CDI SSF Category 3: Data and Information Assets
Submitted under other CDI SSF Categories? No

Networking the California Climate Commons with the USGS GeoData Portal

Applicants/Principal Investigator(s):
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David Blodgett**,** Center for Integrated Data Analytics (CIDA)**,** USGS WI Water Science Center**,** 8505 Research Way Middleton WI 53562, Ph (608) 821-3899 Email *dblodgett@usgs.gov*

Abstract:
We propose to link the California Climate Commons and the USGS GeoData Portal by providing Commons OPeNDAP endpoints for hosted datasets as sources for the USGS Climate Data GeoData Portal, and to enable the web-based applications on the Climate Commons to utilize the processing resources of the GeoData Portal. We propose a partnership between the GeoData Portal and the Climate Commons to accomplish these connections, using the 2013 USGS Basin Characterization Model (2013 BCM), a dataset that is pivotal for numerous other research and planning efforts, as the pilot dataset. Additionally, an application for extracting summary statistics and graphs identified as useful to multiple stakeholders for exploring the range of variability among the 2013 BCM modeled projections will be prototyped on top of the OPeNDAP served data. This project would serve as a model for connecting other external "data silos" with the USGS knowledge infrastructure and demonstrate the flexibility and multiple uses of such an open, interoperable architecture. It would also directly connect high-value but very complicated and large climate change datasets hosted by the USGS with end-users in the research and conservation community.

Total funding amount requested: $44,403
Total in-kind funding: $75,000

Datasets:
2013 USGS Basin Characterization Model

Geographic/geologic/ecosystem/habitat/taxonomic/other context:
Downscaled climate & hydrologic parameters, modeled under multiple climate change scenarios for hydrologic California and Nevada

Type of Product(s) Generated:
OPeNDAP enabled downscaled climate & hydrological dataset,
Prototype OPeNDAP-based data query and visualization tools

Summary

a) Introduction and Background

The California Climate Commons (http://climate.calcommons.org) is a comprehensive catalog and repository of climate related data, publications, and information relevant for climate change research and conservation in California. The Commons is a project of the California Landscape Conservation Cooperative (CA LCC) working to close the gap between the research and conservation communities by providing interpretive materials and forums for communication with climate change scientists. The Commons effort is a partnership of the CA LCC, PRBO Conservation Science, and the UC Davis Information Center for the Environment. The Climate Commons puts particular emphasis on CA LCC and USGS Climate Science Center funded projects, in support of local and regional efforts directed at California conservation and climate change.

The Commons is widely recognized as the starting point for discovery and access to resources across many sources, and an online environment in which land managers can get help applying climate change science to conservation. The Commons hosts a growing collection of datasets for the purpose of enhancing and supporting access. One of these is a USGS downscaled climate and hydrologic response dataset, the 2012 Basin Characterization Model (http://climate.calcommons.org/dataset/10), and the Commons has been tasked with hosting the 2013 version of this USGS data. These high-priority climate change datasets are currently being made available through an online application that allows selection of desired variables and scenarios, clipping, and download, greatly expanding the audience that can access and use them.

At this time, datasets hosted by the Climate Commons are not cataloged in the GeoData Portal, nor are they available for processing by the GDP. Datasets cataloged and hosted by the GDP are likewise not accessible by the existing or planned access-enhancing utilities produced by the Commons.

We propose to enhance the utility and connectivity of the Climate Commons data repository and link it to GeoData Portal services by providing OPeNDAP endpoints for hosted datasets as potential sources for the USGS Climate Data GeoData Portal, and to enable the existing and planned web-based applications on the Climate Commons to utilize the processing resources of the GeoData Portal. We propose a partnership between the GeoData Portal and the Climate Commons to accomplish these connections, using the 2013 USGS Basin Characterization Model (2013 BCM), a dataset that is pivotal for numerous other research and planning efforts, as the pilot dataset. The Commons applications to be integrated with the new data network include the existing selection and download utility and a new application for extracting summary statistics and graphs. The intuitive outputs of the new application have been designed by the Terrestrial Biodiversity Climate Change Cooperative (TBC3) as useful for making the data more understandable for their researchers as well as other stakeholders.

This project would implement an open data "pipeline" between these two important climate change data management systems, directly connecting high-value climate change datasets hosted by both portals with a larger community of end-users in the research and conservation community. The project would serve as a model for connecting external "data silos" with the USGS knowledge infrastructure and demonstrate the flexibility and multiple uses of such an open, interoperable architecture.

b) CDI SSF Category: 3. Data and Information Assets

c) Project Title: Networking the California Climate Commons with the USGS GeoData Portal.

d) Project Leads:
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e) Other Project Personnel:
Jordan Walker
Center for Integrated Data Analytics (CIDA)
USGS WI Water Science Center
8505 Research Way Middleton WI 53562
608-821-3899

Michael Fitzgibbon, mfitzgibbon@prbo.org, 707-781-2555 ext. 309
Deanne DiPietro, ddipietro@prbo.org, 707-781-2555 ext. 310
Zhahai Stewart, zstewart@prbo.org, 707-781-2555 ext. 380
Doug Moody, dmoody@prbo.org, 707-781-2555 ext. 347
PRBO Conservation Science
3820 Cypress Drive, Suite 11, Petaluma, CA 94954

Stuart Weiss, Ph.D.
Creekside Center for Earth Observation
Menlo Park, CA 94025
stu@creeksidescience.com, 650-854-9732

f) Collaborating Organizations:
USGS California Water Science Center
USGS (CIDA/Geo Data Portal and CA Water Science Center)
PRBO Conservation Science
Creekside Center for Earth Observation

g) N/A

h) Description of the geographic/ecosystem/etc. context of the project and its importance or value:
Interpreting the impacts of climate change on the ecosystems, habitats, and species of California is a major thrust of the scientific research community seeking to serve the decision-making of land managers. Examples of conservation and adaptation planning efforts that directly benefit from improved access to the pilot dataset and climate change data in general are: Water resource management in the SF Bay Delta, habitat preservation through land acquisition throughout

California, and habitat and species management plans for existing preserves throughout California.

Scope

The goal of this project is to establish interoperability between two important climate change data efforts: the USGS GeoData Portal and the California Climate Commons.

The project will attain this goal with two objectives:

1. Employ state of the art networking technology to bring the California Climate Commons into network dataflow connectivity with the USGS GeoData Portal, establishing the Commons as both a data source and as a client to the GeoData Portal, and
2. Establish a new partnership for complementary, integrated service of critical climate change datasets from USGS and CA LCC projects, beginning with the 2013 Basin Characterization Model.

These activities contribute to the CDI and the CDI Science Support Framework by:

- Immediately improving machine and human access to a pivotal USGS data product and expanding its use within and beyond the USGS by making it available using the OPeNDAP protocol, providing sub-selection, download, and visualization products, and cataloging the data services within the GeoData Portal,
- Establishing an integrated data sharing network that will be used to provide access and visualization services for other critical shared datasets, and
- Establishing a partnership between two climate change data management systems and efforts that together will be better equipped to serve their combined communities of research scientists and conservation managers, encouraging the transition from climate change data to climate-smart knowledge used in conservation decisions.

The impacts of the project on USGS research goals are:

- Open a direct channel from an existing USGS climate change modeling effort to a wide audience in the research and conservation communities, allowing the USGS to better serve these end-uses of the data and ultimately improve conservation decision-making in the face of climate change,
- Expand future audiences through the CA LCC for USGS climate change data, and open up future CA LCC datasets for improved access by USGS scientists and conservation managers.

Project Tasks

Task 1: Establish 2013 BCM Dataset as an OPeNDAP Service on the Climate Commons

As part of the USGS Water Science Center's "Downscaled climate and hydrologic response for California and the Great Basin" project the Climate Commons is already committed to serving the summary-level ensemble dataset generated by that project, the 2013 BCM, with cataloging and a web based interface for selecting and downloading single layers. This interface would be complemented by also serving the same dataset in the more capable but more technical OPeNDAP protocol. To accomplish that, GeoData Portal (GDP) personnel will assist California Climate Commons (hosted by PRBO Conservation Science servers and staff) in implementing a

THREDDS[1] server within their data center, and in preparing and publishing OPeNDAP endpoints for the 2013 BCM summary dataset hosted by the Climate Commons. This dataset consists of statistical summaries of particular use to the California climate change science and land management communities, comprising approximately 2 terabytes of data. The dataset will be included in the GDP catalog of OPeNDAP endpoints, as a data source for use by the Climate Commons and others, within or beyond the USGS. This dataset as hosted on the Climate Commons will provide derivative products, user support, and documentation relating to the original, unsummarized dataset (approximately 50-100 terabytes) produced as part of the 2013 BCM project. This project would be complementary to the efforts of the GDP, and extend their resources with the unique capabilities of the Climate Commons to encourage expanded use of data and information by providing user-friendly discovery of data resources together with related publications, FAQs, and interactive discussion with scientists and authors. It would be a model for enabling connectivity between the USGS and external data portals, for mutual benefit.

Task 2: Prototype GeoData Portal-derived Data Visualization Products within the Climate Commons

As part of the California and the 2013 BCM project the Climate Commons is also planning to build a new web application that will allow scientists and land managers to generate time series statistical summaries and graphs based on the 2013 BCM dataset and user-chosen watersheds or other polygons. The tool is expected to use local file access and manual preprocessing of the 2013 BCM dataset to extract polygon related statistics for a fixed set of polygons. This proposal would supplement current funds from the California and Great Basin project (proposed as matching funds for this project) to refactor those web applications to make use of the more automated functionality of the GeoData Portal to extract and process data from the OPeNDAP hosted datasets, and to thereby more flexibly add new sets of polygons.

With the technology infrastructure and local expertise established by this project in serving and using GDP results from this first key dataset, the Climate Commons would thereafter (beyond this CDI project) be capable of OPeNDAP enabling of other hosted climate change related datasets for inclusion in the GeoData Portal catalog for use by others; and of creating or enhancing client applications utilizing the GeoData Portal's processing.

Once the California Climate Commons is connected to the USGS OPeNDAP and GeoData Portal services, a variety of synergistic endeavors is expected to benefit both organizations and third parties, bringing the Climate Commons into cooperative data sharing and integration with its natural partners and avoiding the disconnected data silo tendencies which might otherwise result from the barrier of the learning curve for those technologies. The Climate Commons will serve to expand and enhance the use of the cooperatively served datasets within the conservation and land management community.

Analysis of the scope of work against the requested funding:
The requested funding together with the matching funds will ensure the development of the new data server, the re-fitting of the existing data selection and download system (Platinum Services) and the prototyping of the planned new data visualization utilities. The project is entirely funded by the matching funds and the requested funding.

[1] Thematic Realtime Environmental Distributed Data Services, http://www.unidata.ucar.edu/projects/THREDDS/

Product Delivery:
The 2013 BCM dataset will be made available to the CDI and the public through the OPeNDAP server at PRBO Conservation Science. Data access and visualization utilities will act upon the PRBO hosted OPeNDAP server from PRBO web servers. All products will be documented using the FGDC metadata standard. Announcements in the form of newsletters and press releases will be used to raise awareness of the products.

Technical Approach

The California Climate Commons is hosted by PRBO Conservation Science (http://prbo.org), a California-based nonprofit dedicated to conserving birds, other wildlife, and ecosystems through innovative scientific research and outreach. With assistance from the GeoData Portal personnel, the Climate Commons would set up and configure a THREDDS server to support Climate Commons hosted datasets on server hardware within the PRBO Conservation Sciences data center, and would transform and publish the BCM summary dataset as one or more OPeNDAP endpoints. These endpoints would be included in the GeoData Portal catalog for use within the USGS or externally.

This dataset is expected to be approximately 2 Terabytes. Since only selected slices tend to be needed by particular projects, OPeNDAP enabling this should reduce the need to physically transport hard drives from which users would otherwise need to extract their desired subset. The Climate Commons will provide its existing Platinum Services, a parallel web based interface for selecting and downloading smaller subsets of this dataset for use in GIS applications; the OPeNDAP access to the same dataset provided by this proposal will complement that functionality for different purposes or users.

A time series visualization web application is already planned for implementation in to provide graphical and statistical summary results suitable for analysis or publication support, based on the 2013 BCM summary dataset, for scientists and land managers. By expanding the functionality to use the GeoData Portal for intermediate processing over the network, the proposed project would provide additional flexibility for adding additional user-supplied polygons rather than just a fixed list, acquiring and locally caching per polygon multidimensional statistical summaries from the GeoData Portal, which in turn would use the Climate Commons OPeNDAP endpoint for the 2013 BCM summary dataset. This web application would also be hosted by the Climate Commons on its servers. Adding new sets of polygons use the batch operation functions of the GDP, rather than an interactive or real time interface, depending on performance; testing that performance will be one of the results of this project.

Project Experience

The project team represents a unique collaboration combining expertise in climate change modeling, hydrology, ecology, geographic information systems, and computer science. Dr. Lorraine Flint is a hydrologist and climate change modeler working at the forefront of downscaling climate and hydrologic data for use by the research and conservation communities, and is one of the creators (together with Alan Flint) of the Basin Characterization Model dataset. David Blodgett and Jordan Walker work on the Geo Data Portal, and have substantial experience setting up data stores and deploying THREDDS data servers for climate and land use data. They have attended formal training courses and collaborate with software developers in charge of development of the data access and server software products involved in this project.

At PRBO Conservation Science, Michael Fitzgibbon, Deanne DiPietro, Zhahai Stewart, and Douglas Moody all have long-standing experience developing solutions at the interface between environmental conservation and informatics. Together and with other partners they have built the California Climate Commons and its innovative climate change data access utilities that are now in use by the research and conservation communities of California. The Informatics Program that they are part of is currently involved in many high-profile climate change modeling projects producing data and supporting its use for decision-making within the conservation community.

The team also includes Dr. Stuart Weiss of the Creekside Center for Earth Observation, a conservation ecologist using advanced GIS/statistical methods for climate and biodiversity mapping and modeling. He is deeply involved in practical conservation and has a unique understanding of the uses climate analyses for planning and management.
Dr. Weiss currently plays a critical role as part of the Terrestrial Biodiversity Climate Change Consortium (TBC3) in exploring and interpreting the foundational datasets used in the group's many research projects investigating the impacts of climate change on the ecosystems of the San Francisco Bay Area.

The collaboration's broad range of skills in web innovation, geographic analysis, and data visualization, climate change modeling, and vulnerability analysis combined with extensive computing resources make this collaboration especially qualified to accomplish the project.

Commitment to Effort

The California Climate Commons, PRBO Conservation Science, and the CA LCC are committed to supporting conservation decision-making with climate change science data, information, and community of practice into the foreseeable future. The 2013 BCM summary dataset OPeNDAP endpoint served by the Commons will continue to be available to USGS and other users beyond the termination of this proposed project. In addition, the Climate Commons has a growing catalog of other climate related datasets, including all ongoing dataset outputs from the California Landscape Conservation Cooperative sponsored projects. The infrastructure and expertise generated by this proposed project, including the serving of the very useful pilot dataset, will enable those to more easily be served as additional OPeNDAP endpoints, and published in the GeoData Portal catalog as such. This hosting will be a service to the researchers providing the data as well as to the scientists and managers wishing to make use of it. The web application producing time series and Water Balance Diagrams from the above dataset (via the GeoData Processor) will continue to be available, and will continue to use the GDP to extract summary statistics for new polygon sets as needed. This tool could in the future be further generalized to make use of other OPeNDAP endpoints or GeoData Portal results. Future web applications produced by the Climate Commons can be designed to make use of OPeNDAP and/or GeoData Portal functionality to interoperate with datasets hosted by the Climate Commons, by the USGS, or elsewhere.

Budget

Overview

Organization	Requested Budget	Match
USGS CIDA	$9,664	$10,000
USGS CA WSC	$0	$30,000
PRBO Conservation Science	$22,000	$30,000
Creekside Center for Earth Observation	$5,000	$5,000
FWS/CA LCC (Indirect for subcontracts)	$7,739	$0
Totals	**$44,403**	**$75,000**

Budget Details

Budget Category	Federal Funding "Requested"	Matching Funds "Proposed"	Source of Match
1. SALARIES (inc. number of hours and hourly rate)			
Personnel			
Lorraine Flint	$-	$30,000	USGS CA WSC
Jordan Walker (150 hrs @ $26.07/hr)	$3,911	$-	
Contract Personnel			
Zhahai Stewart (280 hrs @ $60/hr)	$16,800	$2,500	USGS CA WSC
Deanne DiPietro (50 hrs @ $60/hr)	$3,000	$2,500	USGS CA WSC
Doug Moody	$-	$23,000	USGS CA WSC
Michael Fitzgibbon	$-	$2,000	USGS CA WSC
Stu Weiss (50 hrs @ $100/hr)	$5,000	$5,000	TBC3
Total Salaries:	**$28,711**	**$65,000**	
2. FRINGE BENEFITS:			
Personnel			
Jordan Walker (150 hrs @ $13.87/hr)	2080		
Contract Personnel			
0	0		
Total Fringe Benefits:	**$2,080**		
3. TRAVEL EXPENSES:			
Per Diem	$153		

Airfare	$600		
Lodging Cost	$450		
Vehicle Cost	$250		
Mileage	$-		
Other travel expense(s)	$-		
	$-		
Total travel expense(s)	**$1,453**		
4.OTHER DIRECT COSTS: (itemize)			
Equipment (inc. software, hardware, etc.)		$10,000	USGS NCCWSC
Total Other Direct Costs:			
Total Direct Costs:	$32,244		
Indirect Cost, 37%	$12,159		
GRAND TOTAL	**$44,403**	**$75,000**	

Timeline

Phase one (OPeNDAP hosting of the summary BCM) expected by May 30, 2013
Phase two (GDP enabling the web application) expected by Aug 31, 2013
Final Report by Sept 30, 2013.

Appendices

Curriculum vitae for selected project personnel.
Letters of support from CA LCC, Pepperwood Foundation, and TBC3.

LORRAINE E. FLINT
U.S. Geological Survey, California Water Science Center, Sacramento, CA 95819-6129; Phone (916) 278-3223, email: lflint@usgs.gov

Education: PhD 2002, Oregon State University (Soil Physics), MS 1985, Oregon State University (Forest Soils), BS 1979, Humboldt State University (Wildlife Biology)

Positions: 2001-present: Research Hydrologist, U.S. Geological Survey, California Water Science Center, Sacramento, CA.; 1986-2001: Hydrologist, Project Chief, Yucca Mountain Project, Matrix-Hydrologic Properties; 1982-1985: Research Assistant, Dept. of Soil Science, Oregon State University

Scientific Presentations: Authored/coauthored over 100 national and international presentations, including about 15 in the last 2 years on downscaling climate change scenarios to fine-scale spatial resolution and using them in regional hydrologic models for analyses on historical and future environmental and ecological conditions.

Publications: Published over 65 peer-reviewed journal articles, book chapters, and USGS reports. Research Direction: Current research involves downscaling future climate projections to ecologically relevant scales (1-km to 30-m) and using that as input to a regional scale hydrologic model with the same scale output. The research provides precipitation, min and max air temperature, soil moisture, potential and actual evapotranspiration, solar radiation, climatic water deficit, snow accumulation, snow melt, sublimation, recharge, and runoff. Projects are being conducted throughout the western US for analyses of water availability, flow and transport, snowmelt processes, and ecosystem change, with particular attention to the California, the Sierra Nevada, and the SF Bay Area.

Relevant Publications:
Flint, L.E. and Flint, A.L., 2012, Downscaling climate change scenarios for ecologic applications: Ecological Processes 1:2.

Micheli, E., Flint, L.E., Flint, A.L., Weiss, S.B., and Kennedy, M., Downscaling future climate projections to the watershed scale: A North San Francisco Bay Estuary case study: San Francisco Estuary and Watershed Science (in press)

Hanson, R.T., Flint, L.E., Flint, A.L., Dettinger, M.D., Faunt, C.C., Cayan, D., and Schmid, W., 2012, A method for physically-based model analysis of conjunctive use in response to potential climate changes: Water Resources Research, 48, W00L08, doi:10.1029/2011WR010774.

Flint, A.L., Flint, L.E., Curtis, J.A., and Buesch, D.C., 2010, A Preliminary Water Balance Model for the Tigris and Euphrates River System: USGS Open-File Report.

Flint, L.E and Flint, A.L., 2008, A basin-scale approach to estimating stream temperatures of tributaries to the Lower Klamath River, California, J. of Environmental Quality 37:57-68.

Flint, A.L., and Flint, L.E., 2007, Application of the Basin Characterization Model to estimate inplace recharge and runoff potential in the Basin and Range carbonate-rock aquifer system, White Pine County, Nevada, and adjacent areas in Nevada and Utah: USGS SIR 2007-5099, 20 p.

David L. Blodgett

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10-26-12

PROFILE

My great interest in water grew from my love of paddle-sports. Designing and building canoes and kayaks beginning in middle school taught me to learn independently by research and experimentation. My first real job was in canoe and kayak specialty retail where I reached the level of manager and buyer but was drawn away to pursue higher education. I briefly worked in custom remodeling as a laborer while working on an undergraduate degree in Civil Engineering. For two semesters, I worked full time on my undergraduate degree that led into a research assistantship in sediment transport and bank erosion. My experience leading the highly successful UW - Madison concrete canoe team gave me perspective and valuable leadership experience. My undergraduate research continued with an emphasis on hydrologic modeling and radar indicated rainfall analysis. I received a master's degree in water resources engineering in January 2010. I am currently applying my background and training in management, environmental modeling, geospatial information science, and environmental data analysis at the USGS Center for Integrated Data Analytics as an IT specialist and project manager.

EXPERIENCE

IT Specialist and Project Manager, Center for Integrated Data Analytics: U.S. Geological Survey Wisconsin Water Science Center; Middleton, WI— Jan 2010 - Present.

Field and Laboratory Research Assistant, Water Group: UW-Madison Civil and Environmental Engineering; Madison, WI— March 2006 – Jan 2010.

Teaching Assistant, UW-Madison Civil and Environmental Engineering; Madison, WI— Aug. 2007 – May 2008.

Project Manager and Co-chair, UW-Madison Concrete Canoe Team; Madison, WI—August 2005 – June 2008.

Carpenter's Assistant, TDS Custom Construction; Madison, WI—October 2004 - August 2005.

Manager - Buyer, Carl's Paddlin' Canoe and Kayak Center; Madison, WI — May 2000 - October 2004.

EDUCATION

University of Wisconsin Madison — BS Civil and Environmental Engineering 2002-2008

- Focused heavily on water resources engineering and environmental studies.

University of Wisconsin Madison — MS Water Resources Engineering 2008-2010

NOTABLE ACCOMPLISHMENTS

Design and construction engineer, paddler and technical presenter for national champion concrete canoe team 2006.
Project manager, lead engineer, paddler and technical presenter for national champion concrete canoe team 2007.
Project manager for national champion wastewater treatment plant design team in Metcalf and Eddy Student Design Competition.

PUBLICATIONS

Blodgett, D.L., Booth, N.L., Kunicki, T.C., Walker, J.L., and Viger, R.J., 2011, Description and testing of the Geo Data Portal: Data integration framework and Web processing services for environmental science collaboration: U.S. Geological Survey Open-File Report 2011–1157, 9 p.

Blodgett, D.L., Booth, N.L., Kunicki, T.C., Walker, J.L., Jessica, L., 2012, Description of the U.S. Geological Survey Geo Data Portal Data Integration Framework: IEEE JSTARS, in press.

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EDUCATION
Stanford University
Ph.D. in Biological Sciences. September 1996
B.S. with Honors Biological Sciences 1984

Current positions: Chief Scientist, Creekside Center for Earth Observation

Past Positions:
Postdoctoral Fellow, Center for Conservation Biology, Stanford University**:** 1996- 1999
Staff Biologist, Center for Conservation Biology, Stanford University: 1984-1992

Selected Projects
Terrestrial Biodiversity Climate Change Collaborative (2011-2013)
Bay Area Conservation Lands Network (2006-present)
Santa Cruz Conservation Blueprint (2010-2011)
Bay Area Critical Linkages Project (2010-present)
Conservation Management of Serpentine Grasslands in Santa Clara County (1985-present)
Santa Clara Valley Habitat Plan (2001-present)
Habitat Restoration and Reintroduction of Bay Checkerspot Butterfly Population at Edgewood Natural Preserve (2001-present)
Reintroduction of Mission Blue Butterfly to Twin Peaks, San Francisco (2008-present)
Habitat Assessment and Management Plan for Overwintering Monarch Butterfly Habitat at Monarch Grove Sanctuary, Pacific Grove, CA (2009-present)
Restoration of Tiburon Indian Paintbrush Populations on Coyote Ridge, Santa Clara County (2012-2015)
Reintroduction of Metcalf Canyon Jewelflower to Tulare Hill, Santa Clara County (2012-2015)

Selected Publications (From 29 peer reviewed, full list available on request)

Bay Area Open Space Council (2011). The Conservation Lands Network: San Francisco Bay Area Upland Habitat Goals Report. Berkeley, CA (**S.B. Weiss** co-author as Science Advisor)
Ackerly D.D., S.R. Loarie, W.K. Cornwell, **S.B. Weiss**, H. Hamilton, R. Branciforte, N.J.B. Kraft (2010). The geography of climate change: implications for conservation biogeography. Diversity and Distributions, Blackwell Publishing Ltd. p. 1-12.
Fenn, M.E., E.B. Allen, **S.B. Weiss**, S. Jovan , L.H. Geiser , G.S. Tonnesen, R.F. Johnson, L.E. Rao, B.S. Gimeno, F. Yuan, T. Meixner, A. Bytnerowicz. (2010). Nitrogen critical loads and management alternatives for N-impacted ecosystems in California. Journal of Environmental Management 91:2402-2423.
Van de Ven, C., **S.B. Weiss,** and W.G. Ernst. 2007. Plant species distributions under present conditions and forecasted for warmer climates in an arid mountain range. *Earth Interactions* 11:1-33.
Weiss, S.B. (2000). Vertical and temporal patterns of insolation in an old-growth forest.

Canadian Journal of Forest Research 30:1953-1964
Weiss, S.B. (1999). Cars, cows, and checkerspot butterflies: nitrogen deposition and grassland management for a threatened species. Conservation Biology 13:1476-1486
Guisan, A., **S. B. Weiss,** A.D Weiss. (1999). "GLM versus CCA spatial modeling of plant species distribution." Plant Ecology **143**: 107-122.
Weiss, S.B., and D.D. Murphy. (1993). Climatic consideration in reserve design and ecological restoration. pp. 89-107 in Saunders, D.A., R.J. Hobbs, and P.R. Ehrlich (eds.) *Nature Conservation 3: Reconstruction of Fragmented Ecosystems*. Surrey Beatty & Sons, Chipping Norton NSW, Australia.
Murphy, D. D. and **S. B. Weiss** (1992). Effects of climate change on biological diversity in western North America: Species losses and mechanisms. Global Warming and Biological Diversity. R. L. Peters and T. E. Lovejoy. New Haven, CT, Yale University Press**:** 355-368.
Weiss, S.B., D.D. Murphy, and R.R. White. (1988). Sun, slope, and butterflies: topographic determinants of habitat quality for *Euphydryas editha bayensis.* Ecology 69:1486-1496.

Biographical Sketch: Michael Fitzgibbon

EDUCATION

- University of California, Berkeley, CA. Landscape Architecture (Environmental Planning), MLA. 1985
- University of Wisconsin, Green Bay, WI. Mathematics. BS. 1981.

APPOINTMENTS

- 2009 – present. Science Operations Manager, PRBO Conservation Science
- 2007 – 2009. Informatics Engineer, PRBO Conservation Science.
- 2002 – 2007. Group Software Architect, Intuit, Inc., Mountain View, CA
- 2000 – 2002. Chief Technology Officer, Omware, Inc., Sebastopol, CA
- 1994 – 2000. Director of Product Management, Autodesk, Inc., San Rafael, CA
- 1987 -- 1994. Product Manager, ESRI, Redlands, CA
- 1985 – 1987. Software Engineer, Manatron Corp., Kalamazoo, MI

PUBLICATIONS (published software products – major releases)

- PRBO. Western Hummingbird Information Network – designer, engineer. (http://www.westernhummingbird.org/)
- PRBO. Sierra Nevada Management Indicator Species – designer, engineer. (http://data.prbo.org/partners/usfs/snmis/)
- PRBO. Modeling Bird Distribution Responses to Climate Change – designer, engineer. (http://data.prbo.org/cadc/tools/ccweb/index.php)
- PRBO. CADC Data Entry Applications for Biologists, Project Leaders and Analysts – framework architect, designer, engineer. (http://data.prbo.org/apps/public/index.php?page=home-page-for-cadc)
- PRBO. California Avian Data Center – designer, engineer (http://data.prbo.org/cadc2/)
- Intuit. Intuit Quicken Online v.1 – architect, system designer
- Intuit. Intuit QuickBooks Easy Estimate v. 1 & 2 – architect, lead system designer, UI design manager, engineered core calculation engine
- Omware/Intuit. Intuit MasterBuilder v. 7 – development manager, designed and engineered API, system components
- Omware. MentorPoint v. 2 – development manager, designed and engineered core system components
- Autodesk. Autodesk MapGuide v. 1 and 2 – product lead, all aspects of design and management
- Autodesk. Autodesk World v. 1 – product lead, all aspects of design and management
- Autodesk. AutoCAD Map v. 1 and 2 – functional, system and UI design
- ESRI, Arc/Info v. 6 and 7 – co-designed Librarian module, wrote user documentation
- Manatron. Manatron Maps – designed and engineered GBEDIT, GBDEED, GBPOLY

EARLIER CAREER ACTIVITIES

- Led many different software development releases at Intuit and Autodesk, frequently involved in the entire product lifecycle from concept and design through public availability and on-going maintenance releases.
- Extensive experience with a wide variety of development methodologies on different development platforms.
- Taken class work in Software Architecture through the Software Engineering Institute at Carnegie Mellon.

- Was on advisory committee to University of California at Berkeley Extension for development of a GIS program
- Represented Autodesk as a member of ANSI committee for development of SQL-93 Multimedia standards.
- Represented Autodesk as a member of Open GIS Consortium (OGC) during development of the first OpenGIS Specifications.
- Helped develop PRBO Informatics Division strategic plan as a volunteer.

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Education:
M.A., Geography; University of California Davis, 2002
B.S., Botany; University of California Davis, 1984

Positions:
July 2012 – Present; CA LCC Data Manager, Project Manager for the California Climate Commons
2004 – 2012; Research & Informatics Program Manager, Sonoma Ecology Center
2002 – 2004; Research Analyst, Sonoma State University
2000 – 2002; Project Manager for the California Information Node of the USGS National Biological Information Infrastructure (NBII). UC Davis, Information Center for the Environment
1994 – 2000; Technical Projects and Outreach Coordinator, California Resources Agency CERES Program (http://ceres.ca.gov)

Other Activities:
Founding member of North Bay Climate Adaptation Initiative (http://www.nbcai.com)
Co-chair, Science and Technology Working Group, NBCAI, 2009 – present
California Invasive Plant Council Board of Directors, 2002 – 2003
Cal-IPC Weed Mapping Committee, 2004 – 2012
Bay Area Early Detection Network Technical Advisory Committee, 2008 – present

Recent Projects:
The California Climate Commons. http://climate.calcommons.org
The San Francisco Bay Area Conservation Commons. http://sfcommons.org
Sonoma Valley Knowledge Base. http://knowledge.sonomacreek.net
Trotta, M., Sesser, B., DiPietro, D., Lawton, R. 2011. Sonoma Valley Groundwater Recharge Mapping Project Technical Report. http://knowledge.sonomacreek.net/groundwaterrecharge
Lawton, R., DiPietro, D., Young, A. 2010. A transferable protocol to identify and prioritize sites for watershed restoration under Clean Water Act Programs.
http://knowledge.sonomacreek.net/TMDL_Planning
Napa County, et. al. 2010. Technical and Final Report: Application and Findings of the North Bay- Delta Transect Watershed Assessment Framework (WAF), and Napa Watershed Report Card 2010. http://sfcommons.org/scorecards/waf/napa.
Sonoma Ecology Center, et. al. 2010. Sonoma Creek and Napa River Watershed Health Scorecards. http://sfcommons.org/scorecards/.

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Lorraine E. Flint, Ph.D.
Research Hydrologist
U.S. Geological Survey
Placer Hall, 6000 J Street
Sacramento, CA 95819

November 6, 2012

Dear Dr. Flint,

I'm writing to express my support for your proposed project "Networking the California Climate Commons with the USGS GeoData Portal".

The partnership and data networking system established by this project between the California Climate Commons and the USGS Geo Data Portal for the purpose of sharing and interpreting the next version of the Basin Characterization Model directly supports the work of the California Landscape Conservation Cooperative (CA LCC). The CA LCC is a science management partnership developed to provide science and data to resource managers to help inform their decision making. The California Climate Commons is one product of the CA LCC and we are seeking to create a platform that is meaningful to multiple users. The California LCC is interested sharing this pivotal dataset with our partners across our region.

The CA LCC is interested in seeing the USGS work with the Commons on open technologies for data sharing so that there may be solutions for data management that last into the future. The steps this project would take to establish and promote flexible, multi-purpose data servers, and the complementary services it would establish between the USGS and the Commons are valuable to the CA LCC and the National LCC network.

I highly recommend that this project be funded.

Sincerely,

Debra L Schlafmann
Coordinator
California LCC

Pepperwood
PRESERVE
Inspiring conservation through science

November 6, 2012

Lorraine E. Flint, Ph.D.
Research Hydrologist
U.S. Geological Survey
Placer Hall, 6000 J Street
Sacramento, CA 95819

Re: Proposal for CDI SSF Category: Data and Information Assets
"Networking the California Climate Commons with the USGS GeoData Portal"

Dear Dr. Flint,

I'm writing to express my support for your proposed project "Networking the California Climate Commons with the USGS GeoData Portal."

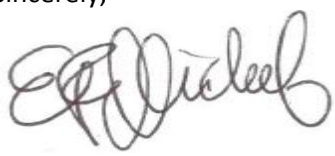
The partnership and data networking system established by this project between the California Climate Commons and the USGS Geo Data Portal for the purpose of sharing and interpreting the next version of the Basin Characterization Model directly supports the work of the Terrestrial Biodiversity Climate Change Cooperative, the research consortium focused on producing critical climate change research for the San Francisco Bay Area and California.

The TBC3 is interested in seeing this pivotal dataset made accessible not only across our own researchers but also to other research scientists and conservation managers. This project would develop a data distribution network that best supports the diverse and evolving uses for this important data, in a way that optimizes data management funding by reducing duplication of effort.

The analysis tools developed together with Stuart Weiss of TBC3 are an important product for supporting an understanding of the data across TBC3 researchers, and their communication of modeled climate change impacts to the conservation community. This fact that this would not be an end-point for data visualization but the demonstration of one use of an open system upon which others may build analysis and tools is exactly what we're looking for in a climate change data management system for California.

We support this project and recommend that it be funded.

Sincerely,



Lisa Micheli, Ph.D.
Executive Director, Pepperwood Foundation
Lead Coordinator, TBC3

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