Climate Preparedness in Colorado: A Catalog for the Next Governor

Statement of Work

Introduction

In November of 2007, Governor Ritter released the "Colorado Climate Action Plan: A strategy to address Global Warming".[1] The CCAP outlined three key strategies for the state government to address the climate challenge: (1) enact bridge strategies to reduce greenhouse gas emissions immediately, (2) provide leadership to ensure that long term strategies are developed and implemented, and (3) prepare the state to adapt to those climate changes which cannot be avoided.

In the intervening 30 months since the release of the report much has transpired on all three goals. This report will address the state's progress towards meeting CCAP goal 3: preparing the state to adapt to unavoidable climate changes. The primary purpose of this effort will be to set the stage for the next governor to continue to plan for climate variability and change by providing a catalog of climate vulnerabilities and current activities, personnel, products, and projects from Colorado and other applicable entities along with policy relevant, but not prescriptive, suggestions for future actions.

Climate, in the context of this new effort, will include both climate variability and climate change. Planning for climate variability has been pursued for many years by climate-vulnerable sectors. Planning for climate change, however, is a new activity and it is particularly difficult because some of the future environmental impacts are unknown and because minimizing future societal impacts will involve understanding the complicated interactions between sectors such as water and agriculture. Climate change in many cases will be experienced through new forms of climate variability. By combining climate variability with climate change into one topical area, "climate preparedness", this report will overcome the somewhat artificial distinction between the two timescales and at least some of the current difficulties of planning for climate change.

The effort will cover five key sectors: (1) water, (2) agriculture, (3) wildlife, ecosystems and forestry, (4) climate-sensitive recreation and tourism, and (5) energy. It will also consider the interactions between sectors; for example, water and energy are linked and decisions in one sector (e.g., convert power plants to natural gas) can affect the other sector (e.g., consume less water). This project will accomplish its goals through: (1) a literature search, (2) structured interviews with key decision makers and other personnel, and (3) the creation of a database of climate response activities underway, planned and/or desired in Colorado (supplemented by selected materials from other locations). A final report, "***Climate Preparedness in Colorado***" summarizing all of these efforts will be prepared by the University of Colorado, with assistance from the State, by January 10, 2011.

[1] http://www.cdphe.state.co.us/climate/climateactionplan.html

Document Overview

This document presents a proposed statement of work for the ***Climate Preparedness in Colorado*** project. In addition to the introduction, it describes the four tasks and provides information on personnel, timelines and budget.

Task 1: Literature Search

Overview

This task will build on previous work by Western Water Assessment to collect climate adaptation websites, plans, guidebooks[2], and relevant societal impacts documents, from the federal government[3], states, municipalities, NGOs and others. Examples would include adaptation planning documents from Chicago[4], New York City[5], states of Utah, New Mexico and California, the Water Utility Climate Alliance[6], the Water Research Foundation, ICLEI[7], and many others. Compilations of adaptation efforts from the Pew Center and the Center for Climate Strategies will be included. Science impacts and adaptation literature will also be canvassed including IPCC documents[8], U.S. Global Change Research Program synthesis and assessment documents, and documents from nearby states including the substantial work done by the state of California. Literature deemed worthy will be added to the database and wiki created in Task 2.

Purpose

The purpose of this task is threefold: (1) provide content for the wiki/database created in Task 2, (2) provide information to guide the interviews in Task 3, and (3) inform the report to be created in Task 4 including potential adaptation strategies already being utilized by other entities.

Resources

Personnel: Bobbie Klein, Graduate Research Assistant, Brad Udall, Joel Smith
Budget: $34,000 Total, CWCB $10,000
Timeline: Begin immediately, finish by July 30, 2010

CWCB Justification: Of the total task, CWCB's portion is about 30%. A prorated portion of the task budget would ascribe 20% to CWCB alone because water is one the five selected sectors (water; agriculture; wildlife, ecosystems and forestry; recreation and tourism; and energy). However, water-oriented literature makes up a large portion of the existing impacts and adaptation studies which will be surveyed for this task. This effort will look at documents produced by the state of California on future

[2] See http://www.cses.washington.edu/db/pdf/snoveretalgb574.pdf
[3] See http://www.globalchange.gov/publications/reports/scientific-assessments/us-impacts
[4] See http://www.chicagoclimateaction.org/
[5] See http://www.nyc.gov/html/planyc2030/html/plan/climate.shtml
[6] See http://www.wucaonline.org/assets/pdf/actions_whitepaper_012110.pdf and http://www.wucaonline.org/assets/pdf/actions_whitepaper_120909.pdf
[7] See http://www.iclei.org/index.php?id=10832
[8] For example, the IPPC Special report on Water would be referenced as well as the appropriate chapters in Working Group 2 on adaptation.

impacts to water supply, New York City's Department of Environmental Protection water impacts, the Water Utility Climate Alliance and the Water Research Foundation among many others. IPCC documents to be surveyed include the IPCC Special Report on Water and water-oriented chapters in Working Group 2. Hence, 30% of this task has been charged to CWCB.

Task 2: Database and Wiki Creation

Overview

This task will create a web-based searchable database and wiki containing the material gathered in Task 1. A web-interface will allow for online data input into both the database and the wiki by approved people.

The database will contain four key tables populated as follows. The "organizations" table will list organizations actively involved in climate adaptation and the key contacts in those organizations. Organizations would include State of Colorado departments, counties, cities, University groups, federal agencies, NGOs and entities like the Western Governors' Association[9]. The "people" table will include key players in federal and state government, municipalities, as well as NGOs and researchers. The "products" table would include websites, documents, major meetings and other relevant outputs. This table would include, for example, material, including URLs, from the 2008 Governor's Conference on Managing Drought and Climate Risk, the CWCBs Colorado River Water Availability study, and recent climate studies in Aspen and Boulder. The "projects" table would include descriptions of large scale adaptation efforts and programs such as the US Forest Service and Department of Interior climate change programs, the Joint Front Range Vulnerability Study (this ongoing effort is much more the original effort to quantify flow changes for Front Range water providers), the Western Water Assessment, and relevant adaptation activities of the state. The four tables will be linked in logical fashion; for example, projects will contain links to organizations, people and products, and the products table will link to the organizations and people table.

Wikis are relatively new (1995) free-form databases that are edited using a web browser. These databases can be searched by non-registered users. Initially we will populate the wiki with free-form information in addition to likely providing another easy-to-access window into the fixed-field database. The wiki would allow anyone in Colorado who wanted to understand climate preparedness in the state search on all activities. (Such searches could also be done on the database, but the wiki will present a more user-friendly interface.) In the long run, registered users will be allowed to edit or add new content . For example, users who have an entry on the "people" table could add new papers, talks, pictures, diagrams, comments, etc. to their entry, as well as highlight, and comment on, useful elements of the various climate adaptation products.

[9] http://www.westgov.org/index.php?option=com_content&view=article&id=128&Itemid=62 and http://www.ecy.wa.gov/climatechange/docs/ipa_wgaletter.pdf

Prior to constructing the database and wiki, we will devise a database schema and wiki structure. Sample database fields are shown below.

Sample Database Fields

Organization Table	People Table	Products Table	Projects Table
Contact Information	Name	Name	Name
Key People	Title	Type of product (paper, website, talk, etc)	Link to people table
Expertise	Organization	URL	Link to organization table
Concerns	Email	Keywords	Link to products table
Wiki Link	Phone	Link to people table	URL to project info
	Mailing Address	Sector	Other URLs
	Free-form information	Wiki link	Purpose
	Keywords		Type of effort
	Expertise		Funder
	Sector		Funding amount
	Link to products, projects, organizations tables		Sector
			Wiki link

Purpose

The purpose of this task is to provide a searchable compilation of notable organizations, people, products and projects which are actively engaged in climate adaptation work in the state or are relevant to state adaptation efforts. The wiki and database will be two of three deliverables from this effort. They, along with the report in Task 4, will provide the next governor and staff with a comprehensive catalog of climate adaptation activities.

Resources

Personnel: Evan Pugh, Brad Udall, Bobbie Klein
Budget: 39,000, CWCB $5000
Timeline: Begin immediately, database structure established by June 30, fully populated by August 15. Bug fix, features added over duration of project.

CWCB Justification: CWCB's portion of this task is approximately 12% of the total budget. A prorated portion of the budget would ascribe 20% to water alone based on the five selected sectors. We have elected to ascribe less than 20% of the budget in this task to CWCB because of the general nature of the task.

Task 3: Structured Interviews

Overview

Structured interviews and follow-on discussions with decision makers and other relevant personnel are the core part of this effort. The structured interviews will allow the identification of societal impacts and vulnerabilities by the interviewees, ongoing preparedness efforts by the state and others, identification of personnel active in such efforts, and other critical information necessary to create the final report and populate the database and wiki.

We will conduct up to five – but more likely two or three - individual and group interviews, per sector. An interview plan will be prepared for each sector before this task will commence. The plan will identify by sector the target interviewees and a proposed interviewer team. The need to provide interviewee confidentiality in each meeting will be considered as part of the plan. The interview plan will be prepared in conjunction with the state, the University of Colorado, and key outsiders to make sure that the right mix of interviewers and interviewees is present in each meeting. For example, interviewers for each interview would likely include the project manager (Klein), a climate science expert (Udall), a social science expert (Travis) and sectoral experts. To increase consistency from meeting to meeting, to the extent possible, the interview team will remain constant with the exception of the sectoral expert. The groups to be interviewed will be identified by the state in consultation with the project team. Each interview group could include several people from one state entity, or people from different state entities. Consideration should be given to including participants who are outside the normal high-level discussions about climate but may have valuable insights. Meetings with NGOs and for-profit entities might be included to the extent desired by the state. We anticipate most interviews will be conducted in person, although some may take place on the phone. The interviews will be recorded for later transcription. Follow-up phone calls, emails and other forms of communication may be necessary to obtain additional information or clarification.

Prior to each interview the project team will prepare two documents, a set of questions, and a brief overview of the known climate-related science, environmental and societal impacts associated with the sector. The set of questions will be provided ahead of time so that the interviewees can be adequately prepared, including inviting additional people to the meeting if necessary. Sample questions are provided below. A consistent set of questions will allow post-interview comparison from sector to sector. The science, environmental, and societal impacts summary will provide basic information on the known impacts of climate on the sector. We expect this document to be prepared from documents such as the U.S. Global Climate Change Impacts in the United States report produced in 2009[10]. This overview will provide critical background for an informed discussion of the societal impacts and vulnerabilities during the interview.

[10] See http://www.globalchange.gov/publications/reports/scientific-assessments/us-impacts

Pilot Interviews

A series of two or three pilot interviews will precede the structured interviews. The purpose of the pilot interviews is to test the interview questions and identify any issues that might arise with the interview plan. Pilot Interviewees will include members of the group of state personnel who are advising the University of Colorado team, specifically: Veva DeHeza, Taryn Hutchins-Cabibi, and Jennifer Gimbel, CWCB; Jim Miller, Department of Agriculture; Tom Schreiner, Division of Wildlife; Seth Portner, Governor's Energy Office; Alice Madden, Governor's Climate Advisor, and Ginny Brannon, Dave Akers, Colorado Department of Health and the Environment. Pilot interviews will cover at least two sectors, likely water and energy. Final interviewees will be provided by the state advisory team in consultation with the project team.

Note: Pursuant to University of Colorado policy, all research involving human participants that is conducted by UCB faculty, staff or students must receive some level of review by the Institutional Review Board (IRB). The team will seek the relevant approvals before commencing interviews.

Sample Interview Questions

Questions to be asked of all interview subjects might include:

1. What climate-related stresses affect your decision making?
2. What non-climate related stresses affect your decision making?
3. How you noted any climate changes in your professional area of concern over the course of your career, or in recent years?
4. What are your top-three concerns about both climate and non-climate vulnerabilities for your sector?
5. Who are the key players in your organization who deal with climate preparedness?
6. What key organizations do you interact with to handle climate preparedness?
7. What basic questions need to be asked before we can begin adaptation planning? For example, will climate-stresses be overwhelmed by growth stresses? What solutions are and are not possible?
8. What are known climate-related impacts and vulnerabilities for the sector?
9. What climate variability and change adaptation actions are..
    a. Underway?
    b. Completed?
    c. Planned?
    d. None of the above, but desirable?

10. What existing planning documents, either from your organization or others, are important for climate preparedness?

11. What existing laws, federal and state, aid or hinder climate preparedness by your organization?

12. How would these regulations need to be adjusted?

13. What information needs do you have to make decisions with respect to...

    a. Monitoring?
    b. Data?
    c. Science?
    d. Research?
    e. Personnel?
    f. Other Resources, e.g., GIS?

14. Are you aware of any cross-sectoral impacts that would affect your climate preparedness? For example, what changes, either from climate or other major stresses, e.g., growth, in another sector affect your climate preparedness decision making either positively or negatively?

15. Sectoral Questions. For each sector we will ask a series of focused questions. For example, we will provide a list of measures that have been suggested for coping with climate variability and change in a given sector, and ask which of the measures their agency has adopted/is thinking of adopting/has considered but rejected? What are the pros and cons of each measure for adapting to climate variation and change? What is considered a 'good' result and what is considered an 'unacceptable' out come?

Purpose

The purpose of these interviews is to: (1) provide additional information for the database and wiki, (2) identify impacts and vulnerabilities in the sectors, (3) provide information that will form the basis of the final report for the new governor.

Resources

Personnel: Bobbie Klein, Eric Gordon, Bill Travis, Brad Udall, Graduate Research Assistant, others as needed
Budget: $35,000, CWCB $10,000
Timeline: Begin Immediately, finish by November 1

CWCB Justification: Of the total task, CWCB's portion is about 30%. A prorated portion of the budget would ascribe 20% to water alone based on the five selected sectors. We have elected to ascribe more than 20% of the budget to CWCB because our interviews for Agriculture, Recreation and Tourism, and Energy will also heavily discuss water considerations. In the case of agriculture, water is a primary consideration. In the case of recreation and tourism sector, water has a strong connection to rafting, fishing, and skiing, three critical recreation and tourism activities in the state. In the case of the energy sector, water is required for many new sources of energy, and the energy required for moving and treating water will be an important part of the interviews.

Task 4: Summary Report

Overview

The report will be the most important deliverable associated with the effort. It will summarize the entire effort including key findings from the literature search and interviews. The report will feature an opening letter from the governor, an executive summary, an overview chapter on the entire project, a chapter describing the database and wiki, chapters on key findings from the water, agriculture, wildlife/ecosystems/forestry, recreation/tourism, and energy sectors, a cross-sectoral chapter detailing identified issues, and finally policy relevant but not prescriptive conclusions. The focus of this report is reporting impacts and vulnerabilities that have been identified by our interview subjects , as well as adaptation strategies identified in the interviews and the literature search. The report will also contain an appendix with more detailed information on the database/wiki, a list of interviews and contributors, and references, among other information. In order to save time in a tight schedule at a difficult time of year (December), this report will be formatted internally by WWA and supplied as a PDF to the state. The report will be issued in Draft by December 1, and there will be a 10-day review period for all interested parties. The final report will be completed by January 10, 2011.

Purpose

This is one of three key deliverables from this project. The other two deliverables are the database and wiki.

Resources

Personnel:	Bobbie Klein, Eric Gordon, Joel Smith, Brad Udall, Bill Travis
Budget:	Total: $63,000, CWCB $15,000
Draft:	Draft by December 1
Review Period:	December 1 to December 10
Final:	Final by January 10, 2011. Work will commence prior to finishing all the interviews, depending on interview timing in each sector.

CWCB Justification: CWCB's portion of this task is approximately 25% of the total funding. On a prorated basis, the water sector alone is 20% of the report given that there are five sectors total. The additional 5% charged to this task will be spent describing water impacts in the agriculture, recreation and tourism, and energy sectors.

Overall Timeline

Literature Search:	Completed by July 30
Database Creation:	Working Version June 30, bugfix and additions to December 1
Database Populated:	August 15 for initial effort, work to continue to December 1
Pilot interviews:	Completed by June 30
Interviews:	Completed by November 1
Draft Report:	Completed by December 1

Reviews Completed:	Completed by December 10
Final Report:	January 10

Personnel and Roles

Bobbie Klein:	Project Manager, University of Colorado and WWA
Eric Gordon:	Researcher, Writer, Interviewer
Kristen Averyt:	Researcher, Interviewer
Evan Pugh:	Database Creation, University of Colorado
Bill Travis:	Researcher, Interviewer, Writer, University of Colorado, Center for Science Technology Policy Research
Brad Udall:	Overall Direction, Interviewer, University of Colorado and WWA
Joel Smith:	Stratus Consulting, Literature Search, Summary Report Review
Graduate Research Assistant:	Lit Search, Database Populate
Others:	To be identified as necessary

State Convening Team

Ginny Brannon	Project Lead, State of Colorado and CDPHE
Seth Portner	Lead, Governor's Energy Office
Jim Miller	Lead, Colorado Department of Agriculture
Veva Deheza	Lead, Colorado Water Conservation Board
Tom Shriner	Lead, Colorado Division of Wildlife
Alice Madden	Governor's Climate Advisor
Dave Akers	CDPHE
Taryn Hutchins-Cabibi	CWCB

Overall Budget

Literature Search:	$34,000
Database and Wiki Creation:	$39,000
Structured Interviews:	$35,000
Report Creation:	$63,000
Total:	$171,000

Budget Breakdown

Pursuant to discussions with the state convening group, $40,000 of the budget is allocated to the Colorado Water Conservation Board as follows:

Literature Search:	$10,000
Database and Wiki Creation:	$5,000
Structured Interviews:	$10,000
Report Creation:	$15,000
Total:	$40,000

$40,000 represents less than 25% of the total project costs. Given that water connects all of the sectors to be studied, we anticipate that at least 25% and likely far more of the effort will be expended on water related matters.

Pursuant to discussions with the state convening group, $10,000 of the budget is allocated to the Colorado Department of Agriculture.

The remaining $121,000 is allocated to the other funding partners as they see fit:

Literature Search:	$19,000
Database and Wiki Creation:	$29,000
Structured Interviews:	$25,000
Report Creation:	$48,000
Total:	$121,000