

Protecting Indigenous Knowledge in the Age of Climate Change

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ABSTRACT

Indigenous knowledge has the potential to ameliorate the destructive impacts of climate change. Given their enduring connection to place, indigenous communities are the subjects of research efforts to study and acquire their traditional knowledge for its value to addressing climate change. Yet, because outsiders have exploited this traditional knowledge before, indigenous communities may be wary of sharing it outside of their communities. Moreover, even if they do share their traditional knowledge, indigenous peoples may wish to maintain control over its use to guard against further exploitation.

Many tribes hold traditional knowledge that may prove helpful in the fight against climate change. This article addresses concerns associated with the stewardship of traditional knowledge and adds legal structure to the discourse surrounding its use.

As the value of traditional knowledge for addressing climate change becomes increasingly clear, there is a growing need for the academic and legal spheres to consider new methods of protecting indigenous community-based research from misuse. This includes developing measures to hold those who engage with traditional knowledge accountable to indigenous communities. Existing domestic and international law has the potential to protect traditional knowledge from exploitation, but such laws currently provide inadequate protection at best.

Ultimately, tribes may be better served by enacting their own tribal laws to protect traditional knowledge. At least three tribes in the United States have already taken steps toward achieving this goal.

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“Before any final solution to American history can occur, a reconciliation must be effected between the spiritual owner of the land—American Indians—and the political owner of the land—American Whites. Guilt and accusations cannot continue to revolve in a vacuum without some effort at reaching a solution.”

—Vine Deloria, Jr.¹

I. INTRODUCTION

Given that indigenous communities maintain close, enduring connections to the environment, their traditional knowledge has the capacity to ameliorate the impacts of climate change. The production and collection of traditional knowledge is proven to assist in climate change adaptation.² As the climate changes,

1. VINE DELORIA, JR., *GOD IS RED: A NATIVE VIEW OF RELIGION* 75 (2d ed. 1994).

2. The World Health Organization defines “adaptation” as “[a]djustment in natural or human systems to a new or changing environment. Adaptation to climate change refers to adjustment in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities. Various types of adaptation can be distinguished, including anticipatory and reactive adaptation, public and private adaptation, and autonomous and planned adaptation.” WORLD HEALTH ORG., *CLIMATE CHANGE AND HUMAN HEALTH—RISKS AND RESPONSES, SUMMARY* 32 (2003), http://www.who.int/globalchange/environment/en/cc_SCREEN.pdf?ua=1. The Intergovernmental Panel on Climate Change defines adaptive practices as “actual

indigenous peoples³ rely on place-based knowledge systems as a mechanism of resilience and adaptation. For example, “given the close connections between Indigenous people and the environment and the rapid environmental changes occurring in Alaska, Alaska Natives are well poised to observe climate change, understand its ecological and societal consequences, and develop potential response strategies.”⁴

This article discusses the use of traditional knowledge in climate adaptation efforts and the important need to protect that knowledge from exploitation. Relationships that fail to honor and respect the contributions of traditional knowledge practitioners over many generations also fail to understand core principles of traditional knowledge. Even as researchers and governments increasingly recognize the value of traditional knowledge, they often fail to see its application in the climate change context.⁵ The challenge is to create research mechanisms that value as well as protect indigenous, community-based knowledge.⁶ Such mechanisms must hold those who seek and steward traditional knowledge accountable, not only for the end products of their research, but also for their methods of acquiring and disseminating traditional ways of knowing to the world at large. Researchers seeking to use indigenous communities’ traditional knowledge must learn to work with and respect ways of knowing the world

adjustments, or changes in decision environments, which might ultimately enhance resilience or reduce vulnerability to observed or expected changes in climate.” W. Neil Adger et al., *Assessment of Adaptation Practices, Options, Constraints and Capacity*, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2007: IMPACTS, ADAPTATION AND VULNERABILITY 717, 720 (M.L. Perry et al. eds., 2007), <http://www.ipcc.ch/pdf/assessment-report/ar4/wg2/ar4-wg2-chapter17.pdf>. See Terry Williams & Preston Hardison, *Culture, Law, Risk, and Governance: Contexts of Traditional Knowledge in Climate Change Adaptation*, 120 CLIMATIC CHANGE 531 (2013), <http://link.springer.com/content/pdf/10.1007%2Fs10584-013-0850-0.pdf>.

3. The authors use the term “indigenous peoples” in the same context as used by Professor S. James Anaya: “[t]he rubric of indigenous peoples includes the diverse Indian and aboriginal societies of the Western Hemisphere, the Inuit and Aleut of the Arctic, the aboriginal peoples of Australia, the Maori of Aotearoa (New Zealand), Native Hawaiians and other Pacific Islanders, the Sami of the European far North, and at least many of the tribal or culturally distinctive non-dominant people of Asia and Africa. They are *indigenous* because their ancestral roots are embedded in the lands on which they live, or would like to live, much more deeply than the roots of more powerful sectors of society living on the same lands or in close proximity. And they are *peoples* in that they comprise distinct communities with a continuity of existence and identity that links them to the communities, tribes, or nations of their ancestral past.” S. JAMES ANAYA, INTERNATIONAL HUMAN RIGHTS AND INDIGENOUS PEOPLES 1 (2009).

4. Patricia Cochran et al., *Indigenous Frameworks for Observing and Responding to Climate Change in Alaska*, 120 CLIMATE CHANGE 557, 558 (2013), <http://link.springer.com/content/pdf/10.1007%2Fs10584-013-0735-2.pdf>; see also Henry P. Huntington, *Preface: Human Understanding and Understanding Humans in the Arctic System*, THE EARTH IS FASTER NOW: INDIGENOUS OBSERVATIONS OF ARCTIC ENVIRONMENTAL CHANGE xxi, at xxv (Igor Krupnik & Dyanna Jolly eds., 2002); Garrit Voggesser et al., *Cultural Impacts to Tribes from Climate Change Influences on Forests*, 120 CLIMATIC CHANGE 615, 622 (2013), <http://link.springer.com/article/10.1007/s10584-013-0733-4>.

5. See, e.g., David C. Natcher, *Implications of Fire Policy on Native Land Use in the Yukon Flats, Alaska*, 32 HUM. ECOLOGY 421, 423 (2004) (incorporating Alaska Natives’ knowledge and perspective into research on the impacts of wildfire policy in the state).

6. See Cochran et al., *supra* note 4, at 558-59, 563; Huntington, *supra* note 4; Voggesser et al., *supra* note 4, at 616-17.

that may be different from the familiar protocols of the academic and legal professions.

There remains a great need for further study of the legal structures surrounding the acquisition of traditional knowledge. Historically, researchers have had significant autonomy over the ways in which they acquire and disseminate traditional knowledge. As Henry Huntington et al. state in their article, the extent to which researchers' personal characteristics, or those of their subjects, has influenced "research outcomes" is unclear.⁷ It is also unclear how other, less apparent characteristics may impact researchers, such as differing temporal and spatial perspectives,⁸ epistemological assumptions, or individual and factional motivations.⁹ Such cognitive and motivational differences can either impede communication—leading to misinterpretation of research results or the underlying traditional knowledge itself—or they can enrich the research process, leading to mutual appreciation of the broader context of traditional knowledge.¹⁰ "Thus it is to everyone's benefit that there be cooperation between the researcher and the Native people. The researcher needs to set aside notions of human superiority to things of the universe."¹¹

Whenever researchers enter indigenous communities in search of traditional knowledge, the potential for exploitation exists. Specifically, many indigenous communities share concerns associated with: (1) the use of traditional knowledge to develop commercial products, such as drugs; (2) the misuse of indigenous names, sacred symbols, or images; and (3) "the disturbance of an embedded landscape in which indigenous knowledge is so intimately tied to nature that it cannot be removed without either detracting from its original environment or rendering the knowledge less useful."¹² Traditional knowledge should ultimately belong to the community as a whole, rather than an individual.¹³ Yet, this central

7. Henry P. Huntington et al., *The Significance of Context in Community-Based Research: Understanding Discussions about Wildfire in Huslia, Alaska*, 11 *ECOLOGY & SOC'Y*, no. 1, art. 40, 2006, available at <http://www.ecologyandsociety.org/vol11/iss1/art40/>.

8. See, e.g., Natcher, *supra* note 5, at 428 (acknowledging that, although interviewing community members was important to the research, the lack of female participants meant that this approach failed to account for female perspectives on the community's use and value of the land).

9. See, e.g., Charles L. Briggs, *LEARNING HOW TO ASK: A SOCIOLINGUISTIC APPRAISAL OF THE ROLE OF THE INTERVIEW IN SOCIAL SCIENCE RESEARCH* 3 (1986); Phyllis Morrow & Chase Hensel, *Hidden Dissention: Minority-Majority Relationships and the Use of Contested Terminology*, 29 *ARCTIC ANTHROPOLOGY* 38, 38 (1992).

10. See, e.g., Bonnie J. McCay & Svein Jentoft, *From the Bottom Up: Participatory Issues in Fisheries Management*, 9 *SOC'Y & NAT. RESOURCES* 237, 240-43 (1996); Huntington et al., *supra* note 7.

11. Angayuqaq Oscar Kawagley & Ray Barnhardt, *Education Indigenous to Place: Western Science Meets Native Reality*, ALASKA NATIVE KNOWLEDGE NETWORK, <http://www.ankn.uaf.edu/curriculum/Articles/BarnhardtKawagley/EIP.html> (last modified Sept. 18, 2007).

12. Robert K. Paterson & Dennis S. Karjala, *Looking Beyond Intellectual Property in Resolving Protection of the Intangible Cultural Heritage of Indigenous Peoples*, 11 *CARDOZO J. INT'L & COMP. L.* 633, 637 (2003) (citations omitted).

13. *Id.* at 637-38.

goal simultaneously makes it difficult to develop adequate legal protections for traditional knowledge.

The inherent value of traditional knowledge, which has evolved over millennia, is clear. Our goal is to analyze indigenous knowledge in the climate change context while demonstrating the need for the academic and legal professions to better steward and protect it.

Part II examines what constitutes traditional knowledge. Part III discusses how traditional knowledge may be used to address climate change. Climate impacts are already being felt worldwide. “Global climate change has already had observable effects on the environment. Glaciers have shrunk, ice on rivers and lakes is breaking up earlier, plant and animal ranges have shifted and trees are flowering sooner.”¹⁴ Tribes are not immune from the impacts of climate change. In fact, because of their locations and, in many instances, increased reliance on the natural environment, many tribal communities are especially vulnerable to climate impacts. As these impacts tend to be heavily localized, local traditional knowledge can be invaluable to communities within broader regions outside of tribal territories as they strive to adapt.¹⁵

Part IV surveys the legal “tools” that may be used to protect traditional knowledge in the climate change context. A complete discussion of all potential avenues of protection under domestic and international law is beyond the scope of this article; this survey is designed to help lawyers and academics familiarize themselves with the laws that may be applicable to their research pursuits, and for tribes considering new means to regulate such pursuits. Some scholars have previously examined traditional knowledge in the context of intellectual property (“IP”) laws. This article, however, provides concrete examples of how traditional knowledge can be used to combat climate change, while revealing that existing domestic and international law does not adequately protect such traditional knowledge against misuse.

Part V provides a brief overview of tribal law and analyzes three tribes’ efforts to enact laws that protect traditional knowledge from exploitation. Other scholars have suggested that tribes should develop their own laws to better protect their traditional knowledge. This article examines the development of such tribal laws

14. *The Current and Future Consequences of Global Change*, NASA, <http://climate.nasa.gov/effects> (last visited Aug. 9, 2013); *Indigenous/Traditional Knowledge & Intellectual Property*, CENTER FOR THE STUDY OF THE PUBLIC DOMAIN, <http://web.law.duke.edu/cspd/itkpaper> (last visited Jan. 28, 2015).

15. Notably, the benefits of traditional knowledge are already well established in other areas, such as drug development, “as an estimated seventy-four percent of the one hundred nineteen drugs developed from plants on the market today were initially developed from traditional herbal medicines. It has also been shown that the use of indigenous, traditional knowledge ‘can increase success ratios in trials for useful substances from one in ten thousand to one in two.’” Gregory Schlais, *The Patenting of Sacred Biological Resources, the Taro Patent Controversy in Hawai’i: A Soft Law Proposal*, 29 U. HAW. L. REV. 581, 584 (2007) (citations omitted); see also Miriam Quinn, *Protection for Indigenous Knowledge: An International Law Analysis*, 14 ST. THOMAS L. REV. 287, 296 (2001) (“[T]he use of traditional knowledge not only helps in encouraging medical research, but is also useful for increasing its efficiency, thus lowering the costs and increasing the predictability.”).

in greater depth and discusses how some tribes are already using them to secure greater protections for their traditional knowledge.

II. AN INTRODUCTION TO TRADITIONAL KNOWLEDGE

As a concept, “traditional knowledge encompasses much more than the Western intellectual property regime, such as ‘beliefs, knowledge, practices, innovations, arts, spirituality, and other forms of cultural experience and expression’ rather than Western tendencies toward protecting scientific, technological, artistic, and literary innovation through hardline tests of patent, copyright, and trademark law.”¹⁶ In practice, traditional knowledge:

[I]s the knowledge that is developed over time and used to sustain a community. Traditional knowledge can consist of experience, culture, environment, local resources, animal knowledge, or plant resources. Communities expand their traditional knowledge over many years and develop and research new innovative practices to encourage growth in farming and medicine. Traditional knowledge is generally considered part of the collective ownership of the community and is transmitted across generations through traditional stories.¹⁷

Individuals carry and transmit traditional knowledge throughout their communities in many ways. “Traditional knowledge is typically transmitted via ‘songs, proverbs, stories, folklore, community laws, common or collective property and invention, practices and rituals.’”¹⁸ The term itself invokes complex histories and relationships with particular landscapes involving both human and non-human entities.¹⁹ What makes the knowledge traditional is the historic and spiritual influence in the community.²⁰ What makes it knowledge is the manner in which it was acquired, or the usefulness of the information.²¹ Place-based traditional knowledge derives from observational experiences in a landscape. Indigenous communities’ long-term observations are central to developing traditional knowledge and reflect the importance they place on understanding the surrounding environment.²² The environment provides for the people and establishes their spiritual connection to the world in a manner separate from that of modern

16. Lindsey Schuler, *Modern Age Protection: Protecting Indigenous Knowledge Through Intellectual Property Law*, 21 MICH. ST. INT’L L. REV. 751, 753 (2013) (internal quotation marks omitted).

17. *Id.* at 773 (citations omitted).

18. *Id.* at 754 (quoting TONINA SIMEONE, PARLIAMENT OF CANADA, *INDIGENOUS TRADITIONAL KNOWLEDGE AND INTELLECTUAL PROPERTY RIGHTS* (2004)).

19. CAROLINE BROWN ET AL., ALASKA DEP’T OF FISH & GAME, *TRADITIONAL ECOLOGICAL KNOWLEDGE AND HARVEST SURVEY OF NONSALMON FISH IN THE MIDDLE YUKON RIVER REGION, ALASKA, 2005-2008* 4 (2010).

20. Kawagley, *supra* note 11.

21. *Id.*

22. See Cochran et al., *supra* note 4, at 559; Fikret Berkes, *Traditional Ecological Knowledge in Perspective*, in *TRADITIONAL ECOLOGICAL KNOWLEDGE: CONCEPTS AND CASES* 1 (Julian T. Inglis ed., 1993).

science.²³ As Vine Deloria, Jr. notes in recounting Aaron McGaffey Beede's work with the Western Teton Sioux, indigenous epistemological approaches to the world are fundamentally different from the scientific profession's tendency to gather information and allocate it into distinct categories and schools of knowledge:

Of course, the history of any people contains mythology (which is, perhaps, not quite so simple or invaluable as many a "scientist" might assume), but is such a mythology composed entirely of myths added one to another, or is there beneath all and through all and in all an all-compelling something unexplained by our "scientific" "force and energy" which the Western Sioux thought of, sincerely claimed to know of, as Woniya (Spirit)? It does not bother the old Indians to understand, in an elementary way, what we mean by "the modern scientific attitude" . . .

There is no difficulty in leading an old Teton Sioux Indian to understand the "scientific" attitude, and that the processes that give rise to phenomena may be more and more known by man and may be, to some extent, controlled by man . . . The idea of atoms and electrons is easy and pleasing to an old Indian, and he grasps the idea of chemistry. Such things make ready contact with his previous observation and thinking."²⁴

As Deloria explains further, "[t]he old Indians . . . were interested in finding the proper moral and ethical road upon which human beings should walk. All knowledge, if it is to be useful, was directed toward that goal."²⁵

The socio-cultural landscape in which traditional knowledge can be handed from one person to another is extraordinarily diverse. The complexity of traditional knowledge is immense. As Oscar Kawagley, a world-renowned Yupiaq scholar, states, "[s]pirituality is imbedded in all elements."²⁶ Therefore, the ideologies that make up knowledge as a system or communal consciousness are derived from efforts to understand the universe as a living, changing thing. It is important to understand that flux is just as much a part of the natural environment as the knowledge itself.²⁷ Furthermore, "[i]ndigenous knowledge is not static, an unchanging artifact of a former lifeway."²⁸

Traditional knowledge can also be understood by what it is not. Because this article focuses on the intangible idea of knowledge, our use of the term

23. Michael Davis, *Bridging the Gap or Crossing the Bridge? Indigenous Knowledge and the Language of Law and Policy*, in BRIDGING SCALES AND KNOWLEDGE SYSTEMS: CONCEPTS AND APPLICATIONS IN ECOSYSTEM ASSESSMENT 145, 150 (Walter V. Reid et al. eds., 2006); Deloria, Jr., *supra* note 1.

24. Deloria, Jr., *supra* note 1.

25. *Id.* at 43-44.

26. Kawagley, *supra* note 11 (citing P. KNUDTSON & D. SUZUKI, WISDOM OF THE ELDERS 13-15 (1992)).

27. Leroy Little Bear, *Jagged Worldviews Colliding*, in RECLAIMING INDIGENOUS VOICE AND VISION 77, 78 (Marie Battiste ed., 2000).

28. Ellen Bielawski, *Cross-Cultural Epistemology: Cultural Readaptation through the Pursuit of Knowledge* (1990) (unpublished E.B. thesis, University of Alberta) (on file with the University of Alberta, Department of Anthropology).

“traditional knowledge” does not encompass cultural property. “Cultural property usually refers to ‘prehistorical and historical objects that significantly represent a group’s cultural heritage, whether the group is a tribe or other localized community, a cultural or ethnic group, or a nation *qua* political entity.’”²⁹ Similarly, “[l]egal scholars characterize the range of cultural property as ‘all of the tangible materials . . . [and] forms of culture produced by humans to adapt to and exercise control over their environment.’”³⁰ (While the term “intangible,” when referring to elements of indigenous spirituality, can be offensive to some indigenous peoples, we use the term here as a bridge or common thread to create dialogue, not as a representation or notion of conformity to literary contexts.)

In sum, the term “traditional knowledge” is uniquely specific to place and represents the collective memory of generations of indigenous people.³¹ Indigenous communities pass on their experiences and observations from one generation to the next with the profound intention of remaining a part of, not apart from, the ever-changing universe. This inherent intergenerational element to traditional knowledge, however, makes it difficult to protect through American intellectual property laws, as discussed below.³² Traditional knowledge is not about the pursuit and acquisition of facts for the purpose of drawing conclusions about the world. Rather, it is about creating and understanding values, beliefs, and moral protocols to better live in the world.

III. TRADITIONAL KNOWLEDGE IN THE CLIMATE CHANGE CONTEXT

“Our Elders tell us that our earth is getting old and needs to be replaced.”

—Jerry Wongittilian, Sr.³³

Climate change is exacerbating global environmental problems in ways that many people have yet to fully grasp.³⁴ Indigenous peoples across the world, however, have experienced both long-term and sudden climatic changes throughout their histories. For example, in Alaska, where indigenous peoples have long used traditional knowledge to adapt to climate extremes, the climate is now changing at a rate that is challenging many communities’ ability to adapt.³⁵ The

29. Jill Koren Kelley, *Owning the Sun: Can Native Culture Be Protected Through Current Intellectual Property Law?*, 7 J. HIGH TECH. L. 180, 183 (2007) (footnote omitted).

30. *Id.*

31. Lynn M. Baker, *Comparing Two Views of the Landscape: Aboriginal Traditional Ecological Knowledge and Modern Scientific Knowledge*, 14 THE RANGELAND J. 174, 174 (1992).

32. See *infra* Part III. B., Applying Traditional Knowledge to Climate Adaptation.

33. Eli Rabett, *Our Elders Tell Us That Our Earth Is Getting Old and Needs to Be Replaced by a New One*, RABETT RUN (Jan. 15, 2007, 8:19 PM), <http://rabett.blogspot.com/2007/01/our-elders-tell-us-that-our-earth-is.html>.

34. See Cochran et al., *supra* note 4, at 560.

35. See *id.* at 559-61.

many old indigenous communities still intact throughout the world today are proof of indigenous peoples' ability to adapt to the ecological and social impacts of both climate change and colonial regimes. Traditional knowledge plays a large part in that success.³⁶ Yet, this ability simultaneously places them in a precarious position in the discourse of knowledge acquisition. Accordingly, this article focuses not on abstract notions of what traditional knowledge can be, but on discussing what we aim to protect when we use traditional knowledge in the context of climate change.³⁷

A. THE THREAT OF CLIMATE CHANGE

Climate change threatens humankind's existence. The Intergovernmental Panel on Climate Change states, "[h]uman influence on the climate system is clear, and recent anthropogenic emissions of greenhouse gases are the highest in history. Recent climate changes have had widespread impacts on human and natural systems."³⁸

In the United States, climate change affects tribes on a daily basis. Because of their location and, in many instances, increased reliance on the environment, many tribal communities are particularly vulnerable to the impacts of climate change. For example, starting in 1998, tribal nations in the Pacific Coast and Rocky Mountain regions reported the following climate change-related issues: increased and more constant winds; violent weather changes where storms wiped out intertidal shellfish; declining salmon runs; deformed fish; significant decreases in the life spans of individual Natives due to the unavailability of traditional foods; air pollution from burning forests; minimum river flows necessary for native fish species; and erosion from rising sea levels.³⁹ Tribal nations in other regions of the United States are also experiencing profound changes to their environments.⁴⁰

Climate change is causing more frequent and intense weather events, which are in turn disrupting whole ecological systems. These changes not only have biophysical outcomes (i.e., effects on both the living and non-living environment, such as on plant growth or on wind patterns), but are also disrupting the cyclical connection between human beings and the natural world.⁴¹ For example, global

36. DOUGLAS NAKASHIMA ET AL., WEATHERING UNCERTAINTY: TRADITIONAL KNOWLEDGE FOR CLIMATE CHANGE ASSESSMENT AND ADAPTATION 8 (2012).

37. See Cochran et al., *supra* note 4, at 559.

38. INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, RECORDED WEBCAST OF PRESS CONFERENCE (Oct. 2014) available at http://www.ipcc.ch/news_and_events/press_information.shtml (last visited Feb. 19, 2015).

39. U.S. GLOBAL CHANGE RESEARCH PROGRAM, NATIVE PEOPLES—NATIVE HOMELANDS CLIMATE CHANGE WORKSHOP: FINAL REPORT 43–44, 49 (Nancy G. Maynard ed. 1998) [hereinafter NATIVE PEOPLES], available at <http://www.usgcrp.gov/usgcrp/Library/nationalassessment/native.pdf>.

40. See generally NAT'L TRIBAL AIR ASS'N, IMPACTS OF CLIMATE CHANGE ON TRIBES IN THE UNITED STATES (2009), available at http://www4.nau.edu/tribalclimatechange/resources/docs/res_ImpactsCCTribesNUS.pdf (compiling responses of tribal nations to a request from EPA Assistant Administrator Gina McCarthy concerning tribal experiences of climate change).

41. Brian Helmuth, Joel G. Kingsolver, & Emily Carrington, *Biophysics, Physiological Ecology, and*

warming is accelerating the rate at which the Greenland and Antarctic ice sheets are melting, contributing to global sea-level rise, which in turn directly threatens Pacific Island communities.⁴² The problem of ocean acidification is also altering the relationship that fishermen have with aquatic life.⁴³

In the Northern Hemisphere, Alaskan Native peoples, in particular, are being forced to adapt to the accelerated effects of climate change while struggling to maintain their connection to place. The Alaskan interior has been experiencing drastic temperature changes over the last fifteen years—leading to, among other problems, increasingly destructive wildfires in the region.⁴⁴ These wildfires are becoming a “wicked problem,” carrying both environmental and social consequences.⁴⁵ Fire has been a part of the natural Alaskan landscape for nearly six thousand years; what has changed since 2004 are the fires’ intensity, frequency, and geographic scope.⁴⁶ Major fires are more apparent in extraordinarily dry years, but in recorded history, there were multi-year gaps between these types of fires.⁴⁷

The science shows that increasing greenhouse gas emissions tend to “oscillate” toward higher latitudes; studies have specifically linked the Pacific Decadal Oscillation (PDO) to the occurrence of wildfires.⁴⁸ Thus, Alaska is at the forefront of dangerous environmental change.⁴⁹ As these changes unfold and as many communities confront more extreme fluctuations in patterns that once seemed relatively stable and familiar, some of them are rediscovering the observational experiences and traditional knowledge of Alaskan Native peoples.

B. APPLYING TRADITIONAL KNOWLEDGE TO CLIMATE ADAPTATION

Indigenous peoples have lived through trying climatic times and developed systems directly related to climate adaptation and efficient land management as a result. Alaskan Native communities, in particular, have managed their lands

Climate Change: Does Mechanism Matter?, 67 ANN. REV. OF PHYSIOLOGY 177, 177 (2005).

42. Eric Rignot et al., *Acceleration of the Contribution of the Greenland and Antarctic Ice Sheets to Sea Level Rise*, 38 GEOPHYSICAL RESEARCH LETTER, MAY 13, 2011, at 1; Nobuo Mimura, *Vulnerability of Island Countries in the South Pacific to Sea Level Rise and Climate Change*, 12 CLIMATE RESEARCH 137 (1999).

43. See generally DANIEL CHIRAS, ENVIRONMENTAL SCIENCE (9th ed. 2013).

44. Eric S. Kasischke & Merritt R. Turetsky, *Recent Changes in the Fire Regime Across the North American Boreal Region—Spatial and Temporal Patterns of Burning Across Canada and Alaska*, 33 GEOPHYSICAL RES. LETTERS, May 2006, at para. 1.

45. L.H. Grunderson, *Assessing for Understanding in Complex Regional Systems*, BIOREGIONAL ASSESSMENTS: SCIENCE AT THE CROSSROADS OF MANAGEMENT AND POLICY 27 (K.N. Johnson et al. eds., 1999).

46. F. Stuart Chapin III et al., *Increasing Wildfire in Alaska’s Boreal Forest: Pathways to Potential Solutions of a Wicked Problem*, 58 BIOSCIENCE MAGAZINE 531, 533 (2008).

47. Lilly Ray et al., *A Case for Developing Place-Based Fire Management Strategies from Traditional Ecological Knowledge*, 17 ECOLOGY & SOC’Y, art. 37, 2012.

48. Chapin et al., *supra* note 46.

49. Larry Hinzman, Neil Bettez, W. Robert Bolton, et al., *Evidence and Implications of Recent Climate Change in Northern Alaska and other Arctic Regions*, 72 CLIMATIC CHANGE 251 (2005).

using highly productive techniques for generations. Many Alaskan Native families are now applying this intergenerational knowledge to adapt to climate change today. Their efforts demonstrate how traditional knowledge may be used in the climate context and also show why greater legal protections for such knowledge are necessary. It is important to note, however, that traditional knowledge and Western science⁵⁰ can work together to better address climate change.⁵¹

Alaskan interior villages, such as Huslia—a primarily subsistence village in the boreal forest climate system home to nearly three hundred majority Native Alaskan or Koyukon Athabascan residents—have been experiencing increasingly extreme summer heat and intense fires.⁵² Since the record-breaking fire season of 2004, when extreme wildfires ravaged the state,⁵³ the village of Huslia has been working to better understand its role in managing fire suppression. Wildfires have affected the community's subsistence activities in a number of ways, such as by limiting wild berry harvests, moose populations, and harvestable firewood.⁵⁴

As a community, Huslia stands out for its proactive efforts to rely on traditional knowledge and collaboration with non-indigenous scientists to address the wildfire threat. The village has experimented with a number of innovative methods in this regard, such as: staying connected to outside resources (i.e., the Alaska Native Sciences Commission); increasing access to and use of technology; leveraging resources and relationships; consistently holding regular village-wide meetings; and drawing upon longtime residents trained in traditional knowledge and Western scientific fields. This list is by no means comprehensive, and does not account for new methods being developed. Such approaches are often unique to a location and may not apply to all situations.⁵⁵ But Huslia's techniques are an important part of the village's comprehensive approach to successful modern fire suppression. Furthermore, Huslia is not only using its traditional knowledge to combat the impacts of climate change within the village community, but is working to share its successes with a wider audience through

50. “[M]odern science directly implies that the world is organized strictly in accordance with mechanistic principles. There are no purposive principles whatsoever in nature. There are no gods and no designing forces that are rationally detectable.” PHILLIP E. JOHNSON, *DARWIN ON TRIAL* XX (2010). Western science is the product of a specific geographical area and school of thought. George Basalla, *The Spread of Western Science*, 156 *SCIENCE* 611 (1967) (“The small circle of Western European nations provided the original home for modern science during the 16th and 17th centuries: Italy, France, England, the Netherlands, Germany, Austria, and the Scandinavian countries. The relatively small geographical area covered by these nations was the scene of the Scientific Revolution, which firmly established the philosophical viewpoint, experimental activity, and social institutions we now identify as modern sciences.”).

51. CLIMATE AND TRADITIONAL KNOWLEDGES WORKGROUP, *GUIDELINES FOR CONSIDERING TRADITIONAL KNOWLEDGES IN CLIMATE CHANGE INITIATIVES* XX (2014), available at <http://climatetkw.wordpress.com>.

52. U.S. CENSUS BUREAU, *PROFILE OF GENERAL DEMOGRAPHIC CHARACTERISTICS, HUSLIA ALASKA NATIVE VILLAGE STATISTICAL AREA, ALASKA*, tbl. DP-1 (2000), available at <http://censtats.census.gov/data/US/>.

53. Chapin et al., *supra* note 46.

54. Chapin et al., *supra* note 46, at 532.

55. Huntington et al., *supra* note 7.

community meetings and scholarly mediums, drawing further attention to traditional knowledge in the process. Other indigenous communities in Alaska and California are taking similar approaches to community involvement in fire suppression.⁵⁶

In Alaska, combining traditional knowledge with Western technology has helped reduce potential fuel sources for wildfires by diversifying management of black spruce and willow trees, which are overabundant and contribute to more intense fires when unmanaged.⁵⁷ Additional opportunities exist to enhance the application of indigenous traditional knowledge in this community fire suppression approach. For example, communities could determine the distance between stands of spruce or willow and their villages. Where larger, denser stands of the trees grow within a ten-mile radius of the village, those stands could theoretically be identified for prescribed burns or clearing (i.e., the denser the stand, the more intense the fire in a dry year). Community members could attend a workshop to identify areas on a map that show the location of such stands, and lead trips to the locations to directly measure the spruce and willow configurations. In conjunction with these on-site assessments using traditional knowledge, villages could use satellite imagery or geographic information systems (GIS). Technology like GIS (which can also measure ecological variables, such as canopy or vegetative cover) or the Normalized Difference Vegetative Index could be used to reveal the density of tree stands from another vantage point and thus compliment the on-site assessments.⁵⁸ Together, the traditional knowledge and technology-based measurements could produce a more holistic, place-based knowledge of the area. Such knowledge could include information about wildlife in the area, how long stands have been there, and whether they have burned in the past. Global positioning system (GPS) data could be used to take latitudes and longitudes to convert all of the information into an accurate map, which would then become the property of the village.⁵⁹

Researchers visiting these communities to gather such traditional knowledge, however, should be aware of the communities' protocols when designing questions and considering information needed to accomplish the community's goals. Equally important, they should understand the complex relationship between the community's knowledge and their research agenda and methodologies, and

56. M. KAT ANDERSON, *TENDING THE WILD: NATIVE AMERICAN KNOWLEDGE AND THE MANAGEMENT OF CALIFORNIA'S NATURAL RESOURCES* (2005).

57. *Id.* Community-based Participatory Research does not always account for the experiences and knowledge of indigenous people, but it does incorporate community members' particular interests and insights. KAREN HACKER, *COMMUNITY BASED PARTICIPATORY RESEARCH* (SAGE Publications, Inc., 2013). Other Indigenous authors and practitioners of traditional knowledge have contributed insights to this topic, as well. See Cochran et al., *supra* note 4, at 559.

58. Ardavan Ghorbani et al., *Utility of the Normalized Difference Vegetation Index (NDVI) for Land/Canopy Cover Mapping in Khalkhal County (Iran)*, 3 *ANNALS OF BIOLOGICAL RES.* 5494 (2012).

59. Mac Chapin et al., *Mapping Indigenous Lands*, 34 *ANN. REV. OF ANTHROPOLOGY* 619, 620, 623 (2005).

should consider the effects their research could have outside of the community.⁶⁰ Researchers may be required to comply with local policies, including tribal laws, when designing projects and studies.⁶¹

Ultimately, the traditional knowledge gathered from the community can be tremendously helpful in combating climate change. Collected information on subjects such as weather, density of stand, tree species, drought year, wet year, or whether the area is near a water source, can be used to make decisions concerning the need and method of fuel load reduction. Such information can have a direct correlation to how prescribed burns and vegetation-clearing is planned. For example, information on green tonnage versus dry tonnage will determine how hot the fire will burn, which may therefore assist in reducing fuel loads.

This scenario, based upon observation and fieldwork experiences, illustrates just one approach to putting traditional knowledge into practice and calls attention to what makes villages like Huslia unique. Moreover, trusted community members are fully capable of designing and implementing this type of research agenda themselves. The proposed Huslia fire suppression approach would be incomplete without the traditional knowledge techniques discussed above. Western fire suppression and fuel load reduction techniques alone are insufficient to combat the problem,⁶² and local community members often do not have sufficient training in fire suppression in general. Nevertheless, coupling Western and traditional knowledge systems offers a pathway to reducing fire in and around Huslia.⁶³ The Huslia example shows how villages can enhance their fire suppression abilities through community interaction.

Chapin recommends using small-scale traditional fire suppression techniques practiced by Eastern Alaskan Natives: “policies that incorporate some of the successful aspects of past indigenous fire use” can help communities practice more effective fire suppression using traditional knowledge.⁶⁴ These traditional techniques include “bridging” landscapes by setting prescribed burns between natural areas like wetlands, marshes, and rivers to reduce fuel load density and fire frequency. This type of “bridging” fire can prevent a large fire from moving forward and consuming undesired locations like a village.⁶⁵ By incorporating indigenous fire suppression techniques such as this into broader forest management, communities can shield themselves from larger-scale fires.⁶⁶

60. PRINCIPLES OF ECOSYSTEM STEWARDSHIP: RESILIENCE-BASED RESOURCE MANAGEMENT IN A CHANGING WORLD XX (F. Stuart Chapin III, Gary Kofinas & Carl Folkes eds., 2009).

61. See *infra* Section IV., Legal Protections for Indigenous Knowledge.

62. Ray et al., *supra* note 47; Paul Sillitoe, *Interdisciplinary Experiences: Working with Indigenous Knowledge in Development*, 29 INTERDISC. SCI. REVS. 6, XX (2004).

63. Chapin et al., *supra* note 46, at 533-34.

64. *Id.*

65. *Id.*

66. *Id.*

One of the more interesting footnotes to these techniques is the manner in which the methods came about and how Alaskan Natives came to possess this traditional knowledge.⁶⁷ Indigenous peoples have been using their own fire suppression techniques for millennia. In the United States, the National Park Service's approach to reducing fuel loads has been inconsistent, due in large part to the agency's insufficient understanding of how fire or prescribed burning affects the ecosystem.⁶⁸ Indigenous peoples in North America have long understood that fire is often the best tool to suppress fire and have been using prescribed burns to accurately manage both landscapes and whole ecosystems for decades.⁶⁹

Before the 1970s, Alaska Native family units managed land in highly productive systems; one family could manage large areas of land and natural resources with relatively small numbers of people.⁷⁰ Essentially, families were spread out geographically over vast amounts of land and moved depending on the season, thereby managing all of the areas they occupied for a certain amount of time on a year-round basis.⁷¹ Families were responsible for taking care of their trap lines, fish camps, and land generally, which assisted in the maintenance of ecosystem health.⁷² Simply put, the more effectively the land was cared for, the healthier the land was. This was similar to the Hawaiian *ahupua'a* system of land conservation and stewardship, in which a family is responsible for the management and health of broad swaths of land, stretching from coral reefs to mountaintops throughout the islands.⁷³ In both traditional systems, relatively small groups of people sustainably managed their families' land and resources in a way that minimized environmental repercussions. In Alaska, the need for shelter and heat combined with daily village interactions gave rise to a reciprocal relationship between Native communities and the environments where they lived and flourished. Maintaining and investing in that reciprocal relationship has been critical to community and resource sustainability.⁷⁴

67. ANDERSON, *supra* note 56. In addition to wildfires, the Alaskan interior is beset with problems such as low river ice and snow pack associated with more frequent and intense flooding events. Some Alaskan Native villages on the Yukon River are using traditional knowledge and Western scientific methods to predict flooding more accurately.

68. David Parsons et al., *Natural Fire Management in National Parks*, 10 ENVTL. MGMT. 21 (1986).

69. See generally OMER STEWART, FORGOTTEN FIRES: NATIVE AMERICANS AND THE TRANSIENT WILDERNESS (1908).

70. HENRY P. HUNTINGTON, WILDLIFE MANAGEMENT AND SUBSISTENCE HUNTING IN ALASKA (Univ. of Washington Press 1992).

71. See generally ANGAYUQAQ OSCAR KAWAGLEY, A YUPIAQ WORLDVIEW: A PATHWAY TO ECOLOGY AND SPIRIT (2d ed. 2006); RICHARD NELSON, MAKE PRAYERS TO THE RAVEN: A KOYUKON VIEW OF THE NORTHERN FOREST (1983); STEPHEN J. LANGDON, THE NATIVE PEOPLE OF ALASKA (3d ed. rev. 1993); Natcher, *supra* note 5, at 426; A. McFayden Clark, *Koyukon*, in 6 HANDBOOK OF NORTH AMERICAN INDIANS 585, 588-89 (June Helm & William Sturtevant eds., 1981).

72. *Id.* at 589.

73. Kenneth Y. Kaneshiro et al., *Hawai'i's Mountain-to-Sea Ecosystems: Social-ecological Microcosms for Sustainability Science and Practice*, 2 ECOHEALTH 349, 351 (2005).

74. Langdon, *supra* note 71.

C. TRADITIONAL KNOWLEDGE ACQUISITION CONCERNS

As Western scientists and land management practitioners engage more frequently with the acquisition of traditional knowledge, it is important to protect traditional knowledge acquisition as an effective means of enhancing community climate adaptation. As the latest techniques in fire suppression become standard practice for indigenous and non-indigenous communities alike, certain questions arise. First, how do we maintain respect for the traditional knowledge systems that originally developed these practices? Second, what should be done with the byproducts of fire suppression techniques, such as spare spruce and willow wood from fuel load reduction? As new climate adaptation approaches combine the scientific method with the more cyclical methods of traditional knowledge, maintaining the integrity of the knowledge acquisition process becomes more important than ever. This process will inevitably continue to produce new recommendations and solutions, but as stewards of this knowledge, we must vigilantly protect traditional knowledge against misuse both within indigenous communities and within academic and legal settings.

For example, one recommended fire suppression technique⁷⁵—to not only suppress fire with Native Alaskan methods, but also consider the byproducts of fire suppression as suitable for energy generation—has caught on in Alaska:

In areas near communities where fires are suppressed, prevent fuel buildup by harvesting black spruce for heat and power generation. Some Alaskan rural communities are currently threatened with abandonment, in part because of the rapidly rising cost of diesel fuel for electrical power and heating. The abundant black spruce that now constitutes a fire risk around many communities could serve as an ecologically sustainable fuel supply for most interior Alaskan communities.⁷⁶

Furthermore, “conservation from diesel to wood fuels would reduce fire risk [and] diminish the vulnerability associated with rising energy costs.”⁷⁷ Rural communities, primarily Native Alaskan villages like Tok, Sitka, Craig, and Tanana, among others, have established combined heating and power facilities that are using biomass to offset extraordinarily high diesel costs.⁷⁸ The village of Fort Yukon has started harvesting stages of cottonwood trees, in particular, as biomass to support a similar operation, and plans to offset nearly \$4 million of diesel costs in five years.⁷⁹ A unique aspect of these projects is the wealth of local

75. Chapin et al., *supra* note 46.

76. *Id.*

77. *Id.* at 538.

78. See *Biomass*, RENEWABLE ENERGY ALASKA PROJECT [REAP], <http://alaskarenewableenergy.org/why-renewable-energy-is-important/alaskas-resources/biomass/> (last visited Nov. 2, 2015).

79. OFFICE OF NEPA POLICY COMPLIANCE, EA-1922: COMBINED POWER AND BIOMASS HEATING SYSTEM, FORT YUKON, ALASKA 2-1 (Feb. 20, 2013) [hereinafter FORT YUKON EA].

knowledge used in the decision-making process. While incorporating traditional knowledge at all levels of these projects has been challenging, the knowledge has a great deal to contribute to understanding natural processes and will make an important contribution to project success and sustainability.⁸⁰ As rural villages in Alaska become more comfortable with collaboration between traditional knowledge and Western sciences, the more these beneficial approaches to managing natural environments can contribute to climate adaption efforts.

However, maintaining the integrity of traditional knowledge must remain a core principle of knowledge transmission. The academy, a place of knowledge creation, acquisition and transmission, continues to research methods to combat climate change. In particular, there has been a global push to view energy production as a reciprocal relationship between humans and their environment.⁸¹ However, obtaining energy from fossil fuel remains an extractive activity dominated by world markets and the priorities of national economies.⁸² Similarly, there is a risk that traditional knowledge could be removed from its community and place-based context and marketed to the world. "Many Natives view the extraction of their traditional knowledge from its broader cultural context as a form of theft, and understandably have been reluctant to share the depth and breadth of what they know with outside interests."⁸³ As more researchers come to understand the value of traditional knowledge, and as indigenous people become more willing to share that knowledge, there is a greater need to protect it from exploitation. Society is racing to adapt to a rapidly changing environment in a manner that reflects the pace of change itself.⁸⁴

While indigenous peoples understand their own knowledge systems, institutions, and methods, other researchers' methods may not always be compatible with traditional knowledge systems and ways of sharing traditional knowledge.⁸⁵ As a result, groups like the American Indian and Alaska Native Climate Change Working Group, comprised mainly of indigenous scholars, continue to remind the world that indigenous people have a great deal to offer in discussions on climate change.⁸⁶ Furthermore, indigenous peoples can enhance adaptation efforts, but it is just as important to understand the protocols surrounding

80. RICHARD HOWITT, *RETHINKING RESOURCE MANAGEMENT: JUSTICE, SUSTAINABILITY AND INDIGENOUS PEOPLES* (Psychology Press 2001).

81. Mason Durie, *Understanding Health and Illness: Research at the Interface Between Science and Indigenous Knowledge*, 33 INT'L EPIDEMIOLOGICAL ASS'N 1138 (2004).

82. NAOMI KLEIN, *THIS CHANGES EVERYTHING: CAPITALISM VS. THE CLIMATE* (Simon & Schuster 2014).

83. Patricia Cochran, *What is Traditional Knowledge? Traditional Knowledge Systems in the North*, ALASKA NATIVE SCI. COMM'N (2004), http://www.nativescience.org/html/traditional_knowledge.html.

84. FORT YUKON EA, *supra* note 79.

85. Paul Nasady, *The Politics of TEK: Power and the "Integration" of Knowledge*, 36 ARCTIC ANTHROPOLOGY 1 (1999).

86. CLIMATE INSTITUTE (2014), <http://www.climate.org/topics/national-action/native-americans-climate.html> (last visited Jan. 10, 2015).

traditional knowledge.⁸⁷ Both indigenous and non-indigenous peoples have developed features such as the Institutional Review Board (“IRB”) and other research protocols to protect traditional knowledge. Yet, these boards and protocols do not calculate the rate at which the climate is changing, and it is unclear how that variable affects the acquisition of traditional knowledge. Further analysis of how legal tools may be used to address concerns associated with the acquisition and use of traditional knowledge is necessary.

IV. LEGAL PROTECTIONS FOR INDIGENOUS KNOWLEDGE

As researchers and others increasingly seek to acquire indigenous communities’ traditional knowledge for use in combating climate change, tribes need to consider what legal protections may already exist to protect their traditional knowledge from exploitation. This section considers, in turn, binding and non-binding American law and international law. (The next section will discuss tribal law, including laws already enacted by tribes in the United States and the potential to enact new tribal laws in the future). Overall, we conclude that existing non-tribal law does not provide sufficient protection for traditional knowledge. Tribes (and interested researchers) would therefore be wise to adopt or support new tribal laws to protect indigenous knowledge.

As discussed above, traditional knowledge is particularly susceptible to exploitation.⁸⁸ “Cultures die, in large measure, because of the exploitation of peoples and the knowledge they possess.”⁸⁹ As Larissa Behrendt explains:

By failing to recognize Indigenous ownership and presence, Indigenous property rights are relegated to the status of a hand-out. Native Title is not seen as a property right descended from prior occupation but a welfare measure: Indigenous people[s], when a legitimate property right is recognized, are seen as getting something for nothing. Due to these perceptions, Indigenous rights are vulnerable, treated differently, and given less protection than their non-Indigenous equivalents.⁹⁰

Indigenous people worldwide, not just in the United States, are calling for increased protection of traditional knowledge and cultural property. “The need

87. Kyle Powys Whyte, Joseph P. Brewer II & Jay T. Johnson, *Weaving Indigenous Science, Protocols and Sustainability Science*, 10 SUSTAINABILITY SCI. 1, 5-7 (2015).

88. See *supra* Part I., An Introduction to Traditional Knowledge.

89. Danielle M. Conway, *Indigenizing Intellectual Property Law: Customary Law, Legal Pluralism, and the Protection of Indigenous Peoples’ Rights, Identity, and Resources*, 15 TEXAS WESLEYAN L. REV. 207, 207-08 (2009). Moreover, “charges of misappropriation of indigenous, traditional knowledge, as well as concerns over whether Western appropriation of such knowledge may, in the end, severely erode and damage indigenous cultures that gave rise to the requisite knowledge, have risen and multiplied.” Schlais, *supra* note 15, at 582.

90. LARISSA BEHRENDT, *ACHIEVING SOCIAL JUSTICE: INDIGENOUS RIGHTS AND AUSTRALIA’S FUTURE* 171 (Federation Press 2003).

for adequate safeguards of traditional knowledge, genetic resources and folklore . . . by means of intellectual property is not a new concern for Indian peoples, but as Native voices have grown stronger in the international human rights arena, the demand for the protection of cultural property has been heard louder by federal governments.”⁹¹ Accordingly, tribes are increasingly turning to intellectual property laws and human rights systems to protect their traditional knowledge. Similarly, tribes are increasingly using institutional and ethical review boards to regulate the conduct of researchers.

Protecting indigenous knowledge is consistent with the democratic ideals underlying American institutions: “[t]rue democracy stands for the proposition that the least represented in a civilized society will continue to enjoy participation and inclusion in the decisions that society must make to accomplish fair, transparent, and respectful governance for individuals and for groups.”⁹² Ultimately, however, American law does not provide adequate protection for traditional knowledge. Such knowledge does not fit neatly into the categories of intellectual property law and other “soft” laws are insufficient. This is true even in the climate change context; although tribes may use traditional knowledge to address relatively new environmental challenges, the forms of knowledge that they are applying are intergenerational in nature and not attributable to a single person or group, placing them largely outside of these laws’ scope.

A. DOMESTIC “HARD” LAW: AMERICAN INTELLECTUAL PROPERTY LAW⁹³

Given the intangible nature of traditional knowledge, American Intellectual Property (“IP”) law would appear to be a natural starting point for analyzing how to protect its use in the climate context.⁹⁴ In the United States, “[i]ntellectual property law is traditionally a combination of copyrights, patents, and trademarks that delineates rights of property ownership and allows for protection against unfair competition.”⁹⁵ A tribal community may wish to use American IP law to protect its traditional knowledge from being misappropriated by non-members or to recoup some benefit from its use.⁹⁶ Nevertheless, “recognition of indigenous

91. Kelley, *supra* note 29 (citations omitted).

92. Conway, *supra* note 89, at 219.

93. For an additional discussion of how American IP laws may be used by tribes, *see generally* Kelley, *supra* note 29.

94. Paterson, *supra* note 12, at 638.

95. Schuler, *supra* note 16, at 755.

96. An example of where the indigenous community did not benefit from the commodification of its traditional knowledge can be seen in the “Periwinkle case”: “A plant native to Madagascar, the rosy periwinkle, has an alkaloid that is used to treat some forms of cancer. A pharmaceutical company produces and sells vimglastine and vincristine, two alkaloids produced from the rosy periwinkle, earning over \$180 million annually. The people of Madagascar, although having used the rosy periwinkle for a long period of time, have not been compensated for its use.” Quinn, *supra* note 15, at 291 (citations omitted).

intellectual property rights . . . has been slow or non-existent, especially in the United States.”⁹⁷

Some tribes, however, may object to IP laws out of concern that they will lead to the “commodification” of their traditional knowledge,⁹⁸ which would entail their “acquiescing to the legacy of colonialism.”⁹⁹ For example, because indigenous knowledge is often intimately connected to the culture of the tribe, applying IP laws to such knowledge may be viewed as equivalent to “collecting culture for the purposes of exploitation, observation, voyeurism, and objectification.”¹⁰⁰ This is because “[t]he Western approach to globalization is keen to recognize culture as an object rather than as a living, evolving organ to be shielded from exploitation.”¹⁰¹ Furthermore, “[b]ecause Indigenous Peoples are rarely in a position to exercise rights from a position of power, there is always a risk in proposing legal rules or models for protection that may not fully account for the complex legacy of colonization.”¹⁰² Colonialism and commodification thus lie at the heart of many tribes’ fears that their traditional knowledge will be misappropriated.¹⁰³

97. Schlais, *supra* note 15, at 582. See also Quinn, *supra* note 15, at 289 (“By definition, indigenous knowledge and heritage does not fall within the subject matter protected under either patent law, copyright law or trademark law”); Paterson, *supra* note 12, at 638 (“Without elaborate modification, existing intellectual property laws were likely an inadequate basis to protect indigenous cultural property.”).

98. See, e.g., Quinn, *supra* note 15 (“[Indigenous peoples] have declared that the current schemes of intellectual property rights, as codified in current treaties and legislation, are destroying their biological diversity and cultural heritage.”) (citing WORLD TRADE ORGANIZATION, WORLD TRADE ORGANIZATION AND INDIGENOUS PEOPLES, INDIGENOUS PEOPLES’ SEATTLE DECLARATION ON THE OCCASION OF THE THIRD MINISTERIAL MEETING OF THE WORLD TRADE ORGANIZATION 30 November–3 December 1999, available at http://www.ienearth.org/ien/intellectual_property.html).

99. Stuart Schussel, *Copyright Protection’s Challenges and Alaska Natives’ Cultural Property*, 29 ALASKA L. R. 313, 322 (2012). Indigenous notions of property may differ from Western notions, as “[e]xclusive ownership is rare among North American tribes.” *Id.* (citation omitted). See also CENTER FOR THE STUDY OF THE PUBLIC DOMAIN, *supra* note 14 (“There are many difficulties that arise at the intersection of indigenous/traditional knowledge and intellectual property law. The most significant being that intellectual property has a unique European derivation and this informs its modes of classification, identification and operation. Intellectual property law promotes particular cultural interpretations of knowledge, ownership, authorship and property. These do not necessarily correspond to or complement indigenous peoples’ understandings about the role and function of knowledge practices.”); see also Paterson, *supra* note 12, at 634 (expressing concerns about the commodification of indigenous intellectual property).

100. Conway, *supra* note 89, at 208.

101. *Id.* (citing Pradip Thomas & Francis B. Nyamnjoh, *Intellectual Property Challenges in Africa: Indigenous Knowledge Systems and the Fate of Connected Worlds*, in INDIGENOUS KNOWLEDGE SYSTEMS AND INTELLECTUAL PROPERTY IN THE TWENTY FIRST CENTURY: PERSPECTIVES FROM SOUTHERN AFRICA 12, 22 (Isaac Mozonde & Pradip Thomas eds., 2007)).

102. *Id.* Professor Conway goes on to explain that “the current and most widely used and recognized laws governing intellectual property are, in their current form, incapable and at times inconsistent with protecting the rights and interests of Indigenous Peoples in their resources and intangible assets that have, through time, putatively derived from their origins, their interactions with their environment, their adaptations to the surrounding world, and their cosmology and creation stories.” *Id.* at 209.

103. Kelley, *supra* note 29.

Moreover, American IP law may be inconsistent with indigenous ethics: “[i]ntellectual property . . . law seeks to reward *individual* effort and investment while balancing the rights of the public with the rights of the inventor, in the case of patent law, or the author, in the case of copyright law.”¹⁰⁴ For an example of an indigenous community’s rejection of the use of American IP law to “commodify” traditional knowledge, consider the Native Hawaiians’ objections to the University of Hawaii’s patent on various types of taro, which were developed using Native Hawaiian traditional knowledge.¹⁰⁵ Tribes wary of the commercialization of traditional knowledge may wish to avoid protecting that knowledge with American IP law. As discussed below, this is yet another reason why tribes may want to adopt their own laws to protect their traditional knowledge, as such tribal laws would be presumptively consistent with tribal community ethics.¹⁰⁶

Despite these concerns, however, some “[i]ndigenous people are looking to intellectual property law as a means to secure [protection of traditional knowledge].”¹⁰⁷ For example, the Sealaska Heritage Institute has specifically called for increased protection for indigenous art and traditional knowledge under intellectual property laws.¹⁰⁸ American IP law may prove valuable to protecting traditional knowledge in some circumstances.¹⁰⁹

Protecting traditional knowledge using American IP law poses not only ethical problems, but doctrinal ones. American IP law can be further subdivided into trademark, patent, and copyright law. Unfortunately, none of these subsets of American IP law provide adequate protection for traditional knowledge in the climate context. This is because such knowledge generally does not meet the definition of information covered under such laws.

1. Trademark Law

For example, the Lanham Act¹¹⁰ protects any “juristic person,” including any “firm, corporation, union, association, or other organization capable of suing and

104. Schlais, *supra* note 15, at 581 (emphasis added).

105. *Id.* The “Quinoa case” is another example of an indigenous community objecting to the commodification of its traditional knowledge: Bolivian Quinoa was successfully patented by two scientists at Colorado State University. This vegetable is a staple food crop of indigenous peoples in Chile, Bolivia, Peru and Ecuador. The patent was later abandoned after indigenous groups exerted pressure on the University.

106. For example, some tribes may wish to develop their tribal laws in a way that rejects profit as a primary motivation and instead focuses on “cultural maintenance, self-determination, and sustainability.” Schlais, *supra* note 15, at 590.

107. CENTER FOR THE STUDY OF THE PUBLIC DOMAIN, *supra* note 14.

108. *Cultural and Intellectual Property Rights Policy*, SEALASKA HERITAGE INST. (Jan. 16, 2014), <http://www.wipo.int>.

109. There are certainly other options available outside of American IP law to protect traditional knowledge, such as authentication programs. For a more extensive discussion of such methods, see Schussel, *supra* note 99, at 330-36, (discussing the Silver Hand authentication program, use of the Native American Graves Protection and Repatriation Act, and licensing arrangements as alternatives to American IP laws for protecting indigenous works).

110. 15 U.S.C. § 22 (2012).

being sued in a court of law.”¹¹¹ The definition of “juristic person” includes tribes, and trademarks are designed to protect marks used in commerce or marks used in association with services (i.e., profit is not necessary to secure trademark protection).¹¹² Some tribes have used trademark law to protect their tribal name from misuse or misappropriation¹¹³ and, in this regard, “trademark law can work as an important tool to prevent third parties not authorized to speak on behalf of an Indian tribe from presenting themselves as the tribe.”¹¹⁴ Yet, “[a]t its core, trademark protects the investment of a commercial operation in names or symbols that identify a commercial product as coming from that source . . . trademark helps assure consumers of authenticity as to the source of particular products.”¹¹⁵ The concept of traditional knowledge extends well beyond marks or symbols. Thus, trademark law alone is insufficient to protect traditional knowledge, in its fullest sense, from potential exploitation by researchers.¹¹⁶

2. Patent Law

Unlike trademark law, patent law was designed to protect the intangible.¹¹⁷ It remains unlikely, however, that a tribe could apply patent law to protect forms of traditional knowledge used to combat the impacts of climate change. “A patent is a legal document which provides protection to the ideas of any individual.”¹¹⁸ “The purpose of patents is to create incentives by granting a limited monopoly to the inventor to spur inventing and discovery for the betterment of society. To receive patent protection, an invention must be new or novel, non-obvious, and useful.”¹¹⁹ Historically, American indigenous communities have found it difficult to take advantage of patent protections, for three reasons: (1) traditional knowledge is usually based on generational knowledge that is not connected to a single “inventor”;¹²⁰ (2) the traditional knowledge is usually not new or novel; and (3)

111. 15 U.S.C. § 1127 (2012). For a discussion of best practices associated with obtaining trademark protection, see Paula M. Yost, Ian R. Barker & Sara Dutschke Setshwaelo, *Branding the Band: Protecting Tribal Identities Through Trademark Law*, 61 FED. LAW. 48 (Apr. 2014).

112. Yost, *supra* note 111, at 50-51.

113. See generally *id.* at 109.

114. *Id.* at 50.

115. Paterson, *supra* note 12, at 666.

116. However, the United States has used trademark law to help protect Indian artists from exploitation by non-Indians through “the Indian Arts and Crafts Act of 1990, which provides for criminal penalties and authorizes civil actions against persons who offer or sell goods in a manner that falsely suggests it is Indian produced, an Indian product, or the product of a particular Indian or Indian tribe or Indian arts and crafts origination.” Paterson, *supra* note 12, at 667.

117. Kelley, *supra* note 29.

118. BLACK’S LAW DICTIONARY (9th ed. 2009), available at <http://thelawdictionary.org/patent-2/>.

119. Schlais, *supra* note 15, at 594.

120. “IP law does not take into account that traditional knowledge of biodiversity is a product of generations of empirical observations and research no less vital than the work done in today’s research laboratories.” *Id.* at 606.

many indigenous communities struggle with the concept of traditional knowledge being “owned” by a limited number of individuals.¹²¹

The “Turmeric case” provides an example of how patents generally cannot be used in the United States to cover traditional knowledge:¹²²

A U.S. patent was granted to two expatriate Indians for the method of administering turmeric to wounds for healing purposes. The Indian Council for Scientific and Industrial Research . . . challenged the patent in re-examination proceedings, claiming that [Turmeric had been so used] by the public for thousands of years. As a result, the U.S. Patent and Trademark Office . . . cancelled the patent.¹²³

Despite the obstacles to patenting traditional knowledge, if it is combined with something “new” that is non-natural, it may be possible for the tribe to patent a derivation.¹²⁴ Ultimately, however, some scholars have concluded that patent law is insufficient to protect traditional knowledge, because such knowledge is not always technological in character.¹²⁵

The U.S. Patent and Trademark Office (PTO) has recognized indigenous knowledge in several ways. First, the PTO created a database for the voluntary registration of indigenous insignia and symbols of federally recognized tribes.¹²⁶ However, this database does not provide legal protections, such as trademark rights.¹²⁷ The PTO also recently collaborated with the Native American Intellectual Property Enterprise Council to develop a Memorandum of Understanding (“MOU”) with the goal of increasing the number of Indian inventors who engage in patent and trademark filing.¹²⁸ One of the goals of the MOU is to “research and

121. *Id.* at 595; see also Quinn, *supra* note 15, at 294 (explaining that the World Intellectual Property Organization also determined that the use of patents to protect traditional knowledge is generally not a good fit, given that traditional knowledge is generally used for non-commercial purposes and is intergenerational in character); Kelley, *supra* note 29 (explaining that “patent protection can be problematic because patenting centuries-old cultural knowledge is unavailable due to the novelty and other statutory requirements of patent regimes”).

122. Another example is the “Ayahuasca patent case,” which involved a “ceremonial drink used for centuries by the indigenous tribes of the Amazon Basin to treat illnesses” and “was successfully patented by a U.S. citizen claiming his ‘invention’ to be a new and unique plant variety. The U.S. PTO rejected the patent claim when leaders of the Amazon filed for re-examination on the basis that such plant variety was not novel.” Quinn, *supra* note 15, at 291 (citations omitted).

123. *Id.* at 290.

124. *Id.*

125. Paterson, *supra* note 12, at 645.

126. *Native American Tribal Insignia Database*, U.S. PATENT & TRADEMARK OFFICE, <http://www.uspto.gov/trademarks/law/tribal/index.jsp> (last visited Sept. 3, 2015).

127. Schuler, *supra* note 16, at 769 (“Since the database is voluntary and is merely a collection of insignia, no intellectual property protections are gained through the database, like trademark rights. To gain trademark registration, Indigenous communities have to meet the specific trademark criteria of the U.S. PTO, which generally cannot be met.”) (citations omitted).

128. Opening Remarks, *Expanding Outreach to the Native American Community*, U.S. PATENT & TRADEMARK OFFICE (Jan. 30, 2012), <http://www.uspto.gov/about-us/news-updates/expanding-outreach-native-american-community>.

identify the IP education needs of specific Native American communities, and to provide that education in whatever way works best.”¹²⁹

3. Copyright Law

Copyright protection typically applies to creative works. Because the forms of traditional knowledge indigenous communities use to combat climate change often do not constitute creative works, copyright law would likely prove unsuccessful in protecting such knowledge. “Copyright protection subsists . . . in original works of authorship fixed in any tangible medium of expression, now known or later developed, from which they can be perceived, reproduced, or otherwise communicated, either directly or with the aid of a machine or device.”¹³⁰ As such, “[c]opyright intends to balance incentives for authors with the public’s interest in having unfettered access to a comprehensive inventory of cultural property. Thus, once the copyright protection term ends for a given work, that work permanently enters the public domain.”¹³¹ In order for an item to be eligible for copyright protection, the work must be fixed,¹³² original,¹³³ and have an identifiable author.¹³⁴ Once an author has obtained copyright protection, she or he enjoys certain rights associated with the work, allowing her or him to direct the reproduction, adaptation, or distribution of the work.¹³⁵

There are exceptions to these rights, however, such as “fair use,” which allows “certain privileged uses in situations where the public interest in access to the work outweighs the interest in protecting the work under copyright law.”¹³⁶ Accordingly, even after obtaining a copyright, the author cannot completely prohibit the use of the work. Moreover, even if a copyright can be obtained, the period of the protection is limited to the life of the author plus fifty years.¹³⁷ Ultimately, copyright laws are designed so that the creative work will be released into the public domain when the copyright term expires.¹³⁸ This limited period of protection may conflict with “[i]ndigenous cultural traditions [which are] usually seen as requiring indefinite protection and contradict the whole notion of a finite

129. *Id.*

130. 17 U.S.C. § 102 (2000).

131. Schussel, *supra* note 99, at 316-17.

132. *Id.* at 318 (“Fixation occurs as soon as an idea is manifest in a tangible medium, such as writing a sentence or drawing an image.”). *See also* Paterson, *supra* note 12, at 639 (explaining that because indigenous cultural property may be oral, it is very rarely written down and therefore not fixed).

133. Schussel, *supra* note 99, at 318 (“In order to be original, a work must be more than a trivial variation on something already existing, either currently under copyright or in the public domain.”) (citation omitted). To be original, the item must have required “creative authorship and independent creation.” *Id.*

134. *Id.* at 319-20.

135. *Id.* at 321 (citation omitted).

136. *Id.* at 314.

137. Paterson, *supra* note 12, at 640.

138. Kelley, *supra* note 29.

term or life span.”¹³⁹

Indigenous communities in the United States have generally struggled to protect their traditional knowledge using copyright law for a variety of reasons, including: (1) the fact that traditional knowledge may not be in written form; (2) it may be challenging to meet the “originality” requirement, given the intergenerational nature of traditional knowledge; (3) traditional knowledge is generally not developed by individuals; (4) typically there is not an identifiable “author” of traditional knowledge;¹⁴⁰ and (5) traditional knowledge is rarely a finished “work,” as it is constantly evolving.¹⁴¹ Additionally, some traditional knowledge may already be part of the public domain and therefore ineligible for copyright protection.¹⁴² Even if an indigenous community receives copyright protections for its traditional knowledge, the traditional knowledge will eventually be released into the public domain at the expiration of the copyright period.¹⁴³ Furthermore, tribes may not want to avail themselves of copyright protection, as “the incentive rationale that underlies copyright may be irrelevant to the concerns of indigenous societies, where cases about intellectual property have more often focused on ‘the sanctity of the process or idea . . . and . . . [efforts] to preserve the sacredness of an object.’”¹⁴⁴ At least one author has concluded that copyright protection is not a viable option for protecting traditional knowledge: “most of the works [that Alaska Natives] seek to protect are not eligible for copyright protection”¹⁴⁵ and, moreover, “many of the remedies these groups desire, such as the ability to block the use of sacred images, cannot be provided under current copyright laws.”¹⁴⁶ Finally, “as one First Nations writer has pointed out, ‘[i]n fact, copyright is used to protect non-Aboriginal people who appropriate and exploit oral tradition.’”¹⁴⁷

As the foregoing discussion of trademark, patent, and copyright law demonstrates, American IP law is currently not suited to adequately address the protection of traditional knowledge from exploitation by researchers and oth-

139. Paterson, *supra* note 12, at 640 (citations omitted).

140. *Id.* at 639 (“The reality will often be that no one today knows just who was involved in creating the innovative expressive aspect that theoretically remains under protection.”).

141. Schlais, *supra* note 15, at 596.

142. Schussel, *supra* note 99, at 324.

143. Paterson, *supra* note 12, at 641.

144. Schussel, *supra* note 99, at 323 (citation omitted).

145. *Id.* at 314 (explaining that copyright protection is generally not extended to unwritten works).

146. *Id.* at 325 (“Indigenous works might also not qualify as original. Instead, many works would be considered ‘serial collaborations,’ with elaboration on ideas by a series of authors, ‘occurring perhaps over years or decades.’”) (citations omitted). Even though copyright protection can exist for “joint works,” indigenous traditional knowledge generally does not qualify for such protection, because “[f]irst the parties must have intended, at the moment of creation, that their contributions be merged into a joint work. Second, the authors must have been known, which is often infeasible. Thus, indigenous works will fail to be eligible for copyright even as joint works.” *Id.* (citations omitted).

147. Paterson, *supra* note 12, at 638 (citing Cynthia Callison, *Material Culture in Flux: Law and Policy of Repatriation of Cultural Property*, U.B.C. L. REV. 165, 176-77 (1995)).

ers.¹⁴⁸ These laws are often not useful in efforts to achieve this goal because traditional knowledge is usually the result of cumulative knowledge instead of the efforts of one or two individuals.¹⁴⁹ Accordingly, given the failure of existing American IP law to protect traditional knowledge, new law should be developed through *sui generis* systems.¹⁵⁰

4. *Sui Generis*

Sui generis (“meaning in a class or group of its own”)¹⁵¹ American IP law currently does not protect traditional knowledge. However, other nations have developed *sui generis* IP law that may prove helpful to efforts to protect traditional knowledge in the United States. *Sui generis* “is used in intellectual property law to describe a regime designed to protect rights that fall outside the traditional patent, trademark, copyright, and trade-secret doctrines.”¹⁵² *Sui generis* IP protections may be used when existing protections do not adequately address the intellectual property at issue.¹⁵³ Notably, “[a] new office in the [PTO] will facilitate their interactions and allow direct access for Native American intellectual property advocates.”¹⁵⁴ Several authors have concluded that the best method to protect traditional knowledge would be a *sui generis* system.¹⁵⁵ Such a system “would draw from the existing patent protection laws, proposed Human Rights *Principles and Guidelines*, WIPO’s [World Intellectual Property Organization] fact-finding missions, customary principles, and indigenous knowledge characteristics in order for protection to be comprehensive and useful.”¹⁵⁶ Such a system could also grant tribes primary jurisdiction over their cultural property in a method analogous to the child welfare system developed under the Indian Child

148. *Id.* at 633 (reaching the same conclusion, although arguing that reformation or amendment to existing American IP law may accomplish adequate protection); Kelley, *supra* note 29 (concluding that “while American intellectual property laws have been significant resources to preserve personal expression, the scope of these laws may be insufficient to adequately safeguard the unique structure of American Indian cultural property”).

149. Kelley, *supra* note 29.

150. *Cf.* Paterson, *supra* note 12 (concluding that instead of *sui generis* systems, “[w]e conclude that, in many cases, legitimate concerns of indigenous people can be accommodated without going to the extreme of recognizing new intellectual property rights, either through modest reinterpretation of existing legal regimes concerning contract, privacy, and unfair competition law, or through carefully tailored but general statutory amendment or incrementally developed common law principles aimed at leveling what might otherwise be seen as an unfair playing field”) (citations omitted).

151. *Sui generis*, MERRIAM WEBSTER.COM, <http://www.merriam-webster.com/dictionary/sui%20generis> (last visited Sept. 3, 2015); *see also* Schlais, *supra* note 15, at 583 n.13.

152. BLACK’S LAW DICTIONARY (9th ed. 2009), available at <http://thelawdictionary.org/patent-2/>.

153. Schuler, *supra* note 16, at 755 (“In the United States and the European Union, *sui generis* protection has regularly been employed over the years to develop new protections for biotechnology, design patents, and databases.”) (citations omitted).

154. *Sui generis*, *supra* note 151; *see also* Schlais, *supra* note 15, at 583, n.13.

155. Quinn, *supra* note 15, at 310-13; Schussel, *supra* note 99, at 314, 340.

156. *Id.* at 310-11.

Welfare Act.¹⁵⁷ Finally, the Native American Graves Protection and Repatriation Act may serve as another appropriate model.¹⁵⁸

One scholar has carefully considered what a *sui generis* system should look like:

Such legislation must begin with acknowledgement of traditional patrimonial intellectual property, which states that in some circumstances the tribe could collectively own property rights. Legislation must also recognize the inherent difference between current copyright laws and property cumulatively created by more than one individual in a family line or by a group of individuals in a social institution. Finally, the laws should expressly address retroactive application to products of knowledge, art and other relevant property. Ultimately, proposals for a *sui generis* intellectual property law, which take into account diverse interest of Native American peoples, may be the most effective long-term solution for overcoming the pitfalls of the current regime.¹⁵⁹

Although not entirely *sui generis*, the United States may look beyond its own existing law to the recent South African adoption of the Intellectual Property Laws Amendment as an example of how such a law may be organized.¹⁶⁰ The Amendment was adopted with the goal of providing better protections for traditional knowledge. Specifically, “key interventions contained in the Act include the prohibition of registration of indigenous knowledge without consent or that is offensive to a particular public.”¹⁶¹ The Amendment requires the informed consent of the indigenous community involved. This tracks the consent requirements discussed in relation to bioethics and international human rights law, below.¹⁶² Ultimately, however, the United States has yet to look to *sui generis* systems to protect the traditional knowledge of tribes. Accordingly, a consideration of other sources of law is helpful.

B. DOMESTIC “SOFT” LAW

Although “soft” law may not be legally binding in all instances, such law can be persuasive.¹⁶³ And given that protecting traditional knowledge used in the climate context may not be feasible under American IP law, domestic “soft” law

157. Schussel, *supra* note 99, at 330; Kelley, *supra* note 29.

158. Schussel, *supra* note 99, at 333-35; Kelley, *supra* note 29.

159. Kelley, *supra* note 29 (citations omitted).

160. Linda Daniels, *South African Traditional Knowledge Protection Bill Amends IP Law*, INTELLECTUAL PROPERTY WATCH, (Feb. 19, 2014), <http://www.ip-watch.org/2014/02/19/south-african-traditional-knowledge-protection-bill-amends-ip-laws/>.

161. *Id.*

162. *See infra* Section IV. B., Domestic “Soft” Law.

163. *See, e.g.*, Schlais, *supra* note 15, at 583-84 (“This approach, although it does not guarantee enforceable legal protection, may influence players in markets such as Hawai’i to adopt appropriate policies, operating procedures, and codes of ethical conduct that may provide assistance in protecting indigenous, traditional knowledge.”).

may be a more viable option.¹⁶⁴ A review of ethical considerations and the requirements of institutional review boards may help provide some direction as to how to regulate research into traditional knowledge.

1. Ethical Considerations

Ethics guidelines, while often not binding, are nevertheless relevant to protecting traditional knowledge. First, because laws typically reflect the ethics of a given society,¹⁶⁵ ethical developments may foreshadow legal innovation. Furthermore, as explained above, the individuals who may use indigenous traditional knowledge to adapt to climate change are researchers outside of tribal communities. Such researchers may have to comply with the ethical review procedures required by their home institutions.¹⁶⁶ Accordingly, ethical considerations are relevant to a discussion of safeguards that could protect traditional knowledge from being used in a manner that the indigenous community does not agree with.

Given that individuals from many different disciplines may be actively engaged in the collection and use of traditional knowledge, no standard set of ethical considerations likely controls. However, bioethics, which focuses on ethical considerations related to science and medicine,¹⁶⁷ may prove to be a particularly relevant field. Most institutional review boards (“IRBs”) apply the primary principles of bioethics when reviewing research proposals related to human subjects.¹⁶⁸ Bioethical principles serve as the backdrop for many state and federal laws.¹⁶⁹ “William Reich defines ‘bioethics’ as ‘the study of the ethical dimensions of medicine and the biological sciences.’”¹⁷⁰ Although bioethics has not been applied in the context of traditional knowledge, it has, for example, been widely applied to American hospital practice.¹⁷¹ Applied bioethics assists decision makers with: (1) developing patient guidelines; (2) “[educating] health care

164. *Id.* at 606 (“[Indigenous peoples’] traditional knowledge and cultural heritage are being appropriated and there does not seem to be adequate protection under the current Western IP rights regime.”).

165. See generally Rebecca Tsosie, *Tribal Environmental Policy in an Era of Self-Determination: the Role of Ethics, Economics, and Traditional Ecological Knowledge*, 21 VT. L. REV. 225 (1996).

166. See, e.g., *Protection of Human Subjects in Research*, UNIV. OF KANSAS OFFICE OF RES. (Sept. 2, 2015, 8:09 AM), https://research.ku.edu/human_subjects.

167. Heidi G. Robertson, *Seeking a Seat at the Table: Has Law Left Environmental Ethics Behind, as It Embraces Bioethics?*, 32 WM. & MARY ENVTL. L. & POL’Y REV. 273, 275 (2008). The field of bioethics, however, is preoccupied with how science and medicine impact the individual, rather than the community. *Id.* at 277. Indigenous communities typically hold traditional knowledge, not individuals; therefore, analogizing to bioethics may not be the most effective way to consider ethical issues associated with the use of traditional knowledge. Environmental ethics, with its focus on entire populations, *id.*, may make for a more appropriate comparison—although that field has yet to be fully defined or applied in practice.

168. See *infra* Part IV. B. ii., Institutional Review Boards.

169. Robertson, *supra* note 167, at 295.

170. *Id.* at 286 (citing Albert R. Jonsen, *THE BIRTH OF BIOETHICS* 27 (Oxford Univ. Press 1998)). Furthermore, “[t]he evolution of bioethics is widely believed to derive from synergies among theologians, philosophers, and physicians.” *Id.* at 287.

171. Robertson, *supra* note 167, at 277.

professionals . . . about ethical concerns associated with the care of patients”;¹⁷² and (3) performing case consultation.¹⁷²

The National Research Act created the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research (“Commission”). The Commission developed three basic principles of bioethics: “respect for persons, beneficence, and justice.”¹⁷³ Although the Commission’s report—later known as the Belmont Report—focused on impacts to human subjects, the report and its conclusions have been used more broadly.¹⁷⁴ The Report requires “consent, which in turn requires information, comprehension, and voluntariness, all of which the researchers must ensure.”¹⁷⁵ Consent is “an issue central in the development of bioethics.”¹⁷⁶ The consent requirement parallels the requirement of informed consent under international human rights law, discussed below.¹⁷⁷ It also allows indigenous communities possessing traditional knowledge a greater ability to direct the use of such knowledge.

Environmental ethics provide another potential lens through which to consider ethical controversies arising from the collection and use of traditional knowledge. Environmental ethics is “the study of what is right and wrong, good and bad, and who bears responsibilities for what . . . in an environmental context.”¹⁷⁸ Moreover, “environmental ethics presents a systematic and comprehensive account of the moral relations between human beings and their natural environment and assumes that human behavior toward the natural world can be governed by moral norms.”¹⁷⁹ Some have also considered environmental ethics as a method for harmonizing public goods and private interests.¹⁸⁰ However, unlike with bioethics, the field of environmental ethics does not appear to revolve around a single, unified set of ethical principles.¹⁸¹ The field has yet to fully develop.¹⁸² For example, “other than preambles, there are no federal laws that encourage the use of environmental ethicists in decision making where ethical questions concern

172. *Id.* at 283 (citations omitted). By referring to bioethics in these ways, the bioethicist may reduce an institution’s liability. *Id.* at 284.

173. *Id.* at 313. The Report encompassing these three principles later became known as the Belmont Report, and remains highly influential within the field of bioethics today. *Id.* “Beneficence” can be understood as “the charge to ‘do no harm’ and the requirement that physicians benefit their patients ‘according to their best judgment,’ as well as an assessment of risks and benefits to the research subject, which must be communicated under informed consent.” *Id.* at 294. Furthermore, “justice” can be understood to mean “considering whether burdens should be distributed to each person equally, to each according to his needs, to each according to his societal contribution, or to each according to merit.” *Id.*

174. *Id.* at 294.

175. *Id.*

176. *Id.* at 314.

177. *See infra* Part IV. C., International Law.

178. Robertson, *supra* note 167, at 296.

179. *Id.* (citing Joseph R. DesJardins, ENVTL. ETHICS 9 (2d ed. 1989)).

180. *Id.* at 298.

181. *Id.* at 304.

182. *Id.* at 277.

human actions and the preservation, conservation, or pollution of the environment.”¹⁸³ Nonetheless, applying environmental ethics to the traditional knowledge context may help augment the field’s role in the broader environmental discourse.¹⁸⁴

2. Institutional Review Boards

Academic researchers entering tribal territories in search of traditional knowledge to combat climate change are typically governed by the requirements of their home institutional review boards. IRBs rely heavily on the three fundamental principles of bioethics,¹⁸⁵ spelled out in the Report discussed above,¹⁸⁶ to govern research activity. Under federal law, IRBs must review any research proposals involving human subjects that request federal funds.¹⁸⁷ “The IRBs use the principles set forth in the Belmont Report to evaluate research according to ethical principles.”¹⁸⁸ Thus, under federal law, IRBs must review research proposals for informed consent, in addition to other requirements.¹⁸⁹ Tribal communities may also wish to further condition use of their traditional knowledge before consenting to academic research.

Ultimately, however, neither American IP law nor ethical considerations or IRBs are capable of providing sufficient legal protections for traditional knowledge. More promising models may exist in international law.

C. INTERNATIONAL LAW¹⁹⁰

International intellectual property regimes and broader public international law principles can potentially contribute to efforts to protect traditional knowledge used in the climate context. However, international law likely does not offer adequate protection (as recognized and enforced in American courts) for traditional knowledge.

1. International Intellectual Property Regimes

The international IP regime is similar to American IP law because of the significant role that the United States has played in shaping it.¹⁹¹ In particular, the concept in international law of “moral rights” is a helpful starting point to

183. *Id.* at 340.

184. *Id.* at 354.

185. Robertson, *supra* note 167, at 295.

186. *See supra* Part IV. B. 1., Ethical Considerations.

187. Robertson, *supra* note 167, at 295. These requirements also apply “to such research conducted, supported, or otherwise subject to regulation by the federal government outside the United States.” *Id.* at 317.

188. *Id.*

189. *Id.* at 316.

190. For a further discussion of types of laws, including international law, that may apply to traditional knowledge, *see* Paterson, *supra* note 12.

191. Quinn, *supra* note 15, at 297-98.

understand the relationship between international IP law and indigenous knowledge.¹⁹² Ultimately, while indigenous artists depend on moral rights, such rights do not extend far enough to protect traditional knowledge from exploitation. “Moral rights” refer to rights held by the creator of a work and, in this regard, carry more weight than mere moral inclinations. However, because such rights are held by identifiable individuals involved in the creation of a work, they typically would not be applicable to indigenous knowledge used in the climate context. “The Berne Convention established specific protection for attribution . . . and integrity,” which are commonly referred to as the moral rights of the artist.¹⁹³ “The right of attribution allows an author to claim authorship and prevents others from making competing claims. The right of integrity lets an author prevent distortion, mutilation, modification or other treatment of his or her work that is prejudicial to the author’s honor or reputation.”¹⁹⁴ Additionally, such rights offer limited protection because of their emphasis on the individual instead of the community.¹⁹⁵

Given that moral rights are generally unhelpful to indigenous communities seeking to protect against the unsanctioned use of their traditional knowledge, it is helpful to examine whether international intellectual property rights or international law more generally provides protections that the American system does not. Unfortunately, because the international IP regime is largely modelled on the American system, the international system offers little more protection to indigenous traditional knowledge used in the climate change context than the American system.

The Trade Related Aspects of Intellectual Property Rights (“TRIPS”) agreement institutionalized the international IP rights regime.¹⁹⁶ Although TRIPS Article 27 largely comports with American patent law, it reads, “patents shall be available for any invention,”¹⁹⁷ which suggests “the patentability of subject matter so general it can be said to cover human altered biological material.”¹⁹⁸ Despite this language, however, indigenous traditional knowledge would still likely fail to garner international protection under TRIPS, because of the

192. For a more extensive discussion of how moral rights can protect traditional knowledge, *see generally* Kelley, *supra* note 29 (explaining that “[t]he moral rights theory would protect the personality of the author(s), and perhaps more significantly, could justify an extension in the protection given to cultural property due to the ‘community interest in the work, [rather than] the reputation of the artist.’”). Ultimately, the author concludes that recognition of moral rights is limited within the United States and, therefore, additional legislation would be necessary to extend such rights to traditional knowledge. *Id.*

193. Paterson, *supra* note 12, at 641-42.

194. *Id.* at 642.

195. *Id.* at 644.

196. Quinn, *supra* note 15, at 299.

197. Agreement on Trade-Related Aspects of Intellectual Property Rights art. 27, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1C, 1869 U.N.T.S. 299 [hereinafter TRIPS].

198. Quinn, *supra* note 15, at 300.

requirements that such inventions be novel and “non-obvious.”¹⁹⁹

The World Intellectual Property Organization (WIPO) is the “primary international body through which discussions and debates [about protecting indigenous knowledge] have been filtered.”²⁰⁰ Ultimately, however, “international consensus has yet to be reached about how indigenous peoples’ rights to the protection of cultural knowledge systems can be secured, either within an intellectual property regime or through some other over-arching legislative or policy framework.” Within WIPO, the Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge, and Folklore has taken the lead on discussing issues related to traditional knowledge.²⁰¹ Specifically, the Committee “is, in accordance with its mandate, undertaking text-based negotiations with the objective of reaching agreement on a text(s) of an international legal instrument(s), which will ensure the effective protection of traditional knowledge (traditional knowledge), traditional cultural expressions (TCEs) and genetic resources (GRs).”²⁰² If the Committee is successful in its work, there may one day be explicit protection under international law for tribal indigenous knowledge.²⁰³

2. Public International Law

Despite the existence of intellectual property regimes under international law, many indigenous communities have yet to avail themselves of their protections. Furthermore, given that such systems are largely modelled on American IP law, the international system is ill-equipped to assist indigenous communities with protecting their traditional knowledge as it relates to climate change. In fact, not only is the international system unhelpful in general, but the system may even be at odds with indigenous systems. To date, even under international law, “Western intellectual property regimes’ . . . globalization through various avenues such as the World Trade Organization . . . and the Agreement on Trade-Related Aspects of Intellectual Property Rights . . . has caused a head on collision with indigenous systems of stewardship of indigenous, traditional knowledge and cultural heritage around the world.”²⁰⁴ Because international IP regimes do not adequately protect indigenous interests, indigenous peoples have in some cases turned to human rights considerations for adequate protection.²⁰⁵

199. *Id.* at 300-01.

200. CENTER FOR THE STUDY OF THE PUBLIC DOMAIN, *supra* note 14.

201. *Id.*

202. *Id.*

203. *But cf.* Schuler, *supra* note 16, at 776 (describing some potential problems associated with international regulation of indigenous knowledge, such as the fear that many indigenous people have of Western regulation).

204. Schlais, *supra* note 15, at 582.

205. Quinn, *supra* note 15, at 293 (“[Indigenous peoples] ‘tend to employ the political discourse of human rights: rights to land, territory, and resources; rights to full disclosure and prior informed consent; rights to cultural integrity and customary practices; and rights to equitable benefit-sharing and control over access to

The human rights regime may in fact prove more useful to protecting such knowledge.²⁰⁶ One applicable law is the 1954 Convention for the Protection of Cultural Property in the Event of Armed Conflict.²⁰⁷ Application of the 1954 Convention has been somewhat limited, as it focuses at a very broad level on the cultural heritage of all humankind.²⁰⁸ However, the “Convention does make it clear that international law regards certain categories of cultural property as different from ordinary movables and justifies the existence of enhanced responsibilities among states.”²⁰⁹ Under the Convention, nation states ultimately have the authority to control their own cultural property.²¹⁰

While the Convention may be a helpful starting point for protecting traditional knowledge under public international law, it ultimately refers back to domestic law for such protections. Other sources of international human rights law may be more relevant to protecting traditional knowledge in the climate context, such as the right to self-determination.²¹¹ The right to self-determination is integral to human rights law and, as a result, States are “[obligated] to protect it and make it effective in a domestic context.”²¹² “Self-determination in modern practice requires applying principles of human rights laws and extending human rights protections to any area of Indigenous life that will ensure survival of Indigenous culture and the sustainability of Indigenous resources.”²¹³ Due to their right to self-determination, “Indigenous Peoples freely determine their political status and freely pursue economic, social, and cultural development, which includes determining appropriate uses of traditional knowledge, cultural expressions, and natural and biological resources.”²¹⁴

One international document that recognizes the right of self-determination is the United Nations Declaration of the Right of Indigenous Peoples (UNDRIP).²¹⁵

traditional resources.”) (citing Rosemary J. Coombe, *Intellectual Property, Human Rights & Sovereignty: New Dilemmas in International Law Posed by the Recognition of Indigenous Knowledge and the Conservation of Biodiversity*, 6 *IND. J. GLOBAL LEGAL STUD.* 59, 79 (1998)).

206. *Id.* at 307.

207. Convention for the Protection of Cultural Property in the Event of an Armed Conflict, Aug. 4, 1956, 249 U.N.T.S. 240.

208. Paterson, *supra* note 12, at 652-53.

209. *Id.* at 653.

210. *Id.* at 654-55 (using the Native American Graves Protection and Repatriation Act as an example of how the United States has used its authority under the Convention).

211. Professor Conway describes “self-determination” in the international context as “applying principles of human rights laws and extending human rights protections to any area of Indigenous life that will ensure survival of Indigenous culture and the sustainability of Indigenous resources.” Conway, *supra* note 89, at 223.

212. Conway, *supra* note 89, at 223 (citing Paul L.A.H. Chartrand, *Legal Pluralism: Reflections on the Role of Law in Providing Justice for Indigenous Peoples—A Canadian Context*, F.I.R.S.T. FOUND., <http://www.firstfound.org/vol.%201/chart1.htm>).

213. *Id.*

214. *Id.* at 224.

215. Declaration on the Rights of Indigenous Peoples, G.A. Res. 295 (LXI), U.N. Doc. A/RES/61/295, at art. 3 (Sept. 13, 2007), available at http://www.un.org/esa/socdev/unpfii/documents/DRIPS_en.pdf [hereinafter UNDRIP].

Notably, many indigenous communities link their traditional knowledge to the right to self-determination.²¹⁶ “An important feature of indigenous, traditional knowledge is its link to a community and that community’s right to self-determination.”²¹⁷ UNDRIP recognizes the linkage between the two concepts of tribal indigenous knowledge and self-determination; Article 11 provides that:

Indigenous peoples have the right to practice and revitalize their cultural traditions and customs. This includes the right to maintain, protect and develop the past, present, and future manifestations of their cultures, such as archeological and historical sites, artifacts, designs, ceremonies, technologies and visual performing arts, and literatures.

States shall provide redress through effective mechanisms, which may include restitution, developed in conjunction with indigenous peoples, with respect to their cultural, intellectual, religious and spiritual property taken without their free, prior and informed consent or in violation of their laws, traditions and customs.²¹⁸

Additionally, Article 31 provides:

Indigenous peoples have the right to maintain, control, protect and develop their cultural heritage, traditional knowledge and traditional cultural expressions, as well as the manifestations of their sciences, technologies and cultures, including human and genetic resources, seeds, medicines, knowledge of the properties of fauna and flora, oral traditions, literatures, designs, sports and traditional games and visual and performing arts. They also have the right to maintain, control, protect and develop their intellectual property over such cultural heritage, traditional knowledge, and traditional cultural expressions.²¹⁹

Article 31 further specifies that “[s]tates shall take effective measures to recognize and protect the exercise of these rights.”²²⁰ Essentially, UNDRIP’s language recognizes the inherent rights of indigenous peoples and their capacity to make distinct contributions to society.

UNDRIP is non-binding on the United States.²²¹ The Declaration, adopted on September 13, 2007, by the UN General Assembly, is an aspirational docu-

216. See, e.g., Schlais, *supra* note 15, at 586 (explaining that, in rejecting the taro patents mentioned above, the Native Hawaiians “produced the Paoakalani Declaration, an organic document expressing [Native Hawaiian] self-determination to protect and perpetuate [their] culture under threat of theft and commercialization of the traditional knowledge of [Native Hawaiians]”) (internal quotation marks omitted) (quoting R. Hokulei Lindsey, *Responsibility with Accountability: The Birth of a Strategy to Protect Kanaka Maoli Traditional Knowledge*, 48 *How. L.J.* 763, 771 (2005)).

217. *Id.* at 587. Furthermore, “[i]n the Native Hawaiian context, traditional knowledge is communally held and, therefore, the community’s right of self-determination goes hand in hand with the protection of indigenous, traditional knowledge.” *Id.* (citation omitted).

218. UNDRIP, *supra* note 215, at art. 11.

219. *Id.* at Art. 31.

220. *Id.*

221. However, some of the rights contained within the UNDRIP, such as the right to self-determination, may have risen to the level of customary international law, which would make them binding on the United States.

ment.²²² However, “[a]lthough a declaration is not binding on UN Member States and not considered to be a primary source of international law, it is influential on future state actions and over time, norms of customary international law can emerge from these state practices and declarations.”²²³ Today, a hundred and fifty nations have endorsed UNDRIP. “[T]he *Declaration* addresses the full range of self-determination, property, civil, political, economic, social, cultural, religious, land and environmental rights of indigenous peoples. It formulates ‘minimum standards’ with high normative value for protecting the survival, dignity and well-being of indigenous peoples.”²²⁴ Therefore, one scholar has concluded that “[w]ith the inclusion of indigenous peoples’ rights in authoritative international instruments and a unique trust relationship with federally-recognized Indian tribes, the United States has a duty to continue to consider and implement more protective intellectual property laws for the benefit of Native Americans.”²²⁵

President Obama endorsed UNDRIP in 2010.²²⁶ As the U.S. Department of State explains, the Declaration, “while not legally binding or a statement of current international law . . . has both moral and political force,” and notes further that “it expresses aspirations of the United States, aspirations that this country seeks to achieve within the structure of the U.S. Constitution, laws, and international obligations, while also seeking, where appropriate, to improve our laws and policies.”²²⁷ Walter Echo-Hawk elaborates:

The short answer [to the question of whether UNDRIP is binding in the United States] is that declarations are not legal binding instruments that courts must enforce, except indirectly to the extent that their provisions amount to norms in customary international law or existing United States treaty obligations. Many provisions in the *Declaration* reflect such norms; and others reflect obligations imposed by UN treaties ratified by the United States, though none are self-enforcing and must be domesticated through implementing legislation.²²⁸

Accordingly, until the relevant provisions of UNDRIP are domesticated through implementing legislation, UNDRIP may not provide much protection for tribal indigenous knowledge.

222. UNDRIP, *supra* note 215, at 1.

223. Schlais, *supra* note 15, at 588 n.43 (citing RESTATEMENT (THIRD) OF FOREIGN RELATIONS LAW § 103 (1987)).

224. Walter Echo-Hawk, *The Human Rights Era of Federal Indian Law: The Next Forty Years*, 62 *FED. LAW.* 32, 36 (2015).

225. Kelley, *supra* note 29 (citation omitted).

226. Valerie Richardson, *Obama Adopts U.N. Manifesto on Rights of Indigenous Peoples*, *WASH. TIMES* (Dec. 16, 2010), <http://www.washingtontimes.com/news/2010/dec/16/obama-adopts-un-manifesto-on-rights-of-indigenous-/?page=all>.

227. U.S. DEP’T OF STATE, U.N. DECLARATION ON THE RIGHTS OF INDIGENOUS PEOPLES, <http://www.state.gov/s/tribalconsultation/declaration/> (last visited Jan. 5, 2014).

228. Echo-Hawk, *supra* note 224, at 37.

In addition to the right to self-determination, international law provides other protections that may be relevant to indigenous knowledge as it applies in the climate change context. For example, Article 15 of the International Covenant on Economic, Social and Cultural Rights (ICESCR) provides, in relevant part, that “[t]he State Parties to the present Covenant recognize the right of everyone . . . [t]o benefit from the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he is the author.”²²⁹ Member states are thus obligated to protect indigenous scientific knowledge, such as knowledge related to climate change. The United States has been a signatory to ICESCR since 1976 and thus cannot take actions that directly contravene it.²³⁰ However, for many tribes, indigenous knowledge is not attributable to a single author, but the product of diverse entities, such as clans and societies, that contribute to the makeup of the tribe over generations. As Patricia Cochran, Director of the Alaska Native Science Commission, states, “Natives possess both collective and traditional knowledge. Most traditional knowledge is shared among community members. But some traditional knowledge may be specific to an individual. For example, some elders and resource-users will, because of different life experiences, be the only source for certain types of traditional knowledge.”²³¹ Therefore, in the instances where traditional knowledge is possessed by an individual, international law may offer some protection. Moreover:

[w]hile Article 15 of the ICESCR provides a foundation for enforcing the rights of everyone to benefit from moral and material interests of intellectual authorship, it stops short of addressing the human rights of Indigenous Peoples to have their Indigenous resources and intangible assets recognized, protected, promoted, and disseminated in accordance with what is deemed acceptable under Indigenous law.²³²

Therefore, given the limitations of existing international law, the need for the development of tribal laws to protect indigenous knowledge remains significant.

V. THE DEVELOPMENT OF TRIBAL LAW TO PROTECT TRADITIONAL KNOWLEDGE

Rather than rely on existing American and international law to protect their indigenous knowledge, some tribes may prefer to develop their own tribal law to protect such knowledge in a manner that is culturally responsible and comports

229. Human Rights, International Covenant on Economic, Social and Cultural Rights, G.A. Res. 2200 (XXI), U.N. Doc. A/RES/21/2200, at 51 (Dec. 16, 1966), available at <http://www.ohchr.org/EN/ProfessionalInterest/Pages/CESCR.aspx>.

230. UNITED NATIONS HUMAN RIGHTS, STATUS OF RATIFICATION, <http://indicators.ohchr.org/> (last visited Jan. 4, 2015).

231. Cochran, *supra* note 83.

232. Conway, *supra* note 89, at 229.

with their sovereignty.²³³ “Through their own laws, tribes can potentially protect even cultural property, such as ancestral knowledge, languages, systems of grammar, as well as art, dance and traditional crafts that do not always fit neatly into the protections allowed by federal and state legal regimes.”²³⁴

Scholars have acknowledged that the use of American IP law and international protections serve mostly as interim measures to protect indigenous knowledge in the climate change context, and should only be used until the indigenous community can effectuate its own self-determination or sovereignty to protect its knowledge.²³⁵ Those existing legal systems are largely foreign to the unique legal concerns of indigenous peoples. Indeed, some tribes may have “an aversion to western intellectual property rights protection systems because they do not account for the contextual history of Indigenous Peoples nor do they take into account the necessity for Indigenous resources to be protected by complementary Indigenous laws.”²³⁶

By creating laws to protect traditional knowledge, tribes can control their own needs and reconsider following more limited models that constrain tribal input to a monolithic voice in policy making. Professor Conway concludes that “[t]he absence of Indigenous legal systems renders any protection of Indigenous resources impotent.”²³⁷ She elaborates that “Indigenous identity and survival in today’s economy depends upon Indigenous control over Indigenous resources and intangible assets.”²³⁸ The ability to operate autonomously within the boundaries of reservations is an important aspect of indigenous sovereignty, a unifying concept for all tribes. “For many indigenous peoples, traditional knowledge and cultural heritage is communally created and held through inter-generational transmission of knowledge and rights.”²³⁹ That is, existing laws that do not acknowledge this communal aspect of indigenous sovereignty are incompatible

233. Yost, *supra* note 111, at 53 (“tribes can exercise their inherent sovereign authority by enacting tribal laws that protect their names and other intellectual property, and they can do so in a manner consistent with the unique features, cultures, and norms of each tribal community”) (citing Paul J. Heald, *The Rhetoric of Biopiracy*, 11 *CARDOZO J. INT’L & COMP. L.* 519, 529 (2003)). *But cf.* Conway, *supra* note 89, at 253-54 (detailing traditional arguments against the adoption of tribal law). Some tribes may not be in a position to develop and adopt tribal law related to the protection of traditional knowledge. In these instances, it may be possible to provide some protection against the appropriation of traditional knowledge by the inclusion of specific contract provisions between the tribe and the researcher or collector. Such a contract would govern when and under what circumstances the traditional knowledge could be used for certain purposes.

234. *Id.* However, tribes enacting such laws should be wary of the potential difficulties associated with regulating non-Indians located within tribal territories. *Id.* (citing *Montana v. United States*, 450 U.S. 544, 566 (1981)).

235. Conway, *supra* note 89, at 208 (“The proposal to indigenize intellectual property law is for sure only an interim measure to protect Indigenous resources up to and until Indigenous Peoples have fully realized self-determination.”).

236. *Id.* at 224.

237. *Id.*

238. *Id.* at 236.

239. Schlais, *supra* note 15, at 591 (citations omitted).

with tribes' day-to-day stewardship of their own resources. Tribes protect their resources in the context of an ongoing conversation, a unifying voice that demands respect from decision makers. Tribes have the right to speak for themselves or choose to be spoken for. Although Congress and the courts have created law affecting all tribes indiscriminately, individual tribes have the autonomy to disregard that legal model when they see fit, assuming that they do not act in contravention of the law.²⁴⁰

Tribes that develop their own laws to protect their indigenous knowledge produce other benefits, as well. For example, protecting traditional knowledge through the law creates an asset. By protecting that asset through their own laws, tribes may be better-positioned to define their assets and capitalize on them as they see fit.²⁴¹ Tribes that develop laws to protect their indigenous knowledge can simultaneously promote their inherent sovereignty and protect their fundamental human rights within their tribal territories.²⁴² And adoption of tribal laws "promotes the principle of equivalence with respect to legal systems."²⁴³ Indigenous communities can achieve recognition of their own laws and in turn influence how other parties treat indigenous resources and intangible assets.²⁴⁴ Moreover, developing new tribal laws counters the narrative that tribal law is "ancient, inflexible and, at times, uncivilized."²⁴⁵

Finally, some tribes may adopt code provisions to remedy historical wrongdoing and ensure that exploitation does not occur in the future. For example, in their Research Code of Ethics and Policy, the Fort Peck Assiniboine & Sioux Tribes explained their reasons for adopting the Code, stating:

The history of research involving American Indian people serves as another compelling reason that human subjects must be protected. Language and cultural differences caused misunderstanding about the intent and content of the research in which Native people were engaged. In sometimes intimidating situations, subjects were not informed, nor were they given the opportunity to decline participation. Sacred knowledge, objects, and sites were all too often violated in the name of research and the generation of new knowledge about indigenous peoples and their cultures. While Fort Peck Tribes must and will demonstrate compliance with this research code of ethics, they are also committed to the protection of the citizens of Fort Peck Reservation so as not to

240. R.A. WILLIAMS JR., *THE AMERICAN INDIAN IN WESTERN LEGAL THOUGHT: THE DISCOURSES OF CONQUEST* (1990).

241. Conway, *supra* note 89, at 209.

242. *Id.* at 210.

243. *Id.* (citations omitted); *see also* Schlais, *supra* note 15, at 612 ("Adhering to indigenous customary law provides the appropriate protection needed for indigenous, traditional knowledge and an amicable process through which Western organizations may access indigenous, traditional knowledge.").

244. *Id.*

245. *Id.* at 211 (citation omitted).

repeat the history that took advantage of them. Further examples of concerns involving research include:

1. Individual Indian people have been persuaded to participate in research in which they did not fully understand the risk to their health and safety;
2. Individuals may have felt that they were required to participate in research in order to maintain their right to health and social services;
3. Research was conducted which did not respect the basic human dignity of the individual participants or their religious and cultural beliefs;
4. Lead Researchers have not respected the confidentiality of Indian people to the same degree that they would have those of non-Indian individuals and communities;
5. Lead Researchers have treated Indian Lead Researchers as "less than" rather than as colleagues, allowing themselves to appropriate the work of Indian Lead Researchers as their own;
6. Lead Researchers have pursued issues of importance to the larger society but of marginal interest to Indian people and have been uninterested in problems of more urgent concern to the Indian community;
7. Lead Researchers have sought and published sensitive religious and cultural information, in some cases destroying its efficacy by publication;
8. Lead Researchers have taken cultural information out of context and, as a result, have published conclusions that were factually incorrect;
9. Lead Researchers have failed to respect the cultural beliefs and practices of the Indian community in their research methods;
10. Lead Researchers have accentuated and sensationalized Indian tribal, community, family and individual problems heedless of their impact on legitimate Indian social or political interests;
11. And despite promises at the outset that research would benefit the Indian community; Lead Researchers have failed or refused to follow through on promised benefits, to share preliminary results with the Indian community or to give the community an opportunity to participate in the formulation of recommendations or of a final report.
12. Given this legacy of miscommunication and exploitation, much misunderstanding and mistrust still exist. It is therefore paramount that principles, policies and procedures governing research activities are put in place that protect the rights and welfare of the Assiniboine and Sioux people.²⁴⁶

Therefore, although it would be wrong to say that the foregoing serve as motivations for all tribes to adopt tribal code provisions given the vast diversity between the 567 current federally recognized tribes, reasons do exist to motivate tribes to develop such tribal laws to protect their traditional knowledge as it is used within the climate context.

246. Fort Peck Assiniboine & Sioux Tribes Research Code of Ethics and Policy, Sec. 102 (a-b), available at <http://www.fpcc.edu/irb-forms/AssiniboineSiouxIRBCode.pdf>.

A. TRIBAL LAW AND CIVIL JURISDICTION²⁴⁷

The term “tribal law” refers to laws enacted by virtue of tribes’ inherent sovereign authority, which must be understood in the context of the relationship between tribes and the federal government. Prior to foreign colonization, most tribes existed as independent, self-governing communities.²⁴⁸ Contact with foreigners certainly impacted tribal governments, but tribal governments are nevertheless still recognized as independent, sovereign entities within the United States. In *Worcester v. Georgia*, the U.S. Supreme Court acknowledged that tribes are “distinct, independent political communities.”²⁴⁹ Thus tribes retain their inherent sovereign authority today. “Tribal powers of self-government are recognized by the Constitution, legislation, treaties, judicial decisions, and administrative practice.”²⁵⁰ Unless Congress divests a tribe of its inherent sovereignty, the tribe’s sovereignty remains intact.²⁵¹ Accordingly, tribes maintain sovereign authority over their members and territory to the extent not limited by federal law.²⁵² “Indian tribes are neither states, nor part of the federal government, nor subdivisions of either. Rather, they are sovereign political entities possessed of sovereign authority not derived from the United States, which they predate.”²⁵³

Despite inherent tribal sovereignty, however, jurisdictional uncertainty sometimes arises in the context of tribal authority over the actions of non-members and non-Indians acting within the tribal territory. Many if not most researchers who work within Indian country are not members of the tribes whose lands they are visiting. And in the civil context, tribes have been divested of their inherent

247. For a more complete discussion of the scope of tribal law and tribal civil jurisdiction, see generally COHEN’S HANDBOOK OF FEDERAL INDIAN LAW (Nell Jessup Newton et al. eds., 2012) (LexisNexis 2012 ed.) [hereinafter COHEN’S HANDBOOK].

248. *Id.* at § 4.01[1][a] (“[m]ost Indian tribes were independent, self-governing societies long before their contact with European nations, although the degree and kind of organization varied widely among them”) (citing STEPHEN CORNELL, THE RETURN OF THE NATIVE: AMERICAN INDIAN POLITICAL RESURGENCE 72-76 (1988)).

249. *Worcester v. Georgia*, 31 U.S. 515, 559 (1832). Even though the Court described tribes as “domestic dependent nations” in *Cherokee Nation v. Georgia*, 30 U.S. 1 (1831), tribal sovereignty still existed and tribes were not dependent on federal law. COHEN’S HANDBOOK, *supra* note 247, at § 4.01[1][a].

250. *Id.*

251. *Id.*

252. COHEN’S HANDBOOK, *supra* note 247, at § 4.01[1][b] (citing *Worcester v. Georgia*, 31 U.S. 515, 555 (1832)) (absent tribal or federal approval “[t]he Cherokee nation, then, is a distinct community occupying its own territory, with boundaries accurately described, in which the laws of Georgia can have no force”); *Ex parte Crow Dog*, 109 U.S. 556, 558, 571-72 (1883) (affirming exclusive tribal authority to impose criminal punishment on tribal members absent federal law to the contrary); *Fisher v. Dist. Ct.*, 424 U.S. 382, 389-90 (1976) (upholding exclusive tribal jurisdiction over an adoption proceeding in which all parties were tribal members and reservation residents); 25 U.S.C. § 1911(a) (2006) (reinforcing the *Fisher* holding by declaring exclusive tribal jurisdiction over certain child custody matters involving children who are tribal members or eligible to be tribal members, so long as the children are domiciled or residing on the reservation, or wards of a tribal court).

253. *Nanomantube v. Kickapoo Tribe in Kan.*, 631 F.3d 1150, 1151-52 (10th Cir. 2011) (quoting *NLRB v. Pueblo of San Juan*, 276 F.3d 1186, 1192 (10th Cir. 2002) (en banc)).

sovereignty over non-citizens, absent certain conditions.²⁵⁴ These conditions are commonly referred to as the *Montana* exceptions.

In *Montana v. United States*, the U.S. Supreme Court considered the extent of the Crow Nation's inherent sovereignty over non-Indians.²⁵⁵ Because the Court found that the tribe's inherent sovereignty over non-Indians on non-Indian land within its reservation had been implicitly divested,²⁵⁶ it determined that the tribe did not have the authority to regulate the hunting and fishing activity of non-Indians owning fee land²⁵⁷ within reservation boundaries.²⁵⁸

However, despite the implicit divestiture of tribal inherent sovereignty over non-Indians on fee land within reservation boundaries, tribes may still regulate such individuals' activities in two limited circumstances: first, tribes may regulate the activities of individuals who have entered into "consensual relationships with the tribe or its members;"²⁵⁹ and second, a tribe retains the "inherent power to exercise civil authority over the conduct of non-Indians on fee lands within its reservation when that conduct threatens or has some direct effect on the political integrity, the economic security, or the health or welfare of the tribe."²⁶⁰ As discussed below,²⁶¹ at least one tribe appears to have developed legal protections for its traditional knowledge with an eye to the *Montana* rule and its exceptions.

B. EXISTING TRIBAL LAW PROTECTING TRADITIONAL KNOWLEDGE

The Colorado River Indian Tribes, Ho-Chunk Nation, and Sisseton-Wahpeton Oyate of the Lake Traverse Reservation have each enacted laws designed, in part, to protect traditional knowledge. These three tribes' code provisions are applicable to protecting traditional knowledge used in the climate change context.

254. *Montana v. United States*, 450 U.S. 544, 563-64 (1981). Tribes' criminal jurisdiction is generally limited to Indians. *Oliphant v. Suquamish Tribe*, 435 U.S. 191 (1978).

255. *Id.* at 565.

256. *Id.* See also Bruce Duthu, *Implicit Divestiture of Tribal Powers: Locating Legitimate Sources of Authority in Indian Country*, 19 AM. INDIAN L. REV. 353, 384 (1994). "According to this theory, courts can rule that, in addition to having lost certain aspects of their original sovereignty through the express language of treaties and acts of Congress, tribes also may have been divested of aspects of sovereignty by implication of their dependent status." Kevin Gover and James B. Cooney, *Cooperation Between Tribes and States in Protecting the Environment*, 10-WTR NAT. RESOURCES & ENV'T 35 (1996).

257. Since *Montana*, the Supreme Court has also considered the ability of tribes to regulate the conduct of non-members and non-Indians on other types of lands. For example, in *Strate v. A-1 Contractors*, the Court held that the Indian tribe did not possess the inherent sovereignty to adjudicate a civil complaint arising from an accident between two non-Indians on a state highway within the tribe's reservation boundaries. The *Strate* Court explained that "[a]s to nonmembers, we hold, a tribe's adjudicative jurisdiction does not exceed its legislative jurisdiction." *Strate v. A-1 Contractors*, 520 U.S. 438, 453 (1997).

258. *Montana*, 450 U.S. at 564-565 (holding that the "exercise of tribal power beyond what is necessary to protect tribal self-government or to control internal relations is inconsistent with the dependent status of the tribes, and so cannot survive without express congressional delegation").

259. *Id.* at 565.

260. *Id.* at 566.

261. See *infra* Part V. B., Existing Tribal Law Protecting Traditional Knowledge.

1. Colorado River Indian Tribes

The Colorado River Indian Tribes (“CRIT”) have adopted a Human and Cultural Resource Code (“CRIT Code”) establishing an Ethics Review Board (“ERB”) and research policy.²⁶² The CRIT Code creates “a uniform standard in how research on the Colorado River Indian Reservation . . . is to be conducted” that protects the Tribes’ property, “including physical, real, cultural and intellectual property *and communal property*,”²⁶³ setting it apart from American IP laws. It broadly applies to non-CRIT governmental officials and non-profit employees.²⁶⁴ The CRIT Code is thus designed to encompass anyone who may come on to the reservation to conduct research.

The ERB is responsible for implementing and enforcing the CRIT Code provisions.²⁶⁵ It reviews all proposals, even if they have been approved by another ERB, “for human research which will occur within the territorial jurisdiction of CRIT.”²⁶⁶ The ERB must determine whether “research and publication activities are consistent with the cultural, health and education goals and objectives of CRIT,”²⁶⁷ and must ensure that researchers seek consent from their research participants.²⁶⁸ The ERB issues permits for approved research activities, thereby reserving to the tribe the right to approve research results.²⁶⁹ A researcher’s proposal packet to the ERB must stipulate that the researcher shall be governed by the laws of the CRIT.²⁷⁰ This potentially satisfies the first exception under *Montana* to the presumption against tribal jurisdiction over a non-Indian on non-Indian land.²⁷¹ Should a dispute over the use of traditional knowledge arise between a non-Indian researcher and the CRIT, the tribe can thus probably assert jurisdiction over the researcher as a consequence of the permit.

In its research policy, the CRIT Code requires “stringent assurance that the data and information generated during the conduct of research is protected from unauthorized access and misuse” and that anyone proposing to use information gathered from the CRIT submit a manuscript to the ERB prior to publication.²⁷²

In sum, the CRIT Code goes a long way toward addressing many of the limitations of American IP law in protecting its traditional knowledge. The CRIT

262. COLORADO RIVER INDIAN TRIBES, HUMAN AND CULTURAL RESOURCE CODE, art. 1 (2009), available at http://www.crit-nsn.gov/crit_contents/ordinances/Human-and-Cultural-Research-Code.pdf [hereinafter CRIT CODE].

263. *Id.* at 1 (emphasis added).

264. *Id.* at 3.

265. *Id.*

266. *Id.*

267. *Id.* at 4.

268. *Id.* at 7.

269. *Id.*

270. *Id.*

271. *Montana*, 450 U.S. at 565.

272. CRIT CODE, *supra* note 262, at 10.

Code recognizes rights to communal property, extends jurisdiction over traditional knowledge from the initial research stage to its potential future uses, and would likely be interpreted by courts to grant the tribe jurisdiction over non-Indian researchers.

2. Ho-Chunk Nation

The Ho-Chunk Nation adopted its Tribal Research Code (“TRC”) on February 9, 2005.²⁷³ The tribe adopted the TRC to protect its culture from exploitation resulting from research conducted within its territory and to create a permitting scheme governing visiting researchers.²⁷⁴ “This Code shall apply to all persons subject to the civil jurisdiction of the Nation, including members and non-members, Indians and non-Indians and other corporate and institutional persons who or which might undertake to conduct research on Nation lands.”²⁷⁵ The TRC prohibits research within the tribe’s territory without a permit from the Ho-Chunk Institutional Review Board (“IRB”).²⁷⁶ Researchers applying to the IRB must include assurances that the data they collect will remain confidential and acknowledge that “rights to license and publish material and information produced after permission is granted by the IRB shall be subject to IRB policies regarding publication.”²⁷⁷ Specifically, researchers must obtain approval before publishing findings related to the tribe’s traditional knowledge, as “[t]he IRB has sole authority to control publication of all research, disclosures, and findings.”²⁷⁸

The Ho-Chunk Nation and CRIT Codes are thus similar in several respects. Both establish institutional boards to permit, review and control the research of individuals entering their territories. Their permit schemes give the tribes jurisdiction over researchers’ use (or misuse) of their traditional knowledge.

3. Sisseton-Wahpeton Oyate of the Lake Traverse Reservation

The Sisseton-Wahpeton Oyate of the Lake Traverse Reservation (“SWO”) has adopted a Cultural Resource Protection Act (CRPA), designed, in part, to protect traditional knowledge, which established a cultural preservation board and the position of cultural preservation officer.²⁷⁹ The CRPA’s purpose “is to protect,

273. HO-CHUNK NATION, TRIBAL RESEARCH CODE, 3 HCC § 3 (2005), available at http://www.narf.org/nill/Codes/hochunkcode/3HCC03_Research.pdf.

274. *Id.* at 2.

275. *Id.* at 3.

276. *Id.* at 4.

277. *Id.* at 5.

278. *Id.* The Tribe’s control over the publication and release of information also includes the right to demand explanation of research and periodic reports on the research from the researcher. *Id.* at 6.

279. SISSETON-WAHPETON OYATE OF THE LAKE TRAVERSE RESERVATION, CULTURAL RESOURCE PROTECTION ACT, ch. 73 (2005), available at http://www.narf.org/nill/codes/sisseton_wahpeton/Chapter73.pdf [hereinafter SWO CRPA].

preserve and promote the Sisseton-Wahpeton Oyate's cultural resources on the Lake Traverse Reservation by establishing a government agency to identify, evaluate and protect cultural, historic, and archaeological resources."²⁸⁰ The CRPA states that "[t]he Sisseton-Wahpeton Oyate is the exclusive owner of indigenous traditional knowledge, cultural resources, biogenetic resources, and intellectual property rights on protected lands."²⁸¹ Furthermore, one of the findings that led to the Act's adoption—that the SWO's "self-governing capability, political integrity, health, welfare and economic security will be enhanced and protected by the [tribe's] control, regulation and preservation of irreplaceable cultural resources"²⁸²—is intended to satisfy the second *Montana* exception.

Like the CRIT code and Ho-Chunk tribal laws, the CRPA prohibits research conducted within its territory without a permit.²⁸³ Researchers' permit applications must include mechanisms for obtaining informed consent from research participants and state in detail how they will protect participants' confidentiality.²⁸⁴ Moreover, applicants must address potential intellectual property rights to the proposed research and include a description of potential "publication, commercialization, or release of the research findings."²⁸⁵ Following submission of the researcher's proposal, "[t]he Preservation Officer shall enter into a written agreement with the researcher ensuring that the representations included in the researcher's application can be maintained and enforced by the Tribe during and after the research project."²⁸⁶ Finally, "[t]he Tribe reserves the right to deny research opportunities and withdraw consent, including seeking injunctive relief from the Tribal Court."²⁸⁷

Like the CRIT and Ho-Chunk codes, the SWO's CRPA prohibits research within its territory without a permit. It grants the SWO the right to review all research and withdraw its consent to the use of research findings, ensuring that the SWO controls access to its traditional knowledge beyond the limitations of American IP laws.²⁸⁸

VI. CONCLUSION

Traditional knowledge, born within indigenous communities and specific to place, can and does contribute to addressing climate change. Indigenous peoples

280. *Id.* at 1.

281. *Id.* at 2.

282. *Id.* Compare with the language of the second *Montana* exception, which declares that tribes maintain the "inherent power to exercise civil authority over the conduct of non-Indians on fee lands within its reservation when that conduct threatens or has some direct effect on the political integrity, the economic security, or the health or welfare of the tribe." *Montana*, 450 U.S. at 566.

283. SWO CRPA, *supra* note 279, at 11.

284. *Id.* at 13.

285. *Id.*

286. *Id.*

287. *Id.*

288. See *supra* Part IV. A., Domestic "Hard" Law: American Intellectual Property Law.

in vulnerable communities are already drawing on this traditional knowledge and their collective experience to adapt to climate impacts for the benefit of current and future generations. As they develop their own climate adaptation strategies, researchers and others who seek to engage with those peoples' traditional knowledge should treat it with respect. Indigenous peoples possess the tools they need to develop their own legal protections for traditional knowledge. These tools are not granted to them by courts of law. They are an inherent part of tribal sovereignty, have withstood the test of time, and continue to endure.

Depending on the region, traditional knowledge has the potential to make an enormous difference in efforts to adapt to climate change. It is vital that such knowledge is protected and used in a way that comports with tribal customs and traditions. A review of potential protections for traditional knowledge in domestic and international law reveals two relevant categories: binding and non-binding laws. Binding laws include existing American and international intellectual property laws. Unfortunately, despite being binding and enforceable, these laws usually do not extend to traditional knowledge given its intergenerational, communal nature. On the other hand, while sources of non-binding soft law can show how the law *should* be applied to protect traditional knowledge, they are not always strictly followed or enforced. For example, although the internationally recognized right to self-determination may protect traditional knowledge, such a right is largely unenforceable in the United States.

Because existing law fails to adequately shield traditional law from misuse, tribes may wish to consider developing their own laws to protect the tribe's knowledge from misappropriation and promote tribal sovereignty. Three tribes—the Colorado River Indian Tribes, the Ho-Chunk Nation, and the Sisseton-Wahpeton Oyate of the Lake Traverse Reservation—have each adopted tribal laws to protect their traditional knowledge in culturally appropriate ways. Their codes can also protect traditional knowledge used in the climate change context. Furthermore, each code requires that researchers obtain permits before conducting research within tribal territories and preserves tribal control over the dissemination of information acquired through such research. Tribal law can thus accomplish two important goals: disseminating traditional knowledge to help communities combat the impacts of climate change and ensuring that traditional knowledge is not exploited or misused.

Traditional knowledge has a crucial role to play in helping communities around the world survive and adapt to climate change. Future research will consider ways to improve the dialogue between the researcher and the academy to ease the tensions surrounding the discourse of traditional knowledge.²⁸⁹ This research will explore the work of those who are successfully pursuing community-based traditional knowledge and fill in gaps in this literature.

289. Nasady, *supra* note 85; Natcher, *supra* note 5, at 423.