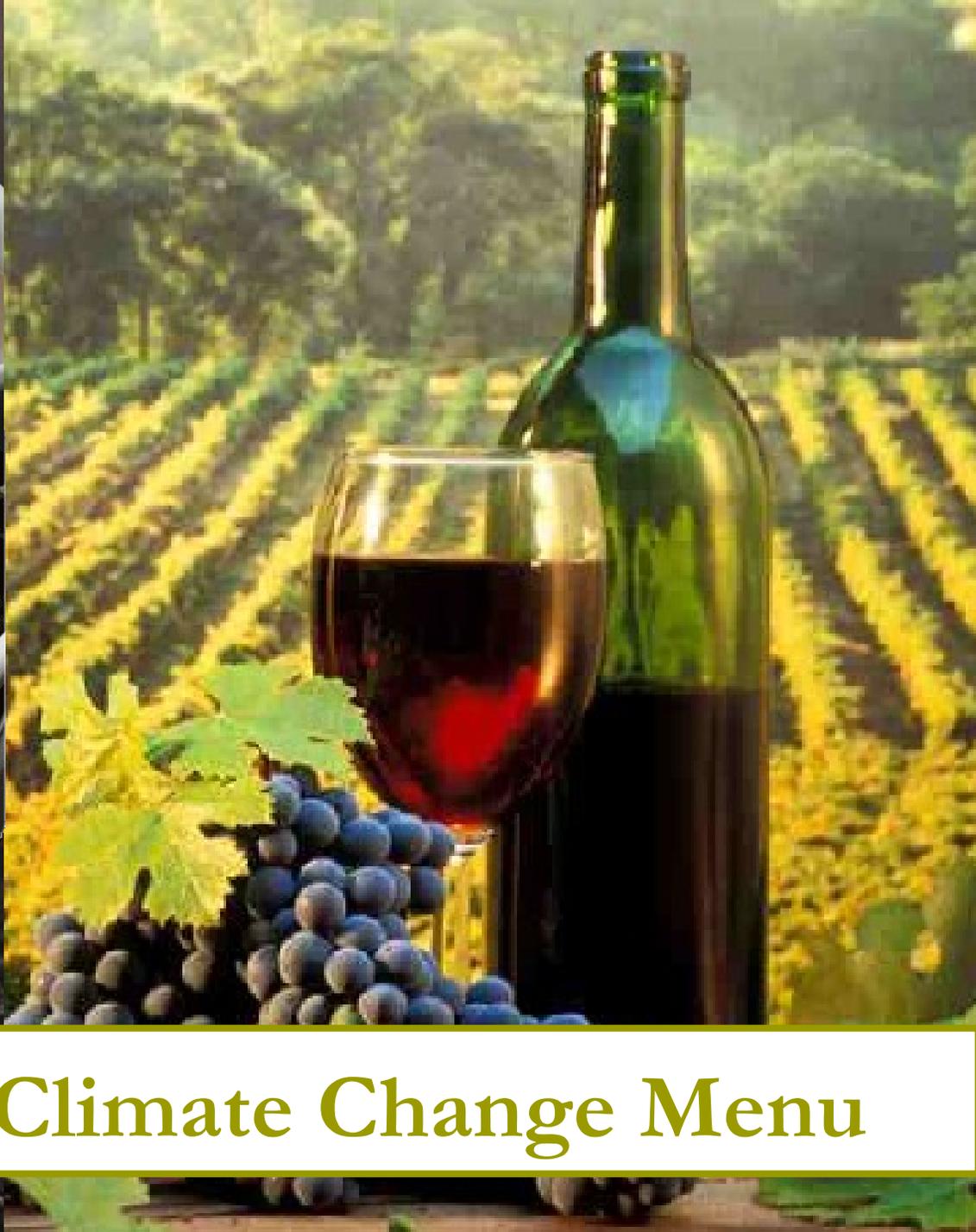


## 2. SWAP Revision Climate Workgroup

---



- Stakeholder input
- Network of climate expertise to support revision
- Provide resources for ecoregional teams
- Participate directly with ecoregional teams



### 3. Climate Change Menu

# Get it while you can-local supplies limited!

---

- ❑ Food is a compelling subject
- ❑ State wide-economic component
- ❑ All partners have a connection
- ❑ Opportunity to collaborate on a joint cc adaptation message
- ❑ Focus on shared objectives & collaborative actions

**Sign up!**



# CLIMATE SCIENCE PROGRAM

*Conservation Today* for a **Better Tomorrow**  
California Department of Fish and Game

**DFG Climate Change website:**

**[http://www.dfg.ca.gov/Climate\\_and\\_Energy/Climate\\_Change/](http://www.dfg.ca.gov/Climate_and_Energy/Climate_Change/)**

**Email: [climatechange@dfg.ca.gov](mailto:climatechange@dfg.ca.gov)**