

What Do Indigenous Knowledges Do for Indigenous Peoples?

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Introduction: Indigenous Peoples, Planning, and Knowledges

In this chapter, I aim to engage with the broad community involved in conversations about the ways in which knowledge exchange can occur between Indigenous peoples' knowledge systems and the fields of climate, environmental and sustainability sciences. I will begin with an introduction that is longer than what I would normally write because I feel it is important that I lay out some of the context that matters to me. I will make some connections among concepts of self-determination, Indigenous planning, climate, environmental and sustainability sciences, and Indigenous knowledges before I preview what will come in the rest of this essay. In the end, my argument is that scientists who seek to exchange knowledge with Indigenous peoples should not only understand what Indigenous knowledge systems can do for them, but also have a sense of the significance of these knowledge systems for Indigenous governance today. Hence the question-based title of this essay: What do Indigenous knowledges do for Indigenous peoples?

The context I wish to share starts with the idea that a crucial facet of the self-determination of peoples such as Indigenous nations and communities is the responsibility and the right to make plans for the future using planning processes that are inclusive, well-informed, culturally relevant, and respectful of human interdependence with nonhumans and the environment (Walker et al., 2013). For Indigenous peoples, the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) affirms key aspects of *the right* to make plans. UNDRIP's Article 3 states that by virtue

of the right to self-determination, Indigenous peoples “freely determine their political status and freely pursue their economic, social and cultural development” (United Nations General Assembly, 2007). Moreover, UNDRIP’s Preamble affirms that “control by indigenous peoples over developments affecting them and their lands, territories, and resources will enable them to maintain and strengthen their institutions, cultures and traditions, and to promote their development in accordance with their aspirations and needs.” The Preamble also recognizes “that respect for indigenous knowledge, cultures and traditional practices contributes to sustainable and equitable development and proper management of the environment.”

As Anishinaabe people (Ojibwe, Odawa, Potawatomi), planning figures prominently in our societies as a responsibility and not just a right, as is true in distinct respects for many other Indigenous peoples (see Jojola, 2001). We have a widely respected core philosophy, shared by many Indigenous peoples and often inspired by the Haudenosaunee, requiring us to consider the broader impacts of what we do now for the seven generations to follow. Depending on the context, this philosophy can refer to three generations prior (i.e., our ancestors), the present generation, and three generations into the future (i.e., our descendants); or it can refer to the long-term planning horizon of seven generations into the future (Benton-Benai, 2010; Walker et al., 2013). And when we consider broader impacts, it is common to look at the world as interrelated in ways that some people outside the Anishinaabe world do not always grasp, such as the complex interrelation of human health; storytelling; gendered and intergenerational relationships; cultural and ceremonial life; the intimacy of human relations with plants, animals and entities (e.g., water); and the moral responsibilities that come with family, clan, and band memberships (Borrows, 1997; Kimmerer, 2013; McGregor, 2009). One of the concepts Anishinaabek often use to describe this integrated conception of life is *bimaadizi* (verb) or “living in a good and respectful way” (Mitchel, 2013: 21; see also Gross, 2002). Though Anishinaabe language is made up mostly of verbs, some people also use the noun form, *bimaadiziwin*, in English written language, since the noun form may be perceived as flowing better in English grammar and style (Lyons, 2010).¹

¹ I tried to use English spellings of words in Anishinaabemowin (the language of the Anishinaabek) that can be identified by diverse Ojibwe, Potawatomi, and Odawa people and people who work in relation to this language. I recognize that there are many accents and spelling systems, that I have mixed a few, and that some of the spellings I am using

Anishinaabe ways of life also stress the importance of future planning in order to live adaptively throughout the year, given metascale forces such as seasonal changes and shifting ecological trends that affect economies and trade, the availability of first foods and medicinal plants, and the timing of ceremonies (Clifton, 1986). Anishinaabe and other Indigenous peoples have built knowledges of how to live adaptively with nonhumans and the environment, lessons that are shared and imparted most often through oral and performative means, including stories, ceremonies, and intergenerational and family activities (e.g., hunting; Reo and Whyte, 2012). These knowledges represent valuable capacities for adaptation planning because they are community-based and, perhaps for that reason, are trustworthy (Scheman, 2012; Werkheiser, 2015). They also contain insights, conservation and environmental governance strategies, methods of analysis, and decision-making processes that arise from hundreds of years of collective memories, experiences, and trial and error in adapting to metascale forces, from historic climate change to the transatlantic fur trade.

Though Indigenous peoples have rights and responsibilities to plan, and useful knowledges for doing so, in the context of US and Canadian settler states, long-term planning for sustainability issues such as climate destabilization is challenging to put in practice for Ojibwe, Odawa, and Potawatomi peoples and other Indigenous nations and communities sharing the region and beyond. As settler states are here to stay, they have instantiated and enforce laws, economic policies, and practices of cultural and political domination that leave Indigenous peoples with little space to plan both creatively and practically about what to do in the future. Consider just a few examples. Settler states are often firm in their legal and policy commitment to enforce Indigenous jurisdictions as fixed and inflexible, such as treaty areas, reservation boundaries, and subnational (e.g., state or provincial) borders and transnational boundaries (e.g., US/Canada; Marino, 2012; Theriault, 2013; Whyte, 2014). One consequence in some cases is that Indigenous peoples cannot practically plan to shift their seasonal subsistence and economic activities if a valuable plant's or animal's habitat moves outside of a treaty area or crosses a transnational border, because settler states would oppose such plans as "illegal" even when the plans are within Indigenous ancestral territories; flow from

are in some ways the least similar to how members of my tribe (Potawatomi) engage in English language spelling. Given that I use these terms every day with family, friends, and colleagues, I just tried to impart spellings people would recognize.

established Indigenous commercial, subsistence, and cultural practices; and are consistent with Indigenous interpretations of the purpose of treaties (Stark, 2010) or with the fact that some Indigenous peoples never consented in the first place to the instantiation of a transnational border bisecting their territories.

Or consider other planning issues stemming from how the weakening of Indigenous subsistence economies and trade networks creates incentives for Indigenous governments to engage with industries that they do not trust or feel are unsustainable. In one story I recently read from outside the Great Lakes, a former Inupiat mayor of the North Slope Borough in the Arctic describes the dilemma he faced when he ended up supporting an Arctic offshore drilling program, which he and his community believed posed unacceptable environmental risks to their waters and food system. He said he was torn on what plans to make because, as the article states, 95 percent of the borough's taxes come from oil and gas. Moreover, the production in oilfields typically relied on for revenue was in decline. According to the mayor, "My biggest responsibility was maintaining the economic well-being of the borough and that largely has to do with maintaining oil in the pipeline" (Birger, 2012).

Finally, the political and cultural domination of settler states affects internal affairs in Indigenous governments. Consider tribes in the United States. Many tribal officials often feel pressure from their electoral constituencies to focus on pressing issues such as unemployment, sexual violence, and diabetes, among other challenges. Governmental units, from environmental services agencies to cultural preservation departments, are often siloed. That is, the units do not communicate or coordinate with one another even though they are responsible for addressing deeply interrelated issues, such as the health and cultural preservation, when, for example, a subsistence and ceremonially valuable fish population is contaminated with hazardous chemicals. These units are usually severely underfunded and employ staff whose time gets spread thin as workers juggle multiple projects. Unnecessary divisions can also separate tribal lawmakers, bureaucrats, and staff from elders, traditional and subsistence harvesters, gatherers, and spiritual and cultural leaders. For example, tribal staff often have to find ways to satisfy federal grant requirements and metrics that may conflict with cultural and subsistence values held by elders, harvesters, and spiritual leaders (Ranco et al., 2011).

The observations in the last few paragraphs arise from my work on climate change adaptation and sustainability planning with Indigenous

nations and communities sharing the Great Lakes region, as well as my learning from Indigenous peoples in other regions about the challenges they are facing and how they are responding. This work ranges from facilitating the development of future climate change scenarios to writing and reviewing Indigenous adaptation plans to organizing dialogues connecting Indigenous governmental regulators, harvesters, and community members with scientists and engineers of other nations and heritages. I also convene or contribute to projects that put forward ethical principles and guidelines for cooperation between Indigenous parties and parties of other nations and heritages on climate change adaptation, large-landscape conservation, and environmental justice. As a Potawatomi person, I aim to support the planning efforts of Anishinaabek and other Indigenous peoples sharing the region on behalf of our continuance and resurgence as distinct and self-determining communities and nations. It is also my responsibility to share with and learn from others outside the Great Lakes region.

This brings me to the central topic of the essay: knowledge. A good planning process for any nation or community requires access to the most reliable and trustworthy sources of knowledge available for thinking about future scenarios and situations. Regarding climate change, for example, an array of different knowledges are needed: from variations in lake levels or shifts in the location of tree species in forests, to indicators tribes should be monitoring to track climate change trends, to health risks that are likely to be faced by tribal members if they lose access to culturally and economically important inland wildlife, to how tribal urban infrastructure, such as storm water management systems, will react to more intense precipitation events. Knowledges are needed of the different adaptation strategies that specific Indigenous communities or nations developed historically to shift to with the dynamics of ecosystems (e.g., knowledge of different varieties of plants suitable to different habitats), as well as the strategies that must be developed collaboratively and diplomatically with neighboring counties, towns, cities, states, and federal agencies (Grossman and Parker, 2012). For the purpose of planning, many Indigenous peoples rely on their own knowledges of how to live adaptively with nonhumans and the environment and how to build strong relationships with neighboring societies. Yet the work being done in a range of climate, sustainability, and environmental sciences is also valuable for Indigenous planning. Many Indigenous peoples and organizations already employ their own scientific staff and use the research of federal agencies and academic institutions to learn how to improve and

evaluate environmental protection, conservation, and climate-change planning.

For some time, tribes have considered the benefits of using different sciences to improve their approaches to planning. It is also the case that climate, environmental, and sustainability scientists – and Indigenous persons who engage these fields – have been writing about the value of Indigenous knowledges to help improve scientists’ research and capacity to support the decisions of leaders and public officials. Indeed, some Indigenous persons and many persons of other nations and heritages have created quite a buzz concerning the value of exchange with Indigenous knowledge systems, which they refer to under a number of names, including Indigenous knowledge (IK), traditional knowledge (TK), Indigenous knowledge of the environment (IKE), traditional ecological knowledge (TEK), and Native Science (Agrawal, 1995; Berkes, 1999; Burkett, 2013; Cajete, 1999). Here, I refer to all such English-language concepts as *Indigenous knowledges*, which is short for Indigenous knowledge systems. For the people in these fields, knowledge exchange is important because Indigenous knowledges possess lessons, principles, and practices that can teach peoples of other heritages and nations about living sustainably – the seven generations philosophy (Nelson, 2008). Indigenous peoples have local knowledges of the properties or behavior of particular plants and animals (Turner et al., 2011), ecosystem services (Alessa et al., 2010), or local environmental change (Reidlinger and Berkes, 2001) that scientists typically do not consider or have access to when they engage in their studies. The United Nations’ report, *Our Common Future*, states that Indigenous peoples “are the repositories of vast accumulations of traditional knowledge and experience,” and that “larger society... could learn a great deal from their traditional skills in sustainably managing very complex ecological systems” (World Commission on Environment and Development, 1987: 114–15). In many science fields, a story has been unfolding about the importance of Indigenous knowledges for research.

In this essay, I want to share another story – a story I began to tell earlier in this introduction – but one that is often not discussed in detail in science literatures on Indigenous knowledges: the value of Indigenous knowledges for us, the members of Indigenous communities, for our own planning, especially in relation to *today’s* climate destabilization ordeal that is entangled with the problems we have with settler states and other colonial and corporate powers. I have found that scientists often appreciate what I will call here the *supplemental value* of Indigenous knowledges – the value of Indigenous knowledges as inputs for adding

(i.e., supplementing) data that scientific methods do not normally track. In the domain of supplemental value, Indigenous peoples' planning processes will improve, in turn, by having access to the supplemented and, hence, improved science. But it is also the case that Indigenous knowledges have *governance value*. That is, they serve as irreplaceable sources of guidance for Indigenous resurgence and nation building. Scientists should appreciate governance value because it suggests that for some Indigenous peoples in knowledge exchange situations, we need to be assured that the flourishing of our knowledges is respected and protected. I hope to make the case for why it is important for scientists who work with Indigenous peoples to appreciate governance value so this understanding will improve their approaches to knowledge exchange with Indigenous peoples.

Supplemental Value and Indigenous Knowledges

Articles in climate, environmental, and sustainability sciences literatures tend to articulate concepts of Indigenous knowledges in ways that stress the value for supplementing scientific methods, or supplemental value. Consider just a few examples (of many available) mostly from climate and sustainability sciences. In 2012, the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the United Nations University published *Weathering Uncertainty: Traditional Knowledge for Climate Change Assessment and Adaptation* (Nakashima et al., 2012). The report states, "Indigenous observations and interpretations of meteorological phenomena have guided seasonal and inter-annual activities of local communities for millennia. This knowledge contributes to climate science by offering observations and interpretations at a much finer spatial scale with considerable temporal depth and by highlighting elements that may not be considered by climate scientists" (Nakashima et al., 2012: 8; see also Reidlinger and Berkes, 2001). The value of Indigenous knowledges rests on their capacities to fill in gaps in certain scientific methods, such as a lack of local or historical data.

The report also mentions that Indigenous knowledges can expand the methods and findings that scientists consider in their research methods. For example, Weatherhead et al. (2010) describe work in Clyde River, Nunavut, in the Arctic. Inuit hunters claimed that it was becoming harder to predict the wind from day to day (i.e., wind persistence). The hunters' observations considered a number of features, including changes in the formation of seasonal ice crusts, animal behavior, sea-ice conditions, and

snow forms. Climate scientists disagreed with the hunters. The weather station only observed changes in wind direction or wind persistence in northeast winds. Some of the difference, it turns out, was attributable to the fact that the weather station was in a stationary, flat area; hunters, instead, were traveling far and wide, within complex landscapes, and were paying close attention to certain snow and ice features as a matter of safety. This spurred the scientists to add more weather stations across the landscape, especially in hunting areas, and to engage in constant comparison between weather station data and Inuit hunters' observations. The collaboration has improved the information that hunters have access to about shifting conditions that matter to their subsistence hunting and safety, which certainly helps to improve their capacity to plan.

Examples such as *Weathering Uncertainty* and the story documented by Weatherhead et al. describe Indigenous knowledges in ways that most climate and other scientists can digest and connect to their research. Yet Indigenous knowledges originate in completely different cultural-linguistic contexts than those that many scientists are used to. Indigenous peoples may report their observations in language that is not empirically useful or acceptable to scientists because the language ascribes agency or spirituality to animals and plants, elements or entities such as water, and landscapes or ecosystem functions. Or Indigenous peoples may be perceived as embedding and enacting their observations within stories, ceremonies, or prophecies that scientists do not understand.

In Chie Sakakabira's collaboration with Iñupiat communities in the Arctic, she describes how many members discuss their knowledge of climate change and adaptive strategies through stories encoded in their languages, cosmologies, and kinship, as well as their spiritual relationships to nonhuman beings and spirits. In the case of the individuals with whom Sakakabira worked, some of their observations of climate change and adaptation are expressed through supernatural stories about changes in the dwellings of shape-shifters and ancestral spirits. The Iñupiat communities live according to relationships of moral reciprocity with whales, an animal they depend on economically, culturally, and for health – a connection so deep Sakakabira calls it *cetaceousnes* (whale consciousness). Climate change is experienced through changes in the availability of the whale tissue used for traditional drum membranes. Whereas historically drum ceremonies expressed the whales' invitations to bring people together, climate-induced disruptions in whale cycles have been associated with a resurgence in drumming ceremonies in some communities that now express humans' invitation for whales to come back to reciprocal

relations (with humans). *Iñupiat* literally describes their relation to whales not as the whale cycle, which is digestible by many scientists, but as *kia-vallakkikput agviq*, or “standing by the whale,” which is still an inadequate translation (Sakakabira, 2010: 1007; see also Sakakabira, 2017).

Writing on this issue of the expression of knowledges, Preston Hardison describes how Indigenous peoples may use English-language terms such as “good mind, guardianship, customary law, cosmovision, reciprocity, obligations and relations” to represent aspects of reality that scientists would describe using totally different concepts, such as “information, economics, intellectual property, common heritage, public domain, secular knowledge and open knowledge” (Hardison, 2014). Sometimes scientists see little value when Indigenous knowledges are expressed in ways that are less akin to how scientists already describe the world. The Arctic Climate Impact Assessment (2004), for example, is clear in its admission that “Indigenous knowledge is far more than a collection of facts. It is an understanding of the world and of the human place in the world ... The emphasis on the cultural aspects of indigenous knowledge in this assessment is not intended to detract from the great utility it has in ecological and environmental research and management.” In the 2004 Assessment, then, certain aspects of Indigenous knowledges are filtered out as valuable for science.

Yet others working in climate science more broadly have emphasized that the linguistic-cultural contexts and expressions of Indigenous knowledges are precisely what scientists should value, especially those working on scientific approaches to planning, management, and policy making in relation to climate change, sustainability/resilience, and conservation. Maxine Burkett offers the following observations on what she refers to as “Indigenous environmental knowledge (IEK).”

The foundational worldview that forms the specific management tools prescribed in IEK are more relevant to the complex and ever-changing natural system that we have so deeply disturbed. In addition, IEK was oriented toward resilience for present and future generations. Instead of looking at the specific management tools, investigating and advancing the worldviews that spawned those tools and methods would be the most effective approach to the law and policy of climate change adaptation. Indeed, drawing on both the management practices and the knowledge and worldview on which they are based – while understanding the governance mechanisms behind them – may speed up the process of designing alternative resource management systems. (Burkett, 2013: 118)

For Burkett, it is precisely the culture that generates the value of Indigenous knowledges for scientific approaches to planning, management,

and policy. The value of Indigenous knowledges here concerns lessons about “governance mechanisms.” This value is discussed by many Indigenous scholars, including Ronald Trosper. In his work, he shows how taking seriously the cultural expressions of the potlatch ceremony of some Indigenous peoples in the Pacific Northwest of North America can yield key governance principles that ultimately should be intelligible to sustainability scientists interested in resilience, such as “high grading is not allowed, consumption has an upper bound, and there is always concern that ecosystem health should be maintained” (Trosper, 1995: 72). Trosper argues that while the cultural aspects of the potlatch ceremony may be initially difficult to comprehend by many scientists, it is nonetheless plausible that these cultural expressions create innovative ways for the societies to buffer, self-organize, and learn in response to environmental issues (Trosper, 2009). These cultural expressions can also be seen in Sakakabira’s work, where society is organized to cultivate reciprocal moral relationships between people and whales – relationships that motivate an environmental stewardship ethic that is lacking in many societies. Such forms of expression from Indigenous knowledges offer climate, environmental, and sustainability sciences touchstones for thinking outside of the laws and economic policies of settler states such as the United States or New Zealand.

All the examples discussed in this section express a story that characterizes Indigenous knowledges as having a *supplemental-value* for scientists. Indigenous knowledges are often seen as associated with particular members of a community, such as hunters or ceremonialists, whose activities generate data and insights that can be used by scientists to improve scientific research. Additionally, from a policy perspective, Indigenous peoples are perceived to have knowledges that mimic sustainable ecological processes, and this is seen as useful and *supplemental*. The predominance of supplemental value in the literature helps to frame scientists’ expectations about what will happen when they reach out to work with Indigenous peoples. It makes interactions an issue of research ethics. That is, scientists should make sure if they interview elders or access Indigenous peoples’ archives that they do not impose risks on the individuals interviewed or the people affected by public release of archives. Here, Indigenous persons or archives of Indigenous knowledges are sources of information. Climate, environmental, and sustainability scientists usually argue that Indigenous peoples today can benefit from such knowledge exchange because Indigenous peoples will gain access to the improved information and research for use in their own Indigenous

planning processes. The story of supplemental value, then, involves scientists finally embracing Indigenous knowledges that their predecessors ignored, while moving toward ethical processes for obtaining these knowledges from Indigenous peoples.

Indigenous Knowledges and Governance Value

There is another story about climate, environmental, and sustainability sciences, and Indigenous knowledges with which I am far more familiar. For many Indigenous peoples this conversation supports planning that helps them prepare for sustainability issues, such as today's climate destabilization (Walker et al., 2013). In these cases, Indigenous peoples believe Indigenous knowledges have an irreplaceable value as guides for structuring how they will prepare for, adapt to, and mitigate future sustainability challenges. I will discuss some examples that represent a wide range of Indigenous peoples. Before moving on to these examples, I will describe what I mean by Indigenous peoples' governance today. In the space I have here, I can only give a brief and rather abstract glimpse of how I understand governance, but enough to give readers a sense of where I am coming from when I return to Indigenous knowledges later in this section. Though my initial treatment of governance may seem abstract to some, I will provide multiple examples to illustrate the relationship between knowledge and governance.

I understand Indigenous governance according to two related conceptual constellations: *resurgence* and *collective continuance*, both of which are expressions of *collective self-determination*. Collective self-determination refers to a group's ability to provide the cultural, social, economic, and political relations needed for its members to pursue good lives. In my understanding, resurgence involves thinking about collective self-determination while grasping the full impact of systems (or structures) of settler colonialism on Indigenous lives today and into the future. The impacts of settler colonialism and the idea of resurgence have long been covered in Indigenous scholarship and advocacy, especially Indigenous writings on gender, feminism, and women's advocacy (Allen, 1992; Calhoun et al., 2007; Chrystos, 1995; Goeman, 2013; LaDuke, 1999; Maracle, 1996; Ross, 1998; Smith, 2005). Mishuana Goeman and Jennifer Denetdate, reflecting on the legacies of Indigenous feminist work, write that "the structures of our lives as Native women and men are shaped by racism, sexism, and discrimination. We strive to recover our former selves and push toward creating better future selves by

reclaiming Native values, which have seen us through multiple traumas, including land dispossession and the loss of our freedoms” (Goeman and Denetdale, 2009: 9). Jeff Corntassel, in dialogue with Taiiaki Alfred, claims that “When considering how colonization systematically deprives us of our experiences and confidence as Indigenous peoples, the linkages between colonialism, cultural harm, and the disintegration of community health and well-being become clearer. Furthermore, this is a spiritual crisis just as much as it is a political, social, and economic one” (Corntassel, 2012: 88). Resurgence, then, concerns acting in ways that “reclaim and regenerate one’s relational, place-based existence by challenging the ongoing, destructive forces of colonization” (88). Leanne Simpson claims that “Resurgence happens *within* Indigenous bodies and through the connections we make to each other and our land. That’s how we strengthen ourselves within Nishnaabeg intelligence” (Simpson and Coulthard, 2014).

Place-based, embodied existence is important in the theory of resurgence because it points to ways of life in which Indigenous peoples do not depend in morally problematic or unjust ways on the resources and recognition of surrounding settler states. That is, such existence unburdens Indigenous peoples from having to trust the supply chains of settler states to provide healthy and safe food for Indigenous children, to rely on settler legal and juridical frameworks for equal representation and protection against violence, such as sexual violence against Indigenous women and two-spirit persons, and to depend on settler notions of citizenship that ultimately work to erase Indigenous political, cultural, and experiential differences, among other oppressive forms of dependence (Coulthard, 2007, 2014; Goeman, 2013; LaDuke, 1999). Governance can therefore be seen as a resurgence of Indigenous peoples’ self-determination using “on the ground strategies” that establish a range of capacities for land-based collective self-determination, from greater economic independence to psychological (spiritual) awakening. These strategies are guided by philosophies flowing from Indigenous peoples’ own knowledges, resources, and heritages, as wellsprings of practical forms of collective self-determination (Coulthard, 2006; Napoleon, 2013; Simpson, 2004; see also a related account of “heritage” in Figueroa, 2001).

Resurgence, for me, is in dialogue with the goal of collective continuance, which I have used to discuss Indigenous adaptation to climate change. I developed this concept by thinking through the role of Anishinaabe/Neshnabé seasonal calendars, which organize society to adapt to the dynamics of ecosystems. Collective continuance is an

Indigenous community's capacity to adapt in ways sufficient for its members' livelihoods to flourish into the future. Adaptation refers to "adjustments that populations take in response to current or predicted change" (Nelson et al., 2007: 397). The flourishing of livelihoods refers to Indigenous conceptions of (1) how to contest hardships imposed by settler colonial and other oppressive social structures and build good diplomatic relationships with parties who do not have oppressive intentions, (2) how to pursue comprehensive aims of robust living in response to the inevitability of change, like building cohesive societies, vibrant cultures, trustworthy sources of useful knowledge, strong subsistence, place-based and commercial economies, and peaceful relations with neighbors of other nations and heritages, and (3) how to make difficult decisions when circumstances require trade-offs, such as having to choose whether to put limited resources into job creation through the coal industry or invest instead in the environmental and cultural protection required for rekindling place-based supply chains for food and medicines. Given (1), (2), and (3), Indigenous collective continuance is a way of understanding Indigenous governance as a community's aptitude for making adjustments to current or predicted change in ways that contest settler-imposed hardships and other oppressions, establish quality diplomatic relationships, bolster robust living in the face of change, and observe balanced decision-making processes capable of dealing with difficult trade-offs (Whyte, 2013). Indigenous conceptions (1), (2), and (3) can be achieved when societies exhibit strong relationships in which the parties to the relationships (i.e., the relatives) see themselves as having reciprocal responsibilities to one another.

Together, resurgence and collective continuance create a rendition in broad strokes of what Indigenous governance means to me. Governance refers to the sphere in which we discuss community-based institutional means, strategies, and processes that are needed for Indigenous peoples to plan for climate destabilization and the dominance of settler states. Both conceptual constellations refer to the importance of collective capacities belonging to and stemming from Indigenous peoples. Collective capacities include land-based practices and vibrant cultures, among others. Both concepts also acknowledge that Indigenous peoples continue to adapt in relation to settler colonialism by adopting emerging means, strategies, processes, and other planning tools. So Indigenous collective capacities are always in dialogue with emerging practices that address today's challenges. For example, land-based practices may be guided by an Indigenous people's traditional knowledge of plant habitat that

is rooted in traditions going back hundreds of years, but, at the same time, use “Western” scientific tools to monitor the impacts of pollution or warming on plant populations. Readers might recognize aspects of Gerald Vizenor’s concept of survivance here. For Vizenor, “survivance is an active sense of presence, the continuance of native stories, not a mere reaction, or a survivable name. Native survivance stories are renunciations of dominance, tragedy, and victimry” (Vizenor, 1994: vii). One commentator interprets survivance as “renewal and continuity into the future rather than memorializing the past” (Kroeber, 2008: 25).

I now return to the topic of Indigenous knowledges. The theories of resurgence and collective continuance suggest that Indigenous knowledges are collective capacities that can provide trustworthy and useful wisdom for planning that supports collective self-determination in the face of change. That is, Indigenous knowledges are capacities Indigenous peoples can use to facilitate their own governance. Indigenous knowledges are not backward-looking repositories of information that are about historic or waning ways of life. Instead, they have a special value in Indigenous planning efforts that is different from the supplemental value of Indigenous knowledges for scientists described in the previous section. In what follows, I will consider some examples of how Indigenous knowledges are being used in planning processes by Indigenous peoples and organizations today to deal with sustainability challenges. Exchanges with different sciences figure prominently in each case.

The first example of Indigenous knowledges and governance is from the Karuk Tribe in North America, in what is referred to by most people as California. Karuk heritage involves longstanding relationships of interdependence with a range of foods, from deer to huckleberry to salmon. Historically, these foods were enhanced through intentional, systematic fire regimes that embodied complex ecological knowledge. In one study, about three quarters of the species Karuk people used for food or cultural practices were enriched in some way by fire (Norgaard). The Karuk also cultivated careful knowledges about how to steward the ecological conditions needed to maintain healthy fish populations, especially salmon, which figures importantly in Karuk diets. Yet earlier in the twentieth century, US government agencies, such as the Forest Service, banned Karuk burning and paved the way for the damming of the rivers, which presented an immediate challenge to the continuance of the Karuk food system. Ron Reed (Karuk) claims that “Criminalization of cultural practices matters for sovereignty because it directly prohibits the enactment of

practices needed for the generation of knowledge” (Norgaard, 2014: 22). Kari Norgaard, in her work with Reed and Van Horn, says:

The exclusion of fire from the ecosystem has a host of interrelated ecological and social impacts including impacts to cultural practice, political sovereignty, social relations, subsistence activities, and the mental and physical health of individual tribal members. In addition, Karuk tribal members are negatively impacted by the effects of catastrophic fires and intensive firefighting activities that in turn result from fire exclusion. (Norgaard et al., 2011: 73)

In response to these challenges, the Karuk have recently engaged in a project funded by the North Pacific Landscape Conservation Cooperative to rekindle their own burning practices and salmon stewardship, in order to stimulate the Karuk economy, address nutritional, health, and other food/dietary related problems, and adapt to climate change impacts that threaten to further weaken Karuk access to their foods (see ITEP, 2014).

Importantly, the project, which is focused on Karuk *knowledge sovereignty*, outlines a system for expanding the use of Karuk knowledge that was curtailed by settler colonialism. The plan involves establishing practices that will strengthen the transmission of Karuk knowledge within the tribe (such as improving intergenerational relationships and increasing youth involvement in environmental management), remove external policy and jurisdictional roadblocks to putting this knowledge in practice on Karuk ancestral lands, and ensure that external policies of the US settler state are favorable. For the Karuk, knowledge sovereignty is not just a knowledge exchange between the Karuk and outside scientists. It involves first strengthening the use and transmission of knowledge within the tribe, the capacity to use Karuk knowledge in as many parts of the landscape as needed, and the assurance that US settlers cannot threaten the flourishing of Karuk knowledges. Any scientist working with the Karuk must understand how scientific work fits into the larger idea of Karuk resurgence and collective continuance, which can be considered a value of Indigenous knowledge for the sake of governance (Norgaard, 2014; Norgaard et al., 2011; Wotkyns, 2013).

Lake sturgeon is an important subsistence species of the Little River Band of Ottawa Indians in what is now referred to as Michigan, yet in the twentieth century the lake sturgeon population was basically eliminated through settler overharvesting, dams, stocking rivers with non-native fish species for sport fishing, and environmental change. By the early 2000s, fewer than 40 to 50 fish per year spawned in one of the major rivers, the Manistee. The tribe believes that restoring certain native species, such as

lake sturgeon, is important for strengthening the resilience of the region to withstand climate destabilization – not just in the sense that native species are tied to ecological resilience, which can be questioned on various scientific grounds, but because some native species also have existence value that can motivate people to be better stewards. For the Little River Band, resilience is connected to the tribe’s philosophy of *bimaadizi* (“living in a good and respectful way”) described in Mitchell. With this goal in mind, the tribe used its own knowledge of how people lived with sturgeon, sturgeon life cycles, and the genetic make-up of sturgeon in relation to families and clans to engage with biologists, tribal members, and others living within the watershed to restore lake sturgeon and bring together the entire watershed around the goal of sustainability (Holtgren, 2013; Holtgren et al., 2014).

One key development was the tribe’s new cultural context group, which was made up of a diverse range of tribal members and biologists, who developed goals and objectives for restoration. Biologist Marty Holtgren describes the cultural context group as facilitating “a voice [that] was an amalgamation of cultural, biological, political, and social elements, all being important and often indistinguishable” (2013:135). Holtgren discusses how the goal was to “restore the harmony and connectivity between [lake sturgeon] and the Anishinaabek and bring them both back to the river.” According to Holtgren, “Bringing the sturgeon back to the river has an obvious biological element; however, restoring harmony and connectivity between sturgeon and people was steeped in the cultural and social realm. Each meeting began with a ceremony, and the conversation was held over a feast” (Holtgren, 2013: 136). Ultimately, the tribe established a riverside rearing system to protect young sturgeon before they can be released each fall. The sturgeon release involves a public ceremony in which up to 600 people now participate, of all nations and heritages in the region, to learn about the importance of sturgeon for the watershed. The program is based on relationships with government, nonprofit, and community partners in the watershed, as well as the integration of scientific and Indigenous knowledges of sturgeon. Ottawa knowledges, then, played an enormous role in structuring the scientifically informed pursuit of the tribe’s governance in the region (Holtgren, 2013; Holtgren et al., 2014).

The Confederated Tribes of the Umatilla Indian Reservation (CTUIR, 2010), in what is now referred to by most as Oregon, has developed a “First Foods” framework for guiding their governance of climate change adaptation. CTUIR has a traditional knowledge system that they refer to

as “food associated culture,” which is a complex web of stewarding, harvesting, storing, and sharing a range of foods in connection with social, cultural, political, and economic life. The system, which is part of their larger philosophy called *Tamanwit*, is concretized through a number of practices, such as the order in which foods are served during feasts, which corresponds to the tribe’s origin and other stories. Additionally, the CTUIR are addressing the importance of gendered knowledge when it comes to traditional foods. The tribe’s comprehensive plan includes a foods category referred to as “Women’s Foods,” which include berries and roots over which some tribal women take on stewardship responsibilities. One elder, Marie “Butch” Dick, pointed out to the natural resources staff, “You’re always talking about the men’s foods. Who’s going to take care of the women’s foods?” (*Confederated Umatilla Journal*, 2008; CTUIR, 2010). To address the gap, the tribe has carried out women’s food assessments, where the women lead by asserting their knowledge to support sound management decisions (Quaempts, 2012; Shippentower, 2014). Importantly, Indigenous women are not restricted to stereotypical roles; they have a right and responsibility to participate in planning, and they do so by respecting the genuine knowledge keepers who are on the land stewarding, harvesting, and sharing local foods (Quaempts, 2012; Shippentower, 2014).

In one presentation, I heard how women’s Indigenous knowledges of plants guide how the Umatilla tribe structures climate change adaptation planning (Shippentower, 2014). The presentation described this knowledge as a “cultural, economic, and sovereign benefit of the CTUIR.” In the planning process, it is precisely the women’s knowledge that structures scientific research that seeks to learn more about “population and habitat management” and the effectiveness of what Shippentower calls “natural resource policies and regulatory mechanisms.” An interesting example involved the tribe using ArcGIS in conjunction with and guided by women’s knowledge “to develop a landscape level model that combines derived geographic information with field inventory data to identify habitat that support 5 food plants; preserve, manage and restore gathering, locations throughout the Ceded lands for Tribal Members ... and provide direct knowledge for assessing climate change,” as well as determining “climate change strategies” (Shippentower, 2014).

The Climate and Traditional Knowledges Workgroup (CTKW, 2014) formed several years ago and is made up of Indigenous persons, Indigenous government staff, and experts in sensitive issues involving the sharing of Indigenous knowledges. The CTKW developed a set of

guidelines through a collaborative effort with funding support from individual Indigenous governments and several US agencies. The group came together to respond to problems associated with the fact that Indigenous peoples who seek to use their knowledges in the ways described earlier do not have adequate protections for doing so. For example, in the case of copyright (a grant of a temporary monopoly by a government to provide economic incentives to individuals or firms for innovation), the law is key in defining what counts as public domain. Unfortunately, Indigenous knowledges are too often considered part of the public domain because they are judged to be too old to protect, and because they are often not written down. Because of a Supreme Court decision in 2001 (*Department of Interior v. Klamath Water Users Protective Assn*), Indigenous peoples are unable to share sensitive knowledge or information privately with the United States on a government-to-government basis. Any exchanges are subject to Freedom of Information Act (FOIA) requests (see Williams and Hardison, 2013). Another issue concerns the idea of “The Common Heritage of Mankind,” which claims that some knowledges are so valuable to all of humanity that this value overrides any particular value they may have to the nations and communities who created them.

These regulations pose problems for tribes because sharing Indigenous knowledges with scientists can disclose risks to Indigenous governance. For example, telling scientists about Karuk fire management or Umatilla root harvesting may disclose the location of sacred sites and medicinal plants or the locations of fish, animals, and plants that people outside the tribe may wish to plunder. Deborah Parker of the Tualip Tribe, for example, states, “Protecting cultural knowledge is an ongoing challenge, on many levels” (Wotkyns, 2013). Parker relates a local issue that illustrates one part of the problem: “We have a place where people like to go fishing. It’s a place where human remains have been found. The tribe has put up signs – ‘Private Area, for Tribal Members Only’ – but others come in and constantly tear down the signs. It’s really been a battle. They have no idea of sacred areas, places that need to remain untouched” (Wotkyns, 2013).

The Guidelines for Considering Traditional Knowledges in Climate Change Initiatives (NOAA 2014) seeks, among other things, to provide guidance for scientists. The guidelines emphasize that governance means Indigenous peoples get to define what Indigenous knowledge is for them in the course of collaboration. Moreover, Indigenous peoples, as collectives, set the rules for sharing Indigenous knowledges, including what knowledge can be shared and who is authorized to share it and in what

form. The guidelines also reference important strategies for ensuring that scientists especially can collaborate with tribes in ways that do not pose risks of knowledge exchange. The guidelines are geared to ensure that Indigenous knowledge is protected because of its value for Indigenous governance, from resurgence to nation building.

In these examples, Indigenous knowledges have what I would call *governance value* for Indigenous peoples. Governance includes a range of planning pursuits of Indigenous collective self-determination involving research development, knowledge transmission, environmental regulation, and building education and awareness. Indigenous knowledges can serve to organize governance at all levels as capacities supporting resurgence and collective continuance. Indigenous knowledges are also a unique form of wisdom that can be disrupted if they are no longer practiced. Many of the projects just described seek to protect the practice of Indigenous knowledges within Indigenous communities and nations. Here, then, Indigenous knowledges are irreplaceable capacities that can guide Indigenous governance to adapt to forces including settler colonialism and environmental change. The idea of sharing or exchanging Indigenous knowledges with scientists should not be separated from the processes Indigenous peoples are undertaking to strengthen their knowledge systems. This is not to say that Indigenous knowledges are the only capacities of Indigenous peoples, but that they are special capacities in that they are tailored to particular places and peoples and are trustworthy from a community standpoint. Indigenous peoples living in metropolitan areas, often diverse in membership, guide their own planning through Indigenous knowledges (Bang et al., 2014; Goeman, 2013).

What Do Indigenous Knowledges Do for Indigenous Peoples? Supplemental Value and Governance Value

The question posed by the title of this section (and essay) is an important one for scientists in fields oriented toward sustainability, climate change, and other planning areas to ask. In the discussion of supplemental value, we do not know what Indigenous knowledges do for Indigenous peoples beyond how improved science can be used by Indigenous peoples in a trickle-down sense. But governance value is different, first because the knowledges are associated with Indigenous capacities for resurgence and collective continuance. Therefore, their primary value is tied to the well-being of current and future Indigenous persons, families, communities, and nations. Sometimes Indigenous well-being conflicts with scientific

aspirations to add to the public domain of global scientific knowledge. Second, in governance value, Indigenous peoples are concerned about protecting their own internal capacity to cultivate, transmit, remember, and exercise Indigenous knowledges, despite what persons and organizations of other heritages and nations do. That is, we need to have *knowledge sovereignty* regardless of what scenarios the settler society throws at us. Third, Indigenous knowledges can actually guide scientific research; it does not have to be the other way around. That is, Indigenous knowledge is not only something people apply in order to generate information useful as a scientific byproduct. Indigenous knowledges are about governance in the form of resurgence and collective continuance that can organize scientific studies on behalf of sustainability. Fourth, Indigenous peoples determine, in a given case, how Indigenous knowledges should be defined and how they should be shared.

Assuming they agree with some of my points, climate, environmental, and sustainability scientists may take from this essay that it is important for them to learn about Indigenous governance value if they are going to engage in appropriate forms of knowledge exchange with Indigenous peoples. That is, scientists need to understand how they may or may not fit into emerging Indigenous governance in terms of resurgence and collective continuance. This is part of my truth here. From my perspective, scientists first need to understand their own positions in relation to Indigenous peoples. For example, when scientists, working for an institution, government agency, or university, approach an Indigenous nation, they must represent themselves as participating in the interests of the United States, a school, or the corporations who donated research money. While the scientists themselves may not agree with the agendas or ideologies of the settler sovereigns or business interests, they are inextricably acting on their behalf *in some way* according to the perspectives of many Indigenous peoples. So, for example, if a scientist treats Indigenous peoples as primarily interview subjects, that may completely ignore what the Indigenous peoples are trying to do in their own right, such as the Karuk Tribe's approach to knowledge sovereignty or the Umatilla Tribe's women's food assessment initiative. Such treatment reflects the scientists' privileging of their own governance agenda without showing respect for Indigenous governance. To be more respectful, scientists would have to ensure that Indigenous peoples have the time and space to be able to strengthen their internal knowledge systems, protect key aspects of their knowledge from going public, and influence the design of scientific research to suit the guidance they receive under their Indigenous knowledges. In theory, but also in

some of my experiences, all of these considerations can very much change the approach, structure, and outcomes of cooperation between scientists and Indigenous peoples on long-term planning projects.

So, what do Indigenous knowledges do for Indigenous peoples? Indigenous knowledges have governance value for Indigenous peoples as an integral part of how our nations and communities plan for the future. The responsibility and right to plan for the future is a key component of collective self-determination and enshrined by important documents such as UNDRIP. Whereas many scientists and people of other heritages and nations value Indigenous knowledges for their own research – or supplemental-value – they also need to reflect on how acknowledging the governance value of Indigenous knowledges for Indigenous peoples may impact their approaches to knowledge exchange. Such acknowledgement should lead scientists to consider how Indigenous peoples interpret the governance value of the scientists' own goals and research approaches.

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