

Traditional Ecological Rulemaking

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We're . . . going to be paying a lot of attention to how we can work together and tap into the wisdom and knowledge of tribal communities in managing and conserving land in the face of what is a profound global challenge.

– President Barack Obama¹

The knowledge of elders is much like the trails of caribou. Etched into the memory of the earth by the passage of countless preceding generations, they point the way for future generations to follow.

– Selawik elders²

I. INTRODUCTION

The Traditional Ecological Knowledge (TEK) of indigenous peoples represents at once the past and the future of environmental management. Since long before environmental policy became a government function, before even the existence of the United States government, the indigenous peoples of the Americas have strived to understand the natural environment that we inhabit. This knowledge, as the Selawik elders suggest, constitutes much more than a set of facts or theories; it is a part of indigenous consciousness that has shaped, and will continue to shape, human development for hundreds of years.

The colonizing Europeans, including the successive United States administrations, chose not to embrace the traditional understanding of the human-nature paradigm. Exploitation of natural resources became the central theme of development. “Manifest destiny” and the view of man as conqueror over nature, rather than a part of it, dominated the approach to the management of land and water. That antagonistic relationship pervades to this day and has brought us to the brink of perhaps the most significant environmental change in human existence

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1. Barack Obama, Remarks by the President After Roundtable with Alaska Native Leaders (Aug. 31, 2015).

2. HANNAH PANIYAVLUK LOON & SELAWIK ELDERS, UQAUSTRITIGUN IN OUR OWN WORDS: SELAWIK ELDERS SPEAK ABOUT CARIBOU, REINDEER AND LIFE AS THEY KNEW IT 1 (SUE STEINACHER, 2007) (words of Daniel Sipahk Foster, Sr.).

as global temperatures and seas rise. Now, at this late juncture, it appears that some have begun to recognize the potential benefits of TEK to environmental management.

Beginning in the 1980s, Western scientists came to accept as valid some conclusions of TEK in the fields of agriculture, pharmacology, water engineering, architecture, ethnobotany, ethnozoology, irrigation systems, soil and water conservation, and ethnoastronomy.³ However, recognizing the legitimacy of this centuries-old understanding is only the first step. Utilizing TEK to shape and improve environmental governance through policy and regulations should logically follow. To date, however, there has been very little utilization of TEK in administrative policymaking. Such a paucity of TEK-based policies exist despite various mechanisms in place that require agencies to engage in consultation with federally recognized tribes, stemming from President Clinton's Executive Order on Consultation and Coordination with Indian Tribal Governments.⁴ Neither the Executive Order, nor any of the policies based on it, requires reliance on TEK.⁵

In July 2015, the Commission for Environmental Cooperation (CEC), which is a tri-national organization comprised of representatives from Mexico, Canada, and the United States, chartered a first-of-its-kind Panel of TEK Experts to advise on policymaking.⁶ The Panel will work closely with the existing Joint Political Advisory Committee (JPAC) with the goal of "identify[ing] opportunities to apply TEK to the CEC's operations and policy recommendations."⁷ Upon announcing the roster of TEK experts, United States Environmental Protection Agency (EPA)

3. Clarence Alexander, et al., *Linking Indigenous and Scientific Knowledge of Climate Change*, 61 *BIOSCIENCE* 477, 478 (2011).

4. Exec. Order No. 13,175, 65 Fed. Reg. 67, 249 (Nov. 9, 2000); *see also, e.g.*, 40 C.F.R. § 1501.2(d)(2) (2016) (NEPA consultation); Secretarial Order 3317, Dep't of the Interior Policy on Consultation with Indian Tribes (Dec. 1, 2011), <http://www.fws.gov/nativeamerican/pdf/secretarial-order-3317.pdf>; Env'tl. Prot. Agency, EPA Policy on Consultation and Coordination with Indian Tribes (May 4, 2011), <http://www2.epa.gov/sites/production/files/2013-08/documents/cons-and-coord-with-indian-tribes-policy.pdf>.

5. Perhaps the earliest recognition of the potential benefits of TEK for policymaking in the United States came from the Department of Interior's Bureau of Ocean Energy Management (formerly the Minerals Management Service), which, through its Alaska Outer Continental Shelf Region, held a series of roundtable discussions on traditional knowledge in early 1996. *See* Bureau of Ocean Energy Management, *Traditional Knowledge* (1996), <http://www.boem.gov/About-BOEM/BOEM-Regions/Alaska-Region/Traditional-Knowledge.aspx>.

6. Comm'n for Env'tl. Cooperation, *Terms of Operation Roster of Experts on Traditional Ecological Knowledge* (2015), http://www.cec.org/Page.asp?PageID=122&ContentID=25884&SiteNodeID=208&BL_ExpandID=567.

7. *Id.*

Administrator Gina McCarthy (the United States representative to the CEC) praised the innovative approach to TEK. Perhaps most significantly, Administrator McCarthy noted that the Panel of TEK Experts will hopefully “provide a model for how you integrate TEK into so much of the work we do in our agencies and internationally.”⁸

This Article examines the implications of an increased role for TEK in United States agency decisionmaking. Specifically, it contemplates where TEK might substantively and procedurally fit and, most importantly, whether a final agency action based on TEK would survive judicial scrutiny. In the midst of a growing body of scholarship questioning the wisdom of deference to agency expertise⁹ and the legitimacy of the administrative state writ large,¹⁰ this Article argues that there remains an important space in administrative rulemaking for the consideration of ways of understanding that differ from traditional Western norms. TEK can and should fill that space. Acknowledging the gatekeeping role of courts in deciding the categories of science or knowledge that deserve consideration,¹¹ this Article spends considerable time engaging with the jurisprudence of judicial deference both to agency interpretation of statutes and to agency choice amongst experts in the face of uncertainty or disagreement. Ultimately, the fate of any future TEK-based action will depend on the specific details relevant to those analyses.

Part I will provide some additional background on the form and content of TEK, drawing on the extensive library of academic literature on the subject. Settling on a definition for TEK has proved difficult

8. Gina McCarthy, Admin. EPA, Introducing U.S. Members of the CEC’s Roster of Experts on Traditional Ecological Knowledge (TEK), July 15, 2015, http://www.cec.org/sites/default/files/documents/council_sessions/summary-record-15-00-en.pdf.

9. See, e.g., Emily Hammond Meazell, *Super Deference, the Science Obsession, and Judicial Review as Translation of Agency Science*, 109 MICH. L. REV. 733, 772 (2011) (describing judicial “super deference” to agency expertise as having been reduced to “meaningless boilerplate” and observing that many courts have “return[ed] to a hard-look approach that systematically describes and evaluates each major scientific contention”).

10. See, e.g., PHILIP HAMBURGER, IS ADMINISTRATIVE LAW UNLAWFUL? 501 (2014) (claiming that, for a variety of reasons, administrative power is incompatible with our constitutional order and the existence of judicial review cannot cure such a violation); *id.* at 316 (describing judges’ deference to administrative agencies as “an abandonment of judicial office”). But see Adrian Vermeule, *No*, 93 TEX. L. REV. 1547 (2015) (reviewing PHILIP HAMBURGER, IS ADMINISTRATIVE LAW UNLAWFUL? (2014)).

11. See Sonya Ziaja & Christopher Fullerton, *Judging Science: The Rewards and Perils of Courts as Boundary Organizations*, 21 HASTINGS W.-N.W. J. ENV. L. & POL’Y 217, 226 (2015) (arguing that “[b]y permitting certain research models or particular scientific experts to be allowed into court proceedings, [courts] establish[] and police[] the boundary delineating legally sanctioned science”).

among experts, particularly across nations, and this part will not settle that debate. Instead, it is meant to provide the reader with the necessary context to follow the later legal and policy discussions, while at the same time offering some insight into the substantive value of TEK to environmentalism. Part II will explore where the statutes that delegate authority to administrative agencies allow sufficient breathing room for the consideration of TEK and where such consideration most naturally fits. This part will focus on *Chevron* deference and suggest a number of openings presented by some specific mandates to administrative agencies. Part III will describe some of the practical and political, rather than legal, challenges that may face administrators pushing for increased reliance on TEK. Part IV will then turn to the legal analysis, examining how federal courts might scrutinize an agency action based primarily on TEK from an administrative law perspective. While such an analysis in the abstract could never be definitive, the ultimate conclusion of this part is that some forms of TEK could provide the basis for agency action without resulting in invalidation by the federal courts. Lastly, Part V will analyze the constitutional Establishment Clause implications of government reliance on TEK, drawing on the conflicted and unsettled jurisprudence of endorsement and entanglement. The interconnectedness of spiritual and natural understanding in Native American life presents an often-overlooked additional layer of potential legal scrutiny. Again, examination of this issue in the abstract is difficult, especially given the uncertainties in the jurisprudence, but this part concludes that the Establishment Clause would not bar the government from taking action based on TEK.

II. WHAT IS TEK AND WHY IT IS IMPORTANT

A. *Defining "Traditional Ecological Knowledge"*

Defining what constitutes "Traditional Ecological Knowledge" has proved a formidable challenge for regulators and TEK experts alike. This Article does not set out to settle that definitional conundrum. However, in order to analyze the questions confronted herein, one must begin with an understanding of what TEK is and is not. This part thus looks to the TEK experts and practitioners who have been grappling with this question for guidance on the subject of what falls into the broad category of TEK. It then turns to a discussion of TEK's rising prominence and why substantive environmental policymaking might benefit from increased reliance on TEK, thus necessitating the procedural legal analysis that follows in subsequent parts.

The first challenge in defining TEK comes from the myriad of

names assigned to it by various actors over the years.¹² TEK “is variously labeled as folk ecology, ethno-ecology, traditional environmental or ecological knowledge, indigenous knowledge, customary law, and knowledge of the land.”¹³ The best way to understand the relationship between those varied terms is to recognize that TEK represents a narrower category of tribal understanding that concerns environmental health. TEK experts thus generally describe TEK as a “subset” of Indigenous Knowledge (IK), which refers more broadly to “the unique, traditional, local knowledge existing within and developed around the specific conditions of women and men indigenous to a particular geographic area.”¹⁴ TEK similarly draws from some of the other aforementioned broader categories related to indigenous culture and its organization, such as customary law and folklore. In other words, TEK is both a subset and combination of many important types of indigenous knowledge. This conception of TEK comports with the belief in many Native American tribes that all natural beings are related, and thus humans’ relationship with the environment pervades every aspect of our lives.¹⁵

Beyond that general description of TEK’s place in the landscape of IK and Native American philosophy, the specific definitions of precisely what qualifies as TEK vary.¹⁶ For the purposes of this Article, the

12. Some recent work on this topic has even suggested that the moniker “traditional ecological knowledge” is a Western academic construction and should be replaced by simply “traditional knowledges.” See CLIMATE AND TRADITIONAL KNOWLEDGES WORKGROUP (CTKW), GUIDELINES FOR CONSIDERING TRADITIONAL KNOWLEDGES IN CLIMATE CHANGE INITIATIVES 7 (2014), <http://climatetkw.wordpress.com/>.

13. Martha Johnson, *Research on Traditional Environmental Knowledge: Its Development and Its Role*, LORE: CAPTURING TRADITIONAL ENVIRONMENTAL KNOWLEDGE (Martha Johnson, ed.) (1992).

14. LOUISE GRENIER, WORKING WITH INDIGENOUS KNOWLEDGE A GUIDE FOR RESEARCHERS 1 (1998); see also FIKRET BERKES, SACRED ECOLOGY: TRADITIONAL ECOLOGICAL KNOWLEDGE AND RESOURCE MANAGEMENT 8 (1999) [hereinafter SACRED ECOLOGY].

15. See GREGORY CAJETE, LOOK TO THE MOUNTAIN: AN ECOLOGY OF INDIGENOUS EDUCATION 74 (1994) (explaining that “[w]e are all related,” is a universal metaphor used by Indian people as a guiding principle of spiritual ecology, dictating the tribes’ perception of Nature); see also Enrique Salmón, *Kincentric Ecology: Indigenous Perceptions of the Human-Nature Relationship*, 10 ECOLOGICAL APPLICATIONS 1328 (2000) (explaining the similar concept of “kincentric ecology”).

16. See, e.g., Bureau of Ocean Energy Management, *Traditional Knowledge* (1996), <http://www.boem.gov/About-BOEM/BOEM-Regions/Alaska-Region/Traditional-Knowledge.aspx> (Providing the following definitions, which are largely consistent with the definition cited here:

Noted author Barry Lopez defined it as “vast and particular knowledge . . . garnered

definition cited by the Intergovernmental Panel on Climate Change, which was penned by perhaps the most prolific scholar of TEK issues Fikret Berkes, will suffice. Berkes has written that TEK should be understood as “a cumulative body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment.”¹⁷

This definition encompasses knowledge that is embodied in a wide range of mediums and collected over the course of history right up until the present. Thus conceived, TEK can take the form of narratives or observations about natural resources, depicted visually, written down, or passed down through oral tradition.¹⁸ Some examples will illustrate the diversity of TEK.

Perhaps the most commonly thought of medium for TEK is oral tradition. These stories, often teaching the environmental dynamics of particular geographic ecosystems, have been passed down from tribal elders to successive generations of tribal members. In some instances, these stories, or at least portions of them, have been recorded through interviews and preserved. For example, a collection of accounts from Selawik elders, compiled by the United States Fish and Wildlife Service (FWS), includes revealing passages of TEK like the following about caribou migration patterns:

The caribou were far. In the earlier years our fathers went hunting *qauña* [out there] past Shungnak. They would be gone for weeks and months. That’s how far the caribou were in those days. They hunted in

from hundreds of years of . . . patient interrogation of the landscape.” Canada’s Traditional Knowledge Working Group stated that “traditional knowledge of northern aboriginal peoples has roots based firmly in the northern landscape and a land-based life experience of thousands of years. Traditional knowledge offers a view of the world, aspirations, and an avenue to truth different from those held by nonaboriginal people whose knowledge is based largely on European philosophies.” Tom Albert, biologist for Alaska’s North Slope Borough, defined traditional knowledge as “information about the natural world from generations of observations by Native people who could be killed if they acted on wrong information. With this in mind there is a strong tendency for traditional knowledge to lean toward the truth.” Ellen Bielawski, anthropologist and former director of the Alaska Chapter of Keeper of the Treasures has said simply that traditional knowledge is “practical strategies—what’s worked and what hasn’t.”

17. SACRED ECOLOGY, *supra* note 14, at 8. This definition is cited by W. Neil Adger, et al., *Human Security*, CLIMATE CHANGE 2014: IMPACTS, ADAPTATION, AND VULNERABILITY (IPCC FIFTH ASSESSMENT REPORT, PART A) 755, 765-766 (C.B. Field et al., eds., 2014) (describing TEK as a subset of indigenous knowledge).

18. Alexander et al., *supra* note 3, at 477.

the winter time. In the fall time, the caribou didn't migrate this way. This was around the 1930s and 1940s. We used to *uumaiiq* [go get alder for firewood] when they went hunting north.¹⁹

This represents a fairly straightforward observational mode of TEK. Projects like the Alaska Native Tribal Health Consortium's Local Environmental Observer Network, partially funded by the EPA, have tried to increase recording of TEK-type observations and consolidate the associated data.²⁰ In another prominent example from the 1980s, Inupiat hunters told the International Whaling Commission (IWC) that, based on TEK, they believed the population of Bowhead whales in the Pacific Ocean to be in the thousands (in other words, sufficient to support subsistence hunting).²¹ The IWC had estimated much lower figures, and instead of trusting the TEK, it spent a decade and \$10 million on Western scientific research to confirm that the population was actually close to 10,000 whales.²²

Still other TEK takes forms that are less directly observational and, from a Western perspective, are probably more akin to art or literature than science. For example, consider the following account dealing with the proper care for and harvesting of cedar trees:

Even when the young cedar-tree is quite smooth, they do not take all of the cedar-bark, for the people of the olden times said that if they should peel off all the cedar-bark . . . the young cedar would die, and then another cedar-tree near by would curse the barkpeeler so that he would also die. Therefore, the barkpeelers never take all of the bark off a young tree.²³

The information about sustainable forestry embedded in this passage is significant, but the narrative form it is presented in does not

19. LOON & ELDERS, *supra* note 2, at 9 (words of Daniel Sipahk Foster, Sr.).

20. See ALASKA NATIVE TRIBAL HEALTH CONSORTIUM, LOCAL ENVIRONMENTAL OBSERVER (LEO) NETWORK, <http://anthc.org/what-we-do/community-environment-and-health/leo-network/> (last visited May 19, 2016) (soliciting observations as well as providing spreadsheets of metadata collected and maps showing the locations of recorded observations).

21. U.S. DEP'T OF AGRIC., INDIGENOUS STEWARDSHIP METHODS AND NRCS CONSERVATION PRACTICES 8 (2010); Elizabeth Barrett Ristroph, *Integrating Community Knowledge into Environmental and Natural Resource Decision-Making: Notes from Alaska and Around the World*, 3 WASH. & LEE J. OF ENERGY, CLIMATE & ENV'T. 81, at 87-91 (2012).

22. U.S. DEP'T OF AGRIC., *supra* note 21, at 8 (2010); Ristroph, *supra* note 21, 87-91 (2012).

23. Nancy J. Turner, Marianne Boelscher Ignace & Ronald Ignace, *Traditional Ecological Knowledge and Wisdom of Aboriginal Peoples in British Columbia*, 10 ECOLOGICAL APPLICATIONS 1275, 1280 (2000).

necessarily fit Western expectations. One might imagine the utilization of TEK contained in similar stories or poetry to present more formidable practical and legal challenges than the more straightforward observations previously described.

The knowledge and practices reflected in all forms of TEK share the same foundation in the “undeniable reality” that humans and their environment are inextricably intertwined and “[seek] to perpetuate a sustainable and mutually reciprocal relationship.”²⁴

B. *The Importance of TEK to Today’s Environmental Challenges*

Whatever form it takes or name it goes by, the substance of indigenous peoples’ understanding of ecosystem dynamics offers tremendous potential to advance the environmental policy goals of sustainability, resilience, and biological diversity, among others.

Although TEK has existed for centuries, it is only relatively recently that environmental scientists and policymakers have begun to recognize its potential. The 1980s and 1990s saw a marked increase in scholarly discussion of TEK and acknowledgement of its usefulness to environmental stewardship.²⁵ Perhaps as a result of this growing interest and attention, researchers now generally agree that “involvement of local people and their local, traditional, or indigenous forms of knowledge in decision making is critical.”²⁶ Despite this consensus among academics, policymakers have nonetheless been reluctant to fully embrace TEK as a substantive basis for decisions.²⁷ The current state of the environment suggests that must change.

Climate change has put the interconnectivity of the global environmental system front and center. Understanding ecosystem dynamics on local and global scales is essential to modern environmental policy. Fortunately, indigenous peoples were the planet’s “first practical ecologists,” and TEK has evolved from a long history of ecological awareness that teaches harmonious coexistence with natural resources rather than exploitive extraction.²⁸ Through TEK,

24. CAJETE, *supra* note 15, at 84.

25. Alexander et al., *supra* note 3, at 478; Fikret Berkes, Johan Colding & Carl Folke, *Rediscovery of Traditional Ecological Knowledge as Adaptive Management*, 10 *ECOLOGICAL APPLICATIONS* 1251, 1252 (2000); Stacie McIntosh, *Incorporating Traditional Knowledge in the Bureau of Land Management’s Planning Process in the National Petroleum Reserve-Alaska*, 27 *PRACTICING ANTHROPOLOGY*, Winter 2015, at 41 (2005).

26. Adger et al., *supra* note 17, at 765-66.

27. *Id.* (noting that despite this consensus among academics, TEK is still left out of most adaptation planning).

28. See CAJETE, *supra* note 15, at 39.

“[i]ndigenous people have preserved ways of ecologically based living that have evolved over 40,000 years of continuous relationship with special environments.”²⁹

Indeed, at least one scholar has argued that indigenous knowledge of environmental planning far surpasses the scientific analysis of dominant Western societies.³⁰ Whether or not policymakers agree wholeheartedly with that assessment (most likely do not), they must at least acknowledge that the inherent complexity of ecosystems has proved a poor match for reductionist science that takes the form of controlled experiments.³¹ This mismatch evidences the potential utility of TEK, which, “with its holistic approach [,] might be able to offer insights into complex, nonlinear systems.”³² As the priorities of resource management policies shift towards identifying the sustainable yields of interconnected resources and ecosystem services, as well as the resiliency of the ecosystem as a whole,³³ TEK can offer insights in a number of important ways, providing “taxonomic, spatial, temporal, and social/cultural frames of reference.”³⁴ The new paradigm of resource management places a premium on understanding ecosystem dynamics, focusing on adaptive management and nonequilibrium systems—subjects that Western science has largely understudied, but TEK has addressed from time immemorial.³⁵ Federal and state agencies have only come to this ecosystem management approach in the last few decades, and thus TEK could help advance their policy agendas more rapidly.³⁶

Relatedly, the loss of ecosystem resilience, a problem that has belatedly come to the fore, might better be understood through TEK. Developments in technology, products of Western science, have had a habit of masking resiliency loss (for example, larger fishing vessels and

29. *Id.* at 78; see also David N. Bengston, *American Indian Perspectives on Natural Resource Management*, J. OF FORESTRY 48, 50 (2004) (noting that a “holistic, ecosystem-based approach has long been used by American Indians to manage the land”).

30. Winona LaDuke, *Traditional Ecological Knowledge and Environmental Futures*, 5 COLO. J. OF INT’L ENVTL. L. & POL’Y 127 (1994).

31. Leonard J. S. Tsuji & Elise Ho, *Traditional Environmental Knowledge and Western Science: In Search of Common Ground*, 22 CANADIAN J. OF NATIVE STUD. 327, 347 (2002). See also GRENIER, *supra* note 14, at 10-11.

32. *Id.*

33. F. Stuart Chapin III et al., *Ecosystem Stewardship: Sustainability Strategies for a Rapidly Changing Planet*, 25 TRENDS IN ECOLOGY AND EVOLUTION 241, 241 (2009).

34. Tsuji & Ho, *supra* note 31; see also GRENIER, *supra* note 14, at 10-11; LaDuke, *supra* note 30, at 130 (noting that the Anishinaabeg have “employed a resource management system that used techniques for sustained yield”).

35. Berkes, Colding & Folke, *supra* note 25, at 1255; see also LaDuke, *supra* note 30, at 127.

36. See Bengston, *supra* note 29, at 48.

improved gear masking diminished stocks, synthetic fertilizers masking soil nutrient depletion).³⁷ TEK comes from an understanding that predates, and often outwardly rejects, Western technological advances in natural resource exploration and extraction. For that reason, TEK likely offers a better picture of resiliency loss than some Western science studies based on data collected by industries that have consistently been improving their technology.

The other area where TEK could improve environmental policymaking is part substantive and part procedural. Environmental justice principles counsel involvement of the full range of perspectives in the public participation process, with a special emphasis on providing space for the voices of previously underrepresented groups to be heard. The communities directly affected by environmental regulations should have a say in the crafting of those rules; this is especially true when the affected community is itself a sovereign tribal nation.³⁸ Giving increased consideration to TEK would help move towards this participation ideal. As commentators and climate change litigants have astutely and loudly pointed out, indigenous communities stand to bear the harshest climate impacts—from the actual loss of territory due to permafrost melting and sea-level rise to the magnification of existing problems with basic municipal infrastructure like drinking water systems and landfills.³⁹ In Alaska, where these climate impacts are already felt, at least some federal agencies have recognized the potential benefits of “community knowledge” in decisionmaking.⁴⁰ This type of thinking must go beyond the communities already being harmed and help frame climate policy across the nation and the world.⁴¹

The United States sadly lags behind in finding ways to involve indigenous communities in environmental decisionmaking that utilize the knowledge they share to improve the environment for all.⁴² Though

37. Berkes, Colding & Folke, *supra* note 25, at 1259 (2000).

38. Mary Arquette et al., *Holistic Risk-Based Environmental Decision Making: A Native Perspective*, 110 ENVTL. HEALTH PERSP. 259, 262 (2002); *see also* GRENIER, *supra* note 14, at 13; Bengston, *supra* note 29, at 48 (“An important challenge for forest management agencies [and agencies regulating the environment more broadly] is responding to an increasingly diverse society in ways that ensure that the views of all citizens are included in management and policy.”).

39. Patricia Cochran et al., *Indigenous Frameworks for Observing and Responding to Climate Change in Alaska*, 120 CLIMATE CHANGE 557, 560 (2013).

40. Ristroph, *supra* note 21, at 90-91 (2012).

41. *See* PRESIDENT’S STATE, LOCAL, AND TRIBAL LEADERS TASK FORCE ON CLIMATE PREPAREDNESS AND RESILIENCE, RECOMMENDATIONS TO THE PRESIDENT 8, 15 (2014) (recommending such an inclusive approach to climate policy).

42. *See, e.g.*, Berkes, Colding & Folke, *supra* note 25, at 1253, Table 1 (providing a table of management practices in Canada that have at least some basis in TEK).

the United States has a well-established consultation obligation,⁴³ that obligation does not give equal weight to tribal knowledge or preferences in the final analysis of whether or not a government action should be taken.⁴⁴ Through increased reliance on TEK, climate policy and environmental policy more broadly would move towards the ecosystem management approach now favored by experts, and do so in a powerfully inclusive way.

III. WHERE AND HOW TEK COULD BE RELIED ON BY AGENCIES

In *Chevron v. Natural Resources Defense Council*, the Supreme Court famously laid out the boundaries of agencies' discretion in interpreting their statutory mandates and acting upon those interpretations.⁴⁵ The amount of deference afforded to agencies in *Chevron* is the open door through which TEK can most straightforwardly enter the rulemaking process. In other words, where enabling statutes use language that is broad or ambiguous in directing the methods and data agencies can rely on in crafting administrative rules, it would often be reasonable for those agencies to include TEK among the bases for a given rule.⁴⁶

There are some statutory provisions that constrain agencies' decisionmaking—specifically dictating how a standard might be set or a technology prescribed (for example, the numerical threshold criteria for designating “Area” and “Major” sources under Section 112 of the Clean Air Act).⁴⁷ Agencies have also in some instances constrained their own methods of analysis by regulation,⁴⁸ posing a similar problem with

43. See Exec. Order No. 13,175, *supra* note 4.

44. Cf. Diana Coronel David, *Green Energy in Indian Country as a Double-Edged Sword for Native Americans: Drawing on the Inter-American and Colombian Legal Systems to Redefine the Right to Consultation*, 38 ENVIRONS: ENVTL. L. & POL'Y J. 223, 243 (2015) (comparing the Colombian and Inter-American legal protections for indigenous rights with the United States' consultation system and concluding that the latter was a “mere procedural formality” in part because the United States has interpreted “consent” under the U.N. Declaration on the Rights of Indigenous Peoples to not provide tribes with an up or down vote on policy proposals affecting their rights and resources).

45. 467 U.S. 837 (1984).

46. See *infra* Part IV for an in-depth discussion of the vulnerability of final agency actions relying on TEK on judicial review.

47. 42 U.S.C. § 7412(a) (West 2016); see also § 7412(d) (setting forth requirements for emissions standards promulgated under the statute, including maximum achievable control technology (MACT) and generally available control technology (GACT)).

48. See Biodiversity Conservation Alliance v. Jiron, 762 F.3d 1036 (10th Cir. 2014), for a detailed description of these Forest Service regulations; see, e.g., 36 C.F.R. §§ 219.1-219.16 (regulations under the National Forest Management Act setting forth how the Forest Service must monitor “Management Indicator Species” were revised in 2005 to permit reliance on habitat data,

regard to deference in interpretation of those constraints,⁴⁹ but not as rigidly limiting due to agencies' ability to change regulations without Congressional action.⁵⁰ However, there exist many other statutory provisions that seemingly leave the agencies a wide berth in deciding the contours of a particular rule, recognizing their role as technical experts in the fields they regulate and deferring to that expertise in analyses.⁵¹

The Supreme Court has also recently called into question the breadth of federal agencies' analytical mandates even when framed with sweeping or ambiguous statutory language.⁵² The Court has been willing to impute its own restrictions on what an agency can and cannot consider, through the guise of *Chevron's* reasonableness screen.⁵³ If an

rather than just population); *see also* 42 U.S.C. § 9651(c)(2) (West 2016) (“[R]egulations shall specify . . . standard procedures for simplified assessments requiring minimal field observation, including establishing measures of damages based on units of discharge or release or units of affected area . . .”).

49. When agencies use their own regulations to constrain their analyses, they are afforded some deference with respect to the interpretation of the regulation setting forth the requirements. *See Auer v. Robbins*, 519 U.S. 452 (1997). Whether it would be permissible for an agency to rely on TEK in such circumstances depends on the application of *Auer* deference, which is not unlike the *Chevron* discussion herein. *See Decker v. Nw. Env'tl. Def. Ctr.*, 133 S. Ct. 1326, 1339-40 (2013) (Scalia, J., concurring in part and dissenting in part) (“In practice, *Auer* deference is *Chevron* deference applied to regulations rather than statutes. The agency's interpretation will be accepted if, though not the fairest reading of the regulation, it is a plausible reading—within the scope of the ambiguity that the regulation contains.”).

50. This Article does not separately analyze, under the *Auer* framework, examples of situations where TEK and regulations might be at odds because, unlike with statutory constraints, agencies have the ability to change regulatory requirements to permit the use of TEK where even a deferential reading of the current regulation might not permit it. Furthermore, to the extent that a guidance document, rather than a rule, dictates an agency's procedure to the potential exclusion of TEK from consideration, the agency need not follow it in all instances. *See Assoc. of Flight Attendants v. Huerta*, 85 F.3d 710, 719 (D.C. Cir. 2015) (“This is irrelevant because the guidance document is simply a non-binding policy statement . . . the [agency] is not obliged to continue following it.”).

51. *Catawba Cty. v. EPA*, 571 F.3d 20, 41 (D.C. Cir. 2009) (“Of particular note in this challenge, we give ‘an extreme degree of deference to [the EPA] when it is evaluating scientific data within its technical expertise.’” (citation omitted)); *see also* STEPHEN BREYER, *BREAKING THE VICIOUS CIRCLE: TOWARD EFFECTIVE RISK REGULATION* 57-59 (1993) (arguing that federal courts cannot, and should not, provide the necessary oversight to improve the effectiveness of technical regulations).

52. *See Michigan v. EPA*, 135 S. Ct. 2699, 2706 (2015) (explaining that under a combination of Supreme Court precedents, “[f]ederal administrative agencies are required to engage in ‘reasoned decisionmaking.’” (citation omitted) “the process by which [they] reach[] [a] result must be logical and rational,” and an action is only lawful if based “on a consideration of the relevant factors” (citations omitted)).

53. *Id.* at 2706-07 (acknowledging that the Clean Air Act section at issue broadly directs EPA to regulate power plants if EPA, in its discretion, “‘finds such regulation is appropriate and necessary,’” and then proceeding to conclude nonetheless that appropriate and necessary “requires at least some attention to cost”).

overzealous judge takes this trend further and puts an increasingly heavier thumb on the scale during *Chevron* analysis, the window for TEK, and other innovative modes of analysis, admittedly may close at the whim of the reviewing court before the merits of the policy in question are even evaluated. However, as long as some semblance of deference persists for the time being, agencies should look to the below-described statutory provisions and programs as opportunities where consideration of TEK would be permissible and advantageous.

A. Climate Change Regulation

Perhaps the most obvious entry point for TEK in rulemaking is climate change regulation, which is largely the purview of the EPA. First, as a matter of general approach, TEK, more so than Western science, tends to focus on holistic environmental health and ecosystem dynamics.⁵⁴ Climate change presents a sweeping environmental threat precisely because it too encompasses the whole earth ecosystem.⁵⁵ For this reason, TEK offers a potentially valuable method of understanding to those setting climate policy. Indeed, tribes are already drawing on TEK to study and prepare for the effects of climate change on their own. For example, the Inuit and the Cree have drawn on the historical base of knowledge from TEK to become more aware of and responsive to the critical indicators of environmental change—using observations passed down for generations to get a picture of the currently warming planet and its localized impacts.⁵⁶ Increasingly, tribes have formalized climate change adaptation plans, many of which specifically draw on TEK.⁵⁷ On

54. See *supra*, Part I.

55. See generally, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (IPCC), CLIMATE CHANGE 2014: SYNTHESIS REPORT 47-52, Fig. 1-11, 1-12 (2014) (describing climate change impacts on various systems).

56. Fikret Berkes, *Indigenous Ways of Knowing and the Study of Environmental Change*, 29 J. ROYAL SOC'Y N. Z. 151, 153 (2009); see also Alexander et al., *supra* note 4, at 478-79 [hereinafter *Indigenous Ways of Knowing*] (describing how the Arctic Climate Impact Assessment (ACIA 2005) combined climate narratives drawn from the TEK of Arctic indigenous people with a GIS overlay).

57. See, e.g., CONFEDERATED SALISH AND KOOTENAI TRIBES OF THE FLATHEAD RESERVATION, CLIMATE CHANGE STRATEGIC PLAN 28 (2013), <http://www.csktribes.org/CSKTClimatePlan.pdf> (“Western science has allowed societies to segregate the roles and different functions of each part of nature. Native people to this land understand that these functions cannot be separated from each other. They understand that there is a direct relationship among everything in the natural environment. As such, Traditional Ecological Knowledge is not only incorporating Tribal traditions and culture, but it is applying Salish, Pend d’Oreille, and Kootenai world views into decision-making.”); JAMESTOWN S’KLALLAM TRIBE, CLIMATE CHANGE VULNERABILITY ASSESSMENT AND ADAPTATION PLAN (2013), http://www.jamestowntribe.org/programs/nrs/JKT_Key_Area_of_Concern_All_Oct_2013%20v2.

a technical scale, the observations about the natural world that comprise TEK provide precisely the type of historical data against which the effects of climate change, and the efforts to mitigate it, should be measured.⁵⁸

In the wake of the Supreme Court’s monumental decision in *Massachusetts v. EPA*, the EPA assumed the front in the regulatory battle against climate change.⁵⁹ The first necessary step in that march was the “endangerment finding” in which the EPA specifically determined that greenhouse gases in the atmosphere threaten the public health and welfare of current and future generations.⁶⁰ The Clean Air Act does not set particular methods by which the EPA was required to make that determination.⁶¹ And although no TEK was ultimately cited as the basis for the endangerment finding,⁶² it would have been reasonable for the EPA to do so. As the EPA now moves to the next phase of its process and determines how precisely to craft the rules governing greenhouse gas emissions from various sources, there is still room for TEK to enter the equation.⁶³ **In fact, the EPA has explicitly mentioned**

pdf (using “traditional harvesters to gather on-the-ground observations”); SWINOMISH INDIAN TRIBAL COMMUNITY, SWINOMISH CLIMATE CHANGE INITIATIVE CLIMATE ADAPTATION ACTION PLAN 24 (2010), http://www.swinomish.org/climate_change/Docs/SITC_CC_AdaptationActionPlan_complete.pdf (citing “efforts underway regionally that are exploring ways to incorporate indigenous knowledge into planning efforts to address climate change issues,” including the Tulalip Tribes attempt to codify their approach to institutionalizing traditional knowledge).

58. See also Alexander, *supra* note 3, at 483 (“[I]ndigenous narratives provide a rich source of information based on multigenerational knowledge about local climate that can contribute a great deal to science assessments, such as the IPCC, that provide policy-relevant information. Indigenous knowledge often deepens understanding about what climate change means for livelihoods, cultures, and ways of life beyond the understanding provided by statistically significant changes reported in the scientific literature. These narratives show that global climate change has already affected integrated physical, biological, and social ecosystems, especially in the northern high latitudes.”).

59. 549 U.S. 497 (2007).

60. Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, 74 Fed. Reg. 66,496, 66,497 (Dec. 15, 2009) (finding that the emission of six greenhouse gases—carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆)—into the atmosphere threatens the public health and welfare and finding that emissions from new motor vehicles and new motor vehicle engines contribute to that greenhouse gas pollution).

61. See 42 U.S.C. § 7521(a) (West 2016) (describing the Administrator’s responsibility to regulate emissions of “any air pollutant from any class or classes of new motor vehicles or new motor vehicle engines, which in his judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare” (emphasis added)).

62. See 74 C.F.R. §§ 66,496, 66,497, *supra* note 60 (explaining the scientific basis of the finding).

63. See, e.g., Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, 80 Fed. Reg. 64,662-668 (October 23, 2015) (codified at 40

that it sees a role for TEK in addressing climate adaptation.⁶⁴ EPA did not identify under what statutory authority climate adaptation policies would fall, but it would necessarily have to be a broad mandate, because none of the environmental statutes were crafted with this problem in mind. That broad authority to address adaptation would thus likely leave room for consideration of TEK in doing so.

In addition to EPA's direct regulation of greenhouse gases, other agencies have begun to target the causes and effects of climate change. Particularly salient to this discussion of TEK's place in the administrative process, the National Resource Conservation Service (NRCS) of the United States Department of Agriculture (USDA) has specifically incorporated indigenous stewardship methods, which are a subset of TEK, in their efforts to stave off the effects of a changing climate.⁶⁵ As more agencies struggle with climate change related problems, whether they be mitigation, adaptation, or some combination of the two, they would be wise to consult with tribes and explore the usefulness of TEK to their analysis; indeed, some agencies already recognize this.⁶⁶

C.F.R. pt. 60) (describing the climate change impacts of greenhouse gas emissions).

64. U.S. ENVTL. PROT. AGENCY, CLIMATE CHANGE ADAPTATION PLAN 49 (2012) ("EPA will also work with the tribes to identify and support the use of climate change relevant traditional ecological knowledge (TEK) in decision making. EPA recognizes that TEK, as an expression of key information that links historical, cultural, and local ecological conditions, may help tribes choose how they adapt to climate change while also protecting resources and resource uses important to their culture and livelihood. These efforts will leverage existing EPA partnerships with the tribes and tribal networks.").

65. See U.S. DEP'T OF AGRIC., *supra* note 21, at 11, 13, 18-19, 23-26, 37 (2010) (providing guidance on how NRCS and tribes can work together to use Indigenous Stewardship Methods (ISM) and noting the uncertainties caused by, among other things, a changing climate); KIRSTEN VINYETA & KATHY LYNN, U.S. DEP'T OF AGRIC. GEN. TECHNICAL REPORT NO. PNW-GTR-879, EXPLORING THE ROLE OF TRADITIONAL ECOLOGICAL KNOWLEDGE IN CLIMATE CHANGE INITIATIVES 13 (2013) ("[T]he Tribal Climate Change Project is a collaboration between the University of Oregon Environmental Studies Program and the USDA Forest Service Pacific Northwest Research Station. One of the Tribal Climate Change Project's central endeavors is the Pacific Northwest Climate Change Network, which serves as a platform for tribes to exchange information on climate change policy, grants, and programs. It provides a place for tribes and nontribal organizations to engage in climate change issues and share helpful resources and ideas. The network has over 50 organizations represented, including tribes, federal agencies, and nongovernmental organizations. A significant area of focus for the network includes exploring the role of TEK in climate change studies, vulnerability assessments, and adaptation plans, as well as the protection of TEK in cross-jurisdictional climate change initiatives.").

66. See VINYETA & LYNN, *supra* note 66, at 20 ("Through consultation, federal agencies have an opportunity to discuss the use of the TEK in addressing climate change and to create formal mechanisms to share and utilize TEK in federal and tribal climate change assessments, plans, and implementation strategies."); see also U.S. ENVTL. PROT. AGENCY, *supra* note 64; PRESIDENT'S STATE, LOCAL, AND TRIBAL LEADERS TASK FORCE ON CLIMATE PREPAREDNESS AND RESILIENCE, RECOMMENDATIONS TO THE PRESIDENT 8 (2014) ("The Federal Government

B. *Management of Wildlife and Fisheries*

The preservation of species, as well as local wildlife populations, is the subject of both federal government regulation and foundational teachings of TEK. The Endangered Species Act⁶⁷ and the Magnuson-Stevens Fishery Conservation and Management Act⁶⁸ are just two major examples of statutes granting authority to agencies to promulgate regulations aimed at ensuring the continued existence of species and populations of animals on which we, as a society, depend. Indian tribes, long before the United States Congress even existed, let alone passed the aforementioned statutes, relied on TEK to not only aid in the quest for fish and meat, but also to protect themselves against overfishing and overhunting.⁶⁹ Hence, wildlife and fisheries managers stand to benefit from TEK, particularly with regard to species and patterns of behavior about which little is known.

For example, the Endangered Species Act directs the FWS to list species that are either “threatened”⁷⁰ or “endangered.”⁷¹ The Endangered Species Act grants only limited discretion to the FWS in how it can make a listing determining, mandating the listing of a species if “best scientific and commercial data available” indicate that the species is endangered or threatened.⁷² The FWS is not free to decline to list a species for economic or policy reasons.⁷³ A reasonable reading of the

must fully incorporate its government-to-government relationship with Tribes and Alaska Native communities into existing programs and activities that relate to climate change by enhancing self-governance capacity, promoting engagement of State and local governments with tribal communities, and recognizing the role of traditional ecological knowledge in understanding the changing climate.”).

67. 16 U.S.C. §§ 1531-44 (West 2016).

68. *Id.* §§ 1801-84.

69. See LaDuke, *supra* note 30, 127-28 (describing how Native American societies have relied on TEK to practice sustainable living for over 300 years and also providing an example of TEK related to fishing).

70. 16 U.S.C. § 1532(20) (“any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range”).

71. *Id.* § 1532(6) (“any species which is in danger of extinction throughout all or a significant portion of its range other than a species of the Class Insecta determined by the Secretary to constitute a pest whose protection under the provisions of this chapter would present an overwhelming and overriding risk to man”).

72. *Id.* § 1533(b)(1)(A).

73. See *id.* (“The Secretary shall make determinations required by subsection (a)(1) of this section *solely on the basis* of the best scientific and commercial data available to him after conducting a review of the status of the species and after taking into account those efforts, if any, being made by any State or foreign nation, or any political subdivision of a State or foreign nation, to protect such species, whether by predator control, protection of habitat and food supply, or other conservation practices, within any area under its jurisdiction; or on the high seas.” (emphasis added)).

“best scientific . . . data available,” however, may very well include TEK’s observational data that has been accumulated over more than a century of tribes residing on and living off of the land in North America.⁷⁴ Indeed, the Secretaries of the Interior and Commerce Departments jointly issued a Secretarial Order on tribal rights and the Endangered Species Act, which acknowledged the need to provide tribes with “adequate opportunities to participate in data collection, consensus seeking, and associated processes.”⁷⁵ The data tribes may provide need not necessarily be population figures for the potentially listed species, but could encompass important information about that species’ range, eating habits, resiliency, and much more. Further, even if this type of TEK cannot inform the listing decision in the first instance,⁷⁶ it could certainly inform the later determinations about whether an action “jeopardize[s] the continued existence of” a listed species,⁷⁷ results in “destruction or adverse modification” of its critical habitat,⁷⁸ or “takes” members of that species altogether.⁷⁹

The Endangered Species Act also gives the FWS the authority to promulgate regulations “necessary and advisable to provide for [the] conservation of [threatened] species.”⁸⁰ The “necessary and advisable” language leaves sufficient room for the FWS to rely on TEK in a decision to promulgate a rule protecting a threatened species.

With respect to fisheries management, the Magnuson-Stevens Fishery Conservation and Management Act established a scheme of regulation that looks to regional councils for guidance on the management of fish stocks in eight distinct regions.⁸¹ These councils

74. See, e.g., HANNAH PANIYAVLUK LOON, SUE STEINACHER & SELAWIK ELDERS, U.S. FISH & WILDLIFE SERV., UQAUSRIPTIGUN IN OUR OWN WORDS: SELAWIK ELDERS SPEAK ABOUT CARIBOU, REINDEER AND LIFE AS THEY KNEW IT at 13-19, 35-45 (2007) (compiling the observations and inherited knowledge of tribal elders regarding the migration patterns and prevalence, or scarcity, of caribou over the 20th century).

75. Bruce Babbitt, Secretary of the Interior, & William M. Daley, Secretary of Commerce, Secretarial Order 3206, American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act at 4 (June 5, 1997), <http://www.fws.gov/nativeamerican/pdf/tek-secretarial-order-3206.pdf>.

76. *But see id.* at Appendix (recognizing that tribes have a role to play in listing decisions).

77. 16 U.S.C. § 1536(a)(2) (West 2016); see also *Gifford Pinchot Task Force v. U.S. Fish and Wildlife Serv.*, 378 F.3d 1059, 1070-1071 (9th Cir. 2004) (describing what FWS must consider in “jeopardy” and “adverse modification” analyses as survival and survival plus recovery, respectively).

78. 16 U.S.C. § 1536(a)(2).

79. *Id.* § 1532(19) (“[T]ake’ means to harass, harm, pursue, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct . . .”).

80. *Id.* § 1533(d).

81. *Id.* § 1852.

develop fishery management plans that have the dual goals of restoring depleted stocks and ensuring the continued existence of healthy stocks.⁸² In crafting fishery management plans, the regional councils consult with the local fishing industry, include tribal fishermen.⁸³ In areas with significant fishing tribes, the regional council includes tribal membership as well.⁸⁴ This setting provides the perfect opportunity for TEK to inform regulation by way of the fishery management plans. Indeed, at least one regional council has already been asked to take this step.⁸⁵

C. Assessing Environmental Impacts of Agency Action

With perhaps the most ambitious purpose of any environmental law,⁸⁶ the National Environmental Policy Act (NEPA) sought to infuse all potentially deleterious regulatory actions with the proper modicum of consideration for environmental harms.⁸⁷ NEPA requires agencies to assess the environmental impacts of their actions using a formalized process. For any action that is not categorically excluded from NEPA,⁸⁸ the agency must first perform an Environmental Assessment (EA) to determine whether said action will have a significant impact on the environment.⁸⁹ If the agency determines that the action will not have a

82. See *id.* §§ 1852(h), 1853(a).

83. See *id.* § 1867.

84. See *id.* § 1852(a) (describing the required composition of the regional councils, including the designated spot for a member of a federally recognized tribe on the Pacific Council); see also Pacific Fishery Management Council, *Council Member Roster*, <http://www.pcouncil.org/wp-content/uploads/council.pdf> (last visited April 17, 2015); North Pacific Fishery Management Council, *Council Members*, <http://www.npfmc.org/council-members/> (last visited April 17, 2015).

85. Letter from James W. Balsiger, Alaska Regional Administrator, National Oceanic and Atmospheric Administration, to Alaska Tribal Representative (June 16, 2010), https://alaskafisheries.noaa.gov/tc/workgroup/nmfs_response_to_nov09.pdf (describing the advice of a work group for Rural Alaska Community Action Program that the North Pacific Fishery Management Council use TEK in fisheries analyses).

86. 42 U.S.C. § 4321 (“The purposes of this chapter are: To declare a national policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the Nation; and to establish a Council on Environmental Quality.”).

87. *Id.* 4321-70h.

88. 40 C.F.R. § 1508.4 (2015) (“‘Categorical exclusion’ means a category of actions which do not individually or cumulatively have a significant effect on the human environment and which have been found to have no such effect in procedures adopted by a Federal agency in implementation of these regulations . . . and for which, therefore, neither an environmental assessment nor an environmental impact statement is required.”).

89. See *id.* § 1508.9 (describing EAs).

significant impact, the agency prepares a “finding of no significant impact” (“FONSI”); if a significant impact is found, the agency is required to produce a complete Environmental Impact Statement (EIS) as prescribed by NEPA.⁹⁰ The statute lays out in some detail what the EIS must describe,⁹¹ and, relevant to the discussion here, directs that, in performing an EIS, an agency must “utilize a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts in planning and in decisionmaking.”⁹²

The emphasized language in the above mandate seems to not only permit the use of TEK in EISs, but to encourage it.⁹³ Indeed, TEK, as a distinct discipline from Western science that integrates social and natural science, would provide a valuable tool for agencies to meet their EIS obligations. The Council on Environmental Quality (CEQ) has a NEPA consultation regulation that requires agencies to engage with tribes when preparing EISs.⁹⁴ Such consultation would provide a natural entry point for TEK. NEPA’s inclusive approach would allow TEK to sit alongside Western science on equal footing in an EIS, rather than be subjugated to the provision of observational data. In this way, it is one of

90. 42 U.S.C. § 4332 (West 2016).

91. *Id.* § 4332(2)(c) (“(i) the environmental impact of the proposed action, (ii) any adverse environmental effects which cannot be avoided should the proposal be implemented, (iii) alternatives to the proposed action, (iv) the relationship between local short-term uses of man’s environment and the maintenance and enhancement of long-term productivity, and (v) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.”).

92. *Id.* § 4332(2)(a) (emphasis added).

93. It is interesting to note that Canada, in its federal environmental assessment statute (which is similar to NEPA), explicitly recognized a place for TEK in EISs. Canadian Environmental Assessment Act (CEAA), 2012, S.C. 2012, c 19, s.19(3) (“The environmental assessment of a designated project may take into account community knowledge and Aboriginal traditional knowledge.”). See GRENIER, *supra* note 14, at 12-13 (1998) (describing how TEK is used in Canadian Environmental Impact Assessments). Though the CEAA was weakened overall by conservative amendments in 2012, the freshly minted administration of Prime Minister Trudeau appears committed to once again taking up the dual causes of environmental protection and indigenous rights. See, e.g., Kristy Kirkup, *Canada to Embrace UN Declaration on Rights of Indigenous Peoples, Minister Indicates*, TORONTO STAR, May 9, 2016, <https://www.thestar.com/news/world/2016/05/09/canada-to-embrace-un-declaration-on-rights-of-indigenous-peoples-minister-indicates.html>; Mandate Letter from Justin Trudeau, Prime Minister of Canada, to Catherine McKenna, Minister of Environment and Climate Change (2015), <http://pm.gc.ca/eng/minister-environment-and-climate-change-mandate-letter> (including—among other policy objectives for the Ministry of Environment and Climate Change—the establishment of “a renewed, nation-to-nation relationship with Indigenous Peoples, based on recognition of rights, respect, co-operation, and partnership”).

94. See, e.g., 40 C.F.R. § 1501.2(d)(2) (2015) (requiring that federal agencies consult with Indian tribes early in the NEPA process).

the more powerful opportunities to utilize TEK in agency action; some have already recognized this fact.⁹⁵ Further, because EISs must be performed by all agencies, not just those regulating the environment, the reach of TEK's influence has the potential to be magnified by its use in the NEPA context.

Some tribes with environmental programs have already begun incorporating TEK into environmental assessments, even outside the NEPA context. For example, the Haudenosaunee tribe has developed what it has dubbed the Haudenosaunee Environmental Protection Process (HEPP), which relies on the tribe's TEK as a guide for adequately protecting the natural world.⁹⁶ The HEPP can be understood as a culturally-based EIS.⁹⁷ As such, it serves a potential model of how TEK might be framed and utilized in future EISs under NEPA.

D. Clean Water Act

The Clean Water Act presents an opportunity for TEK to inform the discharge permits and water quality standards promulgated under the Act.⁹⁸ Section 303 establishes a procedure for the states to set water quality standards, which the EPA then decides whether to approve or reject.⁹⁹ In determining whether a particular water quality standard is adequately protective of human health, the EPA examines the different "designated uses"¹⁰⁰ of the water and determines the exposure levels created thereby.¹⁰¹ Fishing, particularly by tribes, often constitutes such a designated use and, as a result, the fish consumption rate of tribal members can factor into the human health analysis.¹⁰²

95. See Ristroph, *supra* note 21, at 109-11 (2012) (describing how both the National Oceanic and Atmospheric Administration (NOAA) and the Bureau of Land Management (BLM) have utilized TEK in Environmental Impact Statements in Alaska).

96. Brenda E. LaFrance & James E. Costello, *The Haudosaunee Environmental Protection Process (HEPP): Reinforcing the Three Principles of Goodmindedness, Peacefulness, and Strength to Protect the Natural World*, in PRESERVING TRADITION AND UNDERSTANDING THE PAST: PAPERS FROM THE CONFERENCE ON IROQUOIS RESEARCH, 2001-2005 at 61 (Christine Sternberg Patrick ed., 2010).

97. *Id.*

98. 33 U.S.C. § 1313 (West 2016).

99. *Id.* § 1313.

100. "Designated uses" under the Clean Water Act are the uses of a water body that the entity setting water quality standards—whether it be a state, tribal, or federal government—has determined that the water body should be clean enough to support. States and tribes must specify the uses they intend to protect when they submit proposed water quality standards to EPA. See 40 C.F.R. § 131.10 (2015) for a full description of the use designation process and the roles of the different governments involved.

101. *Id.*

102. See Letter from H. Curtis Spalding, Reg'l Adm'r, EPA Region 1, to Patrick W. Aho,

In such a situation, TEK can provide valuable information about the historical fish runs, fish consumption by tribal members, and even the effects of fish consumption on human health.¹⁰³ Many tribes have relied heavily on sustenance fishing for generations, in the process building a wealth of knowledge about how, when, and why tribal members consume certain fish species. That information is potentially invaluable to determining how to calibrate the quantitative function that determines adequately protective human health criteria. TEK, in fact, has already been used to provide qualitative information about where discharges most affect water quality with respect to individual permitting decisions under another Clean Water Act program.¹⁰⁴ Putting greater reliance on TEK in the setting of overall standards would not be a giant leap. In that scenario, TEK could provide the “scientific rationale”¹⁰⁵ for the fish consumption rate component of a state’s (or tribe’s) water quality criteria to protect a designated use that includes tribal fishing. EPA has already acknowledged the existence of surveys of the fish consumption of some tribes in making determinations on such criteria;¹⁰⁶ TEK could fit alongside such conventional survey methods.

Comm’r, Me. Dep’t of Envtl. Prot. (Feb. 2, 2015), Appendix A at 17-27, 30-33, 35-7, <https://turtletalk.files.wordpress.com/2015/02/2015-2-2-me-wqs-epa-decision-letter-attachment-a.pdf> (disapproving the water quality standards for Indian country set by the State of Maine on the basis of the designated use of “sustenance fishing” and the associated effects on the human health criteria); Letter from Daniel D. Opalski, Dir., Water and Watersheds, to Cheryl Niemi, Wash. Dep’t of Ecology (Mar. 23, 2015), <http://www.ecy.wa.gov/programs/wq/ruledev/wac173201A/comments/0054b.pdf> (noting that many tribes in Washington hold treaty-reserved fishing rights and citing multiple studies of tribal fish consumption to suggest that Washington’s current water quality standards were not sufficiently protective of tribes).

103. See Letter to Cheryl Niemi, *supra* note 102 (listing the following studies of tribal fish consumption as the basis for EPA’s comment that Washington’s water quality standards were insufficiently protective: “A Fish Consumption Survey of the Nez Perce, Yakama, and Warm Springs Tribes of the Columbia River Basin (Columbia River Inter-Tribal Fish Commission (CRITFC), 1994); A Fish Consumption Survey of the Tulalip and Squaxin Island Tribes of the Puget Sound Region (Toy et al., 1996); Fish Consumption Survey of the Suquamish Indian Tribe of the Port Madison Indian Reservations, Puget Sound Region (Suquamish Tribe, 2000); Asian and Pacific Islander Seafood Consumption Study (Sechena et al., 1999)”).

104. See Ristroph, *supra* note 21, at 108-09 (describing how EPA Region 10 used TEK to inform decisions regarding various water discharge permits, including those for Red Dog Mine, Cook Inlet, Beaufort Sea, and Chukchi Sea).

105. Establishment of Water Quality Standards, 40 C.F.R. 131.11(a)(1) (2015) (“[W]ater quality criteria . . . must be based on sound scientific rationale and must contain sufficient parameters or constituents to protect the designated use.”).

106. See, e.g., Revision of Certain Federal Water Quality Criteria Applicable to Washington, 80 Fed. Reg. 55,063, 55,066 (proposed Sept. 14, 2015).

E. Superfund

The localized focus of cleanup projects under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) make it a prime candidate for the incorporation of TEK as the basis for agency action.¹⁰⁷ CERCLA was designed to remediate sites where hazardous wastes were improperly disposed of.¹⁰⁸ To help accomplish this goal, CERCLA establishes a comprehensive system of strict liability,¹⁰⁹ which makes cleanup costs and natural resource damages collectable from responsible parties.¹¹⁰ At any given CERCLA site, two big questions under this scheme for both regulators and the parties regulated are what level of cleanup CERCLA requires and what are the natural resource damages. TEK can reasonably inform both of those determinations.

The scope of a cleanup under CERCLA includes those “actions as may be necessary to prevent, minimize, or mitigate damage to the public health or welfare or to the environment.”¹¹¹ CERCLA itself does not set the level of protection that encompasses; the EPA must reasonably interpret that language in setting the cleanup criteria for each CERCLA site.¹¹² As a result, site-specific assessments factor prominently in setting cleanup levels.¹¹³ Much like the EISs discussed above,¹¹⁴ TEK can add significantly to this type of assessment. The benefits of TEK to the site-specific assessment in the CERCLA context might even be more pronounced than the standard EIS, because the natural and social history of a site may only be known through TEK.

In creating liability for natural resource damages, CERCLA specifically mentions the possibility that said liability may accrue to the benefit of Indian tribes.¹¹⁵ Natural resource damages under CERCLA are

107. 42 U.S.C. § 9601-9675 (West 2016).

108. *See id.* §§ 9601-9607.

109. *Id.* § 9607(b) (setting forth a few limited defenses).

110. *See id.* § 9607.

111. *Id.* § 9601(23).

112. *See* Hazardous Substance Response, 40 C.F.R. § 300.400 (2015) (establishing the criteria for “determining the appropriate extent of response authorized by CERCLA”).

113. *Id.* 300.400(g)

114. *See supra*, Part II.C.

115. *See* 42 U.S.C. § 9607(f)(1) (“In the case of an injury to, destruction of, or loss of natural resources under subparagraph (C) of subsection (a) [of this section] liability shall be to the United States Government and to any State for natural resources within the State or belonging to, managed by, controlled by, or appertaining to such State and to any Indian tribe for natural resources belonging to, managed by, controlled by, or appertaining to such tribe, or held in trust for the benefit of such tribe, or belonging to a member of such tribe if such resources are subject to a trust restriction on alienation.”); *see also* Nat’l Ass’n. of Mfrs. v. DOI, 134 F.3d 1095, 1100

a notoriously difficult and contentious figure to calculate.¹¹⁶ What better way to inform this decision, especially when those damages accrue to an Indian tribe, than to rely on the teachings of TEK as to the benefits of the natural resources at a particular site to those who live on or around it.

These are just a few of the places where it would appear, at least at first blush, that the statutory authority could reasonably be read to allow for reliance on TEK in agency action. This section is by no means a final statement as to the viability, or wisdom, of the examples used to illustrate the broader principle—that TEK could provide the basis for rulemaking and other final agency action. The practical and legal hurdles to adopting this approach as a general matter (rather than with respect to any of these specific examples) are examined in the sections that follow.

IV. PRACTICAL CHALLENGES TO INCREASED RELIANCE ON TEK

Before discussing the inevitable legal challenges to an agency action that is based on TEK, one must confront the reality that even the decision to take such an action would require clearing significant internal hurdles within any agency and in the perception of the regulated community. These obstacles are not legal constructs or necessarily formal in any way; they are pragmatic barriers, manifesting as skepticism towards TEK. This general skepticism is articulated in a number of significant arguments, the most prominent and troubling of which are dealt with here.

A. Subordination to Western Science

The dominant theme running through opposition to the use of TEK is that the system of knowledge and research it represents is one that has been surpassed by Western science and technology. Essentially, many view TEK as inferior, and thus suboptimal, as a basis for agency action; at best, these critics believe TEK can only supplement Western science.¹¹⁷ This is so prevalent in the literature on TEK that even TEK advocates employ language that subordinates it to Western science.¹¹⁸

(1998) (discussing how an Indian tribe can assert trusteeship for the purposes of demanding natural resource damages).

116. See generally Patrick E. Tolan, Jr., *Natural Resource Damages Under CERCLA: Failures, Lessons Learned, and Alternatives*, 38 N.M. L. REV. 409 (2008).

117. See *Indigenous Ways of Knowing*, *supra* note 56, at 151 (“Over the years, many scientists have been skeptical of indigenous knowledge.”); see also Vinyeta & Lynn, *supra* note 65, at 16 (discussing Western scientists’ perceptions of TEK).

118. See, e.g., GRENIER, *supra* note 14, at 49 (explaining that the challenges of relying on

The most pervasive example of this phenomenon occurs in requests for agencies to “integrate” TEK, rather than treat it as a separate and legitimate science.¹¹⁹

The conception of TEK as somehow inferior from a scientific perspective is particularly damaging because it tracks the political discourse concerning which scientific studies and reports agencies rely upon. This is true regardless of which end of the political spectrum one argues from. Democrats and Republicans both argue the merits of science qua science, which “end[s] up promoting a debate about ‘good’ versus ‘bad’ (or ‘sound’ versus ‘junk’) science.”¹²⁰ Some opponents of TEK, and even those who unwittingly use subordinating language to refer to it, delegitimize TEK by putting it in the “junk” science bin.

In order to combat opposition to reliance on TEK that tracks this subordination argument, agency decisionmakers and TEK advocates must find a way to reframe the discussion and analysis. Agencies need to move away from the hierarchical approach to evaluation of scientific findings.¹²¹ The environment is a complicated array of natural systems that can probably never be fully understood, especially relying on only one scientific point of view. Furthermore, people inhabiting the earth, and even just the United States, represent a diverse community with myriad perspectives. Agencies aiming to protect those people and save their planet should therefore utilize all the tools at their disposal, including TEK. Diversity in peoples should mean diversity in approaches.¹²²

This should not be a hard sell to make; at the very least, it seems to be getting easier. A number of senior scientists, surveyed in the 1990s, already felt that the problems society was facing had outgrown the conceptual framing within which they operated.¹²³ Hence, scientists agree that new perspectives and approaches are necessary if we want to conquer the environmental challenges of our time, especially climate

TEK research relate to “the difficulty of studying a *subordinate* knowledge system . . . using the dominant knowledge system (that is, Western science)”(emphasis added)).

119. See Paul Nadasdy, *The Politics of TEK: Power and the “Integration” of Knowledge*, 36 ARCTIC ANTHROPOLOGY 1 (1999) (arguing against “integrating” TEK with Western science and policymaking); see also GRENIER, *supra* note 14, at 49 (observing that TEK “typically gains legitimacy only when it conforms to the theory and practice of Western knowledge” and “[e]ven when scientists and bureaucrats promote [TEK], they usually use scientific categories and methods to collect, verify, and validate it”).

120. Holly Doremus & A. Dan Tarlock, *Science, Judgment, and Controversy in Natural Resource Regulation*, 26 PUB. LAND & RESOURCES L. REV. 1, 17 (2003).

121. Arquette, *supra* note 38, at 263.

122. *Id.*

123. *Indigenous Ways of Knowing*, *supra* note 56, at 153.

change. The resultant inclusive approach would be more cooperative and less hierarchical. It means a system of “knowledge co-production”¹²⁴ where TEK and Western science exist on equal footing and either can provide the primary basis for agency action.¹²⁵ It means “moving beyond simply collecting or citing traditional knowledge to applying traditional knowledge in problem-solving and [w]orking in true partnership” with communities who are affected by environmental change.¹²⁶

Getting past the stigma of subordination will be the first and most formidable obstacle to an increased reliance on TEK in agency decisionmaking. However, there are many reasons, only some of which are articulated here, why bringing a more diverse perspective to scientific decisionmaking is not only necessary, but long overdue.

B. *Incompatibility with Decision Analysis*

The second category of obstacles facing an agency looking to rely on TEK as the basis for a final action fits under the broad heading of incompatibility. Environmental policymaking in the United States operates within a certain paradigm, relying, perhaps overly so, on quantitative analysis, particularly of the cost-benefit variety.¹²⁷ Two

124. *Id.* (“Coproduction of requisite knowledge requires all parties to recognize that all knowledge is partial and incomplete, that evidence is debatable, and that there are ways of knowing determined by culture, semiotics and values.” (quoting GRAHAM HARRIS, SEEKING SUSTAINABILITY IN AN AGE OF COMPLEXITY 303 (2007)); *see also* Larry Mason, et al., *Listening and Learning from Traditional Knowledge and Western Science: A Dialogue on Contemporary Challenges of Forest Health and Wildfire*, JOURNAL OF FORESTRY, June 2012 at 187, 189).

125. *See* Tsuji & Ho, *supra* note 31, at 346 (“TEK and western science should be viewed as two separate but complementary sources of information and wisdom”); VINE DELORIA, JR., CUSTER DIED FOR YOUR SINS 80-81 (1988) (“Pure research is a body of knowledge absolutely devoid of useful application and incapable of meaningful digestion. Pure research is an abstraction of scholarly suspicions concerning some obscure theory originally expounded in pre-Revolutionary days and systematically checked each summer since then.”); *see also* Alexander, *supra* note 3, at 478 (“Since the 1980s, various forms of TEK have come to be commonly accepted by scientists in the fields of agriculture, pharmacology, water engineering, architecture, ethnobotany, ethnozoology, irrigation systems, soil and water conservation, and ethnoastronomy and by social scientists” (internal citations omitted)).

126. Cochran et al., *supra* note 39, at 563; Fikret Berkes, *The Problematique of Community-Based Conservation in a Multi-Level World* 6 (2006) (unpublished paper presented at the 11th Conference of the International Association for the Study of Common Property in Bali) (“Taking local priorities and objectives into account in conservation planning requires real participation of the communities and not merely consultation. Achieving this would require a major shift in approach, as many authors have documented that participation is often employed as part of a top-down process of cooption and consultation, rather than participation that can lead to collaboration.”).

127. DOUGLAS A. KYSAR, REGULATING FROM NOWHERE 1-22 (2010).

apparent characteristics of TEK—its normative and non-anthropocentric focus—make it seem, at first glance, incompatible with the mode of analysis agencies employ to justify their actions. When the nuances of these generally apparent characteristics are explored, however, it becomes clear that analyses based on TEK are not only possible, but perhaps necessary.

TEK is often described, even by those who study it, as a “normative” or “qualitative” science.¹²⁸ This impression comes from some of the sources of TEK described in Part I,¹²⁹ especially the stories that pass through the oral traditions of many tribes, and may lead uninformed observers to conclude that TEK is wholly subjective and thus not worthy of consideration. However, that conclusion mistakenly judges the usefulness of the science by its narrative delivery method and the place of storytelling in our society (generally a literary art). A more careful analysis looks to the content of TEK that would inform a rigorous policy analysis—content that could not fairly be characterized as purely subjective.¹³⁰ TEK is based upon the collection of data, sometimes over timescales that many other knowledge systems could never span.¹³¹ Indeed, the accumulation of TEK has been described as “experiential,”¹³² and the results described as “observations.”¹³³ TEK takes those observations and seeks to explain them through universal assertions and natural laws.¹³⁴ By the process of oral tradition and the practical application in tribal lifeways, TEK submits to “peer critique through shared lives and experiences.”¹³⁵ Specifically, TEK has embedded information that may be useful to “taxonomic, spatial,

128. See, e.g., Berkes, Colding & Folke, *supra* note 25, at 1259-60 (referring to TEK as “qualitative”); GRENIER, *supra* note 14, at 49 (reporting that many environmental scientists view TEK as, inter alia, “anecdotal” and “nonquantitative”).

129. See *supra* Part I.

130. Tsuji & Ho, *supra* note 31, at 338.

131. *Id.*

132. Fikret Berkes, *Rethinking Community-Based Conservation*, 18 CONSERVATION BIOLOGY 621, 627 (2004) [hereinafter *Rethinking Community-Based Conservation*]; *Indigenous Ways of Knowing*, *supra* note 56, at 154 (“Indigenous knowledge evolves all the time and involves constant learning-by-doing, experimenting and knowledge-building.”).

133. Berkes, Colding & Folke, *supra* note 25, at 251; Cochran et al., *supra* note 39, at 559.

134. Tsuji & Ho, *supra* note 31, at 346.

135. *Id.* When I invoke Tsuji and Ho’s use of the term “peer critique” in reference to TEK, I do not mean to create the impression that TEK is subject to blind expert review like much of Western science. Rather, I am referring to the underlying purpose of such blind review—substantiation and verification—and how the sharing of TEK with many members of a community who interact with the resource, at times over the course of generations, can serve that same function. In other words, if the lesson a particular piece of TEK teaches proves untrue or unhelpful to the society that holds it, that TEK is not likely to endure.

temporal, and social/cultural frames of reference” and may provide “the sole source of baseline data” in some areas.¹³⁶ Thus, it is overly simplistic for the reader or listener to dismiss TEK offhand because it more often takes the form of a fable than a statistical analysis.

TEK, regardless of delivery method, contains valuable information. Such information does not differ tremendously from that provided by Western science.¹³⁷ Indeed, “the difference between the two knowledge systems relates to the interpretation of the data,” not the data itself.¹³⁸ The methods applied to the data and the framing of the derived conclusions most likely differ, but the underlying truth remains consistent. Accordingly, in order to use data from TEK in analysis of agency action, the only real obstacle is understanding. That can be overcome by utilizing personnel who already study TEK and actively engage with it, and by more meaningful engagement with the sources of TEK—the tribes themselves.

In addition to the quantitative focus of decision analysis in United States environmental policymaking, agencies tend to have an anthropocentric approach to environmental challenges. These two characteristics often lead agencies to focus on the measureable effect a particular action will have on human health and/or the economy.¹³⁹ TEK, as described in Part I,¹⁴⁰ takes a more holistic approach to environmental science; it is a different “way of knowing.” As a result, agency decisionmakers might be reticent to rely upon it or struggle to find a place for TEK in an anthropocentric analysis.

Admittedly, there is a real tension here. The Western science that currently provides the core of agency analyses is “based on a conceptual separation of humans from the environmental world, thus focusing on

136. *Id.* at 347; see also GRENIER, *supra* note 14, at 10-11; U.S. DEP’T OF AGRIC., *supra* note 21, at 8 and Ristroph, *supra* note 21, at 87-91 (both citing the example of Inupiat hunters in Alaska, whose estimates of Bowhead whale populations were ultimately confirmed by \$10 million in studies over the course of a decade by the International Whaling Commission, which had grossly underestimated the numbers).

137. Regardless of the parallels to some Western science methods, it is important to remember that TEK encompasses a broader swath of ways of understanding the natural world and provides a powerful tool for tackling environmental challenges on its own merit. TEK’s usefulness is in no way dependent upon its similarity to Western science and this discussion should not be construed as making that argument. The similarities to Western science articulated herein are meant to demonstrate that the barriers to understanding TEK confronted by Western-schooled policymakers and scientists are not as formidable as one might think at first blush.

138. Tsuji & Ho, *supra* note 31, at 338.

139. See Env’tl. Prot. Agency, *Our Mission and What We Do*, <http://www2.epa.gov/aboutepa/our-mission-and-what-we-do> (last modified Oct. 6, 2014) (“The mission of EPA is to protect human health and the environment.”).

140. See *supra* Part I.

the control of nature.”¹⁴¹ TEK, on the other hand, does not consider humans separate and apart from the ecosystems of which they are undoubtedly components.¹⁴² However, this philosophical tension might soon be rendered moot by a newfound Western science focus on ecosystem management.

Ecologists and conservation biologists, particularly those studying climate change, have increasingly come to recognize the need to take a systems-based approach that has sustainability, rather than resource extraction, as its primary goal.¹⁴³ TEK could provide a much-needed entre into this way of understanding the natural world. TEK uses a holistic framework that considers a tremendous number of variables simultaneously,¹⁴⁴ resulting in policy solutions that emphasize the relationships between humans and other components of the ecosystem.¹⁴⁵ Furthermore, TEK-based conservation practices emphasize ecosystem resilience—a value that Western science has had some difficulty measuring due to the masking effects of advances in technology that have increased the rate and efficiency of resource extraction.¹⁴⁶ Thus, as twenty-first century environmental policymaking shifts towards an ecosystem-based approach, the incongruity between the anthropocentric human health perspective and the holistic TEK perspective will become less significant. At the very least, there will be greater opportunities to utilize TEK in ecosystem management settings.

C. Pushback from Tribes

Perhaps contrary to many policymakers’ expectations, the tribes themselves will likely harbor reservations to agency use of TEK that

141. Mason et al., *supra* note 124 (citations omitted).

142. *Rethinking Community-Based Conservation*, *supra* note 132, at 623.

143. See Chapin III et al., *supra* note 33, at 241 (describing the evolution in Western resource management paradigms from “exploitation, where sustainability is not an important consideration, to steady-state resource management aimed at maximum or optimum sustainable yield (MSY or OSY, respectively) and efficient production of a single resource, such as fish or trees, to ecosystem management to sustain a broader suite of ecosystem services”); see also Bengston, *supra* note 29, at 50 (describing how “ecosystem management” grew in popularity for forest resource management in the 1980s and 1990s, but how “a similarly holistic, ecosystem-based approach ha[d] long been used by American Indians to manage the land”).

144. See *Indigenous Ways of Knowing*, *supra* note 56, at 154.

145. See, e.g., Cochran et al., *supra* note 39, at 559 (describing this approach as it relates to Alaskan climate change policies); LaDuke, *supra* note 30, at 127 (1994) (describing how the Anishinabeg employed a resource management system that used techniques for sustained yield).

146. See Berkes, Colding & Folke, *supra* note 25 at 1259 (explaining that technology improvements, such as large fishing vessels and synthetic fertilizers, can mask loss of ecosystem resilience, which TEK focuses on).

could potentially derail any effort to rely on TEK as the basis for an environmental policy decision by a non-tribal governmental entity (for example, a federal administrative agency). Though individual tribes and tribal members will undoubtedly have very specific objections, speculation about these objections is beyond the scope of this Article. It is more useful to examine two broad themes of opposition—cultural assimilation and concern for intellectual property.

With respect to cultural assimilation, a troubled history generates warranted skepticism of efforts by the United States government to combine indigenous Indian culture with the Euro-American colonialist culture.¹⁴⁷ Some Indian scholars perceive an effort on the part of Western historians, scientists, and policymakers to “redefine[] [Indians] in terms that white men will accept, even if that means re-Indianizing them according to a white man’s idea of what they were like in the past and should logically become in the future.”¹⁴⁸ The use of TEK in agency decisionmaking could be perceived as part of that larger pattern of oppression, forced assimilation, and appropriation.¹⁴⁹ Accordingly, any effort to utilize TEK must begin with careful and robust consultation.

Fortunately, not all tribal elders and other holders of TEK are so skeptical that they would refuse to engage in such a consultation.¹⁵⁰ On this subject, Berkes has suggested that “many indigenous knowledge

147. For a cautionary tale, one need only look to the failed 1940s and 1950s policy of tribal termination and the subsequent decades of restoration and renewed federal recognition. For historical accounts of specific tribes’ experiences with this failed experiment see DAVID R. M. BECK, *SEEKING RECOGNITION: THE TERMINATION AND RESTORATION OF THE COOS, LOWER UMPQUA, AND SIUSLAW INDIANS, 1855-984* (2008) and NICHOLAS C. PEROFF, *MENOMINEE DRUMS: TRIBAL TERMINATION AND RESTORATION, 1954-74* (2006).

148. DELORIA, *supra* note 125, at 92 (1988).

149. See Alaska Native Science Commission, *What is traditional knowledge?* (Nov. 11, 2011), http://www.nativescience.org/html/traditional_knowledge.html (describing the use of TEK outside the cultural confines of its origin tribe as “at best . . . invit[ing] misrepresentation and misinterpretation [and] [a]t worst . . . a form of misappropriation and cultural exploitation”); see also Robert S. Michaelsen, *American Indian Religious Freedom Litigation: Promise and Perils*, 3 J.L. & RELIGION 47, 72 (1985) (describing the potential reluctance of Native American practitioners to discuss sacred matters in a public process).

150. See, e.g., ED MCGAA, *Foreword* to *MOTHER EARTH SPIRITUALITY: NATIVE AMERICAN PATHS TO HEALING OURSELVES AND OUR WORLD* (1990) (“I believe, like Fools Crow, Eagle Feather, Sun Bear, Midnight Song, Rolling Thunder, and a host of other traditional peoples, that it is time that [Native American] spirituality is shared. . . . We do not have any choice. It is one world that we live in. If the Native Americans keep all their spirituality within their own community, the old wisdom that has performed so well will not be allowed to work its environmental medicine on the world where it is desperately needed. . . . I call on all experienced Native American traditionalists to consider coming forward and sharing their knowledge. Come forth and teach how Mother Earth can be revered, respected, and protected.”).

holders are open to a dialogue and partnership with science.”¹⁵¹ In order for such a partnership to have the full support of the keepers of TEK, it must take root at a much earlier stage than the agency analysis; it is not enough to simply “consult” with tribes if an agency expects full access to TEK.¹⁵² The sensitivity to and appreciation for TEK (and other ways of knowing more broadly) should begin in the educational system through which agency scientists rise up.¹⁵³ Admittedly, agencies looking to utilize TEK have little control over the educational institutions that train their scientists in the first instance. However, agencies conduct, and fund, a tremendous amount of continuing education through training, conferences, and research. An important first step towards an open and safe exchange of TEK thus involves not just training, but truly educating agency scientists about TEK and teaching them to understand and respect that way of knowing.¹⁵⁴ The Climate and Traditional Knowledges Workgroup (CTKW), which is comprised of tribal members, tribal government personnel, and leading academics studying these issues, has a number of good suggestions regarding the content of educational programming for agency personnel.¹⁵⁵ Such understanding and appreciation must be evidenced before the agency holds out its hand asking for a serving of TEK to sustain an important action.

Another well-documented concern regarding the disclosure of TEK involves the ownership of any potential intellectual property contained therein.¹⁵⁶ Though perhaps not always “intellectual property” in the purest legal sense,¹⁵⁷ TEK is full of potentially valuable information and

151. *Indigenous Ways of Knowing*, *supra* note 56, at 154 (noting that, nonetheless, “there will be some on both sides who would never be open to a dialogue”).

152. See Exec. Order No. 13,175, 65 Fed. Reg. 67,249 (2000).

153. *Id.* (noting that understanding of different ways of knowing is important for scientists and non-scientists in both cultures).

154. It is worth emphasizing that the all-too-common thirty-minute sensitivity webinar would not be sufficient. Tribal issues, which are often an afterthought relegated to such “training,” are at the core of TEK utilization. The interests of the tribal knowledge holders must be fully appreciated and adequately protected in order to facilitate meaningful cooperation. Such a system must be the product of both sides fully understanding the others’ perspective, beginning with agency personnel and their university education.

155. See CLIMATE AND TRADITIONAL KNOWLEDGES WORKGROUP (CTKW), *supra* note 12, at 14-18 (setting forth ten components to meet CTKW’s “Guideline 5,” which is to “[p]rovide training for federal agency staff working with indigenous peoples on initiatives involving TKs”).

156. See, e.g., U.S. DEP’T OF AGRIC., *supra* note 21, at 21 (“Traditional knowledge or ISM can be cultural/intellectual property. So, who owns the intellectual property?”).

157. “Intellectual property,” as the term is used in law, refers to a “proprietary interest[] in [a] creation of the mind . . . [protected by] copyright, which concerns artistic and literary works; patent, pertaining to pragmatic innovations; and trademark, relating to commercial symbols.” ROGER SCHECHTER & JOHN THOMAS, *INTELLECTUAL PROPERTY: THE LAW OF COPYRIGHTS, PATENTS AND TRADEMARKS* 1 (2008). It is beyond the scope of this Article to examine in-depth

ideas that may be otherwise unknown. As a result, many tribal members “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.”¹⁵⁸ For example, TEK may reveal the location of valuable minerals or the migration patterns of economically important species, along with the best practices for harvesting or capturing those resources; the reliance on that information by an agency would allow the United States government, or the public to whom that information is consequently made available, to capture the associated value.¹⁵⁹

The Convention on Biological Diversity recognizes sovereignty over natural resources,¹⁶⁰ as well as the concept of intellectual property rights over biologically embedded information.¹⁶¹ The Convention encourages the use of bilateral agreements to address the transfer of those intellectual property rights.¹⁶² Unfortunately, the Convention provides little guidance as to how to equitably divide the rights and benefits in a bilateral agreement or how to control third parties who may want to exploit the information revealed by the government action.¹⁶³

The CTKW’s *Guidelines for Considering Traditional Knowledges in Climate Change Initiatives* has a marked focus on how to protect the rights of knowledge holders.¹⁶⁴ Recognizing that federal agencies must maintain public records and are subject to the Freedom of Information Act (FOIA), the Guidelines emphasize the need to make those considerations clear to tribal knowledge holders and to obtain “free,

how biological information embedded in TEK might, or might not, enjoy the protections of these areas of law in the United States.

158. Alaska Native Science Commission, *supra* note 149; Ristroph, *supra* note 21, at 98-99 (“A community may be concerned that once knowledge enters the public domain, it can be exploited without any recognition of the community’s rights to the knowledge.”). *But see* GRENIER, *supra* note 14, at 22-23 (collecting indigenous views on the subject that evince a general sentiment that natural life is common property that cannot be patented, and a consequent aversion to intellectual property laws, but nonetheless expressing concern with taking of knowledge from indigenous communities without compensation).

159. Ristroph, *supra* note 21, at 98-99.

160. Convention on Biological Diversity, preamble, June 5, 1992, 31 I.L.M. 818, 822 (“[r]eaffirming that States have sovereign rights over their own biological resources”).

161. *See id.*, arts. 15-16 (describing the principles governing the exchange of genetic resources and biotechnology, while “recognizing that patents and other intellectual property rights may have an influence on the implementation of this Convention”); GRENIER, *supra* note 14, at 17.

162. *See* Convention on Biological Diversity, arts. 15-16, 20-21, 31, June 5, 1992, I.L.M. 818.

163. *See* Ristroph, *supra* note 21, at 98-99.

164. CLIMATE AND TRADITIONAL KNOWLEDGES WORKGROUP (CTKW), *supra* note 12.

prior, and informed consent” before any exchange.¹⁶⁵ The Guidelines also incorporate creative solutions to protect indigenous knowledge and resources, such as the use of proxies or indicators, rather than specific valuable species, when the risk of exploitation for economic gain exists.

Substantial legal precedent seems to significantly limit what information a federal agency can protect from public disclosure.¹⁶⁶ Nonetheless, a number of specific legal mechanisms have been suggested by scholars and researchers, and tested in limited circumstances. These mechanisms are borrowed from the tools used to protect intellectual property rights in Western science research and include the transfers of money in exchange for rights, contracts dictating which parties are entitled to which rights, and non-disclosure agreements.¹⁶⁷ The sole agency that has analyzed the transfer and protection of intellectual property rights associated with TEK—the USDA’s NRCS—advocates not only reaching an agreement with tribes, but also suggesting to tribes that they codify protections for TEK in their own laws.¹⁶⁸

Until an agency makes a more concerted effort to collect and then rely on TEK, the scope of the intellectual property concern will not be fully known. Even then, the rights associated with the TEK involved, and the solution for protecting them, will likely be specific to that particular agency action and environmental problem. Accordingly, the best strategy for dealing with this inevitable confrontation over intellectual property rights is for agencies to (1) recognize that it is indeed inevitable and (2) treat TEK as equivalent to intellectual property in other contexts.

V. IMPLICATIONS FOR JUDICIAL REVIEW

Once an agency musters the necessary political will and determines

165. *See id.* at 9.

166. *See, e.g.,* Dep’t of Interior v. Klamath Water Users Protective Assn., 532 U.S. 1 (2001) (holding that there is no exemption under FOIA for communications between tribes and the federal government); Nat’l Ass’n of Home Builders v. Norton, 309 F.3d 26, 38 (D.C. Cir. 2002) (holding that, despite its potential economic value, owl-sighting data was not commercial and thus not protected from disclosure by FOIA exemption 4, in part relying on the finding that “there [was] no evidence that the parties who supplied the owl-sighting information [had] a commercial interest at stake in its disclosure”).

167. *See* GRENIER, *supra* note 14, at 22 (1998); *see also* DARRELL A. POSEY & GRAHAM DUTFIELD, BEYOND INTELLECTUAL PROPERTY: TOWARD TRADITIONAL RESOURCE RIGHTS FOR INDIGENOUS PEOPLES AND LOCAL COMMUNITIES (1996) (describing these mechanisms in more detail).

168. *See*, U.S. DEP’T OF AGRIC., *supra* note 21, at 23.

that its statutory authority is not so limited as to prescribe a particular scientific methodology to the exclusion of TEK,¹⁶⁹ it must confront the risk that an action relying on TEK could be struck down on substantive grounds by a federal court. In other words, a court may conclude, consistent with the analysis in Part II above, that a reasonable interpretation of a statutory authority includes TEK as among the types of permissible decisionmaking inputs. Nonetheless, the court could decide, with regard to the specific decision and TEK at issue, that the agency acted outside the bounds of its discretion in that particular instance. The most common challenges to agency action in this regard allege that the action violates the Administrative Procedure Act's (APA) "arbitrary and capricious" clause.¹⁷⁰ This Part will examine the risk presented by judicial review to agency action that cites TEK as its basis and will provide some guidance as to how an agency might insulate an action from such risk.

A. Documenting Reliance on TEK

Judicial review of agency action is confined, except for a few narrow exceptions, to the administrative record.¹⁷¹ Thus, an agency action that relies on TEK must obviously have a record that documents the TEK. Due to the often vast scope of administrative records and the threat of judicial review, agencies often explain in painstaking detail the specific record components they are relying on when publishing notice of a rule or other action in the Federal Register. Some commentators have analogized this function of the administrative record to judicial opinion writing because it "give[s] a 'reasoned elaboration' for . . . actions according to norms of consistent, neutral and candid decisional processes."¹⁷²

For example, when the EPA published the aforementioned "endangerment finding" with respect to greenhouse gases, it stated

169. See *supra* Part II.

170. 5 U.S.C. § 706(2)(A) (West 2016) ("[T]he reviewing court shall . . . hold unlawful and set aside agency action, findings, and conclusions found to be . . . arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law . . .").

171. See *Florida Power & Light Co. v. Lorion*, 470 U.S. 729, 744 (1985) ("If the record before the agency does not support the agency action, if the agency has not considered all relevant factors, or if the reviewing court simply cannot evaluate the challenged agency action on the basis of the record before it, the proper course, except in rare circumstances, is to remand to the agency for additional investigation or explanation.").

172. Sidney A. Shapiro & Richard E. Levy, *Heightened Scrutiny of the Fourth Branch: Separation of Powers and the Requirement of Adequate Reasons for Agency Decisions*, 1987 DUKE L.J. 387, 412 (1987).

“[t]he major assessments by the U.S. Global Climate Research Program, the Intergovernmental Panel on Climate Change, and the National Research Council (NRC) serve as the primary scientific basis supporting the Administrator’s endangerment finding.”¹⁷³ The notice did not stop there; it included an entire section devoted to explaining why those studies “compellingly support[ed]”¹⁷⁴ the finding.¹⁷⁵ Furthermore, in a footnote, the notice directed the reader to its “Technical Support Document (TSD)” (another part of the record) summarizing the major assessments listed.¹⁷⁶ The section explaining the EPA’s scientific analysis concluded with a statement emphasizing the reasonableness of the EPA’s reliance on the aforementioned assessments.¹⁷⁷

An agency relying on TEK would in all likelihood still abide by these conventions of scrupulous documentation and explanation, even if the TEK in the record was not as expansive or technically confusing as the Western science studies generally referenced and explained. Indeed, stating clearly how a particular piece of TEK in the record supports the agency’s action would serve two functions. First, it would serve the conventional purpose of providing the reviewing court with a roadmap of the record and a distillation of potentially difficult to understand information. Second, and specific to TEK, it would signal to a reviewing court that reliance on TEK is not different in kind from the reliance on Western science.

B. *Arbitrary and Capricious Review*

Once an agency has documented its reliance on TEK and taken its final action on the matter, that action will likely be subject to judicial review. Under the APA, an agency action is unlawful if it is “arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law.”¹⁷⁸ As the Supreme Court has noted, such a determination necessarily entails a “searching and careful” fact-specific inquiry, but “the ultimate standard of review is a narrow one.”¹⁷⁹ “The court is not

173. Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, 74 Fed. Reg. 66,496, 66,497 (Dec. 15, 2009).

174. *Id.*

175. *See id.* at 66,510-516.

176. *Id.* at 66,497 n.1.

177. *Id.* at 66,511 (“In summary, EPA concludes that its reliance on existing and recent synthesis and assessment reports is entirely reasonable and allows EPA to rely on the best available science.”).

178. 5 U.S.C. § 706(2)(A) (West 2016).

179. *Citizens to Preserve Overton Park, Inc. v. Volpe*, 401 U.S. 402, 416 (1971).

empowered to substitute its judgment for that of the agency.”¹⁸⁰

The Supreme Court has provided some much needed context to this rather amorphous standard over the years. The most commonly cited definition, from the Court’s opinion in *Motor Vehicle Manufacturers Ass’n of the United States v. State Farm Mutual Automobile Insurance Co.*, holds that the “arbitrary and capricious” standard is violated when “[t]he agency has relied on factors which Congress has not intended it to consider, entirely failed to consider an important aspect of the problem, offered an explanation for its decision that runs counter to the evidence before the agency, or is so implausible that it could not be ascribed to a difference in view or the product of agency expertise.”¹⁸¹

The *State Farm* iteration of the standard of review is still rather broad, and with respect to scientifically based decisions (a category within which TEK would likely fall), the Supreme Court and other federal courts (chiefly, the D.C. Circuit) have added even more specific context. The general approach of the reviewing courts in highly technical, science-based matters is to defer even more readily to the agency’s expertise.¹⁸² As the D.C. Circuit aptly put it, “we review scientific judgments of the agency not as the chemist, biologist, or statistician that we are neither qualified by training nor experience to be, but as a reviewing court exercising our narrowly defined duty of holding agencies to certain minimal standards of rationality.”¹⁸³ In the area of natural resource regulation, the degree of rationality has a philosophical component as well. As Holly Doremus and Dan Tarlock have explained, “the key legitimacy question [becomes] not whether the variety of judgments that go into regulatory decisions are objectively correct or certain, but whether they are adequately serving legitimately chosen societal goals.”¹⁸⁴

Applying these standards of review to a hypothetical agency action

180. *Id.*

181. 463 U.S. 29, 43 (1983).

182. *Baltimore Gas & Electric Co. v. Nat. Res. Def. Council, Inc.*, 462 U.S. 87, 103 (1983) (“When examining this kind of scientific determination . . . a reviewing court must generally be at its most deferential”) (citation omitted); *see also* *Catawba Cty. v. EPA*, 571 F.3d 20, 41 (D.C. Cir. 2009) (“Of particular note in this challenge, we give ‘an extreme degree of deference to [the EPA] when it is evaluating scientific data within its technical expertise.’” (internal quotation marks omitted) (quoting *City of Waukesha v. EPA*, 320 F.3d 228, 247 (D.C. Cir. 2003))). One commentator has dubbed this particular standard “super deference.” Emily Hammond Meazell, *Super Deference, the Science Obsession, and Judicial Review as Translation of Agency Science*, 109 MICH. L. REV. 733 (2011).

183. *Troy Corp. v. Browner*, 120 F.3d 277, 283 (D.C. Cir. 1997) (internal quotations marks omitted).

184. Doremus & Tarlock, *supra* note 120, at 18.

based on TEK, even without the specific context, one can see that the requisite breathing room exists to expand the universe of judicially-approved bases for agency action to include TEK. A review of the jurisprudence on deference to agency scientific decisionmaking demonstrates that agencies can rely on a myriad of sources, even when some of them are contradicted by, or are less persuasive than, others. Though no court has yet reviewed an agency's reliance on a fundamentally different approach to understanding environmental changes, which TEK certainly is, some relatively recent decisions shed light on how a reviewing court might treat such reliance.

In the seminal case for deference to an agency's scientific judgment, *Baltimore Gas & Electric Co. v. Natural Resources Defense Council, Inc.*, the Supreme Court held that the Nuclear Regulatory Commission did not act arbitrarily and capriciously when it based its rule for licensing decisions, in part, on an assumption that the permanent storage of certain nuclear waste would not result in any escape of waste into the environment once a container is sealed (the so-called "zero-release" assumption).¹⁸⁵ The Court acknowledged that the assumption was grounded in uncertainty and that the Nuclear Regulatory Commission counteracted that uncertainty by overestimating presealing releases.¹⁸⁶ The Supreme Court nonetheless declined to assume the role of a supreme commission, deferring to the use of the zero-release assumption as "a policy judgment . . . within the bounds of reasoned decisionmaking."¹⁸⁷ Circuit Courts have similarly upheld agency action that attempts to navigate through scientific uncertainty and deals with unknown future events.¹⁸⁸

Two cases relying on *Baltimore Gas* are particularly illustrative for the hypothetical challenge to an agency action based on TEK.¹⁸⁹ In

185. 462 U.S. at 105.

186. *Id.* at 103.

187. *Id.* at 105.

188. See, e.g., *Upper Blackstone Water Pollution Abatement Dist. v. EPA*, 690 F.3d 9, 23-24 (1st Cir. 2012) ("The EPA did not act irrationally here by issuing the permit in the face of some scientific uncertainty."); *Carstens v. Nuclear Regulatory Comm'n*, 742 F.2d 1546, 1556 (D.C. Cir. 1984) ("The uncertainty of the science of earthquake prediction only serves to emphasize the limitations of judicial review and the need for greater deference to policymaking entities."); *Motor Vehicle Mfrs. Ass'n v. Ruckelshaus*, 719 F.2d 1159, 1164, 1167 (D.C. Cir. 1983) (upholding the EPA's reliance on "greatly simplified" tests and holding that the "use of cutpoints to fudge complex technological problems" was permissible and consistent with the statutory scheme).

189. It should be noted that there exists some scholarly debate, based on the cases discussed here and others, as to whether heightened deference is actually in practice afforded to agency's scientific judgments. See, e.g., Emily Hammond Meazell, *Super Deference, the Science Obsession, and Judicial Review as Translation of Agency Science*, 109 MICH. L. REV. 733, 766 (2011) ("It is also notable that, even though the Court has encountered agencies' scientific

Upper Blackstone Water Pollution Abatement District v. EPA, the First Circuit was confronted with the argument that the existing science the EPA used was “old and unreliable.”¹⁹⁰ The First Circuit declined to hold that the EPA acted arbitrarily and capriciously in not delaying action so it could consider the forthcoming model developed by the petitioner, which it described as offering “superior information.”¹⁹¹ The First Circuit explained that the EPA was entitled to set a deadline for its permitting action in the face of such potential new information, because “in almost every case, more data can be collected, models further calibrated to match real world conditions; the hope or anticipation that better science will materialize is always present, to some degree, in the context of science-based agency decisionmaking.”¹⁹² In *Motor Vehicle Manufacturers Ass’n v. Ruckelshaus*, the D.C. Circuit was confronted with a similar situation, but there the EPA readily acknowledged that it was using “greatly simplified” science and “cutpoints,” rather than complex models already known to be more precise.¹⁹³ Nonetheless, the D.C. Circuit found the EPA to be acting within the discretion afforded to it by the enabling statute and the APA.¹⁹⁴

Upper Blackstone and *Motor Vehicle Manufacturers Ass’n* suggest that reliance on TEK in the face of scientific uncertainty or overly complex predictive modeling could survive judicial review. The most obvious application of TEK such cases seem to endorse would be its use in the context of climate change. Climate modeling is notoriously complex, and the predicted consequences extremely uncertain, especially with respect to effects on specific habitats and species. As discussed above,¹⁹⁵ TEK related to the health and behavior of flora and fauna has the potential to inform decisions aimed at mitigating the localized effects of climate change. This is just one example of the opportunity presented when Western science fails to explain an environmental phenomenon or ecosystem condition. It is in those situations that agencies should feel most confident turning to TEK.

determinations in the years following *Marsh*, it has never elaborated on the super-deference standard, yet in none of those cases does the super-deference principle appear.”) (citation omitted). *Id.* at 772 (“First, the principle has become meaningless boilerplate. . . . Second, the courts have moved away from the extreme deference exhibited by cases like *Carstens* and *Ruckelshaus*, returning to a hard-look approach that systematically describes and evaluates each major scientific contention.”).

190. 690 F.3d at 23.

191. *Id.*

192. *Id.* at 23-24.

193. 719 F.2d at 1167.

194. *Id.*

195. See *supra* Part II.B.

Even where TEK and Western science differ in their conclusions, selecting an approach that favors the TEK analysis might not be arbitrary and capricious. The Supreme Court in *Marsh v. Oregon Natural Resources Council*,¹⁹⁶ specifically held that “[w]hen specialists express conflicting views, an agency must have discretion to rely on the reasonable opinions of its own qualified experts even if, as an original matter, a court might find contrary views more persuasive.”¹⁹⁷ Accordingly, if a TEK-based conclusion can be shown to be the “reasonable opinion” of a “qualified expert,” an agency would have discretion to rely on it. Recent discussion of TEK suggests that it is increasingly viewed as a legitimate basis for scientific opinion.¹⁹⁸ Through the Brundtland Report, the international community has even formally recognized the legitimacy of TEK as a source for environmental policy decisionmaking.¹⁹⁹

Nonetheless, the perceived trend²⁰⁰ in administrative law jurisprudence since *State Farm* does not bode well for a situation where TEK and Western science point in different directions. Litigants challenging agency actions frequently point very specifically to places where they believe the agency’s analysis is flawed or it failed to consider a relevant data point. Federal appellate judges have been increasingly receptive to these arguments, despite paying lip service to a deferential standard of review for agency methodology choices.²⁰¹

196. 490 U.S. 360 (1989).

197. *Id.* at 378 (citing *Citizens to Preserve Overton Park, Inc. v. Volpe*, 401 U.S. 402 (1971)); *see also* *Communities Against Runway Expansion, Inc. v. FAA*, 355 F.3d 678, 689 (D.C. Cir. 2004) (holding that the “choice among reasonable analytical methodologies is entitled to deference from this court”).

198. Tsuji & Ho, *supra* note 31, at 331-32 (observing that “TEK more closely resembles science than lay-knowledge[,] . . . [comprising] specific observations, subject to peer review, rather than sporadic observation of phenomena”).

199. WORLD COMM’N ON ENV’T AND DEV., OUR COMMON FUTURE, ¶ 74 (1987) [hereinafter the Brundtland Report] (describing indigenous communities as “the repositories of vast accumulations of traditional knowledge and experience” and noting that society “could learn a great deal from their traditional skills in sustainably managing very complex ecological systems.”); *see also* United Nations Conference on Environment and Development, Agenda 21, U.N. Doc. A/Conf. 151/PC/100/Add. 1 (1992) [hereinafter Agenda 21]; Convention on Biological Diversity, June 5, 1992, 31 I.L.M. 818.

200. *See* James D. Cox & Benjamin J. C. Baucom, *The Emperor Has No Clothes: Confronting the D.C. Circuit’s Usurpation of SEC Rulemaking Authority*, 90 TEX. L. REV. 1811 (2012). *But see* Thomas J. Miles & Cass R. Sunstein, *The Real World of Arbitrariness Review*, 75 U. CHI. L. REV. 761, 765 (2008) (noting the “sparse empirical literature . . . on the actual operation of the hard look doctrine,” and finding “no systematic evidence on the rate of invalidation under hard look review.”).

201. *See, e.g., Nat’l Ass’n for Surface Finishing v. EPA*, 795 F.3d 1, 9-10 (D.C. Cir. 2015) (purporting to defer to EPA’s choice amongst competing models, but, in doing so, painstakingly

Courts have emphasized that there need only be a “rational relationship” between the model or methodology employed and the data inputs (a well-established standard),²⁰² but the degree of scrutiny to determine that rationality has increased.²⁰³ Accordingly, a court faced with a study based on more familiar Western science methodology and an alternative based on TEK might be inclined to find the former the only rational choice. Hence, agencies could rely on TEK that conflicts with some Western science, but they do so subject to the whim of judges whose fondness for dabbling in science seemingly grows each year. Agencies would be on much firmer ground in relying on TEK where a gap in Western science persists, or at the very least the science is unsettled.

C. Best Available Science Scrutiny

Despite the *Chevron* concerns articulated above,²⁰⁴ there are some instances where even the statutory or regulatory requirement that an agency rely on the “best available science” would not necessarily cause a court to invalidate an action based on TEK. Because in such situations the agency’s discretion is statutorily constrained, meaning its authority is limited, the inquiry on judicial review changes from the unadorned “arbitrary and capricious” standard. Under statutes like the Endangered Species Act, which requires that a decision to list (or not list) a species as threatened or endangered be made “solely on the basis of the best scientific and commercial data available,”²⁰⁵ the question is whether the science relied upon fits within that definition.²⁰⁶

Courts have expounded on what agencies can point to as the “best available science” under the various statutes that require it, with the majority of informative cases arising under the Endangered Species Act. The discretion afforded agencies in these situations is narrow indeed. The D.C. Circuit held that an agency may not ignore “scientifically

explaining how EPA took account of all of the data and factors that the challengers argued the agency had ignored); *Am. Farm Bureau Fed’n v. EPA*, 559 F.3d 512, 520 (D.C. Cir. 2009) (holding that “[a]n agency’s failure adequately to consider a relevant and significant aspect of a problem may render its rulemaking arbitrary and capricious” and applying that reasoning to invalidate an EPA revision to the National Ambient Air Quality Standards that was based solely on long-term air quality studies (as opposed to also considering conflicting short-term studies)).

202. *Am. Iron & Steel Inst. v. EPA*, 115 F.3d 979, 1004 (D.C. Cir. 1997).

203. *See, e.g., Surface Finishing*, 795 F.3d at 9-10.

204. *See supra* Part II.

205. 16 U.S.C.S. § 1531(b)(1)(A) (West 2016).

206. *See, e.g., Cook Inlet Beluga Whale v. Daley*, 156 F. Supp. 2d 16, 18-20 (D.D.C. 2001) (“Plaintiffs argue that the agency decision in this case [listing of the Cook Inlet Beluga Whale as “depleted” under the Marine Mammal Protection Act, but not as “endangered” under the ESA] . . . failed to apply the best scientific and commercial data available.”).

superior evidence.”²⁰⁷ Some commentators have suggested that courts employ a *Daubert*-like²⁰⁸ process for examining the scientific evidence relied upon by an agency (analogizing the situation to the introduction of expert witness testimony).²⁰⁹ No court has yet adopted this recommendation, but it is indicative of the increased level of scrutiny applied to science in the presence of statutory prescriptions.

All that said, the key component of these types of requirements is that the science—or more precisely data—relied upon be available. Agencies are entitled to work with what is readily available in the scientific community and need not commission new cutting edge studies, even when the existing data may be imperfect.²¹⁰ As discussed in the prior section on APA review,²¹¹ TEK often has the potential to serve a gap-filling function, where Western science cannot offer any reliable guidance. In such a situation, an agency could legitimately argue that TEK was, therefore, the best available science. In at least one Endangered Species Act litigation, *In re: Polar Bear*,²¹² the plaintiff tribe pointed to TEK as science that the FWS failed to consider.²¹³ The district court did not dismiss this evidence as irrelevant, but rather noted that “[b]ecause FWS will be required to complete a new 12-month finding [for other reasons], the Court will leave it to FWS to deal with these sources of information in the new finding.”²¹⁴ This provides some indication that TEK could at least form part of the best available science that an agency should examine. Against this suggestion weighs the general consensus among commentators about what constitutes the best available science, as it tends to emphasize the traditional markers of Western science experiments and studies published in peer-reviewed journals.²¹⁵

207. *Las Vegas v. Lujan*, 891 F.2d 927, 933 (D.C. Cir. 1989); *see also* *Sw. Ctr. for Biological Diversity v. Babbitt*, 926 F. Supp. 920, 927 (D. Ariz. 1996) (finding that agency’s unexplained reliance on earlier data while ignoring more recent data violated § 1533(b)(1)(A)).

208. Referring to *Daubert v. Merrell Dow Pharmaceuticals*, 509 U.S. 579 (1993).

209. J. Tavener Holland, *Regulatory Daubert: A Panacea for the Endangered Species Act’s “Best Available Science” Mandate?* 39 MCGEORGE L. REV. 299, 308-13 (2008) (advocating for “regulatory *Daubert*” or increased scrutiny of science relied upon by agencies).

210. *San Luis & Delta-Mendota Water Auth. v. Jewell*, 747 F.3d 581, 602 (9th Cir. 2014) (Explaining that “where the information is not readily available, we cannot insist on perfection: ‘[T]he ‘best scientific . . . data available,’ does not mean ‘the best scientific data possible.’” (quoting *Building Indus. Ass’n v. Norton*, 247 F.3d 1241, 1246 (D.C. Cir. 2001))).

211. *See supra* Part III.B.

212. *Ctr. for Biological Diversity v. Salazar (In re Polar Bear)*, 2011 U.S. Dist. LEXIS 138307 (D. Ariz. 2011).

213. *Id.* at *26, *33.

214. *Id.* at *26-27.

215. *See, e.g.,* P.J. Sullivan et al., *Defining and Implementing Best Available Science for*

D. Information Quality Act Challenges

A new breed of challenge to agency action might also be deployed against reliance on TEK. Perhaps spurred by the emergence of scholarly discourse,²¹⁶ and strategic white papers by industry attorneys,²¹⁷ claims based on the Information Quality Act have skyrocketed.²¹⁸ Though no independent claim under the Information Quality Act or derivative APA claim based on the Information Quality Act has yet been successful, the trend is worth briefly discussing here as a threat to the reliance on TEK.

The Information Quality Act, or Data Quality Act, requires the Office of Management and Budget (OMB) to, inter alia, develop guidelines “ensur[ing] and maximiz[ing] the quality, objectivity, utility and integrity of information” that federal agencies disseminated to the public.²¹⁹ It further requires OMB to develop “administrative review mechanisms allowing affected persons to seek and obtain correction of information maintained and disseminated by the agency that does not comply with [OMB’s] guidelines.”²²⁰ The statute then directs federal agencies to set forth guidelines for compliance.²²¹

Guidelines promulgated by OMB and the regulated federal agencies have a heavy emphasis on peer-reviewed studies and the quality of data obtained by third-parties.²²² The precise details of these guidelines

Fisheries and Environmental Science, Policy, and Management, 31 FISHERIES 460, 461 (2006) (“To achieve high-quality science, scientists conduct their studies using what is known as the scientific process, which typically includes the following elements: A clear statement of objectives; A conceptual model, which is a framework for characterizing systems, making predictions, and testing hypotheses; A good experimental design and a standardized method for collecting data; Statistical rigor and sound logic for analysis and interpretation; Clear documentation of methods, results, and conclusions; and Peer review.”).

216. See, e.g., David S. Caudill, *Images of Expertise: Converging Discourses on the Use and Abuse of Science in Massachusetts v. EPA*, 18 VILL. ENVTL. L.J. 185, 200 (2007) (stating that many proposed regulations are challenged with claims that the scientific evidence is flawed or otherwise imperfect).

217. See, e.g., Lawrence A. Kogan, *Revitalizing the Information Quality Act as a Procedural Cure for Unsound Regulatory Science: A Greenhouse Gas Rulemaking Case Study* (Wash. Legal Found. Critical Legal Issues, Working Paper Series, Vol. 191, 2015).

218. Pub. L. No. 106-554, 114 Stat. 2763, 2763A-153-54 (2000) (codified as a note to 44 U.S.C. § 3516).

219. *Id.*

220. *Id.*

221. *Id.*

222. See, e.g., Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by Federal Agencies, 67 Fed. Reg. 8,452 (Feb. 22, 2002) [hereinafter OMB IQA Guidelines]; OFFICE OF MGMT. AND BUDGET, FINAL INFORMATION QUALITY BULLETIN FOR PEER REVIEW (Dec. 16, 2004) [hereinafter OMB Peer Review Bulletin], <http://www.whitehouse.gov/sites/default/files/omb/memoranda/fy2005/m05-03.pdf>; U.S. ENVTL. PROT. AGENCY, GUIDELINES FOR ENSURING AND MAXIMIZING THE QUALITY, OBJECTIVITY,

matter little to the discussion here. It is enough to note that the guidelines focus on Western science methods, surmise that a majority of TEK likely fails to meet the specific standards articulated, and acknowledge that they are not legally binding or enforceable.²²³ Three features of this law and the related guidelines, as well as the way courts have interpreted them, render the law toothless and, thus, of only marginal concern to those agencies interested in TEK.

First, the Information Quality Act mandates that OMB provide “policy and procedural guidance” to ensure its objectives are met.²²⁴ It is well-established that guidelines and statements of policy do not have the force and effect of law, and agencies have discretion to take an inconsistent approach, so long as they justify it.²²⁵ Second, as already noted, many of the regulations promulgated pursuant to the Information Quality Act apply by their terms to peer-reviewed studies. Take, for example, OMB’s guidelines establishing a rebuttable legal presumption of “objectivity” for peer-reviewed studies that meet the following criteria: “(a) peer reviewers [must] be selected primarily on the basis of necessary technical expertise[;] (b) peer reviewers [must] be expected to disclose to agencies prior technical/policy positions they may have taken on the issues at hand[;] (c) peer reviewers [must] be expected to disclose to agencies their sources of personal and institutional funding (private or public sector)[;] and (d) peer reviews [must] be conducted in an open and rigorous manner.”²²⁶ None of these requirements could reasonably be read to apply to many types of TEK.

UTILITY AND INTEGRITY OF INFORMATION DISSEMINATED BY THE ENVIRONMENTAL PROTECTION AGENCY, EPA/260R-02-008 (Oct. 2002) http://www.epa.gov/quality/informationguidelines/documents/EPA_InfoQualityGuidelines.pdf [hereinafter EPA IQA Guidelines]; U.S. ENVTL. PROT. AGENCY, PEER REVIEW HANDBOOK (4TH ED.), EPA/100/B-06/002 (2015), https://www.epa.gov/sites/production/files/2016-03/documents/epa_peer_review_handbook_4th_edition.pdf [hereinafter EPA Peer Review Handbook].

223. See, e.g., EPA IQA Guidelines, *supra* note 222, at § 4.2, p.11 (describing EPA’s “Peer Review Policy”); EPA Peer Review Handbook, *supra* note 222, at § 1.3.2, p.25 (“The Peer Review Policy does not establish or affect legal rights or obligations.”).

224. Pub. L. No. 106-554, 114 Stat. 2763, 2763A-153-54 (2000) (codified as a note to 44 U.S.C. § 3516).

225. *Am. Petroleum Inst. v. EPA*, 684 F.3d 1342, 1348 (D.C. Cir. 2012) (“By their terms, however, the Guidelines provide only ‘non-binding policy and procedural guidance.’” (quoting U.S. ENVTL. PROT. AGENCY, GUIDELINES FOR ENSURING AND MAXIMIZING THE QUALITY, OBJECTIVITY, UTILITY AND INTEGRITY OF INFORMATION DISSEMINATED BY THE ENVIRONMENTAL PROTECTION AGENCY, EPA/260R-02-008 (Oct. 2002)); see also *Association of Flight Attendants v. Huerta*, 785 F.3d 710, 719 (D.C. Cir. 2015) (“This is irrelevant because the guidance document is simply a non-binding policy statement, . . . the [agency] is not obliged to continue following it.”).

226. OMB IQA Guidelines, *supra* note 222, at 8,454.

Lastly, as intimated at the outset, no court has yet invalidated an agency action for noncompliance with the Information Quality Act. In fact, numerous courts have held that the Information Quality Act does not provide an independent basis for judicial review of agency action.²²⁷ Most tellingly, the language of OMB's guidelines themselves, in a section titled "Judicial Review," indicates that they do not create judicially enforceable rights, stating that they are "not intended to . . . create any right or benefit, substantive or procedural, enforceable at law or in equity, against the United States, its agencies or other entities, its officers or employees, or any other person."²²⁸ Notwithstanding the unavailability of judicial review based solely on the Information Quality Act, challengers have made attempts to use the standards articulated in the act and implementing guidance to define the contours of APA "arbitrary and capricious" review. Courts have so far debunked this approach as well, finding that the Information Quality Act and implementing guidelines fail to set forth judicially manageable standards.²²⁹

For now at least, the threat posed by Information Quality Act litigation to greater utilization of TEK warrants little consideration.²³⁰ However, agencies again would do well to follow the developments in

227. See, e.g., *Salt Inst. v. Thompson*, 345 F. Supp. 2d 589, 601 (E.D. Va. 2004) ("Neither the Act itself nor its very limited legislative history provide a mechanism for judicial review of information quality or any avenue for judicial relief.") *aff'd sub nom. Salt Institute v. Leavitt*, 440 F.3d 156 (4th Cir. 2006); see also *Delta Smelt Consol. Cases v. Salazar*, 760 F. Supp. 2d 855, 959-64 (E.D. Cal. 2010) (holding that the Information Quality Act did not provide private right of action); *Family Farm Alliance v. Salazar*, 749 F. Supp. 2d 1083, 1091-92 (E.D. Cal. 2010) (asserting that makeup of peer review panel was committed to agency discretion, precluding judicial review of Information Quality Act challenge and further explaining that the act contained no substantive standards). *But see Prime Time Int'l Co. v. Vilsack*, 599 F.3d 678 (D.C. Cir. 2010) (noting that the Information Quality Act claim failed on its merits rather than dismissing it outright, as the district court had done).

228. OMB Peer Review Bulletin, *supra* note 222, at 35.

229. See, e.g., *Styrene Info. & Research Ctr., Inc. v. Sebelius*, 944 F. Supp. 2d 71, 84 (D.D.C. 2013) ("[T]he IQA provides no judicially manageable standards sufficient to enable judicial review . . . [and] APA claims challenging noncompliance with the IQA are consequently unreviewable pursuant to 5 U.S.C. § 701(a)."); *Salt Institute v. Thompson*, 345 F. Supp. 2d 589, 602 (E.D. Va. 2004) ("Neither the IQA nor the OMB Guidelines provide judicially manageable standards that would allow meaningful judicial review to determine whether agency properly exercised its discretion in deciding a request to correct a prior communication."); *Am. Petroleum Inst. v. EPA*, 684 F.3d 1342, 1349 (D.C. Cir. 2012) ("[T]he agency did not bind itself to a judicially enforceable norm.").

230. This is separate and apart from the practical difficulty potentially created by agency's own IQA guidelines and any inconsistency reliance on TEK may generate. See, e.g., EPA IQA Guidelines, *supra* note 222. To the extent that an agency may run afoul of its own guidelines in relying on TEK, it is worth reemphasizing that guidelines do not have the force of law and can be changed without a rigorous notice and comment process. See *supra* note 225 and associated text.

Information Quality Act case law, of which there promises to be a fair amount in the coming years.

The judicial review analysis offered here, under the APA and otherwise, has taken a generalized hypothetical form. In practice, should an agency decide to rely on TEK, the specific circumstances will likely determine the outcome. The particular enabling statute that an action comes under will matter. The environmental problem the regulation aims to address will matter, perhaps to an even greater extent. And the TEK utilized will matter. To this last point, TEK scholars have consistently emphasized the diverse nature and content of TEK across tribes and as between members of the same tribe.²³¹ When this issue ultimately finds its way to a courtroom, the reviewing judges do well to heed the caution of the Supreme Court in a related, but slightly different, context that “[t]o make scientific precision a criterion of constitutional power would be to subject the State to an intolerable supervision hostile to the basic principles of our Government.”²³²

VI. ESTABLISHMENT CLAUSE SCRUTINY

Separate and apart from the administrative law challenges discussed above, agency action taken on the basis of TEK potentially faces constitutional scrutiny. Unlike Western knowledge paradigms, in TEK, science is interwoven with spirituality and a particular understanding of the meaning of human existence. Native American religions cannot be extracted and isolated from TEK. Accordingly, the Establishment Clause of the United States Constitution could come into play and potentially derail any attempt to rely on TEK by the government. This is far from a hypothetical threat, as commentators in Canada, where TEK is more widely used at present, have suggested that utilizing TEK in environmental impact assessments is an “imposition of religion on Canadian citizens . . . [that] flies in the face of a fundamental premise of the Charter of Rights and Freedoms.”²³³ It is not at all difficult to conceive of a similar charge being levied against the use of TEK by agencies in the United States.

The First Amendment succinctly states, “Congress shall make no law respecting an establishment of religion, or prohibiting the free

231. See, e.g., Tsuji & Ho, *supra* note 31, at 331-36 (“[I]t must be emphasized that not all community members possess the same quantity and quality of TEK.”).

232. *Sproles v. Binford*, 286 U.S. 374, 388-89 (1932).

233. Albert Howard & Frances Widdowson, *Traditional Knowledge Threatens Environmental Assessment*, POLICY OPTIONS, Nov. 1996, at 34.

exercise thereof.”²³⁴ The Establishment Clause is the first of the two prohibitions enumerated. Beyond simply forbidding the government from pronouncing an official religion of the United States, the clause polices “three main evils . . . ‘sponsorship, financial support, and active involvement of the sovereign in religious activity.’”²³⁵ Much scholarly debate has centered on the Supreme Court’s Establishment Clause jurisprudence and what the proper test for violation should be.²³⁶ In recent years that debate has found its way into the Court’s opinions as well, muddying the waters as to the controlling test in Establishment Clause cases.²³⁷ For the purposes of this Article, the analysis will be confined to the paradigm set forth in *Lemon v. Kurtzman*²³⁸—screening for endorsement and entanglement—as that is the lens through which the precedents related to Native American religions were established.

A. *Is TEK Religious?*

The question of religiosity of particular symbols, practices, texts, and other articles is fraught with subjectivity and, thus, notoriously difficult to judicially administer. Nonetheless, whether something qualifies as religious clearly plays a gatekeeping role in Establishment Clause analysis. As one scholar has noted when discussing the difficulty of this threshold determination, “[a]rguably, there are as many definitions of religion as there are students of religion.”²³⁹ Of particular importance with respect to Native American articles and practices,

234. U.S. CONST. amend. I, § 1.

235. *Lemon v. Kurtzman*, 403 U.S. 602, 612 (1971) (quoting *Walz v. Tax Comm’n*, 397 U.S. 664, 668 (1970)).

236. See Matthew S. Steffey, *Redefining the Modern Constraints of the Establishment Clause: Separable Principles of Equality, Subsidy, Endorsement, and Church Autonomy*, 75 MARQ. L. REV. 903, 907 n.13 (1992) (collecting “scholarly attempts to articulate a generally applicable constitutional standard”); see also Steven G. Gey, *Reconciling the Supreme Court’s Four Establishment Clauses*, 8 U. PA. J. CONST. L. 725, 725 (2008) (“It is by now axiomatic that the Supreme Court’s Establishment Clause jurisprudence is a mess—both hopelessly confused and deeply contradictory. On a purely doctrinal level, the Court cannot even settle on one standard to apply in all Establishment Clause cases.”).

237. See, e.g., *Town of Greece v. Galloway*, 134 S. Ct. 1811 (2014) (declining to apply the *Lemon* test to legislative prayer); *Van Orden v. Perry*, 545 U.S. 677, 686 (2005) (declining to apply the *Lemon* test to a “passive” Ten Commandments display on state grounds, while observing that “[m]any of our recent cases simply have not applied the *Lemon* test”). But see *McCreary County v. ACLU*, 545 U.S. 844, 859-65 (2005) (applying the *Lemon* test to a Ten Commandments display at a courthouse). It is beyond the scope of this Article to enter the fray of the intense scholarly debate around the proper Establishment Clause analysis.

238. 403 U.S. at 602.

239. Michelle Kay Albert, *Obligations and Opportunities to Protect Native American Sacred Sites Located on Public Lands*, 40 COLUM. HUM. RTS. L. REV. 479, 486 (2009).

courts make an effort to distinguish between religion and culture.²⁴⁰ This presents an extraordinary challenge because Native American spiritual beliefs pervade all aspects of life;²⁴¹ “[t]he task or role of the tribal religions is to relate the community of people to each and every facet of creation as they have experienced it.”²⁴² TEK is emblematic of this intermingling.

Scholars of TEK acknowledge that it has a prominent spiritual component. Winona LaDuke even goes so far as to define TEK as “the culturally and *spiritually* based way in which indigenous peoples relate to their ecosystems.”²⁴³ Native American knowledge systems purposefully integrate the physical, social, and spiritual worlds in understanding ecosystem dynamics and how to protect the associated natural resources.²⁴⁴ Looking at a specific example of this method of understanding in practice, Brenda LaFrance and James Costello point out how the Haudenosaunee Thanksgiving Address, together with tribal cosmology, shapes the tribe’s environmental policy through discussion of the relationship between man and creator.²⁴⁵ This sounds remarkably similar to the modality and purpose of religious prayers and teachings from various faiths around the world.

“[T]he modern [W]estern tendency to break up human life into such categories as religion, politics, economics, etc. is not very useful in describing or understanding traditional Indian life.”²⁴⁶ As George Cajete

240. *Id.*

241. *Id.*; VINE DELORIA, JR., *GOD IS RED* 127-28 (Fulcrum Publishing 3d ed. 2003) (1973) (“Indian religious practices include . . . , what names can be addressed . . . [,]the speaking of the native tongue . . . [,]hunting, farming, the gathering of herbs . . . [and] the deference paid to an elder In short, a whole way of life has religious potential.”)

242. DELORIA, JR., *supra* note 241, at 127-28.

243. LaDuke, *supra* note 30, at 127 (emphasis added).

244. *See, e.g.*, LaFrance & Costello, *supra* note 96, at 62 (“Haudenosaunee knowledge systems endeavor to integrate the physical, social, and spiritual states into a cohesive force for the betterment of future generations.”).

245. *Id.*; *see also* CAJETE, *supra* note 15, at 87 (“In all tribes, environmental understanding, environmental conservation, expressions of religion, and economic enterprise were fully integrated.”). The Thanksgiving Address, and the similar integrated expressions of environmental and spiritual values noted by Cajete, serve as mission statements or broad mandates of tribal environmental policy goals. Contrast the spirituality in those statements with the secular, rational morality of NEPA’s stated goal “to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans.” National Environmental Policy Act, 42 U.S.C. § 4321 (1969).

246. Michaelsen, *supra* note 149, at 49; *see also id.* at 62 (“The typical western approach is to split reality into separate categories which can be objectified and labeled ‘church,’ ‘religion,’ ‘culture,’ ‘art,’ ‘economics,’ ‘politics,’ etc. But the use of this common approach in dealing with traditional Indian realities rends the seamless garment of Indian life.”).

explains, the apparent religiosity of Native American teaching in all subjects, but particularly with respect to the environment, comes from the fact that “[i]n traditional American Indian life, the foremost context for understanding is the Spiritual, the orienting foundation of Indigenous knowledge and process. It is the spiritual that forms not only the foundation for religious expression, but also the ecological psychology underpinning the other foundations.”²⁴⁷ In other words, the framing differs tremendously from Western understanding of the world, and the familiar lines between the spiritual and the observable blur.

This is not by accident. It is intentional and important. For many Native American tribes, this is the “rightful orientation to the natural world,” and, hence, TEK rightly takes the form of a “spiritual ecology.”²⁴⁸ Interconnectedness to one’s environment serves as one of the foundational pillars of tribal education and understanding.²⁴⁹ “This foundation *connects* a tribe to their *place*, establishing their relationship to their land and the earth in their minds and hearts . . . [making] American Indians [not only] America’s first practical ecologists [but also fostering] a deep sense of ecological awareness and state of being.”²⁵⁰

Herein lies the crux of the dilemma—ecological understanding and general respect for nature plays a much more central in Native American society, culture, *and* religion than it does in the Western counterparts.²⁵¹ The First Amendment implicitly assumes that these categories—culture, religion, church, state—can be simply defined and everything fit neatly into one box or another.²⁵² Tribal practices and teachings fly in the face of that notion. Accordingly, when analyzing innately tribal material, like TEK, through a Western constitutional lens, like the Establishment Clause, one must avoid the temptation to overgeneralize and oversimplify.²⁵³ In other words, as the above example of the

247. CAJETE, *supra* note 15, at 38-39 (1994).

248. *Id.* at 37, 87.

249. *Id.* at 39.

250. *Id.*

251. Allison M. Dussias, *Asserting a Traditional Environmental Ethic: Recent Developments in Environmental Regulation Involving Native American Tribes*, 33 NEW ENG. L. REV. 653, 654 (1999); CAJETE, *supra* note 15, at 87 (“In all tribes, environmental understanding, environmental conservation, expressions of religion, and economic enterprise were fully integrated.”); Michaelsen, *supra* note 149, at 59 (explaining that the framers’ “view of religion does not do justice to traditional Indian culture in which religion pervades all aspects of life”).

252. Michaelsen, *supra* note 149, at 59 (“The framers of the first amendment generally assumed that religion could be identified as a separate and discreet element in human life.”).

253. *Cf.* Dussias, *supra* note 251, at 654 (“[W]e must be careful to avoid overgeneralizing, oversimplifying, and overromanticizing the relationship between Native Americans and nature.”).

Thanksgiving address demonstrates, the specific material in question matters. Some TEK will undoubtedly look more like that address and invoke Western notions of prayer—likely spurring an Establishment Clause analysis.²⁵⁴ Other TEK will look more like population or migration information that might be found in a history or Western science text—raising no constitutional alarms. Thus, though deeply unsatisfying, the answer to the threshold question of whether TEK is sufficiently “religious” in nature to trigger an Establishment Clause analysis is that tired trope of the legal profession—it depends.

B. Endorsement

Assuming an Establishment Clause analysis proves necessary, the first relevant inquiry concerns whether the government action, in this case relying on TEK, has the principal or primary effect of advancing religion. Justice O’Connor penned the most famous articulation of this standard, writing that a government action unconstitutionally advances religion if it has either the purpose or the effect of endorsing religion.²⁵⁵ Though some alternative tests have been utilized in specific scenarios,²⁵⁶ O’Connor’s two-pronged “endorsement test” remains the most applicable to the situation of TEK.²⁵⁷ The “effect” prong of that test,²⁵⁸

254. Anastasia P. Winslow, *Sacred Standards: Honoring The Establishment Clause In Protecting Native American Sacred Sites*, 38 ARIZ. L. REV. 1291, 1298 (1996) (“Under tribal religions, all of creation, whether animated or not (plants, streams, and mountains), have their own spirits and potential for life, and Native Americans pray through these spirits in much the same way that Christians pray to God through Christ and the saints.”).

255. *Lynch v. Donnelly*, 465 U.S. 668, 690 (1984) (O’Connor, J., concurring).

256. See, e.g., *Lee v. Weisman*, 505 U.S. 577, 592-94 (1992) (employing the “coercion test” to hold that a religious invocation at a high school graduation was unconstitutional).

257. See, e.g., *Capitol Square Review & Advisory Bd. v. Pinette*, 515 U.S. 753, 764 (1995) (explaining that the Court has “tested for endorsement of religion [where] the subject of the test was either expression by the government itself, or else government action alleged to discriminate in favor of private religious expression or activity.”) (citations omitted); *Cty. of Allegheny v. ACLU*, 492 U.S. 573, 592 (1989) (“In recent years, we have paid particularly close attention to whether the challenged governmental practice either has the purpose or effect of ‘endorsing’ religion, a concern that has long had a place in our Establishment Clause jurisprudence.”). *But see Elmbrook Sch. Dist. v. Doe*, 134 S. Ct. 2283, 2284 (2014) (Scalia, J., dissenting from denial of certiorari) (asserting that “*Town of Greece* abandoned the antiquated ‘endorsement test’”). Again, it is beyond the scope of this Article to debate the continued prevalence of the “endorsement test”; it is sufficient to note that the *Town of Greece* case dealt with the special circumstance of legislative prayer and, thus, does not explicitly cover the situation posited here involving the regulatory reliance on TEK.

258. I do not analyze TEK as a policy basis under the “purpose” prong for two reasons. First, it seems exceedingly unlikely that an agency would indicate that its purpose in utilizing ecological information would be to advance religion. Second, the relevant case law focuses primarily on the effects of government action, rather than their stated purpose. Third, to the extent that purposeful advancement of religion can be divined by a court, it could also be “fairly

specifically, “asks whether, irrespective of the government’s actual purpose, the practice under review in fact conveys a message of endorsement or disapproval.”²⁵⁹

Courts, particularly in the Ninth and Tenth Circuits, have had occasion to apply the endorsement test in analyzing whether government actions that protect Native American religious sites violate the Establishment Clause. The general rule derived from such cases is that “the Establishment Clause does not bar the government from protecting a historically and culturally important site simply because the site’s importance derives at least in part from its sacredness to certain groups.”²⁶⁰ In *Access Fund v. United States Department of Agriculture*, the Ninth Circuit considered a Forest Service prohibition on rock climbing at Cave Rock, a site with spiritual, cultural, and historical significance.²⁶¹ The court found that the prohibition “cannot be fairly perceived as an endorsement of Washoe religious practices,” reasoning that it did not prohibit all activities inconsistent with traditional Washoe belief, only rock climbing (for example, hiking and other public uses of Cave Rock are still permitted).²⁶² The court emphasized that the Forest Service regulation permitted activities that violated the core tenets of the religion supposedly endorsed, and, in such a scenario, the government agency does not run afoul of the Establishment Clause.²⁶³ The court further emphasized that, unlike the voluntary ban on climbing considered in *Bear Lodge Multiple Use Association v. Babbitt*,²⁶⁴ the Forest Service’s action at Cave Rock protected historic and cultural values, in addition to religious ones.

In *City of Albuquerque v. Browner*,²⁶⁵ the Tenth Circuit considered whether the EPA’s approval of the designation of a “Primary Contact Ceremonial Use” for the Pueblo of Isleta in setting Clean Water Act water quality standards violated the Establishment Clause.²⁶⁶ The Tenth

perceived” by the public and thereby render the action unlawful under the “effect” prong as well (in other words, the “purpose” test is for practical purposes subsumed by the “effect” test, because the latter is essentially the former without an intent element).

259. *Lynch*, 465 U.S. at 690 (O’Connor, J., concurring)

260. *Cholla Ready Mix, Inc. v. Civish*, 382 F.3d 969, 977 (9th Cir. 2004).

261. 499 F.3d 1036 (9th Cir. 2007).

262. *Id.* at 1045.

263. *Id.*

264. F. Supp. 2d 1448 (D. Wyo. 1998), *aff’d on other grounds*, 175 F.3d 814 (10th Cir. 1999). In upholding the voluntary ban in *Bear Lodge*, the District Court implied in dicta that a mandatory ban on climbing might violate the Establishment Clause. *See id.* at 1454-56.

265. 97 F.3d 415 (10th Cir. 1996), *cert. denied*, 522 U.S. 965 (1997).

266. *Id.* at 428 (“The tribe defines ‘Primary Contact Ceremonial Use’ as ‘the use of a stream, reach, lake, or impoundment for religious or traditional purposes by members of the

Circuit held that the EPA's approval of the tribe's designated use had the primary effect of promoting the Clean Water Act's goals, not of advancing the tribe's religion.²⁶⁷ The court did not consider the tribe's motivation for designating the use, which may very well have been religious in nature. Instead, the court focused on the fact that the protection of the designated use had the effect of "serv[ing] a clear secular purpose" and the EPA approved it on that basis.²⁶⁸

In another line of cases dealing with the accommodation of Native American religious practices, courts have recognized the pervasive integration of culture and religion in tribes. These cases primarily concerned statutory exceptions created for the benefit of Native American religious practices that would otherwise be illegal.²⁶⁹ In perhaps the most influential of such decisions, the Fifth Circuit held that "[t]he unique guardian-ward relationship between the federal government and Native American tribes precludes the degree of separation of church and state ordinarily required by the First Amendment."²⁷⁰ Thus, drawing the line between the religious and the secular need not be as precise when the "religion" purportedly endorsed is of Native American origin.²⁷¹

Although neither of these lines of cases directly addresses the issue, the principles derived from them would certainly inform an Establishment Clause challenge to a regulatory action based on TEK. The overarching principle teaches that a subject (for example, a site, a species, a water body, or an ecosystem) that has spiritual significance can also have secular significance, and that a governmental policy that protects both values, even without distinguishing between them, does not run afoul of the Establishment Clause.²⁷² This principle is crucial to

PUEBLO OF ISLETA; such use involves immersion and intentional or incidental ingestion of water.").

267. *Id.*

268. *Id.* ("The EPA's purpose in approving the designated use is unrelated to the Isleta Pueblo's religious reason for establishing it.").

269. *See, e.g.,* Rupert v. Dir., U.S. Fish & Wildlife Serv., 957 F.2d 32 (1st Cir. 1992) (exemption in Eagle Protection Act); United States v. Rush, 738 F.2d 497, 513 (1st Cir. 1984) (peyote exemption); Olsen v. Drug Enf't Admin., 878 F.2d 1458, 1463 n.5 (D.C. Cir. 1989) (peyote exemption).

270. *Peyote Way Church of God, Inc. v. Thornburgh*, 922 F.2d 1210, 1217(5th Cir. 1991).

271. It is important to note that protection of the environment necessarily involves normative judgments that often embody spiritual and philosophical ideals, regardless of a connection to a particular religion—Native American or otherwise. Even objective, quantitative data analysis is laden with normative (i.e. moral) assumptions, particularly with respect to cost-benefit analysis. Accordingly, one cannot expect an environmental policymaking decision to be completely devoid of references that could be construed as spiritual or related to religious tenets.

272. Albert, *supra* note 239, at 512 ("[These] cases establish a fairly clear principle that if a

the use of TEK in environmental policymaking, because so many of the subjects of TEK—plants, animals, habitat—have both spiritual and secular value, such that the content of the TEK may interchangeably use words that invoke both.²⁷³ Indeed, one might expect that, at least in the Ninth and Tenth Circuits, the precise rule of the cases where Native American religious sites have been protected would also control when a governmental agency relies on TEK to protect, or restore, the environment or a species. That is, the court would hold that “the Establishment Clause does not bar the government from protecting a historically and culturally important [natural resource] simply because the [resource’s] importance derives at least in part from its sacredness to certain groups.”²⁷⁴ Applying the more general endorsement test would lead to the same result, because, as one scholar explained, “[m]ost Americans upon seeing preserved park land probably do not conclude that the government is endorsing a religion, but rather, they likely conclude that the government is preserving land for secular environmental reasons.”²⁷⁵ Hence, even if an agency relies upon TEK, which integrates the spiritual and ecosystem values of natural resources, the general public would reasonably identify the secular values as the primary motivation and thus the concept being endorsed.

C. Entanglement

Where entanglement has been analyzed as a separate and distinct prong,²⁷⁶ the Supreme Court has examined the interactions between

federal agency has at least one valid secular purpose for enacting a regulation in addition to a purpose of accommodating Indian practitioners’ religious practices at a sacred site, the regulation will probably not violate the Establishment Clause.”).

273. See, e.g., Gail Wells, *Native American Forestry Combines Traditional Wisdom with Modern Science*, 6 SOLUTIONS 107, 107-08 (2011) (“‘Any time I talk to one of our foresters, I try to stress the idea of balance,’ [chief of the Coquille tribe, Ken] Tanner says. ‘We don’t own the forest; it’s a part of our organic being, which we share with all other creatures and creations. Anything we take, we honor with prayers. We make sure those forest spirits – the spirits of the tree or the salmon, as it might be – tell their relatives that we’re good people, so they’ll continue to be there for us.’”).

274. *Cholla Ready Mix, Inc. v. Civish*, 382 F.3d 969, 977 (9th Cir. 2004); see also Dussias, *supra* note 251, at 660-61 (explaining that “after *City of Albuquerque*, there is reason to be optimistic about the increased tribal regulatory role in environmental affairs and the willingness of EPA and the courts to support environmental protection standards based on the Native American vision of the respect due to nature”).

275. Winslow, *supra* note 254, at 1316-17.

276. See *Mitchell v. Helms*, 530 U.S. 793, 807-08 (2000) (remarking that the Court has “acknowledged that our cases discussing excessive entanglement had applied many of the same considerations as had our cases discussing primary effect, and we therefore recast *Lemon*’s entanglement inquiry as simply one criterion relevant to determining a statute’s effect”).

church and state to determine if they are excessive.²⁷⁷ At first blush, the integration of “environmental understanding, environmental conservation, expressions of religion, and economic enterprise” that TEK embodies seems to smell rather strongly of entanglement.²⁷⁸ However, the type of entanglement the First Amendment polices, and the Supreme Court has been troubled with, is the entanglement of *institutions*, rather than *ideas*.²⁷⁹ The entanglement prong considers “the character and purposes of the *institutions* that are benefited, the nature of the aid that the State provides, and the resulting relationship between the government and religious authority.”²⁸⁰ Thus, the concern is with the separation of church (the religious institution) from state (the political institution), not with dissecting ideas in order to determine their religious or political philosophy components. In other words, government is prohibited from both acting as a religious institution and from meddling in the affairs of existing ones; it is not prohibited from considering ideas put forth by religious citizens, even if those ideas are influenced by the citizens’ beliefs.²⁸¹

The Tenth Circuit’s opinion in *City of Albuquerque v. Browner* demonstrates this principle in practice.²⁸² The court held that the EPA’s approval of the tribe’s designated use did not constitute excessive entanglement, reasoning that the approval “does not require any governmental involvement in the Isleta Pueblo’s religious practices.”²⁸³ It further reasoned that the mere incorporation of the tribe’s water quality standards in future NPDES permits did not constitute entanglement.²⁸⁴ The focus there was on the intermingling of the institutions—the EPA and the Pueblo of Isleta.

Examining the reliance on TEK through this lens, it becomes far less problematic. As long as the governmental agency relying on TEK is not itself generating the TEK or making religious pronouncements, but rather simply taking account of information provided to it by outside

277. See *Agostini v. Felton*, 521 U.S. 203, 233 (1997).

278. CAJETE, *supra* note 15, at 87.

279. See *Albert*, *supra* note 239, at 498 (“[The third prong of the *Lemon* test] aims to prevent government from participating in the affairs of any religious organizations or groups and vice versa.”).

280. *Lemon v. Kurtzman*, 403 U.S. 602, 615 (1971) (emphasis added).

281. *Cf. Albert*, *supra* note 239, at 489 (explaining that Establishment Clause jurisprudence generally permits agency actions that protect “culture” and “religion” together, finding no entanglement problem).

282. 97 F.3d 415 (10th Cir. 1996), *cert. denied*, 522 U.S. 965 (1997).

283. *Id.* at 428-29.

284. *Id.* at 429.

actors, there is no institutional entanglement. Agencies are free to consider comments and information provided by people and organizations from a wide spectrum of beliefs. Simply considering that input, even relying on it, does not entangle the agency with religious institutions. Here, it is important to distinguish this entanglement analysis from the endorsement analysis discussed above. In that analysis, the source of ideas becomes relevant. With respect to entanglement, agencies seeking to rely on TEK can simply stay out of the business of TEK generation to avoid a constitutional problem.

The likelihood of an Establishment Clause challenge to an agency action based on TEK remains markedly lower than the inevitable risk of challenge under the APA. However, as *City of Albuquerque v. Browner* demonstrates, sophisticated litigants are poised to challenge environmental protection as an unconstitutional establishment of Native American religion. The above analysis should provide some degree of consolation that any such challenge would likely fail. As noted above, the risk of invalidation of a TEK-based decision remains highly dependent on the TEK at issue. Thus, when the TEK relied upon presents more indicia of religiosity, an agency would do well to acknowledge the spiritual nature of the content, rather than pretend it did not exist.²⁸⁵

VII. CONCLUSION

Even as much of the academic literature and jurisprudence trends in the direction of closer and closer scrutiny of agencies' scientific rationales, there exists a countervailing push to expand the perspective from which environmental problems are examined and managed. TEK represents an important battleground in that movement. The legal battle over the legitimacy of TEK will not be fought until an agency leads the charge. Perhaps after the Panel of TEK Experts has proven a valuable asset to the CEC, an agency, such as the EPA, FWS, or DOI, will feel more comfortable taking a more aggressive approach to the utilization of TEK. But until that time, the best one can do is examine abstract hypotheticals through imperfect analogies as this Article attempted to do.

Agencies should not be disheartened. Despite the increased skepticism of agency expertise and of the wisdom of the jurisprudence of deference described at the outset, there remains some hope for new ways of understanding like TEK. Scholars have noted that as courts have

285. See U.S. DEP'T OF AGRIC., *supra* note 21, at 19 (advising as such).

grown more comfortable delving into scientific analysis, they exhibit a tendency to evaluate agency science by employing the agency's own analytical frameworks.²⁸⁶ Accordingly, if an agency can find the will to employ a framework that allows for TEK and subsequently find said TEK reliable and persuasive, there is good reason to believe that a court would agree.

As TEK increases in notoriety and visibility, pressure mounts for real action. Agencies ignore pleas to consider traditional and other alternative ways of understanding at their own peril. Just as reliance on so-called "junk science" can doom an agency action, so too could failure to consider the potentially revealing information preserved in TEK. Tribes attempting to defend treaty-protected resources threatened by climate change could flip the script and sue an agency claiming that it acted arbitrarily and capriciously by refusing to adequately consider TEK.²⁸⁷ The threat of such action should serve as a reminder that if agencies lag too far behind on this issue due to lack of political will, they soon may have no choice but to consider TEK and lose the opportunity to define the context of the pioneering cases. That is not only a recipe for bad law, but a failure to appreciate what TEK could add to efforts to improve our environment.

286. See Elizabeth Fisher, Pasky Pascual & Wendy Wagner, *Symposium: Science Challenges for Law and Policy: Rethinking Judicial Review of Expert Agencies*, 93 TEX. L. REV. 1681, 1697, 1712 (2015).

287. Cf. *Wyoming v. U.S. Dep't of the Interior*, 2015 U.S. Dist. LEXIS 135044, at *54 (D. Wyo. Sep. 30, 2015) (granting a preliminary injunction against the Bureau of Land Management's regulations applying to hydraulic fracturing on federal and Indian lands, based in part on the Ute Tribe's "argument that the BLM failed to consult with the Tribe on a government-to-government basis in accordance with its own policies and procedures").