

**U.S. Department of the Interior**  
**U.S. Geological Survey**  
**Southwest Climate Science Center**  
**FY 2012 Annual Science Work Plan**  
**Proposal Solicitation and Guidelines**

**GENERAL INFORMATION**

- Eligible Applicants:** Federal funds administered by the Southwest Climate Science Center (SWCSC) are available to investigators affiliated with SWCSC host institutions and with USGS science centers.
- Estimated Available Funds:** It is anticipated that at least \$1,000,000 will be available to fund new projects that support SWCSC Research Themes in Fiscal Year 2012.
- Project Duration:** Not to exceed 24 months from date of award
- SWCSC Contact:**
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**PROGRAM DESCRIPTION**

**Background**

The U.S. Department of the Interior (DOI) established the Southwest Climate Science Center (SWCSC or Center) in 2010 to address the challenges presented by climate change and variability in the Southwestern United States (<http://www.doi.gov/csc/southwest>). The Center's purpose is to provide scientific information, tools, and techniques that resource managers and other partners interested in land, water, wildlife, and cultural resources can use to anticipate, monitor, and adapt to a changing climate. The Center operates using advice and guidance from a Stakeholder Advisory Committee (SAC). The SAC is chaired by the U.S. Geological Survey (USGS) Regional Executive for the Pacific Southwest Area. The SWCSC also works closely with four Landscape Conservation Cooperatives located wholly or partially

within the SWCSC boundaries<sup>1</sup>.

Information needs and scientific priorities for the SWCSC will be addressed through the sequential implementation of Annual Science Work Plans and other activities designed to enhance, leverage, and coordinate the collective contribution of individual projects to natural resource management-relevant climate science.

This FY2012 Science Work Plan invites research project proposals associated with priority climate-related information needs for the Southwest. It provides instructions regarding the solicitation, review, and selection of those proposals. The SWCSC identified a set of Research Themes in consultation with, and taking into consideration input from, the following sources:

- Information needs from the SWCSC Stakeholder Advisory Committee (SAC);
- An analysis of climate- and climate-effects information needs conducted by the SWCSC;
- National Climate Change and Wildlife Science Center planning goals;
- Other DOI Climate Science Center research emphases; and
- Input from a science planning workshop involving participants from the SWCSC host institutions, USGS scientific leadership, and a Science Panel with representatives nominated by the SAC.

## **Research Themes**

Proposals for FY2012 SWCSC research funding must address one of the following Research Themes:

### **A.) Regional evaluation and clearinghouse for down-scaled Global Climate Models**

Impact and adaptation studies require climate projections at a scale that is relevant for management and decision-making. Efforts to develop climate projections utilize different methods, approaches, resolutions and time periods. There is need to provide guidance on what projections to use for different applications in both research and natural resources management.

Demand exists for interpretation of and guidance about existing downscaling simulation products for researchers and resource managers. Another need is for GCM downscaling in particular regions for specific applications. In terms of scientific approaches, anticipated products would share common attributes, including:

- Working closely with users (applied researchers, resource managers) to better understand and clarify variables, as well as the form and suitability of downscaling products;

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<sup>1</sup> California, Great Basin, Southern Rockies, and Desert; information about the LCCs is available at <http://www.fws.gov/science/shc/lcc.html>

- Providing guidance concerning which scenarios and which GCMs are available and may be useful;
- Offering feedback to users regarding what resolutions will be needed for particular applications, what resolutions are scientifically possible or defensible, what resolutions and products are available, and what level of effort is required to deliver and to use particular products;
- Evaluating downscaled model output regarding performance in simulating historical variability, differences between scenarios, downscaling techniques, and applications (e.g. hydrologic responses, ecological responses, etc);
- Comparing historical and projected epochs in the simulations, between models and emission scenarios through use of historical observational datasets;
- Estimating uncertainty (range with existing data);
- Producing downscaling within specific regions and applications, as informed by other CSCs, other research conducted by the SWCSC and its collaborators, and involving potentially increased resolution, additional variables, or a focus on climatic extremes.

## **B.) Climate-induced changes and coastal vulnerability**

Future sea-level rise, coupled with changes in storm intensity/frequency and freshwater runoff, may result in dramatic changes to coastal systems, affecting natural and built environments. Other drivers include climate-induced changes in water temperatures, salinity, chemistry (including acidification and nutrient loading), turbidity and circulation. A goal of the SWCSC is to create a state-of-the-art assessment of how the complexity of climate-induced changes will affect the California coastal zone. This goal will require research focused on the physical and biological processes behind these changes, and the integration of this knowledge into comprehensive vulnerability assessments designed to inform decision-making.

Current priorities include investigations of how climate-driven physical and biological processes will affect the coastal zone, as well as how these processes can be integrated into a useful range of climate change impacts and vulnerability assessments. Successful proposals will demonstrate that they are using state-of-the-art models (e.g., a collaborative SWCSC model archive/clearinghouse, see Research Theme A.), as well as data resources and tools that provide the best scientific guidance available. Anticipated research products would be broadly applicable to environments of the California Coast.

## **C.) Climate interaction with non-climate stressors**

Substantial uncertainty exists around the question of how climate change amplifies the effects of non-climate stressors on ecosystems. There is a significant need for resource managers to understand non-climate stressors (e.g., invasive species, land use change, wildfire, alterations to the Wildland-Urban-Interface, etc), their interactions with a changing climate, and the impacts of multiple stressors on ecosystems in the Southwest. How are projected climate changes in the Southwest (such as increased occurrence of drought, or increasing

temperatures) affecting the stressors themselves? How do those changed stressors affect ecosystems, including the feedback to climate at regional or landscape scale? How do these factors interact and what resource management options will enhance adaptation to multiple changing factors?

For example, projects could describe the cumulative effects of multiple stressors on one or more specified ecosystem components, functions and services in a probabilistic fashion. What species ranges and community compositions will change, what functions might be altered in the ecosystem, and what results will occur, such as migrations and other geographical shifts? Will there be significant threshold responses to multiple stressors? The primary users of the anticipated products are natural resource managers throughout the Southwest.

#### **D.) Response of species, populations, and ecosystems to climate change**

Syntheses and analyses are needed to address high priority outstanding questions regarding the responses of species, populations, and ecosystems to climate change. Areas of need include the following:

- Little is known about the magnitude and distribution of phenotypic plasticity and adaptive genetic variation in organisms that are a focus of management, potential responses of these attributes to climate change, and how such attributes and responses may affect probabilities of persistence. What management options are available for prospective adaptation strategies?
- Most current models addressing the response of species of management concern to climate change in the Southwest are restricted to the United States. In the future, resource managers will need information on the potential movement across the international border with Mexico of biota (e.g., species of conservation concern, invasive species) as well as related community- and ecosystem-level effects.
- Gaps between fine-resolution, field-derived data and coarser-resolution downscaled climate models need to be addressed. Spatial or temporal resolutions used to estimate and describe biotic processes may not apply at coarser scales. Accuracies and uncertainties are among the model output properties that should be evaluated, as are the scales at which relevant management decisions are based.

Such topics could be approached through the synthesis and analysis of existing data and models to produce state of the science reviews, identify critical data and modeling needs, and describe how they might be filled.

#### **E.) Response of hydrologic systems to climate variability and change**

With nearly all surface water fully allocated and increasing dependence on groundwater across the Southwest, climate change resulting in reduced surface-water runoff will have a direct effect on hydrologic systems. Major impacts include reduced water availability for public

supply, agriculture, industry, and aquatic and terrestrial ecosystems. In surface-water systems that are fully allocated, reduced runoff will result in more dependence on groundwater, with possible consequences of increased drawdown in aquifers, further depletion of surface water from groundwater pumping, and loss of groundwater-dependent vegetation. Water managers have looked to climate change projections from linked climate models, downscaling of GCMs, hydrology models, and planning models to support decision making at the appropriate temporal and spatial scales for the regions in question. Climate projections have been utilized in these studies, but better understanding of the relevance and applicability of the projection information is needed.

Rivers, aquifers, and associated riparian and wetland ecosystems are all in need of analyses and products that integrate climate, hydrologic, and ecosystem information to understand sensitivity to variation in precipitation, surface-water flow, and soil moisture. Surface-water and groundwater models can be integrated with climate inputs to evaluate adaptation options for water management, as well as those affecting interrelated habitats. Products must address dynamics of human water use and must be able to estimate changes in water availability for humans and ecosystems.

## **FUNDING AND ELIGIBILITY**

In Fiscal Year 2012, approximately \$1,000,000 in Federal funds will be administered by the SWCSC to support new projects funded through this solicitation and other priorities at the discretion of the SWCSC Director. The core funding for the SWCSC comes from the U.S. Department of the Interior through the U.S. Geological Survey (USGS). Funded projects must be completed within a maximum of 24 months. Award of funds will be contingent on fund availability. Budgets for projects awarded to USGS investigators must indicate how the FY12 funds will be expended no later than September 30, 2012. The allowance for carry-over of FY12 funds for USGS investigators is expected to be 3%.

Eligible applicants for this program are scientists affiliated with SWCSC host institutions, as well as USGS centers, field stations, units, and laboratories. Each proposal must have a Principal Investigator (PI) from an eligible entity. Parties from other organizations (Federal, state, tribal, or other) not listed here are encouraged to establish working partnerships with one of the eligible applicants to seek participation as part of a project headed by a SWCSC or USGS PI.

## **APPLICATION GUIDELINES**

**1. Submit Pre-proposal.** All parties responding to this solicitation must first submit a pre-proposal. Individual pre-proposals are sought under each of the Research Themes described above. The pre-proposal application template is available in Appendix A. **Pre-proposals will be accepted until April 6, 2012, 5:00 p.m. (PDT), without exceptions.** Pre-proposals must be

submitted via email to [dave\\_busch@usgs.gov](mailto:dave_busch@usgs.gov). Include **“SWCSC pre-proposal,” the Research Theme number, and last name of PI in subject line**. For ease of evaluation, all electronic submissions must be made available both in Word and PDF formats. Failure to follow these guidelines may result in the pre-proposal being removed from consideration.

**2. Evaluation of Pre-proposals.** The evaluation process will involve SWCSC Science Panelists as well as qualified associates as needed. Evaluators will be independent scientists who are not included in the proposed research team. Applicants may be contacted to provide additional or clarifying information. The following criteria will be used to evaluate pre-proposals, along with guidelines for preparation of the two page summary listed in the template in Appendix A.:

#### Relevance / Applicability to Management Needs

- Clearly demonstrates a connection to elements of the SWCSC Research Themes.
- Identifies relevance of project results to priority information needs of the SWCSC.
- Implements the shared science mission of the SWCSC across university and federal research agencies.

#### Knowledge Transfer

- Study design describes outreach components to disseminate research findings and information.
- Identifies human dimension of project topic (i.e., safety, health, social, economic, etc.).
- Identifies collaboration partners who will participate in the project.

#### Scientific Design

- Scientific soundness of overall methodological approach to the project.
- Addresses climate linkages of key human and ecosystem drivers.
- Project results have broad geographic application (regional and/or beyond).
- Describes desired outcomes and indicates the type of data to be used.

#### Leveraging & Capacity Building

- Leverages resources to carry out the proposed project.
- Builds upon existing work and capacity or complements related research underway in other climate science projects in the region.
- Provides opportunities for students and post-doctoral associates to participate.

**3. Request for Full Proposal.** Selected applicants will be invited to develop full proposals (including a statement of work, proposed deliverables, timeline, and an evaluation plan), plus a detailed budget and a Data Management Plan. Because of the federal source of this funding, all proposals must comply with USGS requirements regarding data management, as specified in the USGS Data Sharing Policy found at <https://nccwsc.usgs.gov/?q=node/15>, under the sections “Data Sharing Policy” and “Data Management Plan Requirements.” Projects funded by the SWCSC will require periodic progress reporting during the project, a final project closeout report, and clearly identified final product(s) for publication or other

dissemination. The SWCSC Director reserves the right to interview key participants, negotiate terms and details, and provide input into the final proposal. The due date for full proposals will be approximately 2 weeks after the SWCSC requests them from the applicants. An invitation to submit a full proposal does not necessarily mean that the project will be funded.

**4. Full Proposal Review and Award:** The SWCSC will review the full proposals and notify successful applicants approximately 2 weeks after full proposals are submitted. Final discretion on funding decisions for specific projects remains with the SWCSC Director.

#### **Projected Timeline**

- **April 6, 2012** – Pre-proposals are due from interested parties.
- **April 23, 2012** – Finalize review of pre-proposals and selection of teams for submitting full proposals.
- **May 7, 2012** – Full proposals due to the SWCSC (exact date to be confirmed at time of invitation for a full proposal).
- **May 19, 2012** – Awards announced.

## APPENDIX A – Statement of Interest (SOI) Application Template

### PROJECT ADMINISTRATIVE INFORMATION (cover page)

- Research Theme Number and Project title
- Short description (generally one sentence)
- Name of Lead Agency/Institution/Organization requesting funding
- Project Lead Contact or Principal Investigator
- Mailing Address, City, State, Zip
- Telephone, Fax, E-mail
- Estimated project cost and duration
- Total funding request
- Funding contributions from partners associated with the project proposal

### PROJECT SUMMARY (two pages)

Please provide a brief narrative summary of the project in **no more than 2 pages**. Be sure to include all necessary information to address the proposal selection criteria, including the following:

- Specific research question/s to be addressed and its/their management relevance.
- Significance of project in addressing SWCSC Research Theme.
- Relevance of anticipated project results to addressing fish, wildlife, or habitat issues, and to aspects of human significance (i.e., health, social, economic, etc.).
- Brief description of overall methodological approach to the project and its anticipated contribution to the advancement of climate and climate-effects science.
- The geographic application area for the project.
- Brief description of previous work or existing capacity.
- How the project complements related climate science projects in the region.
- Description of any collaborative partnerships involved in the project.
- List of additional investigators and institutions involved in the project.
- Opportunities provided to early-career researchers and students.
- Anticipated deliverables, data types, and data management approach.
- Outreach opportunities to engage targeted users in the study design, and to disseminate research findings and information.