

Project Leader/Agency/Contact Information:

- Tom Lupo, Chief, Biogeographic Data Branch, CDFG. tlupo@dfg.ca.gov
- Amber Pairs PhD, Climate and Renewable Energy Branch, CDFG. apairs@dfg.ca.gov
- Armand Gonzales, Ecosystem Conservation Division, CDFG. agonzales@dfg.ca.gov

Title: Assessing species vulnerability to climate change and mapping occurrences and distribution of those believed to be most vulnerable in California.

Project Goals: Many species and habitats are potentially at great risk of habitat contraction as lowlands are flooded, alpine habitats move up in elevation, stream temperatures warm and precipitation patterns change. Species with very restricted distributions or dependent on specific geo-climatic regimes are believed to be at greatest risk. It is important to establish baseline occurrence and distribution maps of these species so current habitat requirements can be determined and monitored into the future. Significant amounts of observation data are known to exist but need to be made available to planners.

The 2009 AFWA document “Voluntary Guidance for States to Incorporate Climate Change into State Wildlife Action Plans & Other Management Plans” states understanding which species and habitats are vulnerable, and why, is key to developing effective adaptation strategies. This process is often referred to as a vulnerability assessment. The goal of a vulnerability assessment is to describe the following elements: 1) exposure; 2) sensitivity; and 3) the capacity to adapt to climate change. A vulnerability assessment provides the scientific basis for developing climate adaptation strategies and uses information about future climate scenarios with ecological information about climate sensitivity and adaptive capacity to help managers anticipate how a species or system is likely to respond under the projected climate change conditions. The relative vulnerability of species or habitats can be used to set goals, determine management priorities and inform decisions about appropriate adaptation strategies.

Once the vulnerability assessment is complete, new occurrence information will inform creation or refinement of species range maps. These maps are important to illustrate the overall distribution of individual species, to identify areas of high species richness and to serve as a baseline for monitoring future distribution of species into the future.

Partners: California Energy Commission, Caltrans, Department of Water Resources

How Project will advance LCC goals: This proposal provides opportunity to achieve many stated LCC goals. It touches on several areas of emphasis including 1) Information – downscaled models, interfacing information, data management, 2) Data Sharing, Management, and Interfacing, 3) Species and Habitat Information, and 4) Communications and Information Exchange. Specifically, the vulnerability analysis will require assembling information on and evaluating multiple methods for vulnerability

assessments; assembling or developing appropriate data sets to conduct the analysis; providing a public interface for data viewing, mapping, analysis and downloading from the Department’s Biogeographic Information and Observation System (BIOS ).

In addition, several U. S. Fish and Wildlife Service desired accomplishments for 2010 are addressed by this proposal including: Risk and vulnerability assessment developed or refined for priority species and habitats; and inventory and monitoring protocols developed or refined to capture data on fish and wildlife populations and their habitats to detect changes resulting from climate change.

Methods: The first phase of this proposal will be to perform an evaluation of species habitat requirements and geographic distribution to assess which groups or guilds of species are likely at greatest risk to habitat change under various climate change scenarios i.e. high, medium, and low emission scenarios (Cayan et al. 2006). NatureServe, has developed a new initiative for all state Natural Heritage Programs to standardize criteria to assign species with a score of its vulnerability to climate change (NatureServe Climate Change Vulnerability Index (version 2.01)). This scoring will be similar to the existing, and widely used, Global and State Ranks of threat and rarity. The product of this first phase will provide data to the national scoring effort and to prioritize priority rare and vulnerable species to be address in the subsequent phases.

The second phase will be to complete the baseline occurrence data of the most vulnerable species so current habitat requirements can be precisely determined and species can be monitored into the future. Significant amounts of digital/non-digital observation data exist for these species but it is not available in a useable form.

Products and Timetable for Completion: The CDFG will make all data products and reports available through its BIOS public website.

Fall 2010	Spring 2011	Summer 2011	Fall 2011
<ul style="list-style-type: none"> <li>• Complete data collection/development</li> <li>• Conduct vulnerable species evaluations</li> </ul>	<ul style="list-style-type: none"> <li>• Complete initial species ranking (Natureserve)</li> <li>• Display data on BIOS through a public interactive viewer <a href="http://bios.dfg.ca.gov/">http://bios.dfg.ca.gov/</a></li> </ul>	<ul style="list-style-type: none"> <li>• Complete baseline occurrence data for vulnerable species</li> <li>• Process data for X number of species determined to be most vulnerable</li> </ul>	<ul style="list-style-type: none"> <li>• Revise data and range maps for vulnerable species</li> <li>• Provide data and analysis results to inform Wildlife Action Plan update</li> <li>• Display data on BIOS through a public interactive viewer <a href="http://bios.dfg.ca.gov/">http://bios.dfg.ca.gov/</a></li> </ul>

Performance Metrics with Timeline for each:

1. CDFG will complete its assessment of species vulnerable to climate change by October 1, 2010.
2. CDFG will complete NatureServe ranking for vulnerable species and display results on BIOS by June 1, 2011.

3. CDFG will process data and complete baseline analysis for vulnerable species by September 1, 2011.
4. CDFG will revise range maps for vulnerable species and display results on BIOS by January 1, 2012.

Conservation Outcomes: Access to high-quality scientific data is a critical component of sound planning and decision making. This kind of data is largely unavailable for the most vulnerable bird and mammal species in the project area. This proposal will allow for the development of the combination of occurrence and range data for each species. Fish and wildlife habitat planning organizations will then have improved, up to date, standardized, rigorous information to use in their analysis and decision making processes. These maps will better inform updates to the California Wildlife Action Plan, and landscape conservation planning such as the Desert Renewable Energy Conservation Plan.

Budget- by outcomes:

Assessing species vulnerability to climate change in California.

	Number	Base	Salary		Total Year	
			w/benefits	Phase 1	Phase 2	2010/2011
Env Scientist	1	0.5	\$89,091.00	\$22,272.75	\$22,272.75	\$44,545.50
GIS Support	1	1	\$18,000.00	\$18,000.00	\$18,000.00	\$36,000.00
Sub-Total				\$40,272.75	\$40,272.75	\$80,545.50
Overhead				\$11,276.37	\$11,276.37	\$22,552.74
				\$51,549.12	\$51,549.12	\$103,098.24

Matching Funds:

Assessing species vulnerability to climate change in California - Match Totals

	Number	Base	Salary and		
			Benefits	Federal	State
Manager	2	0.1	\$118,170.00	\$0.00	\$23,634.00
Staff Env Sci	1	0.1	\$102,570.00	\$0.00	\$10,257.00
			\$220,740.00	\$0.00	\$33,891.00

Project Summary	
	Cost
Federal	
Sub-total	\$80,545.50
State	
Match	\$33,891.00
Overhead	\$22,552.74
	\$136,989.24

Letters of Support: See attached



# Audubon CALIFORNIA

June 1, 2010

Ms. Debra Schlafmann  
California Landscape Conservation Cooperative  
Pacific Southwest Region 8  
2800 Cottage Way  
Sacramento, CA 95825

Dear Ms. Schlafmann,

Audubon California, a field office of the National Audubon Society, is writing in support of the California Department of Fish and Game proposal(s) to conduct a pilot study to evaluate downscaling methods and effectiveness for California's Area of Conservation Emphasis (ACE-II) conservation priority model and the California's Essential Habitat Connectivity Project; and to assess species vulnerability to climate change and mapping occurrences and distribution of those believed to be most vulnerable in California.

Audubon California staff have completed several modeling projects for more than 300 species of birds in California. Using historical bird data for Christmas Bird Counts and Breeding Bird Surveys, we created distribution models based on location and climate. With these we then projected the impacts of each species' range under 122 future climate scenarios. The proposed work by the Department would help inform our work to date and our future conservation efforts in California.

The Department has shown leadership in developing strategies to address climate change in California and funding these proposals through the newly created California Local Conservation Cooperative would greatly benefit further planning at all levels, both within government and amongst our conservation partners throughout the State. The Department is well positioned to provide meaningful progress in developing these important conservation tools, and will build on recently completed initiatives including the California Essential Habitat Connectivity Project and the Areas of Conservation Emphasis (ACE-II) model.

Please accept our endorsement of these projects.

Sincerely,

Gary Langham, Ph.D.  
Director of Bird Conservation  
Audubon California  
765 University Avenue  
Sacramento, CA 95825  
(office) 916-649-7600 x105



ASSOCIATION *of*  
FISH & WILDLIFE  
AGENCIES

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Ms. Debra Schlafmann  
California Landscape Conservation Cooperative  
Pacific Southwest Region 8  
2800 Cottage Way  
Sacramento, CA 95825

Dear Ms. Schlafmann,

The Association of Fish and Wildlife Agencies is writing in support of the California Department of Fish and Game proposal(s) to conduct a pilot study to evaluate downscaling methods and effectiveness for California's Area of Conservation Emphasis (ACE-II) conservation priority model and the California's Essential Habitat Connectivity Project; and to assess species vulnerability to climate change and mapping occurrences and distribution of those believed to be most vulnerable in California.

The Department has shown leadership in developing strategies to address climate change in California and funding these proposals through the newly created California Local Conservation Cooperative would greatly benefit further planning at all levels, both within government and amongst our conservation partners throughout the State. The Department is well positioned to provide meaningful progress in developing these important conservation tools, and will build on recently completed initiatives including the California Essential Habitat Connectivity Project and the Areas of Conservation Emphasis (ACE-II) model.

Please accept our endorsement of these projects.

Sincerely,

Arpita Choudhury PhD  
AFWA Science & Research Liaison  
444 North Capitol Street NW suite 725  
Washington DC 20001

**DEPARTMENT OF TRANSPORTATION**  
DIVISION OF ENVIRONMENTAL ANALYSIS, MS 27  
1120 N STREET  
P. O. BOX 942874  
SACRAMENTO, CA 94274-0001  
PHONE (916) 653-7507  
FAX (916) 653-7757  
TTY 711



*Flex your power!  
Be energy efficient!*

May 27, 2010

Ms. Debra Schlafmann  
California Landscape Conservation Cooperative  
Pacific Southwest Region 8  
2800 Cottage Way  
Sacramento, CA 95825

Dear Ms. Schlafmann:

I am writing to on behalf of the California Department of Transportation in support of the California Department of Fish and Game (DFG) proposal(s) to conduct a pilot study to evaluate downscaling methods and effectiveness for California's Area of Conservation Emphasis (ACE-II) conservation priority model and the California's Essential Habitat Connectivity Project; and to assess species vulnerability to climate change and mapping occurrences and distribution of those believed to be most vulnerable in California. These are areas of importance in our efforts to match local land use planning, transportation planning, conservation and mitigation analysis.

Our Department appreciates DFG's leadership in developing strategies to address climate change in California and funding these proposals through the newly created California Local Conservation Cooperative would greatly benefit further planning at all levels, both within government and amongst our conservation partners throughout the State. DFG is well positioned to provide meaningful progress in developing these important conservation tools, and will build on recently completed initiatives including the California Essential Habitat Connectivity Project and (ACE-II) model.

Please accept our endorsement of these projects.

Sincerely,

A handwritten signature in black ink that reads "Gregg Erickson".

GREGG ERICKSON  
Chief  
Biology & Technical Assistance Office  
Division of Environmental Analysis

Cc: Roberta Gerson, USFWS Region 8 Transportation Liaison

U.S. Fish & Wildlife Service  
California Department  
of Fish & Game  
California Department  
of Parks & Recreation  
County of Orange  
Irvine Ranch Water District  
Metropolitan Water District  
Southern California Edison



University of California, Irvine  
Transportation Corridor Agencies  
City of Irvine  
The Irvine Company  
Headlands Reserve, LLC  
California Department of Forestry  
Coastal Greenbelt Authority  
Orange County Fire Authority

May 31, 2010

Ms. Debra Schlafmann  
California Landscape Conservation Cooperative  
Pacific Southwest Region 8  
2800 Cottage Way  
Sacramento, CA 95825

Dear Ms. Schlafmann,

The Nature Reserve of Orange County is writing in support of the California Department of Fish and Game proposal(s) to conduct a pilot study to evaluate downscaling methods and effectiveness for California's Area of Conservation Emphasis (ACE-II) conservation priority model and the California's Essential Habitat Connectivity Project; and to assess species vulnerability to climate change and mapping occurrences and distribution of those believed to be most vulnerable in California. Of particular interest in managing multiple sensitive species within Orange County's Central and Coastal Natural Community Conservation Plan is the downscaling of regional climate models to watershed-scale. Downscaling climate change predictions to this scale would greatly improve our ability to predict potential distributional responses of sensitive species to changing climate conditions. This information is essential to identify areas most resilient to the effects of climate change and to develop strategies to monitor and manage sensitive species under future climate change scenarios.

The Department has shown leadership in developing strategies to address climate change in California and funding these proposals through the newly created California Local Conservation Cooperative would greatly benefit further planning at all levels, both within government and amongst our conservation partners throughout the State. The Department is well positioned to provide meaningful progress in developing these important conservation tools, and will build on recently completed initiatives including the California Essential Habitat Connectivity Project and the Areas of Conservation Emphasis (ACE-II) model.

Please accept our endorsement of these projects.

Sincerely,

Kristine Preston, PhD  
Science Program Director

*Forever Wild*



Ms. Debra Schlafmann  
California Landscape Conservation Cooperative  
Pacific Southwest Region 8  
2800 Cottage Way  
Sacramento, CA 95825

Dear Ms. Schlafmann,

The mission of the Pepperwood Foundation is to steward the life and landscapes of the 3200-acre Pepperwood Preserve of Sonoma County, and to advance science-based ecosystem conservation throughout our region and beyond.

We are writing in support of the California Department of Fish and Game proposal to conduct a pilot study to evaluate downscaling methods and effectiveness for California's Area of Conservation Emphasis (ACE-II) conservation priority model and the California's Essential Habitat Connectivity Project; and to assess species vulnerability to climate change and mapping occurrences and distribution of those believed to be most vulnerable in California. Pepperwood is presently conducting similar analyses at a regional scale for the North San Francisco Bay: we support the CDFG in looking at potential statewide impacts and response strategies as a means of coordinating the efforts of individual nature reserves like ourselves across the entire state of California.

The Department has shown leadership in developing strategies to address climate change in California. Funding these proposals through the newly created California Local Conservation Cooperative would greatly benefit further planning at all levels, both within government and amongst our conservation partners throughout the State. The Department is well positioned to provide meaningful progress in developing these important conservation tools, and will build on recently completed initiatives including the California Essential Habitat Connectivity Project and the Areas of Conservation Emphasis (ACE-II) model.

Please accept our endorsement of these projects.

Sincerely,

A handwritten signature in black ink, appearing to read "Lisa Micheli". The signature is fluid and cursive, written over the printed name.

Lisa Micheli, PhD  
Executive Director



**BOARD of GOVERNORS**

June 1, 2010

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Ms. Debra Schlafmann  
California Landscape Conservation Cooperative  
Pacific Southwest Region 8  
2800 Cottage Way  
Sacramento, CA 95825

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Steven Smith

**TREASURER**

Douglas Hegebarth

**IMMEDIATE PAST CHAIR**

Jack Raymond

Dear Ms. Schlafmann,

The San Diego Foundation is writing in support of the California Department of Fish and Game proposal(s) to conduct a pilot study to evaluate downscaling methods and effectiveness for California's Area of Conservation Emphasis (ACE-II) conservation priority model and the California's Essential Habitat Connectivity Project; and to assess species vulnerability to climate change and mapping occurrences and distribution of those believed to be most vulnerable in California.

Over the past decade, The San Diego Foundation has worked through our Land and Watershed Initiative to advance the completion of a network of recreational parks and natural areas on rivers, canyons, lagoons and beaches to provide healthy lands, clean water and habitat for people and wildlife. We have had positive experiences working with the Department of Fish and Game to achieve these ends, and support their ongoing efforts to enhance connectivity of open space in the San Diego region, and beyond.

The California Department of Fish and Game has shown leadership in developing strategies to address climate change in California and funding these proposals through the newly created California Local Conservation Cooperative would greatly benefit further planning at all levels, both within government and amongst our conservation partners throughout the State. The Department is well positioned to provide meaningful progress in developing these important conservation tools, and will build on recently completed initiatives including the California Essential Habitat Connectivity Project and the Areas of Conservation Emphasis (ACE-II) model.

Please accept our endorsement of these projects.

Sincerely,

Emily Young, PhD  
Senior Director, Environment Analysis and Strategy  
Community Partnerships

John Cambon

Ted Chan, M.D.

Roger Cornell, M.D.

James Cowley

Sandra Daley, M.D.

Robert Dynes, Ph. D.

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June 1, 2010

Ms. Debra Schlafmann  
California Landscape Conservation Cooperative  
Pacific Southwest Region 8  
2800 Cottage Way  
Sacramento, CA 95825

Re: Support for California Department of Fish and Game Grant Proposal

Dear Ms. Schlafmann,

I am writing on behalf of The Nature Conservancy in support of two proposals from the California Department of Fish and Game for funding from the USFWS Landscape Conservation Cooperatives program. The Department of Fish and Game seeks funding to evaluate downscaling methods and effectiveness for California's Area of Conservation Emphasis (ACE-II) conservation priority model and the California Essential Habitat Connectivity Project; and to assess species vulnerability to climate change and mapping occurrences and distribution of those species believed to be most vulnerable in California.

The Department of Fish and Game has shown leadership in developing strategies to address climate change in California and funding these proposals through the newly created California Local Conservation Cooperative would greatly benefit further planning at all levels, both within government and in collaboration with The Nature Conservancy. The Department of Fish and Game's proposals will provide meaningful insight in developing these important conservation tools, and will build on recently completed initiatives including the California Essential Habitat Connectivity Project and the Areas of Conservation Emphasis (ACE-II) model.

The Nature Conservancy urges you to fund these proposals.

Sincerely,



Louis Blumberg, Director  
California Climate Change Team