

Tahoe Basin Climate Action Database Guidance Memo

US Army Corps of Engineers Climate Change Project

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Purpose & Use

The magnitude and scope of anticipated climate change adaptation and mitigation needs are greater than the financial and human resources immediately available to support implementation. Thus, public and private entities must prioritize available resources, and coordinate efforts to gain additional resources.

The Tahoe Basin Climate Change Action Database (Climate Action Database) supports consistent, efficient and transparent prioritization of actions to improve the resiliency of systems vulnerable to climate change and achieve green house gas (GHG) emissions reductions targets. Specifically, the Climate Action Database enables the diverse set of public and private entities involved in planning and implementing climate actions to 1) efficiently catalog and share action ideas, 2) evaluate and prioritize actions to fund, and 3) identify actions that are in-progress or completed. Priority action ideas are included in the Tahoe Basin Sustainability Action Plan (Sustainability Action Plan) developed through the process described in the Tahoe Basin Climate Change Planning Framework (Climate Planning Framework). As of January, 2011 the first Sustainability Action Plan has not yet been developed however it is funded through a recently awarded grant funded by California's Strategic Growth Council.

The ultimate vision for the Climate Action Database is to evaluate and store all types of climate change adaptation and mitigation actions, including capital improvement projects, policies, programs, research, science synthesis, data management and monitoring. As of January 25, 2011 policy actions with climate change adaptation and/or mitigation objectives are supported, and research and monitoring actions with climate change adaptation objectives only are supported, as scoped in the US ACE Global Climate Change Adaptation Strategy contract. Further enhancing the Climate Action Database to evaluate capital improvement projects is a logical next step.

USERS & ROLES

The Tahoe Basin Climate Collaborative (Climate Collaborative) is a proposed group to represent many agencies and stakeholders, and to be the managing body for coordinating climate change actions in the Tahoe Basin, as outlined in the Climate Planning Framework. The Climate Collaborative is expected to update the Climate Action Database and other decision-support tools through the continual improvement components defined in the Climate Planning Framework.

Implementing entities, such as the United States Forest Service, California Tahoe Conservancy, local jurisdictions and private developers identify potential actions, evaluate actions according to the criteria described in this document, and implement actions to increase system resiliency to climate change impacts and reduce GHG emissions in the Tahoe Basin. Defined roles for each user group are defined below.

IMPLEMENTING ENTITY STAFF

Implementing entity staff includes project managers, policy-makers and researchers, who use the Climate Action Database to efficiently and consistently evaluate and share new action ideas throughout the year. Implementing entity staff also uses the Climate Action Database to catalog actions already implemented.

IMPLEMENTING ENTITY MANAGEMENT

Implementing entity management includes executives, program managers and private investors, who use the Climate Action Database to quickly evaluate actions to prioritize the allocation of existing resources and to coordinate efforts to secure additional financial and human resources.

CLIMATE COLLABORATIVE

The Climate Collaborative uses the Climate Action Database to select potential actions to include in the Sustainability Plan. Further, the Climate Collaborative identifies gaps in action ideas submitted which need to be filled to address Tahoe Basin climate change adaptation and mitigation needs.

LOCATION & OWNERSHIP

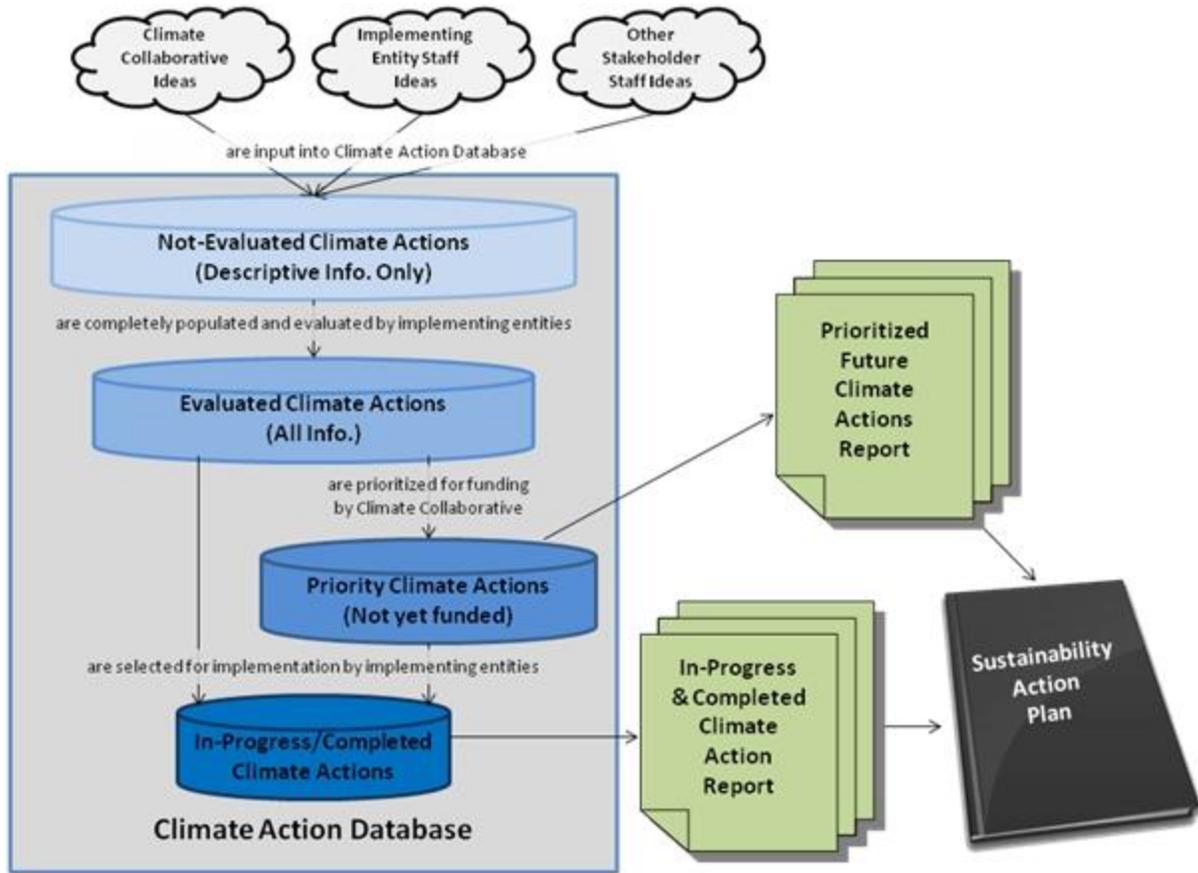
As of January 2011, the Climate Action Database is an Excel spreadsheet. To make best use of the Climate Action Database it should become an online database platform that ensures data integrity and provides universal access to all action ideas. A Tahoe Basin Climate Change Resource Center website (proposed as of June 2010) is envisioned to host the Climate Action Database.

The Climate Collaborative is responsible for ensuring implementing entity staff and management have reliable access to the Climate Action Database. As outlined in the Climate Planning Framework, the fields and weighting should be evaluated annually and improved as decided by the Climate Collaborative.

PROCESS

Action ideas are input into the Climate Action Database continuously throughout the year so that a comprehensive, real-time list of potential actions can quickly be evaluated by decision-makers at any time. At a minimum the descriptive fields are required to submit an action idea. In order for an action to be prioritized all of the evaluation criteria will require ratings and supporting descriptions. Actions already funded are input into the Climate Action Database and evaluation criteria fields are not required.

Implementing entity staff and management can download potential actions in the Climate Action Database at their convenience. The download is an Excel file containing all potential actions submitted to date prioritized by the Priority Ranking. The Excel platform will allow users to sort, organize and evaluate potential actions in the format that fits their process best. The Climate Collaborative will download actions for the Sustainability Action Plan and to identify gaps in potential actions submitted.



Climate Action Database Field Definitions

The Climate Action Database contains descriptive fields and evaluation criteria fields. The descriptive fields are intended to identify the unique elements of each an action, map proposed actions with other action tracking systems (e.g. EIP database), and capture the basic information managers need to understand the relevance of the action. The evaluation criteria fields capture numeric ratings and associated supporting statements to assist in the comparison and prioritization of actions.

The evaluation criteria fields ensure those submitting proposed actions provide relative and consistent ratings for several evaluation criteria relevant to climate change adaptation and mitigation actions. These ratings allow for a systematic approach to evaluate and prioritize proposed actions. For criteria that are defined by a 1 to 5 ranking, a 5 is always the most desirable and 1 is always the least desirable. For most fields guidelines are provided for 1, 3 and 5, although 2 and 4 should be used if the rating falls in between the defined criteria for a particular field.

Characteristics of different action types (e.g. policy or research) are different enough to require separate criteria for effectively prioritizing them relative to climate change issues. There are general descriptive fields that are consistent across all action types, while there are additional descriptive fields and specific evaluation criteria that are unique to each action types. Regardless of the number of evaluation criteria for each action type, the climate action database produces standard priority rankings (1 to 5) for each type of action.

Table 1 summarizes the general descriptive fields as well as the action type specific descriptive fields. Tables 2, 3 and 4 summarize of the additional descriptive fields and evaluation criteria fields for policy actions, research actions and monitoring actions, respectively. They are intended for quick reference for individuals who have become familiar with the more detailed descriptions in the body of this section.

FIELD NAME	FIELD TYPE	FIELD DESCRIPTION
General		
Title	Description	Brief, unique descriptive identifier of the action (formal name if available)
Description	Description	Description of the action (50-200 words)
Contact Information	Description	Contact's name, employer, title, e-mail address and phone number
Issue Type	List	Options: Adaptation, Mitigation or Adaptation & Mitigation (both Adaptation and Mitigation)
Action Type	List	Options: Physical Project, Policy, Program, or (Research, Monitoring, Synthesis or Data Management)
Goal	Description	Description of what the action is expected to accomplish (1-2 sentences)
Objectives	Description	Description of expected, quantifiable benefits or emission reductions from proposed action (3 to 5)
Planning Focus Area	List	Choose all that apply: "Watersheds, Habitat, and Water Quality", "Forest Management", "Air Quality and Transportation", "Recreation and Scenic Resources", "Public Health", "Energy Infrastructure", "Water Supply"
Planning Subarea	List	Choose all that apply: "Stormwater Management", "Watershed Management", "Threatened, Endangered, and Sensitive Species", "Invasive Species", "Forest Ecosystem Health and Hazardous Fuels Reduction", "Air Quality and Transportation", "Recreation", "Scenic", "Education", "Housing", "Community Skills", "Public Safety", "Energy Generation", "Energy Efficiency", "Water Storage", "Water Efficiency"
Likely Executing Entity	List	Choose all that apply: "CSLT", "CTC", "TRPA", "USFS", etc.
Agency Plan Relationship	List	Choose all that apply: "TRPA Regional Plan", "USFS Tahoe Forest Plan", "CSLT Sustainability Commission Work Plan", "Lake Tahoe TMDL", etc.
Geographic Area	Description	Description of geographic or political boundaries and scale directly related to the action affects
System(s) Addressed	List	Choose all that apply: "Alpine", "Atmosphere", "Built Environment", "Forest", "Lake Tahoe" or "SEZ/Riparian"
Status	List	Options: Not-Evaluated, Evaluated, In Progress, Completed, Terminated
Duration	Rating	Options: 5) 1 year, 3) 3 years, 1) 5 years
Research and Monitoring		
Data Gap Addressed	Description	Specific data need to be filled by the research or monitoring
Benefitting Entities	List	List of the benefiting agencies, stakeholders, and organizations

Table 1: Climate Action Database general and action type specific descriptive fields with associated types and descriptions

FIELD NAME	FIELD CRITERIA
Adaptation - Magnitude of Benefit	5) Substantial increase in adaptive capacity of a system or at least two systems benefit 3) Material increase in adaptive capacity of a system or at least two systems benefit 1) No material increase in adaptive capacity of a system or may decrease adaptive capacity
Mitigation - Magnitude of Benefit	5) > 5% of basin-wide GHG reduction target, 3) 3%, 1) < 1%
Adaptation -System Vulnerability	5) The action will reduce the vulnerability of system(s) addressed that are in ongoing emergency conditions 3) The action will reduce the vulnerability of system(s) addressed that are a medium potential for emergency conditions 1) The action will reduce the vulnerability of system(s) addressed that are a low likelihood for emergency conditions
Mitigation - Cost of Abatement	5) < \$5/Metric ton of CO2e, 3) \$25/Metric ton of CO2e, 1) \$100/Metric ton of CO2e
Implementation Risk	5) Implementation is unlikely to yield negative environmental/social/econ impacts and/or there are no potential significant consequences 3) Implementation is moderately likely to yield negative environmental /social/econ impacts but consequences are unlikely significant 1) Implementation is likely to yield negative environmental /social/econ impacts and consequences are likely significant
Risk of Not Implementing	5) Not implementing will likely result in negative environmental /social/economic impacts and negative consequences are likely significant 3) Not implementing will possibly result in negative environmental /social/economic impacts but negative consequences are unlikely significant 1) Not implementing will unlikely result in negative environmental /social/economic impacts and/or there are no potential significant consequences
Basin Climate Strategies & Objectives	5) Substantially contributes to achieving 2 or more Tahoe Basin CC strategies or objectives 3) Substantially contributes to achieving 1 Tahoe Basin CC strategy or objective, or moderately contributes to achieving 2 or more 1) Does not contribute to achieving a specific Tahoe Basin CC strategy or objective
Agency/Legal Mandate	5) Priority mandate to multiple agencies, results & status must be reported, and severe ramifications expected if not implemented 3) Mandate to single agency, or not necessary to report results & status, and modest ramifications expected if not implemented 1) No mandate, not necessary to report results & status, and no ramifications expected if not implemented
Unique Opportunities	5) Current factors increase expected results and reduce costs, or significantly increase results, or significantly reduce costs 3) Current factors increase expected results moderately or reduce costs moderately 1) Current factors do not influence expected results or costs
Non-Climate Objectives & Benefits	5) Benefits are significant regardless of CC benefits 3) Multiple non-CC objectives are supported or one non-CC objective is supported strongly 1) No identified non-CC benefits
Potential Barriers	5) No identified barriers that could impede implementation or increase costs 3) Identified barriers may increase costs and delay implementation but probability is low that barriers would stop action 1) Identified barriers can easily block implementation or increase costs beyond an acceptable level
Public Concern	5) Broad public interest in objectives, status of objectives are reported regularly, and objectives are expected to be addressed 3) Moderate public interest in objectives, status of objectives would be valued, and objectives are desired to be addressed 1) No public interest in objectives, status of objectives would not be noticed, and no desire to address objectives
Ability to Fund	5) Ample available funding 3) Potentially available funding depending on competing priorities 1) No available funding and unlikely to become available
Cost - Planning & Implementation	5) < \$20K, 4) \$20K - \$70K, 3) \$70K - \$250K, 2) \$250K - \$1M, 1) > \$1M (initial)
Cost – Operational	5) < \$2K, 4) \$2K - \$10K, 3) \$10K - \$25K, 2) \$25K - \$100K, 1) > \$100K (annually)
Cost - Affected Parties	5) < \$50K, 4) \$50K - \$200K, 3) \$200K - \$500K, 2) \$500K - \$2M, 1) > \$2M (annually)

Table 2: Climate Action Database evaluation criteria fields with criteria for policy actions

FIELD NAME	FIELD CRITERIA
System Vulnerability	5) System components addressed are highly vulnerable to projected climate change impacts 3) System components addressed are moderately vulnerable to projected climate change impacts 1) System components addressed are minimally vulnerable to projected climate change impacts
Management Relevance	5) The research will produce critical knowledge that directly impacts a priority issue for 3 or more benefitting entities 3) The research is likely to produce knowledge that has a) direct impact on priority issue for 2 benefitting entities, or b) indirect impact on a priority issue for 3 or more benefitting entities 1) The research will produce knowledge that indirectly impacts non-priority issues for 1 or less benefitting entities
Modeling Value	5) The research will produce knowledge identified by scientists as critical for improving models of regional climate change or regional climate change impacts 3) The research will produce knowledge that will indirectly benefit regional climate modeling studies but does not fill a critical knowledge need identified by scientists 1) The research will not inform regional climate modeling studies
Unique Opportunities	5) The research is strongly dependent on events or conditions which are unlikely to occur in the next 30 years 3) The research is strongly dependent on events or conditions which are unlikely to occur in the next 10 years 1) The research is not particularly dependent on the occurrence of unique events or conditions
Outcome Usability	5) The research will result in peer-reviewed publications and products suitable for personnel without extensive expertise in the subject matter or low time resources to allocate to understanding outcomes and results 3) The research will result in either products suitable for personnel with no expertise in the subject or low time resources to allocate to understanding outcomes and results; or it will result in peer-reviewed publications 1) The research will not result in peer reviewed publications or products suitable for personnel without extensive expertise in the subject matter or low time resources to allocate to understanding outcomes and results
Cost	5) The total cost to complete the research is less than \$20,000 4) The total coast to complete the research is between \$20,000 and \$70,000 3) The total cost to complete the research is between \$50,000 and \$250,000 2) The estimate to complete the research is between \$250,000 and \$1,000,000 1) The estimate to complete the research is greater than \$1,000,000

Table 3: Climate Action Database evaluation criteria fields with criteria for research actions

FIELD NAME	FIELD CRITERIA
Climate Sensitivity	5) Published measurements and modeling studies both indicate that the parameter is very sensitive to climate forcing 3) Published measurements or modeling studies indicate that there is a measureable response in the parameter to climate forcing, but it is not particularly sensitive 1) Published measurements or modeling studies indicate that the parameter is not sensitive to climate forcing
Management Relevance	5) Monitoring will result in data that has been explicitly identified as a critical data gap by researchers and managers for understanding system responses to climate change or climate change impacts 3) Monitoring will result in data that has been explicitly identified as a critical data gap by either researchers or managers for understanding system responses to climate change or climate change impacts 1) Monitoring will result in data with no clear connection to understanding system responses to climate change or climate change impacts
Modeling Value	5) The proposed research will produce knowledge identified by scientists as critical for improving models of regional climate change or regional climate change impacts 3) The proposed will produce knowledge that will indirectly benefit regional climate modeling studies but does not fill a critical knowledge need identified by scientists 1) The proposed research will not inform regional climate modeling studies
Existing Dataset Enhancement	5) The monitoring design contributes directly to understanding long-term trends in system component condition or functioning by measuring parameters already measured for at least 10 years 3) The monitoring design contributes to understanding long-term trends in system component condition or functioning by measuring parameters already measured for at least 5 years or adding critical interpretive value to other data sets already measured for at least 5 years 1) The monitoring design will not contribute to understanding of long term trends in system component condition or functioning
Data Availability and Interpretability	5) The monitoring project will result in raw data and products targeted to specific audiences with adequate documentation that are readily interpretable along with a plan to widely disseminate them 3) The monitoring project will result in data with adequate documentation that will be widely available with no plan for developing data products targeted to specific audiences 1) The monitoring program will produce only raw data with no plan for ensuring adequate documentation or dissemination to a wide audience
Cost	5) The annual cost is less than \$20,000 4) The annual cost is between \$20,000 and \$70,000 3) The annual cost is between \$50,000 and \$250,000 2) The annual cost is between \$250,000 and \$1,000,000 1) The annual cost is greater than \$1,000,000

Table 4: Climate Action Database evaluation criteria fields for monitoring actions

DESCRIPTIVE FIELDS

Several descriptive fields provide the user the ability to select options from a pre-defined list. Lists are recommended because they require less time for the user to populate and data integrity is stronger than free form fields. However, in order for users to be able to efficiently submit actions when an appropriate option is not in a specific list, the user should be provided the ability to add new options to each pre-defined list.

Title

The title is a brief descriptive identifier for the action. It should be short and unique. Use formal names for actions when they are available.

Description

Description is a brief description of the action. Provide a description that is between 50 and 200 words in length.

Contact Information

Contact information identifies the individual who can be contacted to find out more about the action. If a person other than the Contact enters the information in the Climate Action Database, include the person's name in parentheses. Provide the Contact's full name, employer, title, e-mail address and phone number.

Issue Type

Issue type is the type of issue that the action is expected to address. Select one of the issue types accepted by the Climate Action Database and listed in Table 4.

ISSUE TYPE	DESCRIPTION
Adaptation	Actions which increase a process' ability to moderate, cope with, and take advantage of the consequences of climatic events
Mitigation	Actions which reduce greenhouse gases through either preventing emissions or sequestering atmospheric greenhouse gases
Adaptation and Mitigation	In order for both Adaptation & Mitigation to be selected, the action must be expected to rank at least a 2 on both the Adaptation and Mitigation Magnitude of Benefit criteria (see the Evaluation Criteria subsection below for definitions)

Table 5: Issue Type

Action Type

Action type is the type of action proposed. Select one of the action types accepted by the Climate Action Database and listed in Table 5. As of June 2010, "Policy" is the only Action Type accepted by the Climate Action Database.

ACTION TYPE	DESCRIPTION
Physical Project	An action that produces planned physical changes to the environment or built infrastructure
Program	An action that requires ongoing resources to effect a change in the environment or in the behavior of many people
Policy	An action that guides the decisions of members of an individual organization or a community with the intent of achieving a specific outcome
Research	An action that searches to develop new knowledge.

ACTION TYPE	DESCRIPTION
Monitoring	An action that tracks and documents change in specific measures

Table 6: Action Types

Goal

The goal of the action describes what the action is expected to accomplish. Provide a goal statement that is 1-2 sentences in length.

Objectives

Objectives are the expected system benefits or emissions reductions, as well as other results such as new regulation or ordinances. Provide 3 to 5 objectives that are as quantitative as possible.

Planning Focus Area

Planning Focus Area is the highest level planning category, which is used for organizing proposed actions and mapping them to other programs such as the EIP. The pre-defined list of Planning Focus Areas includes EIP Focus Areas related to natural systems plus additional planning areas unrelated to the EIP program. Select one of the Planning Focus Areas accepted by the Climate Action Database and listed in Table 6.

PLANNING FOCUS AREA
Watersheds, Habitat, and Water Quality
Forest Management
Air Quality and Transportation
Recreation and Scenic Resources
Public Health
Energy Infrastructure
Water Supply

Table 7: Planning Focus Areas

Planning Subarea

Planning Subarea is the second level planning category, which is used for organizing proposed actions and mapping them to other programs such as the EIP. The pre-defined list of Planning Subareas includes EIP Subprograms related to natural systems plus additional planning subareas unrelated to the EIP program. Select one of the Planning Subareas accepted by the Climate Action Database and listed in Table 7 by Planning Focus Area.

PLANNING FOCUS AREA	PLANNING SUBAREA
Watersheds, Habitat, and Water Quality	Stormwater Management
	Watershed Management
	Threatened, Endangered, and Sensitive Species
	Invasive Species
Forest management	Forest Ecosystem Health and Hazardous Fuels Reduction
Air Quality and Transportation	Air Quality and Transportation
Recreation and Scenic Resources	Recreation
	Scenic
Public Health	Education
	Housing

PLANNING FOCUS AREA	PLANNING SUBAREA
Energy Infrastructure	Community Health
	Public Safety
	Energy Generation
	Energy Efficiency
Water Supply	Water Storage
	Water Efficiency

Table 8: Planning Subareas by Planning Focus Area

Likely Executing Entity

Likely implementing entity is the entity likely to be primarily responsible for action design and implementation (e.g. TRPA, CTC, TERC). Select an implementing entity from the pre-defined list containing all implementing entities participating in the Climate Planning Framework. Not Identified is in the pre-defined list for actions for which there is no obvious implementing entity likely to be the lead or many implementing entities may possibly be the lead entity.

Agency Plan Relationships

Identify if the action is directly related to any of the plans in Table 8. Select all plans that call for the action or will be recognized as being implemented by the action. Consult with agency staff or management from the agency developing the plan if there is a question.

AGENCY PLAN
USFS Tahoe Forest Plan
TRPA Regional Plan
CSLT Sustainability Commission Work Plan
Lake Tahoe TMDL

Table 9: Agency Plans

Geographic Area

Geographic area is the description of the geographic location and scale impacted by the proposed action. Provide a clear description of the geographic location and scale in geographic (e.g. Blackwood Creek watershed), political (e.g. CSLT jurisdiction), or general (all urban) terms.

System(s) Addressed

System(s) addressed are the physical environments which are expected to benefit from the proposed action. Select one system from Table 9, which is informed by the Climate Science Synthesis and Action Effectiveness Report organization.

SYSTEMS
Alpine
Atmosphere
Forest
Riparian/SEZ
Lake Tahoe
Built Environment

Table 10: Systems

Status

Status is the state of the proposed action in the development process. Select one of the statuses accepted by the Climate Action Database and listed in Table 10.

STATUS	DESCRIPTION
Not-Evaluated	Proposed actions that are not completely evaluated in the Climate Action Database
Evaluated	Proposed actions that are completely input and not yet reviewed and prioritized by the Climate Collaborative (Tahoe Basin Sustainability Action Plan governing body)
Prioritized	Proposed actions that have been reviewed and given a priority for funding by the Climate Collaborative (Tahoe Basin Sustainability Action Plan governing body) – priority may be revised at any time
In Progress	Actions that are funded and currently being implemented
Completed	Actions that are completely implemented
Terminated	Actions that were funded but will not be completed

Table 11: Statuses

Duration

Duration is the estimated length of time that it will take to design and implement the action. Provide a rating according to the following descriptions:

5	Short Duration	The action is expected to take less than 1 year to design and implement
3	Medium Duration	The action is expected to take 3 years to design and implement
1	Long Duration	The action is expected to take more than 6 years to design and implement

POLICY ACTION –EVALUATION CRITERIA FIELDS

EVALUATION CRITERIA FIELDS

Adaptation - Magnitude of Benefit

If the Issue Type for the action is “Adaptation” or “Adaptation and Mitigation” then an Adaptation - Magnitude of Benefit rating is required. If the Issue Type for the action is “Mitigation” a 0 should be input for the rating. Adaptation - Magnitude of Benefit describes the expected effect that implementing the adaptation action will have on the status of one or more system. Table 6 contains a list of all systems that possibly benefit from the action. Describe the magnitude of influence related to each benefiting system in the description field, and in the rating field provide the rating according to the following descriptions:

5	Significant Influence	The action will substantially increase the adaptive capacity of a system and at least two systems benefit from the action
3	Moderate Influence	The action will materially increase the adaptive capacity of a system or at least two systems benefit from the action
1	No or Negative Influence	The action will not materially increase or may decrease the adaptive capacity of a system

Mitigation - Magnitude of Benefit

If the Issue Type for the action is “Mitigation” or “Adaptation and Mitigation” then a Mitigation - Magnitude of Benefit rating is required. If the Issue Type for the action is “Adaptation” a 0 should be input for the rating. Mitigation – Magnitude of Benefit describes the expected effect that implementing the mitigation action will contribute to the basin-wide emissions reduction target. Describe the magnitude of benefit related to each benefiting planning focus area (see Table 3 for a list of Planning

Focus Areas) in the description field, and in the rating field provide the rating according to the following descriptions:

5	Significant Influence	The action will contribute cumulative 5% or more of the basin-wide GHG emissions reduction target
3	Moderate Influence	The action will contribute approximately cumulative 2% of the basin-wide GHG emissions reductions target
1	Low Influence	The action will contribute cumulative less than 0.5% of the basin-wide GHG emissions reductions target

Adaptation – System Vulnerability

If the Issue Type for the action is “Adaptation” or “Adaptation and Mitigation” then an Adaptation - Vulnerability¹ of System(s) Addressed rating is required. If the Issue Type for the action is “Mitigation” a 0 should be input for the rating. Vulnerability refers to the degree to which a system is susceptible to, or unable to cope with, the adverse effects of climate change, including climate variability and extremes.

Determining the vulnerability of a particular natural system (e.g. forest, watershed, stream reach) or system component (e.g. species assemblage, habitat) involves an assessment the sensitivity² and adaptability³ to climate changes or climate change impacts. The steps involved in determining vulnerability are described in the Lake Tahoe Basin Climate Change Science Synthesis⁴ (see Chapter 7, Section 7.1). System components identified as particularly vulnerable to climate change impacts either due to sensitivity to climate changes or lack of capacity to adapt should be prioritized so that the most severe impacts can be better understood and potentially avoided. In the description field, provide evidence for the level of vulnerability of the system component (e.g. species, ecological relationship, physical process) to projected climate changes or climate change impacts. Provide a rating using the following descriptions:

5	High Vulnerability	The action will reduce the vulnerability of system(s) addressed that are in ongoing emergency conditions
3	Moderate Vulnerability	The action will reduce the vulnerability of system(s) addressed that are a medium potential for emergency conditions
1	Low Vulnerability	The action will reduce the vulnerability of system(s) addressed that are a low likelihood for emergency conditions

Mitigation Cost of Abatement

If the Issue Type for the action is “Mitigation” or “Adaptation and Mitigation” then a Mitigation Cost of Abatement rating is required. If the Issue Type for the action is “Adaptation” a 0 should be input for the rating. Mitigation cost of abatement is an economic potential metric describing the economic efficiency of

¹ Vulnerability is the susceptibility of a system component to harmful impacts due to climate change. The vulnerability of systems to specific climate change impacts is determined by combining sensitivity and the natural adaptive capability of the system.

² Sensitivity is the degree to which system components (e.g., wildfire regimes, salmonid populations, or stormwater conveyance) respond to climate conditions (e.g., temperature and precipitation) or system impacts (e.g., stream temperature increases or snowmelt timing changes). If the system or system component is likely to be significantly affected by future climatic conditions then it is considered sensitive.

³ Adaptability is the inherent natural ability of a system or system components to accommodate climate change without any human intervention

⁴ 2NDNATURE and Environmental Incentives. Nov 2010. Lake Tahoe Climate Change Science Synthesis – Aquatic Resources, funded by the US Army Corps of Engineers.

each metric ton of CO₂e reduced by the proposed action. The initial cost of implementing an action must be reduced by any savings (e.g. reduced energy bills) over the expected lifetime of the action and then divided by the metric tons of CO₂e reduced by the action. There are many calculators available on the internet to guide users and efficiently produce an estimate. Include the inputs and calculation used to determine the estimate in the description field and provide a rating for the mitigation cost of abatement field using the following descriptions:

5	Low Cost/Mg CO ₂ e	The action will reduce GHG emissions at a cost less than \$5 per metric ton of CO ₂ e, including any negative costs (savings exceed costs)
3	Moderate Cost/Mg CO ₂ e	The action will reduce GHG emissions at a cost of \$25 per metric ton of CO ₂ e
1	High Cost/Mg CO ₂ e	The action will reduce GHG emissions at a cost greater than \$100 per metric ton of CO ₂ e

Implementation Risk

Implementation risk addresses the probability that implementation (e.g. construction) of the proposed action will yield negative impacts (environmental, social or economic) and the severity of potential consequences. Describe identified implementation risks and potential consequences in the description field. Provide the rating according to the following descriptions:

5	Minimal Implementation Risk	There is a) little to no chance that the implementation of the proposed action will yield negative environmental, social or economic impacts, and/or b) there are no potentially significant negative consequences
3	Moderate Implementation Risk	There is a) a moderate probability that the implementation of the proposed action will yield negative environmental, social or economic impacts, but b) the negative consequences are unlikely to be significant and long lasting
1	Significant Implementation Risk	There is a high probability that the implementation of the proposed action will yield negative environmental, social or economic impacts, and the negative consequences are likely to be significant and long lasting

Risk of Not Implementing

Risk of not implementing addresses the probability that no implementation (e.g. construction) of the proposed action will yield negative impacts (environmental, social or economic) and the severity of potential consequences. Describe identified risks of not implementing the action and potential consequences in the description field. Provide the rating according to the following descriptions:

5	Significant Risk of Not Implementing	There is a) a high probability that not implementing the proposed action will result in negative environmental, social or economic impacts, and b) the negative consequences are likely to be significant and long lasting
3	Moderate Risk of Not Implementing	There is a) a moderate probability that not implementing the proposed action will yield negative environmental, social or economic impacts, but b) the negative consequences are unlikely to be significant and long lasting
1	Minimal Risk of Not Implementing	There is a) little to no chance that not implementing the proposed action will yield negative environmental, social or economic impacts, and/or b) there are no potentially significant negative consequences

Tahoe Basin Climate Change Strategies and Objectives

Tahoe Basin climate change strategies and objectives are developed by the Climate Collaborative and are directly impacted by the proposed action. These strategies and objectives are provided as guidance to implementing entities and are located in the Tahoe Basin Climate Change Action and Preparedness Plan. In the description field, list specific Tahoe Basin climate change strategies and objectives that the proposed action directly contributes to helping achieve and a brief description if context is necessary. Provide the rating according to the following descriptions:

5	High Contribution	The action directly and substantially contributes to achieving two or more Tahoe Basin climate change strategies or objectives
3	Moderate Contribution	The action directly and substantially contributes to achieving one Tahoe Basin climate change strategy or objective, or directly and moderately contributes to achieving two or more Tahoe Basin climate change strategies or objectives
1	Low Contribution	The action does not directly contribute to achieving a specific Tahoe Basin climate change strategy or objective

As of May 2010 basin-wide climate change strategies and objectives are not developed. Until they are developed it is recommended that the strategies and action items in the California Adaptation Strategy⁵ are used for adaptation actions and the key strategies in the AB 32 Scoping Plan⁶ (Scoping Plan Fact Sheet is a fast reference) are used for mitigation actions.

Agency/Legal Mandate

Agency and legal mandates determine the statutory and practical need for an issue to be addressed and the status of the issue to be reported. In the description field provide specific agency and legal mandates related to the proposed action and any expected ramifications if the mandate is not addressed through this or other actions. Provide the rating according to the following descriptions:

5	Strong Mandate	a) there is a priority mandate to multiple agencies to address the objectives of the action, b) there is a need to report the results of the action and status of the related objectives, and c) severe ramifications are expected if the action is not implemented and results are not reported in the next 3 years
3	Weak Mandate	a) there is a mandate to address the objective of the action by one agency, or b) it is not necessary to report the results of actions or the status of the objective on a regular and frequent basis, and c) modest ramifications will result if the action is not implemented and results are not reported in the next 5 years
1	No Mandate	a) there is a no mandate to address the objective, b) it is not necessary to report the results of actions or the status of the related objectives, and c) no ramifications will result if the objective is not addressed and reported

Unique Opportunities

Unique opportunities address the degree that current, unique factors (e.g. political, temporal) related to the implementation of the proposed action increase expected implementation results (e.g. projected climatic changes will increase agricultural production) or reduce implementation costs (e.g. there is a

⁵ California Natural Resources Agency. "2009 California Climate Adaptation Strategy." *The California Energy Commission*. December 2, 2009. <http://www.energy.ca.gov/2009publications/CNRA-1000-2009-027/CNRA-1000-2009-027-F.PDF> (accessed February 2010).

⁶ California Air Resources Board. "Climate Change Scoping Plan." December 2008. http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf (accessed April 2010)

short window of time after a forest fire when reforestation will avoid additional costs such as removing vegetation that returns naturally). In the description field identify known opportunities and provide a brief description of how each opportunity benefits the action implementation and constraints, as well as the timeframe for the opportunity (e.g. the funding source will only be available August 2010 through October 2010). In the rating field provide the rating according to the following descriptions:

5	High Opportunity	a) there are factors that are expected to increase implementation results and reduce (or provide unique funding for) implementation costs, or b) there are factors that are expected to significantly increase implementation results or significantly reduce (or provide unique funding for) implementation costs
3	Moderate Opportunity	There are factors that are expected to increase implementation results moderately or reduce implementation costs moderately
1	Little Opportunity	There are no identified factors that increase expected implementation results or reduce implementation costs

Non-Climate Change Objectives and Benefits

Non-climate change objectives and benefits address the degree that the action provides social, economic or environmental benefits beyond climate change adaptation and mitigation benefits (e.g. CSLT energy efficiency actions that also reduce operating costs). Benefits produced by an action that are not related to climate change adaptation and mitigation are encouraged. In the description field identify the non-climate change objectives and benefits related to the action. In the rating field indicate the rating according to the following descriptions:

5	High Non-Climate Benefits	The action is beneficial regardless of the climate change adaptation and mitigation benefits (e.g. mitigation action pays for itself in less than 2 years and continues to accrue cost savings), and the action is a high priority for implementation even if climate change related benefits are not considered
3	Moderate Non-Climate Benefits	The action supports multiple other non-climate change objectives or strongly supports one non-climate change objective and the action is a low priority for implementation if climate related benefits are not considered
1	No Non-Climate Benefits	There are no identified benefits of the action other than climate change adaptation and mitigation related benefits

Potential Barriers

Potential barriers include political, social or physical impediments to the successful implementation of the proposed action. Potential barriers can completely block the implementation of an action or increase the cost beyond a point for which the action is no longer a priority. Identifying and evaluating potential barriers early on is an efficient use of public funds. In the description field provide a brief description of potential barriers. You may also discuss the likelihood of and potential strategies for overcoming each potential barrier at this point. This information will be required if the action is further developed. In the rating field provide the rating according to the following descriptions:

5	No Barriers	There are no identified barriers that could potentially impede the implementation of the action or materially increase the cost of the implementation
3	Surmountable Barriers	There are potential barriers that may increase the implementation costs and delay implementation but the barriers do not present a clear threat to the successful implementation and are not likely to

		increase the cost beyond a point for which the action is no longer worth funding
1	Insurmountable Barriers	There are potential barriers that could completely block the implementation of the action or increase the cost beyond a point for which the action is no worth funding

Public Concern

Public concern addresses the degree of public and political attention given to the objectives of the action. Provide a brief description in the description field and the rating according to the following descriptions:

5	High Public Concern	a) there is broad interest in the status of this objective and it is actively discussed in public and political venues, b) the status of the objective is regularly reported or the lack of reporting is noted and criticized, and c) the resource management entities in the basin are expected to address this objective through actions
3	Moderate Public Concern	a) some constituencies are interested in the status of this objective, b) regular reporting of the status of the objective would be noticed and appreciated, and c) there is desire for resource management entities in the basin to address this objective through actions
1	Low Public Concern	a) no constituency is directly interested in the status of this objective, b) little notice is given to whether the status of the objective is reported or not, and c) there is no desire for resource management entities in the basin to address this objective through actions

Ability to Fund

Ability to fund addresses the availability of funds for implementing the action. In the description field identify likely or potential funding resources – entities or funding programs – that would likely provide the funding for the design, implementation or maintenance of the proposed action. In the rating field provide the rating according to the following descriptions:

5	Highly Fundable	Ample available funding to implement the action
3	Moderately Fundable	Potentially available funding to implement the action depending on competing priorities
1	Unfundable	No available funding and unlikely for funding to become available

Cost - Planning & Implementation

Planning and implementation costs are the estimated cost in nominal dollars to develop the policy statements and completely roll-out the policy. Include staff time at the rate of \$120,000 per person year/full time equivalent. Provide estimate costs for primary planning and implementation components in the description field and provide the rating according to the following descriptions:

5	Low Cost	The estimate to plan and implement the action is less than \$20,000
4	Low to Moderate Cost	The estimate to plan and implement the action is between \$20,000 and \$50,000
3	Moderate Cost	The estimate to plan and implement the action is between \$50,000 and \$250,000
2	Moderate to Significant Cost	The estimate to plan and implement the action is between \$250,000 and \$1,000,000
1	Significant Cost	The estimate to plan and implement the action is greater than \$1,000,000

Cost - Annual Operational

Annual operational cost is the estimated annual cost in nominal dollars to communicate, train and enforce the proposed policy, including labor and capital costs. Include staff time at the rate of \$120,000 per person year/full time equivalent. Provide estimate costs for primary annual operation and maintenance components in the description field and provide the rating according to the following descriptions:

5	Low Annual Cost	The estimate to operate and maintain the action outcome is less than \$2,000 annually
4	Low to Moderate Annual Cost	The estimate to operate and maintain the action outcome is between \$2,000 and \$10,000 annually
3	Moderate Annual Cost	The estimate to operate and maintain the action outcome is between \$10,000 and \$25,000 annually
2	Moderate to Significant Annual Cost	The estimate to operate and maintain the action outcome is between \$25,000 and \$100,000 annually
1	Significant Annual Cost	The estimate to operate and maintain the action outcome is greater than \$100,000 annually

Cost - Affected Parties

Cost to affected parties is the estimated cost in nominal dollars per year expected to be incurred by other parties as a result of the policy. Other parties may be internal to an agency (e.g. staff must adjust existing processes) or external (e.g. land owners must adjust existing processes). Include staff time at the rate of \$120,000 per person year/full time equivalent. Provide estimate costs for primary affected parties in the description field and provide the rating according to the following descriptions:

5	Low Cost	The estimate to plan and implement the action is less than \$50,000 annually
4	Low to Moderate Cost	The estimate to plan and implement the action is between \$50,000 and \$200,000 annually
3	Moderate Cost	The estimate to plan and implement the action is between \$200,000 and \$500,000 annually
2	Moderate to Significant Cost	The estimate to plan and implement the action is between \$500,000 and \$2,000,000 annually
1	Significant Cost	The estimate to plan and implement the action is greater than \$2,000,000 annually

RESEARCH & MONITORING ACTION ADDITIONAL DESCRIPTIVE & EVALUATION CRITERIA FIELDS

Research and monitoring actions are dissimilar enough to require separate criteria for effectively prioritizing them relative to climate change issues. Both research and monitoring actions may include collection of monitoring data. The focus of research actions is to use the data to address specific questions or test hypotheses, while the focus of monitoring actions is primarily the collection, storage, management, and dissemination of measurements. The general descriptive fields are the same for research and monitoring and provided in Table 12 below. Both action types have six evaluation criteria and research and monitoring may share field titles; however each criteria is tailored to each action type.

ADDITIONAL DESCRIPTIVE FIELDS

FIELD NAME	FIELD TYPE	FIELD DESCRIPTION
Data Gap Addressed	Text	Specific data need to be filled by the research or monitoring
Benefiting Entities	List	List of the benefiting agencies, stakeholders, and organizations

Table 12: Research and Monitoring Action Specific Descriptive Fields

Data Gap Addressed

Research and monitoring projects may generate data for which a specific gap has been previously identified by scientists or resource managers. This field should be used to indicate the nature of the data gap, evidence of need, and how the proposed research or monitoring will fill the gap.

Benefiting Entities

Benefiting entities will use the results from the proposed action to improve existing programs or the design or prioritization of future actions. Select one or more benefiting entities from the pre-defined list provided in Table 13 containing all implementing entities participating in the Climate Planning Framework.

Note: This list of entities is a preliminary list and all potential benefiting entities should be added. Additionally, the list should be dynamic and grow over time.

BENEFITING ENTITY
California State Parks (CSP)
California Tahoe Conservancy (CTC)
California Water Quality Control Board – Lahontan Region (LRWQCB)
Nevada Division of Environmental Protection (NDEP)
Nevada Division of State Parks (NDSP)
Tahoe Environmental Research Center (TERC)
Tahoe Regional Planning Agency (TRPA)
Tahoe Science Consortium (TSC)
U.S. Forest Service (USFS)

Table 13: Benefiting Entities

RESEARCH EVALUATION CRITERIA FIELDS

System Vulnerability

System vulnerability of a particular natural system (e.g. forest, watershed, stream reach) or system component (e.g. species assemblage, habitat) involves the sensitivity and adaptability to climate changes or climate change impacts. System components identified as particularly vulnerable to climate change impacts either due to sensitivity to climate changes or lack of capacity to adapt should be prioritized so that the most severe impacts can be better understood and potentially mitigated. In the description field, provide evidence for the level of vulnerability of the system component (e.g. species, ecological relationship, physical process) to projected climate changes or climate change impacts. A general procedure for assessing the vulnerability of a system or system component is presented in the Tahoe Basin Global Climate Change Science Synthesis⁷ completed to inform the Climate Change Action

⁷ <http://2ndnature.centraldesktop.com/p/aQAAAAAAnivz>

Database (see Chapter 7, Section 7.1). In the rating field, provide the rating according to the following descriptions.

5	Highly Vulnerable	System component(s) addressed are highly vulnerable to projected climate change impacts
3	Moderately Vulnerable	System component(s) addressed are moderately vulnerable to projected climate change impacts
1	Minimally Vulnerable	System component(s) addressed are minimally vulnerable to projected climate changes impact

Management Relevance

Research prioritization relative to climate change should be driven by identified knowledge gaps that prohibit effective management of natural systems or where there is a substantial ecological risk associated with an environmental issue. Often, knowledge gaps are related to elements of natural system functioning that can be addressed with fundamental research, while applied research may have management issues embedded in the research design. In the management relevance description field, provide the case for relevance to management issues with a clear connection between the research to be performed and a management issue. Provide management practices, processes or programs that will benefit from the results and a brief description of the improvement or additional support the results will provide the management practices, processes or programs. Include any agency management or executives who specifically request or explicitly support the action. Include any documentation of the research need in existing planning documents. In the rating field provide the rating according to the following descriptions:

5	High Relevance	The research will produce critical knowledge that directly impacts a priority issue for 3 or more benefitting entities
3	Moderate Relevance	The research is likely to produce knowledge that has a) direct impact on priority issue for 2 benefitting entities, or b) indirect impact on a priority issue for 3 or more benefitting entities
1	Low Relevance	The research is likely to produce knowledge that indirectly impacts non-priority issues for 1 or less benefitting entities

Modeling Value

Since it is not possible to predict or measure all of the potential responses of natural systems to climate change and the interactions between the various impacts within and across natural systems, environmental models are used as a tool for management decision-making. Modeling studies will benefit from research that improves translation of global scale climate and impact projections to a regional scale. Model development relies on a sound scientific understanding and the ability to quantify of natural processes at time and spatial scales relevant to natural resource managers. In the description field provide evidence for the specific modeling knowledge need that the research will fulfill. In the rating field provide the rating according to the following descriptions:

5	Critical Knowledge	The research will produce knowledge identified by scientists as critical for improving models of regional climate change or regional climate change impacts
3	Pertinent Knowledge	The research will produce knowledge that will indirectly benefit regional climate modeling studies but does not fill a critical knowledge need identified by scientists
1	Unrelated	The proposed research will not likely to inform regional climate modeling studies

Unique Opportunities

Certain research projects may depend on events that do not occur regularly and present a unique opportunity to learn about a system during short time window, such as extreme climate events or disturbance events (e.g. wildfires, flooding, landslides). Intermittent extreme climate events are some the earliest climate change effects anticipated. Occurrence of extreme climate events may provide opportunities to study impacts or system responses to impacts that don't regularly occur. In the description field, provide evidence of a unique opportunity. In the rating field provide the rating according to the following descriptions:

5	Highly Unique Opportunity	The research is strongly dependent on events or conditions which are unlikely to occur in the next 30 years
3	Somewhat Unique Opportunity	The research is strongly dependent on events or conditions which are unlikely to occur in the next 10 years
1	Not a Unique Opportunity	The research is not particularly dependent on the occurrence of unique events or conditions

Outcome Usability

Outcomes from research have different levels of usability or immediate applicability to resource management staff depending on their background and time resources available. Findings published in peer-reviewed journals come with the highest level of scientific credibility, which can make research outcomes more useful to resource management staff. However, these outcomes require audiences with the time and expertise to ingest research findings from the primary literature. Outcomes or products from research that are easily communicated and interpreted may be readily applicable to a natural resource management problem and can be most efficiently used for decision making. Additionally, the uncertainty surrounding the occurrence, timing, and magnitude of projected climate change impacts in the Tahoe Basin make it particularly difficult to efficiently prioritize management actions. Therefore, the ability to judge the confidence of scientific conclusions will contribute to the interpretability of research outcomes. In the project description field, provide details of the level of the estimated level of usability of the outcomes of the research for a resource management audience. In the rating field, provide the rating according to the following descriptions

5	Highly Usability	The research will result in peer-reviewed publications and products suitable for personnel without extensive expertise in the subject matter or low time resources to allocate to understanding outcomes and results
3	Moderate Usability	The research will result in either products suitable for personnel with no expertise in the subject or low time resources to allocate to understanding outcomes and results; or it will result in peer-reviewed publications
1	Low Usability	The research will not result in peer reviewed publications or products suitable for personnel without extensive expertise in the subject matter or low time resources to allocate to understanding outcomes and results

Cost

The total cost is the estimated cost in nominal dollars for an entire research project including development of the study design, data collection, equipment purchases, and production of deliverables. Provide estimate costs for the various components of the proposed research in the descriptive field and provide the rating according to the following descriptions:

5	Low Cost	The total cost to complete the research is less than \$20,000
4	Low to Moderate	The total coast to complete the research is between \$20,000

	Cost	and \$50,000
3	Moderate Cost	The total cost to complete the research is between \$50,000 and \$250,000
2	Moderate to Significant Cost	The estimate to complete the research is between \$250,000 and \$1,000,000
1	Significant Cost	The estimate to complete the research is greater than \$1,000,000

MONITORING EVALUATION CRITERIA FIELDS

Climate Sensitivity

Some environmental parameters have been shown or are anticipated to be particularly sensitive to projected global climate changes and associated impacts (e.g. lake temperatures, stream temperatures, snowpack thickness, soil moisture, algae growth and abundance). In context, sensitivity refers to a particularly strong response of an environmental parameter per unit change of a climate forcing variable (e.g. temperature) relative to its observed range of variability. From a climate change perspective, it is sensible to focus limited monitoring resources on these variables that we would expect to respond strongly to climate change so that issues related to those variables can be more effectively managed. Provide evidence for climate sensitivity of the monitoring parameters in the description field. Indicate the sensitivity of monitoring parameters based on the following rating criteria:

5	Highly Sensitive	Published measurements and modeling studies both indicate that the parameter is very sensitive to climate forcing
3	Moderately Sensitive	Published measurements or modeling studies indicate that there is a measureable response in the parameter to climate forcing, but it is not particularly sensitive
1	Insensitive	Published measurements or modeling studies indicate that the parameter is not sensitive to climate forcing

Management Relevance

Monitoring prioritization relative to climate change should be driven by identified data gaps that prohibit effective management of natural systems or where there is a substantial ecological risk associated with an environmental issue. Such data gaps may be addressed by new monitoring programs or those that build off of existing designs or data sets. In the management relevance description field, provide the case for relevance to management issues with a clear connection between the research to be performed and a management issue. This rationale should include references to documentation of specific knowledge gaps that have been identified relative to specific management issues. In the rating field provide the rating according to the following descriptions:

5	High Relevance	Monitoring will result in data that has been explicitly identified as a critical data gap by researchers and managers for understanding system responses to climate change or climate change impacts
3	Moderate Relevance	Monitoring will result in data that has been explicitly identified as a critical data gap by either researchers or managers for understanding system responses to climate change or climate change impacts
1	Low Relevance	Monitoring will result in data with no clear connection to understanding system responses to climate change or climate change impacts

Modeling Value

Monitoring data is needed to refine climate, hydrologic, and ecosystem models that can be used to understand localized future climate changes and impacts. Model results are limited by the types, locations, length, and continuity of existing data sets to constrain process representation, specify parameter values, and perform validation. Local climate change responses are often dependent on models to provide plausible future scenarios of impacts to local systems. Certain data sets identified by the modeling community can improve capacity to test hypothesis about system responses to future climate changes and associated impacts. Provide the specific modeling value of a particular type of data in the description field that includes references of documentation of the specific data need. Indicate the level of monitoring data value based on the following rating descriptions:

5	Critical Need	Monitoring will result in data that has been explicitly identified by the modeling community as a top priority data set for modeling local Tahoe Basin system responses to climate change or climate change impacts
3	Relevant	Monitoring will result in data with clear potential for integration to or development of models for understanding climate change or climate change impacts locally but has not been identified as a critical data gap by the modeling community
1	Unrelated	Monitoring will result in data with no clear connection to understanding representation of system responses to climate change or climate change impacts in models

Existing Dataset Enhancement

Because climate changes occur on long time scales (e.g. several decades to millennia), measuring changes in climate variables or system impacts independent of sources of short term variability requires long term data sets. Short-term monitoring projects will tend to have very little power to detect changes related to climate, since other factors will control most of the variability of measurements. Monitoring data sets may enhance the value of existing data sets for understanding long-term trends by extending the record length if they are compatible in terms of measurement types, locations, and measurement protocols. Conversely, discontinuing a monitoring program that has been ongoing for a number of years represents a loss of the potential to use those data for detecting long term trends in systems. Explain the value added for a particular type of data in the description field relative to existing data sets. Indicate the value added based on the following rating descriptions: enhancement continuation

5	Substantial Enhancement	The monitoring design contributes directly to understanding long-term trends in system component condition or functioning by measuring parameters already measured for at least 10 years
3	Moderate Enhancement	The monitoring design contributes to understanding long-term trends in system component condition or functioning by measuring parameters already measured for at least 5 years or adding critical interpretive value to other data sets already measured for at least 5 years
1	No Enhancement	1) The monitoring design will not contribute to understanding of long term trends in system component condition or functioning

Data Availability and Interpretability

Monitoring is more valuable if it results in data that are readily available and interpretable to other researchers or organizations. Thoroughly documented data will be more interpretable than data with minimal documentation and data products may be more interpretable to resource managers compared to raw data measurements. The monitoring project will increase opportunities for the data to be used in the future if there is a plan in place to disseminate data and make products widely available, such as through a web-based interface. Provide the level of availability and interpretability of data and data products in the description field. Indicate the data availability and interpretability of the monitoring project based on the following rating descriptions:

5	High Availability and Interpretability	The monitoring project will result in a) raw data and b) products targeted to specific audiences with adequate documentation that are readily interpretable and c) a plan to widely disseminate them
3	Moderate Availability and Interpretability	The monitoring project will result in a) data with adequate documentation and b) products widely available and c) no plan for developing data products targeted to specific audiences
1	Low Availability and interpretability	The monitoring program will produce only raw data with no plan for ensuring adequate documentation or dissemination to a wide audience

Annual Cost

The annual costs is the estimated cost in nominal dollars on an annual basis, including study design, monitoring personnel, equipment purchases and maintenance, data storage and management. Provide estimated costs for the various components of the monitoring program in the descriptive field and provide the rating according to the following descriptions of annual cost:

5	Low Cost	The annual cost is less than \$20,000
4	Low to Moderate Cost	The annual cost is between \$20,000 and \$50,000
3	Moderate Cost	The annual cost is between \$50,000 and \$250,000
2	Moderate to Significant Cost	The annual cost is between \$250,000 and \$1,000,000
1	Significant Cost	The annual cost is greater than \$1,000,000

SYSTEM GENERATED FIELDS

System generated fields are fields that are automatically generated by the system without effort from the author of the proposed action.

Action ID Number

Action ID number is a unique number assigned to each proposed action for unique identification of actions. The action ID number is automatically generated and stored for data integrity purposes.

Action Submission Date

Action Submission Date is the date the proposed action was submitted into the Climate Action Database and it is automatically captured and available for reporting purposes.

EVALUATION CRITERIA DETERMINATION

Some evaluation criteria are important to capture for use by decision-makers and to simplify the data input process. However, criteria may need to be combined with other evaluation criteria to avoid over-

weighting a specific factor of consideration. The following ratings are calculated using the logic described and used in the ranking methods.

Cost - Implementers

Two implementation cost evaluation criteria are collected to capture each cost component for use by decision-makers. The two evaluation criteria collected are combined into a single average rating and the average cost for implementers rating is used in the ranking methods.



Figure 1: Cost – Implementers rating determination

Climate Action Database Results

The Climate Action Database provides two results for actions completely submitted to assist in evaluating and comparing proposed actions. Both results are considered when evaluating actions and users are encouraged to understand the methodology supporting each result. The criteria and evaluation methodology should be regularly reviewed and improved based on implementing entity staff recommendations.

RISK ASSESSMENT

The risk assessment categorizes priority actions into well-defined and well-established climate change action categories. These action categories are one way to address the varying degrees of uncertainty and risk related to climate change actions due to the uncertainties in projected climate changes and in system responses to those changes. Timing, economic and political costs, and the efficacy of actions all impact the successful implementation of a climate change related action. To address the uncertainty of climate change and action implementations is to identify low-risk, low-cost or opportunistic actions.

All policy, program and project actions in the Climate Action Database will be labeled one of the four action categories described below. The action categories are determined by evaluation criteria field ratings and the rating requirements for each action category are provided in tables below. There is not necessarily an order of preference for action categories as each considers a unique subset of evaluation criteria and an action can be associated to multiple categories.

No-regret

No-regret actions make sense regardless of climate change adaptation and mitigation related benefits. Table 14 contains the criteria used to determine a no-regret action.

EVALUATION CRITERIA FIELD	RATING REQUIREMENT
Non-Climate Change Objectives & Benefits	4 - 5
Potential Barriers	4 - 5
Risk of Implementation	4 - 5

Table 14: Criteria for a no-regret action

Low-regret

Low-regret actions have relatively low costs and low risks while benefits under projected climate changes are high. Table 15 contains the criteria used to determine a low-regret action:

EVALUATION CRITERIA FIELD	RATING REQUIREMENT
Potential Barriers	3 - 5
Risk of Implementation	3 - 5
Cost - Planning & Implementation	3 - 5
Adaptation - Magnitude of Benefit, or Mitigation - Magnitude of Benefit, or Both (Average)	3 - 5
Adaptation - Vulnerability of System(s) Addressed, or Cost of Abatement, or Both (Average)	3 - 5

Table 15: Criteria for a low-regret action

Opportunity

Opportunity actions capitalize on short term opportunities and/or climatic changes. Table 16 contains the criteria used to determine an opportunity action:

EVALUATION CRITERIA FIELD	RATING REQUIREMENT
Unique Opportunities	4 - 5
Non-climate Change Objectives & Benefits	3 - 5
Potential Barriers	3 - 5
Risk of Implementation	3 - 5

Table 16: Criteria for an opportunity action

No Category

No category actions do not fulfill the criteria required by any of the action categories described above. The action may still be worthwhile, but the individual evaluation criteria field ratings should be reviewed to clearly understand the context of the action.

PRIORITY RANKING

The priority ranking provides agency staff with a consistent ranking to evaluate and compare all potential actions in the Climate Action Database. The priority ranking is derived from the evaluation criteria field ratings and a Relative Value of Importance associated to each evaluation criteria field. The Relative Value of Importance for each evaluation criteria field is used to apply weights to evaluation criteria fields and is listed in Table 18.

It is critical that the Relative Value of Importance associated to each evaluation criteria field is well thought out so that actions are ranked in order that best suits the climate change needs of the Tahoe Basin. The Climate Collaborative should agree to adjustments in the values in the table over time when there are opportunities to better address Tahoe Basin climate change needs. Table 17 contains a description of Relative Value of Importance values.

RELATIVE VALUE OF IMPORTANCE VALUE	DESCRIPTION
5	High importance in decision-making processes for most implementing entities in the Tahoe Basin
3	High importance in decision-making processes for 2 primary implementing entities, or medium importance in decision-making processes for most implementing entities in the Tahoe Basin
1	Low importance in decision-making processes for most implementing entities in the Tahoe Basin

Table 17: Relative Value of Importance for each evaluation criteria

To calculate the priority ranking, first each evaluation criteria rating is multiplied by the respective Relative Value of Importance. Then the product (evaluation criteria rating * Relative Value of Importance) for each evaluation criteria is summed and a 1-5 score is applied depending on where the summed value falls within the scale, which changes as Relative Value of Importance values change over time. For policy actions, see Table 18 for the possible ranges of summed values and Table 19 for the scale used to determine the 1-5 score for the example Relative Value of Importance values used. For research and monitoring actions see Tables 20 and 22 respectively for the possible ranges of summed values and Tables

21 and 23 for the scale used to determine the 1-5 score for the example Relative Value of Importance values used.

EVALUATION CRITERIA	RELATIVE VALUE OF IMPORTANCE	LOWEST POSSIBLE RATING	HIGHEST POSSIBLE RATING
Adaptation - Magnitude of Benefit	3	1	5
Mitigation - Magnitude of Benefit	3	1	5
Adaptation - Vulnerability of System(s) Addressed	3	1	5
Mitigation - Cost of Abatement	3	1	5
Implementation Risk	3	1	5
Risk of Not Implementing	3	1	5
Tahoe Basin Climate Change Strategies & Objectives	3	1	5
Agency/Legal Mandate	3	1	5
Unique Opportunities	3	1	5
Non-Climate Change Objectives and Benefits	3	1	5
Potential Barriers	3	1	5
Public Concern	3	1	5
Ability to Fund	3	1	5
Cost – Implementers	3	1	5
Cost - Affected Parties	3	1	5
	Summed Rating * Relative Value of Importance	45	225

Table 18: Relative Value of Importance for each policy action evaluation criteria

PRIORITY RANKING	SCALE OF SUMMED RATING * RELATIVE VALUE OF IMPORTANCE
5	190 – 225
4	154 – 189
3	118 – 153
2	82 – 117
1	45 – 81

Table 19: Priority Ranking and associated scale of summed rating * Relative Value of Importance for policy actions

RESEARCH EVALUATION CRITERIA	RELATIVE VALUE OF IMPORTANCE	LOWEST POSSIBLE RATING	HIGHEST POSSIBLE RATING
System Vulnerability	3	1	5
Management Relevance	3	1	5
Modeling Value	3	1	5
Unique Opportunities	3	1	5
Outcome Usability	3	1	5
Cost	3	1	5
	Summed Rating * Relative Value of Importance	18	90

Table 20: Relative Value of Importance for each research evaluation criteria

PRIORITY RANKING	SCALE OF SUMMED RATING * RELATIVE VALUE OF IMPORTANCE
5	76-90
4	62-75
3	47-61
2	33-46
1	18-32

Table 21: Priority Ranking and associated scale of summed rating * Relative Value of Importance for research actions

RESEARCH EVALUATION CRITERIA	RELATIVE VALUE OF IMPORTANCE	LOWEST POSSIBLE RATING	HIGHEST POSSIBLE RATING
Climate Sensitivity	3	1	5
Management Relevance	3	1	5
Modeling Value	3	1	5
Existing Dataset Enhancement	3	1	5
Data Interpretability and Accessibility	3	1	5
Annual Cost	3	1	5
	Summed Rating * Relative Value of Importance	18	90

Table 22: Relative Value of Importance for each monitoring evaluation criteria

PRIORITY RANKING	SCALE OF SUMMED RATING * RELATIVE VALUE OF IMPORTANCE
5	76-90
4	62-75
3	47-61
2	33-46
1	18-32

Table 23: Priority Ranking and associated scale of summed rating * Relative Value of Importance for monitoring actions

Evaluation Criteria Field Selection Factors

The specific evaluation criteria in the Climate Action Database were selected from many alternatives considered. Evaluation criteria should account for the important factors that climate change actions should seek to achieve and be well balanced to avoid double counting. Tables 24 and 26 contain a list of key factors based off of the criteria James Titus identified for policy-makers in assessing responses to climate change⁸. To ensure the key factors were balanced among the evaluation criteria a key factor distribution matrix was developed for each action type, see Tables 25, 26 and 27. Light green represents an indirect representation and dark green represents a direct representation.

Economic Efficiency	Will the action yield benefits greater than if the resources were applied elsewhere?
Flexibility	Is the action reasonable for the entire range of possible changes in temperatures and precipitation?
Urgency/Priority	Will the action be successful if implemented in 10 or 20 years? Will the action decrease the risk of losing unique environmental or cultural resources?
Institutional feasibility	Is the action acceptable to the public? Can it be implemented with existing institutions under existing laws?
Consistency	Does the action support other national state, community, or private goals?
Equity	Does the strategy unfairly benefit some at the expense of other regions, generations, or economic classes?

Table 24: Primary factors that climate change actions should seek to achieve

Table 23, 24 and 25 show that the current set of evaluation criteria for policy, research and monitoring action types covers all of the identified key factors. For policy action types, institutional feasibility may be overemphasized and flexibility may be underemphasized using the current evaluation criteria. For Research and monitoring action types, ecological risk may be somewhat underrepresented.

⁸ Titus, James G. 1990. *Strategies for Adapting to the Greenhouse Effect*. In *Journal of the American Planning Association*, Summer: 311-323 (1990).

FIELD NAME	KEY FACTORS					
	ECONOMIC EFFICIENCY	FLEXIBILITY	URGENCY/PRIORITY	INSTITUTIONAL FEASIBILITY	CONSISTENCY	EQUITY
Evaluation Criteria Fields						
Adaptation - Magnitude of Benefit	Dark Green					
Mitigation - Magnitude of Benefit	Dark Green					
Adaptation - Vulnerability of System(s) Addressed			Dark Green	Light Green		
Mitigation - Cost of Abatement	Dark Green			Light Green		
Implementation Risk		Dark Green				Dark Green
Risk of Not Implementing			Dark Green			Light Green
Basin Climate Strategies & Objectives			Light Green	Dark Green	Light Green	
Agency/Legal Mandate			Dark Green			Light Green
Unique Opportunities			Dark Green			
Non-Climate Objectives & Benefits				Light Green	Dark Green	Light Green
Potential Barriers	Light Green			Dark Green		Light Green
Public Concern			Light Green	Dark Green	Light Green	Dark Green
Ability to Fund	Light Green			Light Green		
Cost - Implementers	Dark Green			Light Green		
└ Cost - Planning & Implementation						
└ Cost - Operational						
Cost - Affected Parties	Light Green					Light Green

Table 25: Key factor distribution matrix for balancing important research action factors accounted for by different evaluation criteria (dark green represents a direct representation)

Economic Efficiency	Will the research/monitoring yield benefits greater than if the resources were applied elsewhere?
Impact Uncertainty Reduction	Will the research/monitoring result in knowledge to improve the current level of confidence associated with climate change impacts?
Urgency	Will the opportunity for knowledge gain be lost if the research is not conducted within a certain time frame?
Ecological Risk	Does the research/monitoring address an issue with important environmental consequences of climate change impacts?
Applicability	Does the research/monitoring result in outcomes that can be efficiently used by the intended audience?

Table 26: Primary factors that climate change research and monitoring prioritization should achieve

RESEARCH EVALUATION CRITERIA	ECONOMIC EFFICIENCY	IMPACT UNCERTAINTY REDUCTION	URGENCY	ECOLOGICAL RISK	APPLICABILITY
Vulnerability			Light Green	Dark Green	
Management Relevance	Light Green	Light Green		Light Green	Light Green
Modeling Value		Dark Green	Light Green		
Unique Opportunities			Dark Green		
Outcome Usability	Light Green				Dark Green
Cost	Dark Green				

Table 27: Key factor distribution matrix for balancing important research action factors accounted for by different evaluation criteria (dark green represents a direct representation)

MONITORING EVALUATION CRITERIA	ECONOMIC EFFICIENCY	IMPACT UNCERTAINTY REDUCTION	URGENCY	ECOLOGICAL RISK	APPLICABILITY
Climate Sensitivity					
Management Relevance					
Modeling Value					
Existing Dataset Augmentation					
Data Accessibility and Interpretability					
Annual Cost					

Table 28: Key factor distribution matrix for balancing important monitoring action factors accounted for by different evaluation criteria (dark green represents a direct representation)