

EASTERN SIERRA SUSTAINABLE RECREATION PARTNERSHIP: CLIMATE ADAPTATION & RESILIENCE ASSESSMENT

Project Understanding

The Eastern Sierra Sustainable Recreation Partnership (ESSRP) is a non-funded challenge cost share agreement¹ between Mono County and the Town of Mammoth Lakes, California and the USDA Forest Service Pacific Southwest Region, Inyo National Forest and Intermountain Region, Humboldt-Toiyabe National Forest, established in July 2018. In the spring of 2019, the Sierra Nevada Conservancy (SNC) Governing Board authorized \$618,750 of Proposition 68 funding to go to the Town of Mammoth Lakes (on behalf of the regional partnership) to administer the Sustainable Recreation and Tourism Initiative (SRTI) which is being led by the Mammoth Lakes Trails and Public Access Foundation (MLTPA) and the Town of Mammoth Lakes (Town) on behalf of regional partners which currently include Mono County, Inyo County, Alpine County, the City of Bishop, the Town of Mammoth Lakes, the Inyo National Forest, and the Humboldt Toiyabe National Forest.

The Sustainable Recreation and Tourism Initiative identifies four project “tracks” including the “Climate Adaptation & Resilience Assessment.”² The Climate Adaptation and Resilience Assessment will include a climate change vulnerability assessment and adaptation strategy for the Eastern Sierra focused primarily on outdoor recreation while also valuating the region’s natural resources and outdoor recreation and tourism economy. The assessment will help inform future investment in sustainable recreation and tourism programs and projects.

Project Team

The consultant project team includes PlaceWorks, Atlas Planning Solutions, and ICF. PlaceWorks will serve as the prime consultant and manage the consultant project team. PlaceWorks will lead Tasks 1, 2, and 4. Atlas Planning Solutions will support project coordination and meetings and provide expertise on wildfire fire hazard assessment and mitigation in support of all tasks. ICF will lead Task 3, the natural capital assessment.

The Town of Mammoth Lakes is contracting with PlaceWorks to provide Climate Adaptation Resilient Assessment services as part of the larger SRTI. Per its contract with the Town of Mammoth Lakes for services related to the SRTI, MLTPA will serve as the primary point of contact for PlaceWorks and the consultant project team. Additional services included in MLTPA’s contract for the SRTI include overall project management and coordination of all four SRTI project “tracks”, along with preparation of all Proposition 68 grant reporting documents for review and submittal by the Town of Mammoth Lakes to the Sierra Nevada Conservancy (SNC). MLTPA’s contract for the Town for services related to SRTI also

¹ A description of the U.S. Code on challenge cost-share agreement authority, 54 USC 101701, can be found at, <https://uscode.house.gov/view.xhtml?req=granuleid:USC-prelim-title54-section101701&num=0&edition=prelim>.

² The Eastern Sierra Sustainable Recreation Partnership. 2018. Accessible at, <https://www.essrp.org/>.

includes liaison efforts with the ESSRP, with staff of the Town, and services specific to the Climate Adaptation Resilient Assessment to be identified by the Project Team, including communications and outreach and efforts to identify and provide data and documents that may be of value to the Project Team.

Draft Scope of Work

Task 1. Review plans and resources

The consultant project team is familiar with the Town of Mammoth Lakes' plans and resources and those of partner agencies that the team reviewed as part of the Resilient Mammoth Lakes project. The project team is not as familiar with federal and regional adaptation studies and land management plans completed since the adoption of Resilient Mammoth or that represent areas outside of the Resilient Mammoth Lakes project area. To increase our familiarity with federal and regional efforts, the consultant project team will review plans, studies, and resources of partners in the ESSRP as an initial step of this Climate Adaptation & Resilience Assessment. The review will include the recently-completed Inyo National Forest Land Management. The PlaceWorks team will review these documents and will work with MLTPA to identify any additional plans and resources that are relevant to climate change and recreational activities in the region including those of the Los Angeles Department of Water and Power, CALTRANS District 9, and the five National Park Service units that share the regions geography. MLTPA will provide PlaceWorks with any existing and applicable GIS files for use by the consultant team.

Deliverables:

- List of plans and resources for team confirmation
- Matrix summarizing plan review, including key content, findings, and data relevant to the vulnerability assessment
- Map of the project area that identifies regional partners and applicable/appropriate project boundaries, including federally managed lands and lands managed by the LA Department of Water and Power. These regional partners include: Inyo County, CA, Mono County, CA, and Alpine County, CA; the Town of Mammoth Lakes, CA, the City of Bishop, CA; two USFS forests in two USFS regions: Inyo National Forest in USFS Region 5 (Pacific Southwest) and portions of Humboldt-Toiyabe National Forest in USFS Region 4 (Intermountain); and including units of the National Park Service with sustainable recreation and tourism interests in the region, including Death Valley National Park, Devils Postpile National Monument, Manzanar National Historic Site, Sequoia & Kings Canyon National Parks, and Yosemite National Park.

Task 2. Identify Climate Scenarios and Prepare Climate Change Vulnerability Assessment

The PlaceWorks team will prepare a climate change vulnerability assessment that focuses on the primary assets of outdoor recreation and tourism and their associated assets, systems, services, and populations, including the visitor audience. The climate change vulnerability assessment will be informed by the previously prepared vulnerability assessment for the Resilient Mammoth Lakes project

as well as other recently prepared assessments. We anticipate use of the future climate hazard regimes in the region prepared and assessed as part of Resilient Mammoth Lakes though we will expand the geography of the area to be assessed. The Resilient Mammoth Lakes project is based on the most up-to-date and best available climate science data for the region. The data has been vetted by the state through the Fourth Climate Change Assessment and is publicly available. The assessment will assess recreation assets such as the Mono Lake Tufa State Natural Reserve, Yosemite National Park, and the Inyo National Forest as discreet regional assets. The assessment will include scoring for impact (how severe the effects of climate change may be on the population or asset) and for adaptive capacity (the ability of the population or asset to resist or recover from the effects of climate change) to assess vulnerability. The project team will prepare a briefing report of the findings that will be included as a chapter in the final report.

Deliverables:

- Draft and final list of climate change effects and hazards, populations, and assets.
- Draft and final vulnerability Assessment scoring matrix (impact, adaptive capacity, and vulnerability as applicable).
- Draft and final briefing report.
- Draft and final maps (map book and/or web-based maps) and climate data for Task 3.

Task 3. Natural Capital Assessment

ICF will lead the team's work on Task 3. ICF will estimate the value of ecosystem services provided by the landscape included in the ESSRP as mapped in Task 1 on an annual basis, assuming current conditions. Following the baseline assessment, ICF will assess the future value of ecosystem services inclusive of climate and land management considerations. ICF will select three key land management activities for the analysis based on input from the Town and ESSRP stakeholders.

Task 3.1 Baseline Assessment of Ecosystem Services

The baseline assessment contains three distinct steps to evaluate and estimate the annual value of ecosystem services under current, or baseline.

Step 3.1a: Identify Relevant Ecosystem Services

The first step is to identify the ecosystem services provided by affected lands. For this task we will adopt the framework used by the Millennium Ecosystem Assessment (MEA) which groups ecosystem services into four main categories. The MEA classification of ecosystem services is commonly accepted and widely used in studies seeking to estimate the value of ecosystem services. The MEA classification is also useful for natural capital assessments as the grouping of ecosystem services by MEA is based in part by the benefits that ecosystem services provide to human beings and thus to the economic values that human beings ascribe to them:

- *Provisioning services* provide products that are used directly by people, such as food, fuel, timber, and fresh water;

- *Regulating services* are outputs from the normal functioning of ecosystems that benefit people in direct ways, such as climate change mitigation, water purification, and pollination services;
- *Cultural services* provide benefits to people through experiences, such as spiritual enrichment, cognitive development, and recreational opportunities; and
- *Supporting services* are processes that are necessary for the production of other ecosystem services, such as the cycling of nutrients through an ecosystem, habitat provision, and soil formation.

We will use information on the ecosystem services in each of these categories that are provided by different land types along with information on the land types present in the affected area to gain an understanding of the ecosystem services provided by the ESSRP landscape as mapped in Task 1 and the total acreage of the lands providing the various ecosystem services.

Step 3.1b: Identify Quantification Methods and Conduct Benefit Transfers

Next, we will determine an approach for the valuation of each ecosystem service provided by the ESSRP landscape as mapped in Task 1. Economists utilize a variety of qualification methods depending on the ecosystem characteristics, including market data (for provisioning services that result in market goods), revealed preference methods for those linked indirectly to market activity (e.g., hedonic pricing studies that use data on real estate transactions to infer the value of environmental goods or travel cost methods), and stated preference methods (public surveys). Lastly, some ecosystem services mitigate against damages such as risks from wildfires, including smoke from wildfires, and the value of these services can be approximated by the value of the damages they help to avoid, or the costs of measures that would be implemented to protect against possible damages if these ecosystem services were lost.

Due to the limited time and budget available for this assessment, ICF will rely on benefit transfer methods rather than primary data collection. Benefit transfer involves using values of benefits estimated in other studies and customizing or adapting them to match a new study context. Benefit transfer is commonly used in the valuation of ecosystem services due to the time and expense of conducting primary revealed and stated preference studies. Benefit transfer methods have also emerged as a preferred approach for estimating the benefits of mitigation or management activities within an adaptive pathways framework. For each affected ecosystem service we will conduct benefit transfers using the identified source data (data outlined in the published ecosystem valuation literature and in conjunction with MLTPA). ICF's preferred approach will be to conduct benefit function transfers, adjusting for the socioeconomic characteristics of the affected population (which varies by ecosystem service), the characteristics of the ecosystem service, and the change in level of provision of the ecosystem service. For situations where benefit function transfers are not possible, ICF will rely on a more simplified approach of conducting benefit value transfers, which involve a reduced degree of customization and adaptation of existing values.

Step 3.1c: Quantify and Monetize Ecosystem Services

Next, we will use the results of the benefit transfers conducted in the previous step to quantify and monetize the value of ecosystem services provided by the ESSRP landscape as mapped in Task 1. The

result of the previous step is unit value estimates for the range of affected ecosystem services. ICF will then aggregate these unit values for the affected ecosystem services to estimate the total benefits for each affected land type, based on the ecosystem services provided by a given land type. We will then perform a series of aggregations at different scales to arrive at other total benefit estimate. First, we will aggregate across the types of values that are attributable to an ecosystem service, such as the different types of recreation that could occur at a site. Next, we will aggregate over each population group (users and non-users) by summing the per-unit values for ecosystem services over the number of affected households or individuals in each group. These affected population groups will vary by ecosystem service, with population centers in Los Angeles and Nevada benefiting from some services (e.g., water filtration) and less so from others (e.g., soil creation). For ecosystem services that are aggregated across a population, we will incorporate spatial variability by allowing for distance decay (i.e., for benefits to decrease with increasing distance from the areas providing the ecosystem services). For ecosystem services do not scale by the population (such as those that scale by acres of land or tons of emissions) it is not necessary to aggregate over the affected population. Lastly, we will aggregate values over time by considering the stream of benefits over a defined analysis period and discounting future values to present value terms using a discount rate.

As part of Step 3.1, ICF will provide an interim report that details the assumptions, data sources, results, and conclusions.

Task 3.2. Assessment of Ecosystem Services under Sustainable Recreation Development and Climate Change

In Task 2, ICF will assess the forecasted value of ecosystem services. For a single mid-century year, ICF will establish a single climate change scenario for the study area which ICF will draw from the Vulnerability Assessment. Under the established future scenario, ICF will identify recreation and key land management alternatives from the activities that ESSRP intends to enact.

Step 3.2a: Identify Future Impacts of Sustainable Recreation Development for a Single Climate Scenario

In Step 1, ICF will utilize the climate scenario drawn from the Vulnerability Assessment to identify the impacts to various ecosystem services. Under the established future scenario, ICF will identify if landcover types are likely to change (e.g., as drier or wetter conditions suit different vegetation types) or become degraded (e.g., ecosystems providing less efficient or damaged services as a result of drier or wetter conditions). ICF will also examine how the climate scenario will impact recreation (e.g., whether less water in lakes and streams would impact water activities such as swimming, fishing, or boating) utilizing recreation data from the United States Forest Service in conjunction with MLPTA.

Step 3.2b: Qualitatively and Quantitatively Assess Impacts of Sustainable Recreation Development for a Single Climate Scenario

Similar to Task 1, this task will evaluate the impacts identified in Step 1. Evaluation includes the baseline alternative (“no development” by ESSRP) and the “sustainable recreation development” alternatives (recreation and land management activities enacted by ESSRP). During this task, we also will integrate

the alternatives under consideration with any revisions that have been made to the vulnerability assessment. ICF recognizes that there is often uncertainty in climate data, and this may result in a range for economic valuation as we account of this uncertainty in the economic analysis.

Step 3.2c: Monetize Impacts of Sustainable Recreation Development for a Single Climate Scenario

Similar Task 1, this task will result in estimates of the value of ecosystem services provided by ESSRP lands under each alternative. We will estimate these values under each alternative using a similar process as in Task 1 where unit values for each ecosystem service are aggregated based on the ecosystem services provided by each land type and the acreage of these land types in each alternative. The results of this task will be total estimates of ecosystem services values provided under the “sustainable recreation development” alternatives.

As part of Step 3.2, ICF will provide a final report that details the assumptions, data sources, results, and conclusions for both the baseline and forecast.

Task 4. Prepare potential climate adaptation strategies

In response to newly-identified and revised issues in the updated vulnerability assessment, and in combination with the natural capital evaluation and other analyses, the PlaceWorks team will identify additional climate adaptation strategies to address specific issues of importance to the ESSRP. Strategies could include policies, projects, programs, operations and maintenance, partnerships, and funding and financing mechanisms. We anticipate that identification of these additional strategies will involve coordination with the regional partners included in the ESSRP, and will include additional external agencies, including state and federal organizations. We will prepare these strategies to support the Town of Mammoth Lakes already identified resilience efforts, but with the intention that they be applicable across the region as mapped in Task 1. This will allow for easier coordination between agencies, which should help lead to a comprehensive regional adaptation approach. The project team will prepare a draft matrix of strategies for review by Sustainable Recreation and Tourism Initiative team – including MLTPA and Town staff - and the identified partners in the ESSRP. Following receipt of consolidated comments, PlaceWorks will prepare a revised matrix of strategies. PlaceWorks assumes the matrix of potential climate adaptation strategies will be integrated into Task 5 of the Sustainable Recreation and Tourism Initiative program and will be revised and refined by the regional partners for future efforts. The PlaceWorks team will work with MLTPA to identify up to 5 “Project Candidates” to be derived from the recommendations of the “Climate Adaptation and Resilience Assessment” for inclusion in Track 4 of the SRTI’s “Project Prioritization and Implementation Plan”, a project deliverable for the Town, MLTPA, and the SRTI.

Deliverables:

- Matrix of draft adaptation strategies by type with identification of co-benefits and best practice examples.
- Revised draft adaptation strategies.

- Recommendations of up to 5 “Project Candidates” for inclusion in the SRTI “Project Prioritization and Implementation Plan”, also referred to as “Track 4” of the SRTI.

Task 5. Project Coordination, Meetings, SRTI Projects, and Final Report

The PlaceWorks team will provide project coordination and management throughout the course of the project. This task includes one in-person kick-off meeting with two members of the PlaceWorks team in-person, regular coordination meetings with the Town and the MLTPA team, and a presentation of the final report to Town Council. Our budget assumes two meetings with the Town and MLTPA will be in-person with others as conference calls or web/video conferences. The PlaceWorks team will provide an in-person presentation to the Town Council. As part of preparation for the Town Council meeting, PlaceWorks will prepare a PowerPoint presentation and support staff with preparation of a staff report. The Town will lead all required noticing for meetings. The Final Report will be approximately 50 pages, including an executive summary, and will document all efforts of the “Climate Adaptation and Resilience Assessment” including efforts by PlaceWorks, Atlas Planning Solutions, and ICF as appropriate.

Deliverables:

- Staff participation in an in-person kick-off meeting Town staff and MLTPA team.
- Project coordination and management throughout project, includes monthly invoicing.
- Meetings with Town staff, MLTPA team, and regional partners (assumes 2 in-person meetings and other meetings by phone or web conferencing).
- Preparation of Final Report (Draft and Final, electronic) including Executive Summary.
- Presentation to Town Council and/or ESSRP (in-person).
- Preparation of PowerPoint presentation for Town Council and/or ESSRP and Project Team.

Data Needs

The geographic scope of the project will be defined per the mapping effort identified in the deliverables for Task 1. To complete Task 3, the project team will need data on the physical characteristics and recreational uses of the study area. Physical characteristics include:

- Acreage of land by entity,
- Information on the various land covers, and
- Other ecological characteristics of the land.

Recreational use data includes:

- Number of visitors by entity,
- Recreational uses,
- Number of visitors by recreational use, and
- Revenues generated from various recreational uses.

The data needed to assess impacts includes anticipated impacts by sustainable recreation development as well as trends in recreation and land management under both a “no development” scenario and a

“sustainable recreation development” scenario. Additionally, if the ESSRP has a preferred future year of analysis or climate scenario for the study area, these should also be provided.

Assumptions

- MLPTA will provide the project team with the data needed to conduct the tasks as described above.
- Data availability, data quality, and sector selection will drive the methods we use and the analysis outcomes we derive.
- For Task 3, ICF will characterize certain elements of the benefits and costs at a high level if necessary or provide a qualitative discussion of benefits or costs it is unable to quantify.
- All deliverables will be electronic.
- Budget for all deliverables assumes one draft and one final version of each deliverable. MLPTA, and the Town as appropriate, will review the draft deliverables and provide one set of consolidated comments, preferably using Track Changes in Word, to PlaceWorks. PlaceWorks will coordinate with the consultant team, MLPTA, and the Town as appropriate, to review the comments and edits, confirm changes, and prepare a final version of the deliverable.
- MLPTA will be responsible for scheduling meetings with project partners and reservation of meeting facilities as applicable.
- Town staff will be responsible for scheduling and noticing related to presentations for the Town Council.

EXHIBIT "B"
SCHEDULE OF SERVICES

Schedule

The project is anticipated to begin in late February or early March 2020. Estimated project completion is no later than February 2021.

EXHIBIT "C"
COMPENSATION

Proposed Budget

PlaceWorks Team
Mammoth Lakes Climate Adaptation and Resilience Assessment
COST PROPOSAL

		PLACEWORKS								SUBCONSULTANTS				Total Budget	
		Seale	Krispi	Profsman	GIS	GRAPHICS	TECH. EDITOR	WP/ CLERICAL	PlaceWorks Hours	PlaceWorks Total	Atlas Planning	ICF	5% Subconsultant Markup		Subconsultant Total
		PIC/PM	APM	Project Planner							Meetings, Wildfire Mitigation	Economic Valuation			
Hourly Rate:		\$215	\$145	\$120	\$125	\$100	\$125	\$85							
TASK 1. Review Existing Plans															
1.1	Review existing federal, state, regional, and local plans	4	8	16					28	\$3,940	640	0	\$32	\$672	\$4,612
1.2	Prepare summary matrix	2	4	8					14	\$1,970	0	0	\$0	\$0	\$1,970
Task 1. Subtotal		6	12	24	0	0	0	0	42	\$5,910	\$640	\$0	\$32	\$672	\$6,582
TASK 2. Identify Climate Scenarios and Prepare Climate Change Vulnerability Assessment															
2.1	Prepare vulnerability assessment	16	40	80	8	8	16	16	184	\$24,000	3,200	0	\$160	\$3,360	\$27,360
Task 2. Subtotal		16	40	80	8	8	16	16	184	\$24,000	\$3,200	\$0	\$160	\$3,360	\$27,360
TASK 3. Natural Capital Assessment															
3.1	Baseline Assessment of Ecosystem Services	2	4						6	\$1,010	0	0	\$0	\$0	
3.2	Assessment of Ecosystem Services under Sustainable Recreation Development and Climate Change	2	4						6	\$1,010	0	0	\$0	\$0	
Task 3. Subtotal		4	8	0	0	0	0	0	12	\$2,020	\$0	\$55,614	\$2,781	\$58,395	\$60,415
TASK 4. Prepare Potential Climate Adaptation Strategies															
4.1	Research and compile example best practices to address vulnerabilities	2	8	20					30	\$3,990	1,280	0	\$64	\$1,344	\$5,334
4.2	Prepare draft adaptation strategy matrix	6	14	30					50	\$6,920	960	0	\$48	\$1,008	\$7,928
Task 4. Subtotal		8	22	50	0	0	0	0	80	\$10,910	\$2,240	\$0	\$112	\$2,352	\$13,262
TASK 5. Project Coordination, Meetings, and Final Report															
5.1	Project Kick-off meeting	8	12	8					28	\$4,420	1,280	0	\$64	\$1,344	\$5,764
5.2	Project coordination and management	12	8						20	\$3,740	1,440	0	\$72	\$1,512	\$5,252
5.3	Meetings with MLTPA, Town staff, regional partners	10	16	10					36	\$5,670	3,840	0	\$192	\$4,032	\$9,702
5.4	Final Report and Presentation	8	10	16		8	12	16	70	\$8,750	1,280	0	\$64	\$1,344	\$10,094
Task 5. Subtotal		38	46	34	0	8	12	16	154	\$22,580	\$7,840	\$0	\$392	\$8,232	\$30,812
Labor Hours Total		72	128	188	8	16	28	32	472						
Labor Dollars Total		\$15,480	\$18,560	\$22,560	\$1,000	\$1,600	\$3,500	\$2,720		\$65,420	\$13,920	\$55,614	\$3,477	\$73,011	\$138,431
EXPENSES															
PlaceWorks Reimbursable Expenses (assumes 2 in-person meetings)															\$3,000
ICF Reimbursable Expenses (assumes 1 site visit)															\$916
Atlas Planning Reimbursable Expenses (mileage for 4 in person meetings/trips)															\$1,600
Expenses Total															\$5,516
Total Labor and Expenses															\$143,947