General Public Summary*: (not to exceed 200 words; submitted on a separate page in the on-line proposal management system)

This project will explore tribal cultural relationships and practices connected to resources and other aspects of nature that are potentially affected by climate change. Tribes are disproportionately affected by climate change because their economies, traditions, and even identity are heavily reliant on place-based natural resources, and changes in these resources may result in associated shifts and adaptations in tribal cultural traditions. Dr. Samantha Chisholm Hatfield, an enrolled member of the Confederated Tribes of Siletz and a cultural anthropologist, will interview elders with two tribes in the Great Basin in order to learn how a changing environment has affected aspects of tribal culture. Observations by tribal elders should lead to better understanding of how the nuances and dimensions of tribal culture in the Great Basin are affected by climate change, what contributes to vulnerability to a changing climate, and the adaptive capacity of these communities to ecological shifts. This project leverages a similar project just being completed, which was funded by the Northwest Climate Science Center, in which Dr. Chisholm Hatfield interviewed elders of three Northwest tribes. She described their primary cultural responses to climate change, which led to some surprising findings.

Project Title: **Understanding Native cultural dimensions of climate change in the Great Basin**

Project type: (select one) Science Project or TEK Project and Topic Area Addressed

TEK project type A. Assess the vulnerability of cultural or subsistence resources that are traditionally gathered or hunted and test or explore potential adaptation actions.

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Project Objective(s)

The objective of this research project is to understand how climate change may be affecting cultural aspects of tribes in the Great Basin, and enhance their adaptive capacity. Many aspects of tribal culture including ceremony, subsistence and cultural vitality are linked to the natural environment and can be affected by environmental change.

Management Objective(s)

This project will help fulfill the GBLCC TEK strategy, by directly collecting TEK with both natural resource and cultural dimensions, as well as provide specific and detailed insights into the challenges faced by tribes in a changing environment. Moreover, it could lead to at least three categories of learning relevant to management: (a) new understanding of the importance of certain species; (b) adaptive strategies underway among tribes, that could be applied to other tribal contexts; and (c) identification of western-oriented management practices that could be made more flexible to reflect Native realities, cultural attributes, and priorities. These are explained in more detail below.Project Description

Need

Climate change can be viewed as one underlying driver of change in animals, plants, and other aspects of nature, which in turn can affect expressions of tribal culture. Previous work (Lynn et al 2011, McGregor 2002) has examined changes in abundance of key species in response to climate variability and change - in short, it has focused on consumptive values, but has ignored core non-consumptive tribal cultural attributes which are tied to natural resource use and cultural identity. **[wood example - Sam will find].** Native Americans, Alaska Natives, and other indigenous groups are disproportionately affected by climate change in part because their economies and traditions are heavily reliant on place-based natural resources (Basso 1996, Cajete 2000, Marino and Ribot 2012, Lynn 2013,Wildcat 2014) and in part because of legacies of colonialism (Marino 2012; Whyte 2014). Social scientists have shown that vulnerability to climate change is particularly salient among populations who are and have been habitually and

historically marginalized through inequitable political and socio-economic systems (Adger 2006, Füssel 2007). Histories of marginalization can lead to conditions in which even small ecological shifts can overwhelm already taxed social systems and already compromised and overburdened populations (Adger et. al 2003, Marino and Ribot 2012).

In the case of Native American peoples, this preexistent vulnerability may be amplified because many aspects of tribal identity are linked to the natural rhythm of the planet and its inhabitants, in a holistic way that is generally unfamiliar and even incomprehensible to mainstream society. For example, project researcher Dr. Chisholm Hatfield, an enrolled member of CTSI, notes that it was commonplace for a woman who had accepted a man's marriage proposal to move into their new home after the man had gifted his dowry to her family. The new bride, whose belongings included a basket of gathered acorns, would then proceed to make acorn soup, a ritual that signified the completion of the marriage ceremony, and the couple was then viewed as a married entity. Because of the displacement of tribes and the dwindling population of oak trees in western Oregon, this ritual for the Siletz women has been discontinued, and current tradition is that only the man participates in gifting a dowry. As this example shows, an environmental change (whether or not caused by climate change) can lead to cultural change.

Our proposed project would provide a novel perspective on tribal cultural traditions and their relationship to the natural world - especially traditions in which key elements such as animals and plants are exposed to shifts in climate, or whose timing is linked to environmental cues that are undergoing seasonal shifts in a warming climate. It would provide new TEK on topics of priority to the GBLCC.

A similar project funded by the NW CSC during 2013-14 is just concluding. For that project, Dr. Chisholm Hatfield visited three tribes in the NW - Quinault Indian Nation (QIN, WA), CTSI (OR), and Confederated Salish-Kootenai Tribes (CSKT, MT). Working with tribal staff, she interviewed 3-4 tribal elders with each tribe, then transcribed and analyzed the interviews. Although some aspects of her research findings were expected - for example, some ceremonies had been altered subtly as a result of environmental changes, and species arriving from warmer climates had to be given names - her work also uncovered a profound and rather surprising aspect of climate change.

The aspect of climate change most commonly noted by her subjects was the ways in which changing seasonality affect the environmental cues that determine the timing of various culturally important activities. These shifts in seasonality are especially important for those activities that collide with western management (e.g., hunting / fishing seasons) determined by calendars, and when interspecies differences in phenology emerge. For example, the Siletz tribe uses a terrestrial cue - the emergence of 'eel ants' (known to non-Siletz as carpenter ants) - to indicate when the season for eel fishing has arrived. These two species have no biological connection, but have traditionally emerged at similar times; as the climate warms, the ants emerge earlier but the timing of the eels has not changed, presenting a cultural conundrum. The cultural consequence of this shift is a sense of disintegration in the balance of the world.

An additional unexpected finding emerged regarding specific time intervals. Natives tended to utilize time in a holistic and experiential manner that directly correlates to natural resources' timing rather than to linear timelines established in mainstream societal standards. This sense of time directly reflected the grounding of cultures in environments to which they are deeply connected and of which they have direct knowledge. The environment also provided markers indicating, for example, when seasons were about to change, the proper time to start cultural events, and geographic locations. Environmental conditions could be relied upon as 3D mapping systems, and indicators of surrounding environmental conditions.

Changes in seasonality linked to climate change have also been documented in Alaska and have been noted as a primary vulnerability to climate change among Alaska Native populations (McNeeley 2009, McNeeley and Shulski 2011). In spite of this, most climate change research continues to focus on hazardous, punctuated events or sustained hazards such as flooding and erosion as critical climate change outcomes and no research on seasonality, other than the initial pilot study by Dr. Chisholm Hatfield, has been conducted on seasonality and traditional resource use in the Pacific Northwest. This project will draw upon the Alaska research and previous research of Dr. Chisholm Hatfield to document how climate change affects seasonality and, in turn, impacts the cultural, social and economic lives of Great Basin tribes. This is an overlooked and critical aspect of the social scientific research on climate change and vulnerability.

Leveraging the Northwest project, this project will carry out research pertaining to the effects of climate on aspects of the environment and resources relevant to Great Basin tribes, leading to insights regarding possible responses of tribal culture to focal animals and plants that, in turn, are exposed and responding to changes in climate. The anticipated results are vital both to understanding Great Basin tribal cultural identities, and to tribes' understanding of how climate changes have already impacted traditional cultural resources and practices or how they may do so in the future.

Methods

The first step in this research is selecting two tribes to participate in the study, in consultation with GBLCC staff and key stakeholders. Dr. Chisholm Hatfield has already begun conversations with tribal staff (those with a cultural focus) from the Te-Moak and Goshute tribes to initiate their participation in the project. These tribes were selected based on a variety of considerations including evidence of strong cultural base as expressed through their web sites and confirmed through direct correspondence. If either of these tribes is unable to participate, or if GBLCC staff recommend another approach, another tribe will be enlisted. The next step is obtaining formal approval from the participating tribes and from OSU's Institutional Review Board, which reviews all research projects involving human subjects.

Purposeful sampling will enlist tribal staff to identify key respondents who hold important cultural knowledge and the interplay with tradition, cultural practice, and the natural environment. A minimum of four tribal participants from each tribe will be selected to participate in informal, semi-structured interviews. These prospective participants, identified as having information critical to this research study, will then be contacted through the respective tribal staff, or directly by Dr. Chisholm Hatfield. In these conversations, Dr. Chisholm Hatfield will explain the project, obtain consent, and discuss scheduling constraints. Upon agreement of the individuals, she will develop her travel schedule to visit the two tribes in coordination with the staff and interviewees. Visits will be scheduled in recognition of traditional cultural protocols concerning the season when it is most appropriate to discuss specific cultural topics through oral discourse, often termed "talking story," usually the fall and winter seasons.

During Dr. Chisholm Hatfield's visits to the tribes, she will first hand participants the consent document, explain the projectand notify participants that copies of the taped interviews will be sent to their tribe, and other copies will stored at USGS, and the Oregon State University Library Archives. Interviewees will be allowed to choose the location of the interview, or interviews will be conducted in the respective tribal center if no specific requests or suggestions are made. Interviews will be informal and semi-structured, allowing participants to lead discussions where they think information is relevant to the question prompts. A tentative interview script including question prompts will guide the interview, but will not limit the scope or direction of conversation. The estimated time commitment for a participant's involvement will be approximately 60-90 minutes in length, depending on a participant's responses (one of Dr. Chisholm Hatfield's interviews lasted well over 2 hours). Additional time will be allocated for longer discussions, as well as informal and culturally appropriate interactions such as meals with hosts. Interviewees will be compensated with a $50 gift card.

Research Questions

This project will employ a grounded theory methodology, common to many social science fields. Researchers will use culturally-appropriate interviewing techniques, including semi-structured interviews, which allow for tribal experts to direct the conversation to critical topics and relevant information that may not have been apparent to the researchers before the data collection began. The following questions outline general categories of inquiry, while allowing for unexpected data on environmental change, community impacts, and local adaptation strategies. This research will collect and analyze this information. Further questions will evolve out of these categories depending on specific and individual tribal cultural practices, as interviews warrant.

Do climate effects shape elements of cultural value?

Are there cultural elements (e.g., dances or seasonally relevant ceremonies) and/or cultural behaviors (e.g., prayers, ceremonial routines, symbols, songs or words) that have adapted in direct response to the presence, abundance or other characteristics of fish, wildlife, vegetation, or other aspects of the natural

environment? Are there times when hunting/fishing/gathering is accompanied with certain behaviors (e.g., prayers, ceremonies or items of symbolic relevance)?

Has tribal culture changed?

Are there aspects of tribal culture that have been evolving, identifiable by responses to climate change impacts on fish, wildlife, and vegetation? Have any adapting measures been taken as a response to climate change impacts to fish, wildlife and vegetation?

Are there times when hunting/fishing/gathering is accompanied with certain behaviors (e.g., prayers, ceremonies or items of symbolic relevance)?

Have adaptations occurred? Are there adaptations that have been made to cultural rituals, practices, or behaviors that are new or have not been traditionally practiced?

How have cultures adapted to culturally traditional elemental changes?

For example, are there stories that deal with the differences of "traditions" that juxtapose the "Tribal cultural ways" of old and present? Do tribal stories contain elements that show differences between traditional cultural ways and present practices? Are there examples of adaptation in the past that might shed light on how communities remain resilient to climate change? Are the changes happening now different, more overwhelming than in the past? Why?

We identify this as an important traditional knowledge component to adaptive capacity – the ability to remember how change has been dealt with in the past. This is also a critical climate change question: are these new changes of a dramatically different sort and degree than changes in the past?

Interviews will be conducted in person and will be audio recorded into a digital recording device. These audio files will be transferred to a secure computer at OSU, and transcribed fully into Word documents. Each document will include a direct translation of interviewees' inflection, intonation, pausing, and stressors of the interview they provided, including any lengthy pauses that are culturally appropriate or that convey meaning. The compiled information will then be categorized into the most commonly mentioned subjects, and topics ranked according to the fervency, repetition, or conviction indicated.

The objectives and work will incorporate both Traditional Ecological Knowledge (TEK) and western science to guide and complete the research project. TEK is based on observation of environmental surroundings over long periods of time and is an integral aspect of Indigenous cultural knowledge. Native culture is holistic and, therefore, it is important to pair TEK and western science techniques in order to achieve a fuller understanding of both the culture and the research. This project relies on qualitative social science methods which are typically more flexible tools for collection and analysis of research in Native American populations than quantitative survey research. In some instances, observations obtained through our TEK work will be augmented using western science methods, viz., literature review.

Species impacted and expected outcomes

As with the Northwest project, species of concern will be identified by interviewees in the course of the research, and many cannot be anticipated in advance except by someone intimately familiar with every tribal custom. Western science has identified species of concern in the Great Basin - for example, pikas (Beever et al. 2010) and sage grouse (Aldridge et al. 2008).

We expect that this research will uncover some culturally important species whose distributions have shifted or whose populations have declined; or even some new species arriving in the usual and accustomed areas that the Great Basin tribes utilize. There may in addition be some emergent findings concerning the unique challenges of climate change to Great Basin tribes. We stress again here that the primary finding of our research with Northwest tribes - the importance of seasonality - was completely unanticipated before we analyzed the interviews. The data showed that seasonal changes and timing of events were the most significant of the findings, and the clearest driver of whether adaptations were occurring or had affected culture.

Two important outcomes are likely to emerge from these data: 1) clear documentation of the species of cultural importance to these two tribes, and 2) for the tribes in the study, a richer understanding of how other tribes are facing and grappling with the cultural dimensions of climate change. A third, possible

outcome are management and/or policy recommendations about ways that wildlife and habitat management, policies, and regulations could be modified in response to climate change to preserve cultural attributes. For instance, the allowable harvest season for eels as established by a state agency in the Northwest is increasingly out of sync with the changing phenology and habitat of the eel population.

As a result of this project, tribes may be able to anticipate climate changes that have the potential for significantly altering cultural behaviors and traditions. Tribes will also be able to view neighboring tribes' techniques for adapting to changes that may have occurred. This provides an opportunity for enhanced communication among tribes and possible coordination of inter-tribal efforts to safeguard valuable cultural practices.

There is ample evidence that merging TEK with western science is a research model that yields important results in the area of climate change research (for review see Riedlinger and Berkes 2001, Huntington 2000, Cruikshank 2001) and natural resource management (for review see Pinkerton 1989, Berkes 1991) The proposed work will integrate TEK from these tribes with western science to achieve a more holistic view of climate change outcomes than either approach alone. TEK is based on observation of environmental surroundings over long periods of time and an integral aspect of Indigenous cultural knowledge. Native culture is holistic in nature (Berkes 1993) and, therefore, it is important to pair TEK and western science techniques in order to assist with a fuller understanding of the culture and the research (Antone 2013, Cochran et al. 2013).

Products

Project products will include (a) digital audio files of the interviews, (b) transcripts of the interviews, (c) a final report detailing the findings of the research, with appropriately selected quotes from the interviewees. Audio files and transcripts may include culturally sensitive data and, following protocols of the field of cultural anthropology, will not be publicly available. After obtaining approval from the tribes, the final report will be made publicly available, and will be shared and discussed with the tribal participants.

Communication & Engagement

We have already been in touch with both the Te-Moak and Goshute tribal staff about this research proposal and shared a draft with them. During the time this proposal is under consideration, we will maintain culturally appropriate levels of conversation by telephone to learn more about the tribes and the cultural elements that may appear in the study, and to obtain tribal approval of the project in the event it is funded. However, following IRB protocol, we will not take any steps to recruit study subjects until IRB approval is received.

If the proposal is successful, we will immediately intensify our engagement with the tribes, and develop a plan and a schedule for Dr. Chisholm Hatfield’s visits to the tribes.

Following completion of the final report, several copies of the report will be printed and sent to the tribal contacts and all interviewees, as well as with GBLCC staff.

At the completion of the research, we offer to work with the GBLCC steering committee and STEK committee to plan a workshop (separately funded) for tribes in the Great Basin to discuss adaptation options in light of our research findings. The workshop, informed by our data on shifting seasons and climate change outcomes on Native peoples in the Great Basin, could address the following questions:

a) internal - comparing key species that are changing and that have cultural importance, and identifying under what circumstances substitution or an alternative adaptation strategy may be an appropriate solution when the species become scarcer

b) internal/external - what can be learned from the cultural responses of other tribes - for example, those studied in our NW CSC project as well as the others in this project? and from adaptation of other, non-native communities?

c) external - develop a series of recommendations, including an adaptive management strategy for western management agencies and/or policy constraints that prevent adaptation? for example, hunting season for a species is defined by the calendar but the natural timing is shifting. A management strategy for climate adaptation developed by tribal members first and informed by this culturally-sensitive research project would be a critical and profound contribution to how we manage resource use during periods of change.

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Disclaimer regarding data sharing *: (Briefly describe any known restrictions on sharing of the data expected to be generated by this project.)

Audio files and transcripts may include culturally sensitive data and, following protocols of the field of cultural anthropology, will not be publicly available. The final report will be made publicly available, and will be shared and discussed with the tribal participants.