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Tillamook Estuaries Partnership, Vulnerability Assessment and Adaptation Strategy Planning, RFP

Proposal Submitted January 31, 2017

Project Team Leader: Dr. Marni Koopman
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GEOS INSTITUTE

Proposal Contents

Transmittal Letter

December 12, 2016

Mr. Scott Bailey
Tillamook Estuaries Partnership
P O Box 493
Garibaldi, OR 97118

Dear Mr. Bailey,

With this letter the Geos Institute is pleased to submit our proposal in response to your RFP for a Tillamook County Vulnerability Assessment and Adaptation Strategy Plan. The Geos Institute helps natural resource managers and community leaders create climate change adaptation solutions that are nature-based and equitable, create co-benefits where possible, and endure over time.

Through our ClimateWise® consulting services we bring the best available climate change science and facilitation methods to help decision-makers and stakeholders understand and respond to changing climate conditions. Our ClimateWise® team uses a Whole Community planning framework, which is a science-based and highly collaborative approach to develop adaptation solutions.

Our Working Waters program helps watersheds in Oregon and Washington respond to changing climate conditions using green infrastructure-based restoration techniques and coordinates the re-granting program of the Drinking Water Provider Partnership. The project team we have put together includes staff from our ClimateWise® and Working Waters programs along with Ms. Cara Pike from Climate Access who will develop the public education and engagement recommendations. We have developed an effective working relationship with Ms. Pike and her team through prior consulting projects and adaptation field development efforts.

Our goals for this effort with the Tillamook Estuary Partnership are two-fold: create an effective and actionable climate adaptation plan and build adaptive capacity within the project area to assist you in carrying on the work and effectively managing unforeseen disturbances once this planning effort is complete. We aim to help you create the foundation of your adaptation program by providing a solid science base, facilitating the development of effective adaptation strategies for your five watersheds and bays, and creating a strong foundation of local support for this work going forward.

Our current principal areas of expertise include: translating climate change science for natural resource managers and community planners, engaging natural resource managers and local communities in developing adaptation plans, facilitating workshops to develop collaborative solutions, creating outreach materials, and building local buy in and support for climate action.

The Geos Institute has conducted similar projects in many areas and with diverse audiences. Our science-based and non-political approach allows us to engage people with a variety of perspectives and backgrounds. We welcome climate change skeptics into our process. We confirm that we have received any and all amendments to this RFP issued by TEP. Thank you for considering our proposal.

Sincerely,

Tonya Graham, Executive Director

Staff Qualifications and Relevant Experience

Project Team and Qualifications

Our ClimateWise® project team combines in-house expertise and experience with strategic partnerships with other firms across the U.S. Our core team members who will implement this project are listed below, with Dr. Marni Koopman serving as Project Lead.

Dr. Marni Koopman - Climate Change Scientist at Geos Institute. She serves as the Project Lead for many ClimateWise® projects, translating science, and leading natural resource agencies through their process. Dr. Koopman is a primary architect of Whole Community Adaptation.

Cathy Kellon - Working Waters Program Director at Geos Institute. She assists municipal watersheds in developing restoration projects that work for people and wildlife and coordinates the re-granting program of the Drinking Water Provider Partnership.

Tonya Graham - ClimateWise® Program Director and Geos Institute Executive Director. A recognized leader in the adaptation field, she has participated in and provided oversight for all ClimateWise® projects and is one of the primary architects of Whole Community Adaptation.

Jessica Leonard - Geospatial Analysis Program Manager. She leads the ClimateWise® data analysis and climate change projection development process turning massive data sets into understandable and actionable information for local decision-makers.

Cara Pike - Executive Director of Climate Access. A national leader in the field of climate change communications, she will serve as a sub-contractor to develop recommendations for TEP's future public information and engagement efforts.

The ClimateWise® team has extensive experience engaging in climate change vulnerability assessments and adaptation planning for both natural systems and human communities. Over the past 8 years, our team has developed and refined the concept of Whole Community Adaptation (learn more with this video: https://www.youtube.com/watch?v=ICFardnOMYs) – a framework that can be used for adaptation planning in natural and human communities. A particular strength of this approach is the ability to integrate the needs of natural systems and people through a process that is cross-sectoral, multi-stakeholder, and adaptive over time.

Our team has the expertise to perform in-house climate model projections analysis and create custom tables, graphs, and maps that are easy to understand for local officials and the general public. We seek out the variables and science most important for the planning area, such as

changes in extreme events, sea level rise, or projections for vegetation change. We then use that information to help our clients identify vulnerabilities and develop actionable strategies.

As part of our adaptation practice, the ClimateWise® team has developed Adaptation Blueprints for natural resources in large landscapes, including the Colorado Plateau, Klamath-Siskiyou Ecoregion, and Pacific Coastal Rainforest Region. The Adaptation Blueprints assess whether existing conservation plans will be adequate to protect focal resources under likely climate change scenarios. We have also conducted science assessments in support of adaptation planning throughout the Sierra Nevada, California. Our team is currently completing a climate change science assessment for the Province of Alberta, Canada, in collaboration with Care Pike, who will serve as a member of the ClimateWise® team for this project. The two organizations have developed an effective working relationship through several projects and field-wide efforts. Reports for the above projects and more examples of the ClimateWise® process are available at our website – www.climatewise.org.

Marni E. Koopman, Ph.D., Geos Institute Climate Change Scientist and Project Lead

Dr. Marni Koopman serves as the lead scientist for the ClimateWise program and is responsible for project management for many ClimateWise® projects. She works closely with Geospatial Analysis Program Manager, Jessica Leonard, to retrieve the latest model outputs, conduct quality control, employ the latest methodology for analyses, and develop displays of data that are accurate in their messaging and depiction of changing conditions for both scientist and non-scientist audiences. Marni communicates regularly with the nation's leading climate scientists and modelers to obtain the most up-to-date information on future trends and is a primary architect of the Whole Community Adaptation framework.

Qualifications

- ✓ Vulnerability Assessment training - US Fish and Wildlife Service
- ✓ Instructor for Climate-Smart Conservation
- ✓ Chapter author for Climate-Smart Conservation handbook
- ✓ Science writing for scientists and general public audiences
- ✓ Presentation and communication of local climate change projections
- ✓ Extreme events climate change projections analysis and graphical display
- ✓ Work with CMIP5 climate model output, BCM and VIC hydrology model output, and MC2 vegetation and wildfire model output

Educational Background

University of Wyoming – Laramie, WY
Ph.D. in Zoology and Physiology 2003

University of California at Berkeley, Berkeley CA
Master of Science in Wildland Resource Science 1995

University of California at Santa Barbara, Goleta CA
Bachelor of Art in Environmental Studies 1992

Select Publications

Koopman, M. E. and T. Graham. 2015. Whole Community adaptation to climate change. Elsevier Reference Module in Earth Systems and Environmental Sciences.

Koopman, M. E., D. DellaSalla, P. vanMantgem, B. Blom, J. Teraoka, R. Shearer, D. LaFever, and J. Seney. 2014. Managing an Ancient Ecosystem for the Modern World: Coast Redwoods and Climate Change. Geos Institute Report. 26pp.

Koopman, M. E. and P. Glick. 2014. Putting Plans Into Action. Pp. 181-193 in Climate Smart Conservation: Putting Adaptation Principles into Practice. National Wildlife Federation. (http://www.nwf.org/pdf/Climate-Smart-Conservation/NWF-Climate-Smart-Conservation_5-08-14.pdf)

Koopman, M. E. and J. Leonard. 2014. Future climate, hydrology, vegetation, and wildfire projections for the Southern Sierra Nevada, California: A climate change synthesis in support of Integrated Regional Water Management Planning. Geos Institute.

Cross, M. S., E. S. Zavaleta, D. Bachelet, M. L. Brooks, C. A. F. Enquist, E. Fleishman, L. Graumlich, C. R. Groves, L. Hannah, L. Hansen, G. Hayward, M. Koopman, et al. 2012. The Adaptation for Conservation Targets (ACT) framework: A tool for incorporating climate change into natural resource management. Env. Mgmt DOI 10.1007/s00267-012-9893-7.

Cathy Kellon, Geos Institute Working Waters Program Director

Cathy Kellon leads the Geos Institute's efforts to restore municipal watersheds for the benefit of native fishes and human communities. As a primary driver of the Drinking Water Providers Partnership, she helps develop partnerships between restoration practitioners, agencies, and municipal water providers that result in innovative watershed restoration projects designed to help communities address climate change-driven water challenges while restoring wildlife habitat. Cathy coordinates the Partnership's re-granting program, and serves on the Healthy Headwaters Leadership Team of Carpe Diem West and the National Drinking Water Advisory Council. Her office is based in Portland, Oregon, which is within a 100 mile radius of Tillamook County, in the event that additional in person meetings need to happen with the Project Team.

Tonya Graham, Geos Institute Executive Director and ClimateWise® Program Director

Tonya Graham supervises the ClimateWise® staff in implementing climate change adaptation planning projects with natural resource and community clients, including overseeing financial management of contract funds. She also serves on the facilitation team for workshops and helps guide program staff in designing the adaptation planning process for communities and natural systems. Along with her colleagues on the ClimateWise® team, Tonya has taken a lead role in developing the Whole Community Adaptation framework and refining the ClimateWise® process. She is actively involved in the development of the climate change adaptation field and served as a co-coordinator with the Kresge Foundation of the first national gathering of adaptation professionals in 2012.

Jessica Leonard, GISP

Jessica Leonard manages the Geos Institute's Geospatial Analysis Program, with an emphasis on preparing local climate change projections for natural resource agencies and communities planning for climate change. She has developed custom python scripts to facilitate the conversion of raw climate data into aesthetically pleasing and

educational projection maps using GIS. Jessica collaborates with climate modelers to obtain the most useful and up-to-date climate data for each project. She also analyzes future climate data and observed weather station data to extract thresholds for temperature and precipitation extremes to provide graphs and information on extreme events, such as heat waves, extended low temperatures, and extended drought. Jessica has a wide range of GIS and cartographic experience and she assists with other mapping needs, such as mapping fish habitat and passage impediments to aid restoration efforts, and assessing pollutants within drinking water surface water source areas.

Cara Pike, Climate Access Executive Director

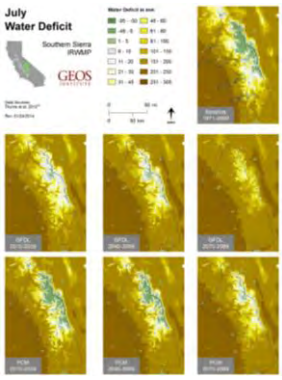
Cara Pike is the founder and director of Climate Access. Her work includes creation of the *Ecological Roadmap*, a values-based approach to building support for environmental protection; *Climate Communications Behavior Change – A Guide for Practitioners*; and other widely used publications and toolkits to guide education and engagement efforts regarding climate change. Cara regularly advises government agencies and nonprofit organizations including the Obama Administration, City of Boston, Province of British Columbia, State of Vermont, and others. She will serve as a sub-contractor on this project.

Specific Similar Project Experience

The Geos Institute's ClimateWise team has worked with natural resource managers across the West to develop and prioritize climate change solutions for their specific needs and vulnerabilities. Representative examples of our work are included below.

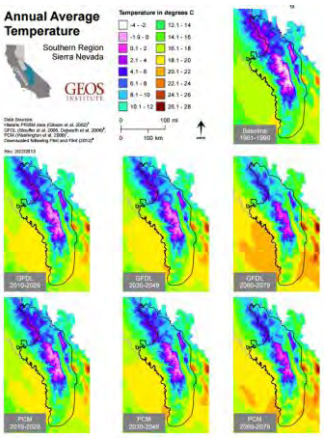
Planning for Water Resources in the Southern Sierra Nevada, California (2014)

The Geos Institute worked with Provost and Pritchard Consulting and Kamansky Consulting to develop a climate change adaptation plan for water resources in the Southern Sierra Integrated Regional Water Management Planning area. We provided extensive model assessment and mapping to guide the development of sustainable water management actions on state, federal, and private lands. We participated in a workshop of diverse stakeholders to present climate change trends and impacts.



For the complete report, visit: http://climatewise.org/projects/1145-southern-sierra. Project lead: Dr. Marni Koopman.

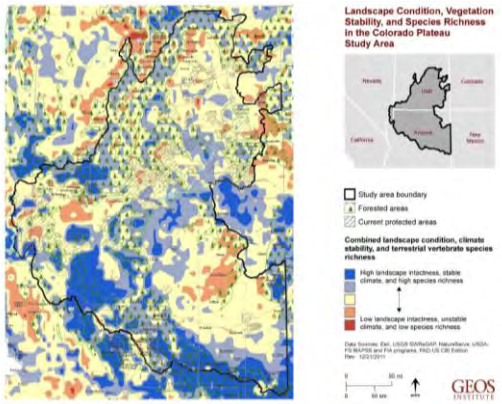
Future Climate, Wildfire, Hydrology, and Vegetation Projections for the Sierra Nevada, California (2013)



The Geos Institute worked with state and federal agencies and NGOs to conduct a vulnerability assessment and develop adaptation strategies for Forest Service lands in the Sierra Nevada Range. Our role was to provide the science assessment and assist in the adaptation strategy development for focal species of the Sierra Nevada.

Geos Institute provided spatial analysis of existing climate models as part of the science synthesis reviewing the relevant model projections and ecological research for the region. We provided climate change projections in two different formats – as regional and seasonal averages and as maps that show variation across the region and over future time periods. We mapped climate, vegetation, hydrology, and wildfire variables for historical period (1961- 1990 for all variables except hydrology variables, where the historical period was 1971-2000) and for three future periods. For the complete report, visit: http://www.climatewise.org/projects/1044-sierra-nevada. Project lead: Dr. Marni Koopman.

Identifying Potential Terrestrial Climate Change Refugia in the Greater Grand Canyon/Colorado Plateau Ecoregion (2012)



The Greater Grand Canyon/Colorado Plateau ecosystem includes significant biological diversity due to its range of elevations and microclimates. To help guide future conservation efforts, we created a blueprint that takes into account not only current areas of conservation importance for terrestrial species and habitats, but also the potential future stability of those areas and the need for species to move and shift their ranges in response to a changing climate. Our conservation blueprint approach acknowledges the importance of conserving historically diverse areas, intact landscapes, biological diversity, landscape linkages, and potential climate change refugia. Project lead: Dr. Marni Koopman.

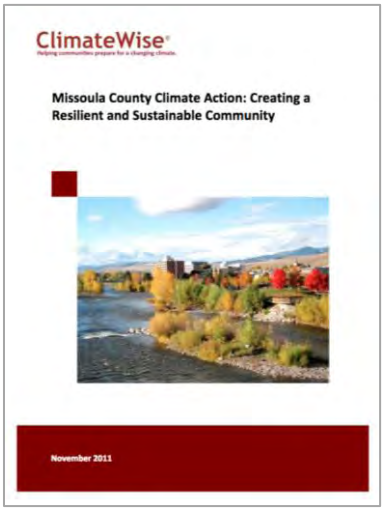
Climate Change Preparation Planning on National Landscape Conservation System Lands (2010)

We worked with NGO partners to conduct a 10-year assessment of progress in conservation management of NLCS lands. This effort included a review of Resource Management Plans, scoring of conservation elements, and assessment of climate change adaptation measures already in place, as well as guidance on new measures that are needed. For each unit reviewed, we provided an overview of climate impacts and trends, as well as current stressors and actions. Project lead: Dr. Marni Koopman.

Two reports from the effort are available:
http://www.forestlegacies.org/images/stories/pdfs/Publications/FederalLandsManagement/ClimateChange_NLCS_smallFinal.pdf

http://www.forestlegacies.org/images/stories/pdfs/Publications/FederalLandsManagement/NLCSReviewReportFinal3small.pdf

Climate Change Adaptation Planning in OR, CA, MT, and TX (2008-2016)



We have conducted ClimateWise community planning processes in more than 12 counties throughout OR, CA, MT, and TX (more info. at www.climatewise.org). Many projects, including Missoula MT, Deschutes and Klamath Counties, OR, and San Luis Obispo County, CA were notable due to the heavy focus on natural resources by the communities. During our workshops, we develop a set of common community values that participants are dedicated to maintaining. Missoulans, for instance, are closely tied to their environment for work, recreation, and quality of life. By integrating adaptation strategies across the different sectors of society, county leaders will reduce conflict among diverse interests for limited resources, such as water, while increasing communication and lowering overall costs.

For more information on the Missoula project, visit http://climatewise.org/projects/905-missoula-county. Project lead: Dr. Marni Koopman.

Working Waters Program and the Drinking Waters Provider Partnership (2013-2016)

The Geos Institute's Working Waters program helps develop partnerships between water providers, restoration practitioners, and natural resource agencies to spur on-the-ground restoration projects to meet climate change-driven water challenges for communities while improving habitat for fish and wildlife. Over the past three years, the Drinking Water Providers Partnership, which started with the Geos Institute and the Forest Service, has expanded to include the Bureau of Land Management, the Environmental Protection Agency, Oregon Department of Environmental Quality, Washington Department of Health, and WildEarth Guardians. 2016 marked the first year of the re-granting process that the Geos Institute coordinates on behalf of the Partnership. In that cycle, 11 projects were funded in Oregon to use restoration techniques to improve water quality or supply issues in municipal watersheds. The Partnership has just issued its second call for proposals to be awarded in 2017. Through this Partnership, the Geos Institute has relationships in many Oregon communities, agencies, and organizations that can be brought to bear on behalf of the TEP. Project Lead: Cathy Kellon.

For more information on the Working Waters Initiative and the Drinking Water Provider Partnership, visit http://www.workingwatersgeos.org/.

Project Approach

The Geos Institute proposes to develop a vulnerability assessment and adaptation strategy for the Tillamook Estuaries Partnership using the EPA's A Workbook for Developing Risk-Based Adaptation Plans for the Vulnerability Assessment and the ClimateWise® process for the Adaptation Strategy.

Our proposal outlines the steps that will result in the Tillamook Estuaries Partnership (TEP) having:

- a clear understanding of its climate change related vulnerabilities for wildlife, fisheries, forestry, and water resources;
- a strategy in place to engage with stakeholders in setting goals, assessing adaptation options, and implementing priority actions into the future;
- recommendations for a public education and engagement initiative; and
- the skills necessary in house to continue revising the strategy into the future.

Phase 1: Project Management and Stakeholder Selection
(January 4 – July 31, 2017)

Task 1: Assemble Project Team and Identify Stakeholders (January 4 – January 31, 2017)

While the responsibility for assembling this Project Team lies with TEP, the EPA's workbook and the ClimateWise Team recommend including key stakeholders as active participants in this Project Team. We will assist in identifying stakeholders and determining how each will be invited to be involved. This is a particularly important step as it not only helps identify who will serve on the Project Team, but also who will be engaged as part of the vulnerability assessment process and who should be kept apprised of the project's progress over time. This engagement is particularly important given TEP's desire to secure public and stakeholder support for the recommendations developed in this process.

ClimateWise Team Contributions: Dr. Marni Koopman, Cathy Kellon, Cara Pike (Sub-contractor)
Deliverables: Guidance to TEP regarding the composition of the Project Team, complete identification of key stakeholders, hold initial phone conversations with up to 15 stakeholders
TEP/Project Team Responsibilities: Identify and invite Project Team members and help identify key stakeholders and determine their roles in the project

Task 2: Project Kickoff Meeting (early February 2017)

We will spend a day on-site facilitating the kickoff meeting with the Project Team and presenting to relevant TEP personnel, local leaders, and officials as guided by TEP. The ClimateWise Team and TEP will clarify and/or refine roles, responsibilities, timelines, and activities to ensure a smooth, productive project and completion of deliverables on time and within budget. It is also an opportunity to introduce the project to key stakeholders, clarify the opportunities to engage in this process in a meaningful way, confirm the specific geographical boundaries, and solicit input regarding issues stakeholders would like addressed in this process.

ClimateWise Team Contributions: Dr. Marni Koopman and Cathy Kellon

Deliverables: One project kickoff meeting plus stakeholder meetings/presentations as needed
TEP/Project Team Responsibilities: Secure a meeting space for the kickoff meeting, identify key staff and elected officials, and invite them to a presentation or one on one meetings as appropriate

Task 3: Project Management Meetings (February 1 – July 31, 2017)

The Project Lead will meet with the Project Team on a schedule determined by the TEP (recommend 2 one-hour meetings each month) by video call to update the Project Team on our progress, request feedback and input on drafts, and address any unforeseen circumstances.
ClimateWise Team Contributions: Dr. Marni Koopman
Deliverables: Participate in up to 12 meetings of the Project Team
TEP/Project Team Responsibilities: Coordinate the Project Team meetings

Task 4: Project Closeout Meeting (by July 31, 2017)

The Project Lead will facilitate a project closeout meeting in person to present the final vulnerability assessment and adaptation strategy to the Project Team.
ClimateWise Team Contributions: Dr. Marni Koopman
Deliverables: One project closeout meeting facilitated, all deliverables complete and approved
TEP/Project Team Responsibilities: Receive and approve final deliverables

Phase 1 Personnel Costs: $9,030 **Direct Costs:** $842

Phase 2: Compile Climate Change Science and Projections
(February 1, 2017 – March 17, 2017)

Task 1: Compile relevant current and future climate science (February 1 – March 17)

The ClimateWise Team will compile information on the most widely accepted climate models, emissions scenarios, downscaled data, and projections for the region that describe the range of possible climate-related impacts the region may experience in the future. In this process, we will evaluate existing climate action plans, vulnerability assessments, and adaptation plans in the region to ensure that climate change projections used in Tillamook are consistent with projections used by neighboring regions. Some resources that we will draw from include the Lower Columbia Estuary Partnership's Vulnerability Assessment, National Climate Assessment Third Assessment report, IPCC Fifth Assessment report, climate projections from the Oregon Climate Change Research Institute, and data available through the USFS's climate portal (TACCIMO.info). We will consult with TEP on the variables of interest, determine what is readily available, identify gaps, and recommend ways to address the gaps in this process.

For climate change projections specific to the Oregon coast, if this information is not already available, the Geos Institute will work with the Northwest Climate Science Center (NW CSC) and the Oregon Climate Change Research Institute to obtain downscaled climate model output. Model output will consist of downscaled Coupled Model Intercomparison Project 5 output based on both the RCP8.5 (less optimistic) and 4.5 (more optimistic) or 2.5 (most optimistic) emissions pathways. We will present the results of an ensemble of multiple models, based on

consultation with NW CSC scientists in a series of tables, maps and graphs that are easily used in management and decision making processes.
ClimateWise Team Contributions: Dr. Marni Koopman and Jessica Leonard
Deliverable: Information with maps and graphs compiled for use in the final climate change science and projections report
TEP/Project Team Responsibilities: Provide feedback regarding relevance of particular variables in this assessment

Task 2: Compile information on climate change-related impacts to wildlife, fisheries, forestry, and water resources (February 1 – March 17)

The ClimateWise team will conduct a literature review of climate change-related impacts publications (scientific papers and reports) and will confer with local experts from government agencies and universities on which species and resources to focus on in the planning area. Some topics to be covered include climate change risk assessments for threatened and endangered species, climate envelope model projections for dominant trees and wildlife, studies of hydrological change related to climate change, sea level rise mapping for the region, and others. As we collect information, we will organize specific impacts in relation to the risk pathways in Phase III. We will draft a concise review of the information, including graphics that help to illustrate climate change stressors and risk pathways. We will ask 2-3 local experts to provide a peer review to ensure scientific rigor.
ClimateWise Team Contributions: Dr. Marni Koopman and Cathy Kellon
Deliverables: Draft report of climate change-related impacts to the four sectors
TEP/Project Team Responsibilities: Provide guidance regarding existing known research in the four sectors, and review, provide feedback, and approve the draft report

Task 3: Finalize the climate change science and projections report (March 1 – March 17)

The ClimateWise team will combine the draft reports from Tasks 1 and 2 and present a draft climate change science and projections report to the Project Team for feedback and approval.
ClimateWise Team Contributions: Dr. Marni Koopman
Deliverables: Final science and projections report that incorporates climate change-related impacts to the four sectors identified above
TEP/Project Team Responsibilities: Review, provide feedback, and approve the climate change science and projections report

Phase 3: Develop a Vulnerability Assessment

(February 1 – May 24, 2017)

Task 1: Develop a Preliminary Vulnerability Assessment (Feb. 1 – April 14)

We will convene small teams of expert stakeholders (identified in Phase I) for each of the four sectors. These teams will assist us in developing a preliminary Vulnerability Assessment based on the EPA's workbook steps and using Table 4-1 for Risk Analysis. We will guide the teams in identifying potential climate-related risks to TEP's ability to meet the goals identified in its comprehensive plan. They will characterize each risk in five areas: (1) consequence, (2)

likelihood, (3) spatial extent of the impact, (4) time horizon until the problem begins, and (5) habitat type. This draft Vulnerability Assessment will be based on the assessment in Phase II and a compilation of information from climate change vulnerability assessments and adaptation plans in the northwest region as well as information from State experts, academic experts, and Tillamook County/Oregon Coast-specific data. We will review other West Coast National Estuary Programs' assessments as well as relevant state initiatives, identify preliminary information gaps that are relevant to Tillamook County, and develop recommendations to address the gaps in the Vulnerability Assessment.

ClimateWise Team Contributions: Dr. Marni Koopman and Cathy Kellon
Deliverables: Draft preliminary Vulnerability Assessment presented to Project Team for review
TEP/Project Team Responsibilities: Review, provide feedback, and approve preliminary report

Task 2: Develop draft public education and engagement recommendations (March 16 – May 17)

Climate Access will conduct interviews with eight of the organizations involved in this process to understand how information is transmitted within the larger community that encompasses the planning area and what opportunities exist and can be brought to bear in the development of recommendations for public education and engagement.

ClimateWise Team Contributions: Cara Pike/Climate Access Team (Sub-contractor)
Deliverables: Eight interviews completed, draft of recommendations for public education and engagement presented to Project Team
TEP/Project Team Responsibilities: Connect the Climate Access team to high priority stakeholders for this task (these stakeholders will be identified in Phase 1)

Task 3: Facilitate a One-Day Technical Vulnerability Assessment Workshop (early May, 2017)

In accordance with the EPA Workbook, we will work with TEP to bring together the Project Team, sector teams, agency staff, other scientific experts, local leaders, affected industries, public and private educational institutions, and select members of the public to review and complete a sector-based Vulnerability Assessment for the planning area ensuring that the completed plan is compatible with State level planning processes. This workshop will identify vulnerabilities to the five watersheds and bays as well as the communities that depend on their healthy functioning. The goal is to check the preliminary risks and information gaps with scientists, natural resource managers, and community leaders who have strong real-world experience in the planning area. We will share climate change science and projections, get feedback on the preliminary Vulnerability Assessment, solicit additional information, fill in any gaps, and adjust the qualitative rankings developed during Phase III, Task 1. This multi-stakeholder, cross-sector approach allows us to ensure that the Vulnerability Assessment is complete and accurate based on current knowledge, and risks are appropriately prioritized. Background materials will be sent to participants at least one week prior to the workshop.

ClimateWise Team Contributions: Dr. Marni Koopman, Tonya Graham, Cathy Kellon
Deliverables: Completed workshop with notes to use in drafting the Vulnerability Assessment

TEP/Project Team Responsibilities: Assist the Geos Institute in identifying and inviting appropriate workshop participants, provide meeting facilities (for 40 people) and logistical support, and attend and participate in the workshop

Task 4: Finalize the Vulnerability Assessment (April 17 – May 24)

Based on the feedback provided at the technical workshop, revise the draft Vulnerability Assessment and present it to the Project Team and workshop participants for one round of edit suggestions prior to finalizing the document.
ClimateWise Team Contributions: Dr. Marni Koopman
Deliverables: A final Vulnerability Assessment for the planning area
TEP/Project Team Responsibilities: Review, provide feedback, and approve the final Vulnerability Assessment

Phase 4: Develop a Climate Change Adaptation Strategy
(April 21 – July 31, 2017)

Task 1: Develop a Climate Change Adaptation Strategy (April 21- May 31)

Having completed the Vulnerability Assessment using the EPA's workbook, we will employ the ClimateWise framework customized to meet TEP's needs and circumstances to develop the Adaptation Strategy as identified in Tasks 2-6. The ClimateWise framework has many features in common with the Climate-Smart Conservation framework (the National Wildlife Federation handbook often used by natural resource managers). It includes a day-long workshop to identify potential adaptation strategies based on the vulnerabilities identified and prioritized in the Phase III. To prepare for this workshop, the ClimateWise Team will review similar plans from the region and identify strategies employed to reduce vulnerabilities. This task involves reaching out to watershed organizations and agencies to elicit ideas for project types. That information will be drafted and shared with the Project Team for comment before serving as the foundation for the strategy development workshop.
ClimateWise Team Contributions: Dr. Marni Koopman
Deliverables: The ClimateWise process customized to meet the needs of TEP. Note: the process for developing the adaptation strategy will be refined during regular Project Team meetings.
TEP/Project Team Responsibilities: Approve the planning strategy, and review, provide feedback, and approve the potential strategies that will serve as the basis of the workshop
Task 1 Personnel Costs: $3,325 **Direct Costs:** $0

Task 2: Develop a prioritization process to be included in the Adaptation Strategy Plan (April 21 – May 31)

For the plan to be effective, strategies developed as part of this phase must be prioritized according to criteria agreed upon by the Project Team. We will work with the Project Team to develop criteria and a methodology for ranking opportunities, evaluating benefits, costs, social and logistical factors to identify high-priority projects. These criteria will be used at the second workshop to prioritize adaptation strategies. Note that our team has developed criteria like this many times and will bring recommendations to the effort.

ClimateWise Team Contributions: Dr. Marni Koopman and Tonya Graham
Deliverable: Finalized prioritization process for adaptation strategies
TEP/Project Team Responsibilities: Review, provide feedback, and approve the prioritization process
Task 2 Personnel Costs: $1,020 **Direct Costs: $0**

Task 3: Facilitate a one-day workshop to develop the adaptation strategy (mid-June, 2017)

We will convene a day-long workshop with internal and external stakeholders to develop and prioritize strategies to address the vulnerabilities identified in Phase III. This step includes prioritization of potential short, mid- and long-term adaptation strategies. This workshop will engage stakeholders in setting goals, assessing adaptation options aimed at reducing impacts and improving resiliency of communities and ecosystems, and implementing priority actions. We will work with the Project Team to determine the types of project opportunities to be identified and scoping methods.

Key to the ClimateWise process is that workshop participants work in cross-sector groups to develop strategies that are co-beneficial across more than one resource or sector. This approach also prevents the development of strategies in one sector that exacerbate climate impacts in another sector. We have had great success with this approach.

We will re-convene the participants from the vulnerability assessment workshop, invite additional participants if needed, and present them with the projections identified in Phase II, the Vulnerability Assessment from Phase III, the draft strategies developed in Phase IV, and the draft recommendations for public education and engagement from Phase III at least one week prior to the workshop. Breakout sessions made up of stakeholders from diverse sectors of the natural resource and relevant community sectors will address each of the draft strategies and recommendations, making adjustments to those actions where possible to create added benefit and address potential conflicts. Participants will then prioritize strategies and review the draft recommendations for public education and engagement.
ClimateWise Team Contributions: Dr. Marni Koopman, Tonya Graham, and Cathy Kellon will coordinate and facilitate the workshop
Deliverables: Completed facilitation of an integrated strategy development workshop, draft recommendations for strategies developed and presented to Project Team
TEP/Project Team Responsibilities: Identify and invite stakeholders to participate in this workshop, secure a meeting facility (for 40 participants), assist with logistics, and attend and participate in the workshop

Task 4: Finalize recommendations for a public information and engagement initiative (mid-June – July 21)

Based on the feedback from the second workshop, and through an editing process with the Project Team, we will finalize recommendations for an ongoing public education and engagement effort. These recommendations will be included in the final document.
ClimateWise Team Contributions: Cara Pike - Subcontractor (Climate Access), Tonya Graham (Geos Institute)

Deliverables: Final recommendations for a public education and engagement effort for the TEP
TEP/Project Team Responsibilities: Review, provide feedback, and approve the recommendations for a public education and engagement initiative

Task 5: Complete a Final Climate Change Vulnerability Assessment and Adaptation Strategy (by July 21, 2017)

We will submit a proposed report outline for approval by the Project Team in advance of developing the draft report. Once the report outline is approved, we will compile all information gathered in the Adaptation Strategies workshop along with the climate change projections, Vulnerability Assessment, and the final recommendations for public education and engagement initiative into one coherent report that clearly identifies high priority adaptation actions that the TEP and local partners can take to reduce the impacts of climate change on the five watersheds and bays. This comprehensive report, which details this assessment and its recommendations, including data and maps and findings on the added benefits of green infrastructure and restoration approaches, will be presented in draft form to the Project Team and key stakeholders from the workshops to solicit feedback. The final draft will incorporate written and oral comments and be presented to the Project Team for approval.
ClimateWise Team Contributions: Dr. Marni Koopman, Cathy Kellon, Tonya Graham, Jessica Leonard, and Cara Pike - Subcontractor (Climate Access)
Deliverables: Final Vulnerability Assessment and Adaptation Plan
TEP/Project Team Responsibilities: Review, provide feedback, and approve the draft report outline and the final Vulnerability Assessment and Adaptation Plan
Task 5 Personnel Costs: $5,735 **Direct Costs:** $0

Task 6: Public or professional presentation of the vulnerability assessment and adaptation plan (by July 31, 2017)

We will assist the TEP in developing and delivering a public or professional presentation that is consistent with the final recommendations for public education and engagement. This event will be timed to occur in conjunction with the close out meeting.
ClimateWise Team Contributions: Dr. Marni Koopman
Deliverable: Successful public or professional presentation completed
TEP/Project Team Responsibilities: Assist in the development of this presentation, secure a venue for the public forum, invite key stakeholders and elected officials, and advertise or identify and invite participants as appropriate

Timeline of Phases and Tasks

	January	February	March	April	May	June	July
PHASE 1. PROJECT MANAGEMENT AND STAKEHOLDER SELECTION							
Task 1: Assemble Project Team and Identify Stakeholders	4 – 31						
Task 2: Project Kickoff Meeting							
Task 3: Project Management Meetings		1 – 31					
Task 4: Project Closeout Meeting							31
PHASE 2. COMPILE CLIMATE CHANGE SCIENCE PROJECTIONS							
Task 1: Compile relevant current and future climate science		1 – 17					
Task 2: Compile information on climate change-related impacts		1 – 17					
Task 3: Finalize the climate change science and projections report			1 – 17				
PHASE 3. DEVELOP A VULNERABILITY ASSESSMENT							
Task 1: Develop a Preliminary Vulnerability Assessment		1 – 14					
Task 2: Develop draft public education and engagement recs			16 – 17				
Task 3: Facilitate a Technical Vulnerability Assessment Workshop							
Task 4: Finalize the Vulnerability Assessment				17 – 24			
PHASE 4. DEVELOP A CLIMATE CHANGE ADAPTATION STRATEGY							
Task 1: Develop a Climate Change Adaptation Strategy				21 – 31			
Task 2: Develop a prioritization process to be included in the Plan				21 – 31			
Task 3: Facilitate a workshop to develop the adaptation strategy							
Task 4: Finalize public engagement recommendations							21
Task 5: Complete a final climate change Vulnerability Assessment and Adaptation Strategy Plan							21
Task 6: Presentation of the Vulnerability Assessment and Adaptation Strategy Plan							31

Note: Dates shown are start and end dates.

Project Budget

Phase I: Project Management & Stakeholder Selection	
Personnel	
M. Koopman (45 hrs @$125/hr)	5,625
C. Kellon (18 hrs @ $100/hr)	1,800
T. Graham (8 hrs @ $135/hr)	1,080
C. Pike - Subcontractor (3 hrs @ $175/hr)	525
Travel (Koopman and Kellon to kickoff mtg)	842
Phase I Subtotal	***9,872***
Phase II: Compile Climate Change Science and Projections	
Personnel	
M. Koopman (80 hrs @ $125/hr)	10,000
C. Kellon (5 hrs @ $100/hr)	500
T. Graham (8 @ $135/hr)	1,080
J. Leonard (30 hrs @ $70/hr)	2,100
Phase II Subtotal	***13,680***
Phase III: Develop a Vulnerability Assessment	
Personnel	
M. Koopman (105 hrs @ $125/hr)	13,125
C. Kellon (30 hrs @ $100/hr)	3,000
T. Graham (20 hrs @ $135/hr)	2,700
C. Pike - Subcontractor (15 hrs @ $175/hr)	2,625
Travel (Koopman, Kellon, and Graham to workshop)	1,445
Direct Costs (workshop expenses)	925
Phase III Subtotal	***23,820***
Phase IV: Develop a Climate Change Adaptation Strategy	
Personnel	
M. Koopman (90 hrs @ $125/hr)	11,250
C. Kellon (32 hrs @ $100/hr)	3,200
T. Graham (20 hrs @ $135/hr)	2,700
J. Leonard (10 hrs @ $70/hr)	700
C. Pike - Subcontractor (4 hrs @ $175/hr)	700
Travel (Koopman, Kellon, and Graham to workshop)	1,445
Travel (Koopman and Kellon to closeout meeting)	842
Direct Costs (workshop and final report expenses)	1,625
Subtotal Phase IV:	***22,462***
Total Budget:	**69,834**

Budget Narrative

Phase I: Project Management & Stakeholder Selection

Personnel

M. Koopman (45 hrs @$125/hr) Project management, lead stakeholder identification effort, facilitate project kickoff meeting, attend all regular project team meetings	5,625
C. Kellon (18 hrs @ $100/hr) Assist with stakeholder identification, attend kickoff	1,800
T. Graham (8 hrs @ $135/hr) Contract finalization/confirm final steps/timeline	1,080
C. Pike - Subcontractor (3 hrs @ $175/hr) Consult re: stakeholder identification	525
Travel Expenses for M. Koopman and C. Kellon to attend a day long kickoff meeting	
M. Koopman: Plane: $275/ticket (Medford to Portland)	275
Hotel: 1 night Tillamook Co. ($91/night), 1 night PDX ($135/night)	226
Food: 2 days @ $51/day per diem	102
C. Kellon: Food: 1 day @ $51/day per diem	51
Hotel: 1 night Tillamook Co. ($91/night)	91
Shared Expense: Mileage (Portland to Tillamook Co. 180 miles X $.54/mile)	97
Phase I Subtotal	***9,872***

Phase II: Compile Climate Change Science and Projections

Personnel

M. Koopman (80 hrs @ $125/hr) Lead science and projections development effort, draft and revise final report	10,000
C. Kellon (5 hrs @ $100/hr) Assist with analysis and report draft	500
T. Graham (8 @ $135/hr) Contract oversight, assist with report editing	1,080
J. Leonard (30 hrs @ $70/hr) Provide special analyst services including developing high quality maps and graphs for the final report	2,100
Phase II Subtotal	***13,680***

Phase III: Develop a Vulnerability Assessment

Personnel

M. Koopman (105 hrs @ $125/hr) Manage small stakeholder groups to identify preliminary vulnerabilities; plan, coordinate and facilitate day long workshop; draft and revise preliminary and final vulnerability reports	13,125
C. Kellon (30 hrs @ $100/hr) Assist workshop planning/facilitation, report editing	3,000
T. Graham (20 hrs @ $135/hr) Assist workshop planning/facilitation, report editing	2,700
C. Pike - Subcontractor (15 hrs @ $175/hr) Interview 8 stakeholders and develop draft recommendations for public education and engagement	2,625
Travel Expenses for M. Koopman, C. Kellon, and T. Graham to facilitate a day long workshop	
M. Koopman and T. Graham: Plane: $275/ticket (Medford to Portland) X 2 people	550
Hotel: 1 night Tillamook Co. ($91/night), 1 night PDX ($135/night) X 2 people	452
Food: 2 days @ $51/day per diem X 2 people	204
C. Kellon: Food: 1 day @ $51/day per diem	51
Hotel: 1 night Tillamook Co. ($91/night)	91
Shared Expense: Mileage (Portland to Tillamook Co. 180 miles X $.54/mile)	97

Direct Costs: Supplies: easel pads, pens, name tags, etc. for workshop	75
Printing preliminary vulnerability report for use at the workshop	250
Food (lunch and coffee for 40 people @ $15/person)*	600
Phase III Subtotal	***23,820***

Phase IV: Develop a Climate Change Adaptation Strategy

Personnel	
M. Koopman (90 hrs @ $125/hr) Lead review of strategies being employed to address vulnerabilities identified in Phase III; plan, coordinate and facilitate day long workshop; draft and revise preliminary and final vulnerability reports	11,250
C. Kellon (32 hrs @ $100/hr) Assist workshop planning/facilitation, report editing	3,200
T. Graham (20 hrs @ $135/hr) Assist workshop planning/facilitation, report editing	2,700
J. Leonard (10 hrs @ $70/hr) Provide spatial analysis services as needed for adaptation strategy workshop and final report	700
C. Pike - Subcontractor (4 hrs @ $175/hr) Finalize recommendations for public education and engagement	700
Travel Expenses for M. Koopman, C. Kellon, and T. Graham to facilitate workshop	
M. Koopman and T. Graham: Plane: $275/ticket (Medford to Portland) X 2 people	550
Hotel: 1 night Tillamook Co. ($91/night), 1 night PDX ($135/night) X 2 people	452
Food: 2 days @ $51/day per diem X 2 people	204
C. Kellon: Food: 1 day @ $51/day per diem	51
Hotel: 1 night Tillamook Co. ($91/night)	91
Shared Expense: Mileage (Portland to Tillamook Co. 180 miles X $.54/mile)	97
Travel Expenses for M. Koopman and C. Kellon to attend project close out meeting	
Dr. Koopman: Plane: $275/ticket (Medford to Portland)	275
Hotel: 1 night Tillamook Co. ($91/night), 1 night PDX ($135/night)	226
Food: 2 days @ $51/day per diem	102
C. Kellon: Food: 1 day @ $51/day per diem	51
Hotel: 1 night Tillamook Co. ($91/night)	91
Shared Expense: Mileage (Portland to Tillamook Co. 180 miles X $.54/mile)	97
Direct Costs: Supplies: easel pads, pens, name tags, etc.	75
Printing final report, draft adaptation strategies, final vulnerability assessment	550
Food (lunch and coffee for 40 people @ $15/person)*	600
Graphic design	400
Phase IV Subtotal:	***22,462***
Total Expenses:	**69,834**

***Rationale for providing lunch at the workshops:** In our experience the workshops serve two very important, but very different purposes. The first is to identify vulnerabilities or develop strategies (depending on the workshop). The second is to build or strengthen relationships between participants. By keeping them together for lunch, we can facilitate their meal time in such a way that it serves to strengthen those relationships rather than creating a disruption in the flow of the day, with some participants not making it back after the lunch break.

References

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