

RESTORATION AFFECTING NATIVE RESOURCES: THE PLACE OF NATIVE ECOLOGICAL SCIENCE

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I. INTRODUCTION

Restoration, of the environment or anything else, begs the question: to what state or process or vision do restorative efforts aspire? In the context of environmental restoration, this question has been noted, and numerous offerings have followed. The National Research Council's view is that restoration is "the return of an ecosystem to a close approximation of its condition prior to disturbance;"¹ and elaborates that this means "the reestablishment of predisturbance ecosystem functions and related physical, chemical and biological

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Notes on method: In this Article, I follow a rule described by Vine Deloria, Jr. Because the stories and knowledge of Native elders, traditional people, and environmental managers belong to them, it is not for me to be the first to put a story into print. Instead, I have sought published accounts that illustrate or describe a similar point or practice. Thus, in many instances in this Article, I relay one or two examples where many more exist. In addition, I rely extensively on oral, anecdotal and non-quantified data. This choice, while a departure from conventional methods in law and science, is meant to emphasize that these are valid kinds of data.

1. NATIONAL RESEARCH COUNCIL, RESTORATION OF AQUATIC ECOSYSTEMS: SCIENCE, TECHNOLOGY, AND PUBLIC POLICY 18 (1992).

characteristics." Others have questioned the exclusion of humans from this definition. Gary Nabhan notes that restoring might usefully include "restorying," that is, reimagining humans' role to focus on their capacity not only for damage but also for listening and healing.² Dennis Martinez' understanding is different still. In the context of restoration affecting tribal homelands, environmental restoration cannot be separated from tribal cultural flourishing; he terms this "eco-cultural restoration."³ Not only are the ends or aspirations of restoration contested, but also the means or methods by which these ends are to be attained.

Given the multiplicity of perspectives, another question presents itself: who decides? This question introduces not only interdisciplinary issues⁴ but intercultural ones as well. Ideas about what restoration is and how (indeed, whether) one ought go about it are likely to reflect one's culture and values. Rebecca Tsosie notes that much might be learned from an "intercultural conversation,"⁵ and points out in particular that various Native American perspectives are likely to be different than those offered by non-Native Americans.⁶ While restorative efforts in a variety of contexts would surely benefit from intercultural exchange, an intercultural approach is indispensable for the numerous decisions that affect Native resources, but that at present are made by federal, state, and local environmental managers.

Native resources include tribal resources and culturally significant resources, whether located on- or off-reservation. Questions of management and restoration affecting Native resources cannot be separated from questions of cultural flourishing for Native peoples.⁷ Only Native peoples themselves can properly articulate what would be required to ensure their cultural flourishing and to attend to eco-cultural issues in decisions affecting their particular resources. For restoration affecting Native resources, Native ecological knowledge is essential.⁸

2. GARY PAUL NABHAN, CULTURES OF HABITAT: ON NATURE, CULTURE, AND STORY 311-19 (1997).

3. Dennis Martinez, Presentation, Indigenous Ecology and Cultural Restoration Workshop (Sept. 21, 1999).

4. These issues are well recognized. See e.g., Duncan T. Patten, *Restoration as the Order of the 21st Century: An Ecologist's Perspective*, 18 J. LAND RESOURCES & ENVTL. L. 31, 31 (1998).

5. Rebecca Tsosie, Presentation, Environmental Restoration: Challenges for the New Millenium (Nov. 12, 1999).

6. See Rebecca Tsosie, *Tribal Environmental Policy in an Era of Self-Determination: The Role of Ethics, Economics, and Traditional Ecological Knowledge*, 21 VT. L. REV. 225, 245-46 (1996).

7. See generally, WINONA LADUKE, ALL OUR RELATIONS: NATIVE STRUGGLES FOR LAND AND LIFE (1999).

8. This Article excludes from its focus federal, state, and local agency decisions that do not affect Native resources, as defined above, to the extent that such decisions exist. Although the boundaries of this caveat are imprecise, my intent is to avoid claims that implicitly impose on Native peoples an obligation to deliver their ecological knowledge to save the world for the common good, or that would seek to cultivate or preserve such

Yet numerous decisions that affect Native resources are at present made entirely or largely by federal, state, and local environmental managers. On current interpretations of United States law, for example, federal and state resource managers have authority to manage most of the land and resources that are culturally significant to California Native peoples, but that are located outside the few, small California reservations or "rancherias."⁹ Federal and state managers in the Pacific Northwest similarly make numerous decisions on lands ceded by treaty that affect the survival of the salmon and other culturally significant, treaty-protected resources of the various Native peoples there.¹⁰

Native leaders, along with commentators such as Dean Suagee and Rebecca Tsosie, have argued persuasively for robust recognition of tribes' environmental decisionmaking authority as an exercise of tribal sovereignty and

knowledge only because and to the extent that it might be useful to the dominant society. Compare Williamson Chang, *The "Wasteland" in the Western Exploitation of "Race" and the Environment*, 63 U. COLO. L. REV. 849, 856(1992) (arguing that a only comparison of Western and Native thinking reveals "both the constraints of solving racism and environmental issues through Western paradigms, as well as the transformative potential of indigenous thought.") and Sandra Lawn, *Sharing Knowledge, Linking Sciences: An International Conference on the St. Lawrence Ecosystem*, AKWESASNE NOTES: J. FOR NATIVE & NAT. PEOPLE, Summer 1995, at 86 (describing proceedings of interdisciplinary, intergovernmental, intercultural conference and noting among organizing principles that "knowledge is powerful, when it is shared") with Susan Ross, *Learning About Survival from Survivors: Mohawk Environmental Communicative Action* (visited Sept. 21, 1998) <<http://cleo.murdoch.edu.au/asu/edtech/mmpp95/elaw-j.arcs/ross.txt>> (pointing out that many Native people are skeptical of invitations to share their knowledge given that the benefits derived from their knowledge are likely to redound mainly to the dominant society and reporting that indigenous leader Rayna Green has observed that "European-Americans still...become interested in indigenous traditional practices only when those practices look like ways to 'fix' their own society.").

9. This is so in part because 18 treaties negotiated in 1851 between the United States and the various California Indian Nations that reserved to these peoples 18 million acres of their aboriginal homelands were never ratified by the United States Senate. Subsequently, the federal government established a few small reservations. Today, only approximately 500,000 acres of the 104.7 million acres in the State of California are under the control of California Indians. See Melissa Nelson, *Why California Indian Land Rights?* THE CULTURAL CONSERVANCY, Autumn 1998, at 13.

10. Native peoples, by several 1855 treaties, ceded vast tracts of their aboriginal homelands but retained the right to fish in their "usual and accustomed" places, as well as gathering and other rights, on both retained and ceded lands. Federal and state managers generally have authority over ceded lands, although this authority is circumscribed by obligations to uphold tribal treaty rights. See, e.g., Treaty with the Nisquallys (Medicine Creek treaty), Dec. 26, 1854, U.S. – Nisquallys, art. III, 10 Stat. 1132 (1855); United States v. Winans, 198 U.S. 371 (1905); United States v. Washington, 384 F. Supp. 312 (W.D. Wash. 1974). See also discussion *infra* note 139. Today, 78% of the treaty-protected lands of the Umatilla, Nez Perce, Warm Springs and Shoshone Bannock tribes are in non-tribal hands. See Wil Phinney, *Report Says Breaching Snake Dams Would Benefit Tribes*, CONFEDERATED UMATILLA J. (June 3, 1999) <<http://www.umatilla.nsn.us/circ rept.html>>.

tribal rights to self-determination and self-government.¹¹ I share this view and so take as one premise of this Article that there should be ongoing efforts to recognize and support Native environmental management authority over Native resources.¹² At the same time, because so many of the decisions affecting Native resources at present involve considerable, if not complete, control by non-Native managers—and because environmental impacts in any event seldom respect jurisdictional boundaries—there is reason to be concerned for the successful management and restoration of Native resources.

I maintain in this Article that federal, state, and local environmental managers have often been insufficiently attentive to the effects that their decisions have on Native resources. These non-Native environmental managers have often denied the place of Native environmental managers in determining the ends and means of restoration affecting Native resources. These non-Native environmental managers have often declined to acknowledge Native expertise.

Where this is the case, I observe that restoration efforts will likely be ineffective, cultural flourishing will be undermined, and cultural discrimination will persist unabated. Indeed, because Native ecological knowledge and Native resources are interdependent—the vitality of each depends upon the vitality of the other—not only will resources not be restored, but the health of the resources and of the Native people will likely deteriorate along each of these interrelated dimensions.

This Article begins by noting that non-Native society—the dominant society in the United States—has often discounted Native expertise and denied a place for Native environmental managers. Part II catalogues the various forms that denigration and denial of Native ecological science have taken. Part III marks the historical antecedents of such efforts to deny Native knowledge and to downplay the role of Native peoples as environmental managers. It then identifies particular features of the approaches favored by non-Native environmental managers that likely work to exclude, devalue, or discriminate against Native science, with the intention of encouraging further work to locate and dismantle occasions for discrimination. Part IV offers two considerations for intercultural conversations on restoration affecting Native resources. Finally, Part V presents some observations from recent efforts at intercultural approaches, meant again to identify issues for further work.

11. See, e.g., *Chairman's Corner: The Exercise of Tribal Sovereignty Lies at the Heart of Healthy Ecosystems*, FORT APACHE SCOUT, May 24, 1996, at 2; Tsosie, *supra* note 6.

12. Thus, this Article also excludes from its focus tribal agency decisions that affect Native resources, inasmuch as Native decisionmakers can attend to eco-cultural issues as they see fit. Even where tribal natural resource agencies employ non-Native managers, tribal agency management decisions are made within a tribally-determined structure.

II. THE DOMINANT SOCIETY'S FAILURE TO RECOGNIZE OR CREDIT NATIVE ECOLOGICAL SCIENCE

The dominant society has often failed to recognize or credit the wealth of ecological knowledge among Native peoples. Historically and today, non-Native society has tended not to count Native understandings of the world as valid bodies of knowledge. Non-Native society has, for the most part, withheld from Native methods of understanding the appellation "science."¹³ By the same token, non-Native society has been unlikely to view Native knowledge holders as "scientists."¹⁴ Meanwhile, as Vine Deloria has observed, members of the dominant society have increasingly looked to scientists for reliable, authoritative explanations of the world: "In our [dominant] society we have been trained to believe that scientists search for, examine, and articulate truths about the natural world."¹⁵ Against this backdrop, to the extent that the dominant society has been reluctant to recognize Native science as "science," it has continued to deny the reliability, validity and authority of Native experiences and understandings of the world. This failure has taken several forms.

13. "Science" is a contested term. See discussion *infra*, Part III.D. I mean to define science broadly, in the sense of the body of understanding or knowledge about the world, and the range of methods that have or might be employed to acquire understandings or knowledge about the world. As such, I will use the terms "Native knowledge" and "Native science" interchangeably. Paul Feyerabend captures this sense when he defines "science" as "free and unrestricted inquiry" and argues "there is nothing in the nature of science that excludes cultural variety." PAUL FEYERABEND, *FAREWELL TO REASON 12* (1987) (emphasis omitted). "Science," however, has often been defined less inclusively. Note that it may be that some Native-knowledge holders indeed do not seek the appellation "science" that has been "withheld" by non-Native society; this Article does not presume to speak to Native knowledge holders for whom it is a matter of indifference whether non-Native society recognizes their knowledge. Rather, it addresses Native knowledge holders who have determined, for whatever reason, that recognition matters.

14. Some recent commentators have emphasized the need to recognize Native knowledge holders as scientists by referring to them as such. See, e.g., Jack D. Forbes, *Native Intelligence: Intellectual Property Rights of Indigenous Peoples*, AKWESASNE NOTES: J. FOR NATIVE & NAT. PEOPLE, Spring 1997, at 27 (discussing work of "First Nations farmer-scientists"); Ross, *supra* note 8 (describing work of Katsi Cook, a traditional Mohawk "midwife-scientist"). Additionally, tribal environmental managers often identify themselves according to the scientific discipline with which their expertise is associated, i.e. "tribal wildlife biologist," "White Mountain Apache Fish Biologist," or "Tulalip Tribes Shellfish Biologist." See, e.g., *infra* notes 140 and 54. Yet, perhaps tellingly, each of these titles also marks the distinctiveness of Native science or tribal management.

15. VINE DELORIA, JR., *RED EARTH, WHITE LIES: NATIVE AMERICANS AND THE MYTH OF SCIENTIFIC FACT 5* (1997).

A. Existence and Contribution of Native Knowledge Not Credited

The dominant society has often failed to acknowledge the existence of Native sources of knowledge. Sometimes, this apparent vacuum has enabled non-Native individuals to take credit for the products of Native science and technology.¹⁶ Yet Native knowledge is the source of numerous instances of enlarged scientific understanding and enhanced application.¹⁷

For example, Native knowledge has made important contributions to the development of world food crops, such as potatoes, corn and beans.¹⁸ Oren Lyons estimates that "about 60% of all food grown in the world today was developed by American Indians."¹⁹

Native environmental management techniques have also shaped numerous ecosystems, often in places that get described as "untouched by humans" or as "pristine."²⁰ Dennis Martinez asks:

16. See, e.g., Forbes, *supra* note 14, at 27 (decrying European appropriation of the products of Native efforts).

17. See, e.g., *id.* (noting contribution of Native science and technology to crops such as maize, potatoes, sweet potatoes, beans, tomatoes, cacao, peanuts, persimmons, bananas, yucca, tapioca, chayote, jicama, and papayas; medicinals such as witchhazel, quinine, golden seal, and American ginseng; and miscellaneous inventions such as applications of rubber, kayaks, and toboggans).

18. See, e.g., *id.*; Naomi Roht-Arriaza, *Of Seeds and Shamans: The Appropriation of the Scientific and Technical Knowledge of Indigenous and Local Communities*, in *BORROWED POWER: ESSAYS ON CULTURAL APPROPRIATION*, 256, 260–61 (Bruce Ziff & Pratima V. Rao eds., 1997) [hereinafter *BORROWED POWER*].

Indigenous and local farming communities have contributed significantly to the quality and diversity of the germ plasm that forms the basis of crop production....This genetic diversity is developed and maintained by community-based innovation systems through which farmers breed varieties suited to their specific local needs and microenvironments....Western science has been largely unable to recognize or value the role of indigenous and traditional farming communities because the innovators themselves have been invisible, the forms of transmission of knowledge incomprehensible, and the purpose of the work different from that of much of formal science. The work of testing, comparing, and breeding 'folk' varieties of seed is usually unrecognized as 'plant breeding' by Western scientists. It is done in fields rather than in laboratories and is highly specific to the local microenvironment.

Id.

19. Oren R. Lyons, *The American Indian in the Past*, in *EXILED IN THE LAND OF THE FREE* 13, 30–31 (Chief Oren Lyons & John Mohawk eds., 1992).

20. See, e.g., Thomas Blackburn & Kat Anderson, *Introduction: Managing the Domesticated Environment*, in *BEFORE THE WILDERNESS: ENVIRONMENTAL MANAGEMENT BY NATIVE CALIFORNIANS* 15, 18 (Thomas C. Blackburn & Kat Anderson eds., 1993) [hereinafter *BEFORE THE WILDERNESS*] (discussing the compelling and unequivocal evidence that has emerged that deliberate Native intervention maintained and regenerated

How many people know that Indian women in the San Francisco Bay Area were prescription-fire experts? How many people know that the forest structure, function, composition, and quality of habitat of areas like Yosemite were at least partly determined through indigenous selective harvesting and fire, through working with and assisting natural processes? When settlers came over the Oregon Trail, they thought that Indians did nothing to enhance the productive capabilities of the land.... Today nothing has changed.... [L]ittle credence is given to the impact that the Indian people have had on the very structure and composition of the landscape.²¹

A version of this failure that likely accompanies many contemporary restoration and other environmental management efforts occurs when agencies cite a lack of data and issue calls for "study" of a place about which considerable Native knowledge likely exists.²²

Any account of instances of Native knowledge, moreover, is likely to be partial to the extent that indigenous contributions have been lost or buried as members of the dominant society have taken most or all of the credit.²³ One researcher who worked recently with the Elim, Koyuk, and Shaktoolik communities to record their traditional ecological knowledge ("TEK") regarding beluga whales observed:

Biologists studying belugas in Alaska have long recognized the importance of local expertise and have acknowledged its use in their research. Nonetheless, the published reports tend to blend TEK and scientific findings so that the contribution of TEK is not

"the extremely rich, diverse, and apparently 'wild' landscape that so impressed Europeans at the time of contact—and which traditionally has been viewed as a 'natural, untrammled wilderness' ever since"); Dennis Martinez, *First People, Firsthand Knowledge*, SIERRA, Nov./Dec. 1996, at 50 ("Modern environmentalists have...fail[ed] to appreciate the high degree of Indian influence on what they see as a 'pristine' environment.").

21. Martinez, *supra* note 20, at 70.

22. See discussion *infra* Part III.A.2.

23. See, e.g., Roht-Arriaza, *supra* note 18, at 259.

Western science characterizes certain natural materials that local peoples and communities have cared for, preserved, improved, and developed as mere wild species or, at the most, as 'primitive species' or 'landraces.' Formal, scientific systems of innovation and research have, at least until recently, denigrated and denied the value of farmers' and communities' informal systems of knowledge transmission and innovation. In addition, whereas the products of formal knowledge systems have been protected as 'property,' those of informal, traditional systems have been tagged the freely available 'common heritage of humanity.'

Id.

immediately apparent or, as sometimes happens, is relegated to anecdotes in contrast to scientific fact.²⁴

B. Validity of Native Knowledge Denied

The dominant society has often questioned the validity and reliability of Native knowledge. It has viewed Native science and scientists as insufficiently "objective," and their observations as unreliable.²⁵ This is so, as Vine Deloria has observed, even when Native peoples have provided observations about their own traditions.²⁶

State and federal environmental agencies' characterization of Mattaponi and Pamunkey leaders' knowledge about tribal members' exposure to contaminated fish illustrates this point. Under the Clean Water Act, environmental agencies set standards that require restoration of contaminated waters to levels that subject humans to no greater than "acceptable" amounts of risk from exposure to the contamination.²⁷ A primary route for human exposure to many toxic chemicals occurs when humans eat fish that have bioaccumulated toxins present in the water.²⁸ So, a crucial piece of information for agencies' assessment of human exposure is the quantity of fish consumed by humans, the "fish consumption rate." Environmental agencies have relied on standard assumptions about how much fish the "average American" consumes; however, Native Americans from coastal regions consume vastly greater quantities than are assumed by such agencies.²⁹ Yet when leaders of the Mattaponi and Pamunkey tribes brought their knowledge about tribal members' exposure to the attention of the relevant agencies in the early 1990s, their statements were largely ignored. Instead, the state of Virginia set

24. Henry P. Huntington, *Traditional Ecological Knowledge and Beluga Whales*, CULTURAL SURVIVAL Q., Sept. 1998, at 66.

25. See DELORIA, *supra* note 15, at 34 (describing the belief in academia and scientific circles "that, for a person and/or community possessing any knowledge that is not white/Western in origin, the data is unreliable. A corollary of this belief is that non-Western peoples tend to be excitable, are subjective and not objective, and consequently are unreliable observers."). Accord Richard G. Kuhn & Frank Duerden, *A Review of Traditional Environmental Knowledge: An Interdisciplinary Canadian Perspective*, XVI CULTURE 71, 74 ("Until recently, Western scientists paid little regard to TEK, describing it as anecdotal, non-quantitative, without method, and unscientific.").

26. See DELORIA, *supra* note 15, at 34 ("Even with tribal peoples now entering academic fields, there is bias, and most academics deeply believe that an Indian, or any other non-Western person, cannot be an accurate observer of his or her own traditions because that individual is personally involved."). Accord Vivien Hailstone, Presentation at Indigenous Ecology and Cultural Restoration Workshop (Sept. 22, 1999).

27. See Federal Water Pollution Control Act ("Clean Water Act"), 33 U.S.C. § 1251(a)(3), 1313(d) (1994).

28. See Catherine A. O'Neill, *Variable Justice: Environmental Standards, Contaminated Fish, and 'Acceptable' Risks to Native Peoples*, 19 STAN. ENVTL. L.J. 3, nn.6-8 (2000).

29. See *id.* at 12-13, 36-69.

water quality standards based on the standard fish consumption rate, and the federal Environmental Protection Agency ("EPA") approved Virginia's standards.³⁰ The EPA's approval was challenged in court, where the EPA justified its actions by arguing that the evidence brought forth by the tribes was "oral" and "anecdotal."³¹ Although the tribal leaders' conclusions were based on observations—likely made over several years—the agencies referred dismissively to the tribal leaders' knowledge: "the beliefs of these individuals were not based on fish consumption studies;...[The] EPA found only anecdotal information, and no data."³² The Fourth Circuit agreed, stating that the agencies were free to ignore this "anecdotal evidence," which the court deemed "speculative at best."³³

C. Native Knowledge Recognized Only Upon "Verification" by the Science of the Dominant Society

The dominant society has sometimes acknowledged the conclusions of Native science, but only if they have been "verified" by the science and methods of the dominant society. Even here, the acknowledgment may be begrudging or skeptical. Instances of Native knowledge are often viewed as exceptional, surprising, or the result of a lucky guess.³⁴ Such skepticism on the part of non-Native society is especially likely where the Native knowledge holders are traditional or spiritual leaders, or where knowledge acquisition occurs (or is believed to occur) by methods outside dominant society orthodoxy.³⁵

For example, the Inupiat had long contended that the United States government's figures considerably underestimated the number of bowhead whales migrating along the coast of Alaska.³⁶ The government's tally of 2000 was obtained by marine biologists counting the number of whales that passed near shore leads. Inupiat experts suggested, however, that the actual population was several times greater because some whales migrate offshore. The Inupiat

30. See *Natural Resources Defense Council v. EPA*, 16 F.3d 1395, 1398–99 (4th Cir. 1993).

31. See Brief for Appellees at 31, *Natural Resources Defense Council v. EPA*, 16 F.3d 1395 (4th Cir. 1993) (No. 92-2520).

32. *Id.* at 31 & n.27.

33. See *Natural Resources Defense Council*, 16 F.3d at 1403.

34. See DELORIA, *supra* note 15, at 34. (noting the belief that "non-Western knowledge, while interesting, is a lucky correspondence between what science has 'proved' and what these people discovered by chance").

35. See, e.g., Rebecca Tsosie, *Privileging Claims to the Past: Ancient Human Remains and Contemporary Cultural Values*, 31 ARIZ. ST. L.J. 583, 619 (1999) (noting that "Native American spiritual leaders were able to suggest a causal connection between a proliferation of rodents and the Hantavirus even before scientists had identified the nature of the virus"). See also DELORIA, *supra* note 15, at 43–44 (discussing Western acceptance that animals and birds provide information about the medicinal uses of plants only upon white scientists' articulation of the "new" field of "zoopharmacognosy").

36. Chase Hensel & Phyllis Morrow, *Co-Management and Co-Optation: Alaska Native Participation in Regulatory Processes*, CULTURAL SURVIVAL Q., Fall 1998, at 69.

knowledge “was accepted only after biologists working for the Inupiat-controlled North Slope Borough placed an array of microphones in offshore migration paths and verified a bowhead population of over 8,000.”³⁷

Bill Rodgers recounts that the fishing Indians of the Pacific Northwest had concluded in 1937–38, through direct observation, that the mortality rate for outmigrating juvenile salmon passing through the newly-constructed Bonneville Dam was at least 15%.³⁸ By contrast, non-Native commercial fishers arrived at the same conclusion by 1945, and the United States Fish and Wildlife Service scientists first accepted the scientific “truth” of this conclusion sometime around 1953.³⁹ The United States Army Corps of Engineers did not accept this conclusion until 1980.⁴⁰ Despite this decades-old Native knowledge, non-Native agency scientists and policymakers continue to debate the effect of the dams on juvenile salmon survival.⁴¹

D. Recognition of Native Knowledge Conditioned Upon Presentation According to Conventions of the Dominant Society

The dominant society has sometimes acknowledged the conclusions of Native science, but only if and to the extent that these conclusions have been presented according to the conventions and preferences of the dominant society. Recognition of Native science as “science” may thus be conditioned upon it having been quantified, written, or peer-reviewed, and upon it having observed formal conventions for presenting data in the form of studies or reports.⁴²

37. *Id.* See also William Aron et al., *Flouting the Convention*, THE ATLANTIC MONTHLY, May 1999, at 22, 24 (noting, without mentioning any role played by Native knowledge, that “[e]stimates of the bowhead population in the late 1970s ranged from 500 to 2,000 animals; [that] the current bowhead population is believed to exceed 8,000[; and that] the rise in the estimate is due in part to population growth but mostly to better survey techniques.”).

38. See William H. Rodgers, *The Myth of the Win-Win: Misdiagnosis in the Business of Reassembling Nature*, 42 ARIZ. L. REV. 297, 301–02 (discussing cultural resistance to scientific findings regarding juvenile salmon mortality).

39. *See id.*

40. *See id.*

41. See, e.g., The Independent Scientific Group, *Return to the River: An Ecological Vision for the Recovery of the Columbia River Salmon*, 28 ENVTL. L. 503 (1998); Symposium on Salmon Recovery, 74 WASH. L. REV. 511 (1999).

42. See, e.g., O’Neill, *supra* note 28, at 45–54 (describing the EPA’s rejection of non-quantified evidence that Native people affected by water quality standards in Washington, Oregon and Idaho consumed fish at far greater rates than non-Native people). The Columbia River Inter-Tribal Fish Commission and several other Pacific Northwest tribes were prompted by this reality to undertake costly and time-consuming studies to quantify their practices and to present this information in the form likely to be recognized by federal and state agencies. See also generally COLUMBIA RIVER INTER-TRIBAL FISH COMMISSION, A FISH CONSUMPTION SURVEY OF THE UMATILLA, NEZ PERCE, YAKAMA, AND WARM SPRINGS TRIBES OF THE COLUMBIA RIVER BASIN (1994); KELLY TOY ET AL., A FISH

Acknowledgment, however, may be begrudging or skeptical. Moreover, there is often no attempt to ask what might have gotten lost in the translation or even to recognize that translation and loss are issues.

For example, Native peoples in the Great Lakes Basin, in partnership with the Canadian government, undertook to assess the environmental health of Native or Aboriginal peoples and to gauge the quantity of contaminated fish and wildlife these peoples consumed.⁴³

Preliminary data gathered by the EAGLE project indicate that Aboriginal people in the Great Lakes Basin consumed from 6 to 11 times more fish and wildmeats than the non-Aboriginal population.... These facts were self-evident to the communities and their technicians in the past. However, the fact remains that in order to get results, the community knowledge must be integrated into the Western scientific approach. That is, community knowledge must be integrated by translating it into a format which is recognized, understood, accepted, and used as a viable approach by Western science.⁴⁴

E. Native Knowledge Subjected to Greater Scrutiny than Similar Sources from the Dominant Society

The dominant society has often subjected the conclusions of Native science to greater scrutiny than the conclusions of the dominant society, even when the sources and methods may be similar. Whereas the dominant society has been willing to rely on its members' years of experience in a field, or familiarity with a given place or subject matter, it has been less willing to rely on experience or familiarity as the basis for Native knowledge. Recollections, inferences, and opinions by "expert" members of the dominant society are likely to be subjected to a less exacting and skeptical scrutiny than recollections, inferences, and opinions by Native knowledge holders.

For example, the EPA derived its default fish consumption rate of 6.5 grams/day from a survey conducted by the National Purchase Diary ("NPD") in the mid-1970s.⁴⁵ Using questionnaires, NPD surveyed approximately 25,000 individuals in the United States, asking participants to indicate the quantity and

CONSUMPTION SURVEY OF THE TULALIP AND SQUAXIN ISLAND TRIBES OF THE PUGET SOUND REGION (1996).

43. See Maxine Cole, *The Effects on Aboriginals from the Great Lakes Environment is the E.A.G.L.E. PROJECT*, AKWESASNE NOTES: J. FOR NATIVE & NAT. PEOPLE, Fall 1995, at 94.

44. *Id.*

45. See Guidelines and Methodology Used in the Preparation of Health Effect Assessment Chapters of the Consent Decree Water Criteria Documents, 45 Fed. Reg. 79, 347 app. C (1980).

species of fish each consumed.⁴⁶ The resulting dataset was presented to the National Marine Fisheries Service, and later interpreted by Harold Javitz and others.⁴⁷ Along the way, data identifying the species consumed were lost; as a result, the EPA had to make several guesses about the missing information.⁴⁸ An internal EPA memorandum recounts:

[A] rather large amount of the consumed fish and shellfish was listed as 'unclassified' or 'species not reported' in the NPD survey. Ms. Betty M. Hackley of the National Marine Fisheries Service has worked with the survey data for years and she feels that most of the unclassified group consists of cod, pollock, and whiting (silver hake). Since all of these species would be considered marine, this whole group was considered marine.⁴⁹

Because the EPA had made the judgment that marine fish need not be included in its tally of fish, the effect of classifying as marine all of the "rather large amount" of the fish consumed was to decrease the estimate of exposure and to reduce the protectiveness of the resulting environmental standards—possibly to a greater degree than was warranted by the fish consumption data.⁵⁰ However, even if the error was one of overestimation rather than underestimation, the point remains that the EPA was willing to rely on Hackley's recollections to fill gaps in the data; her years of familiarity with the data sufficed to make credible her beliefs about the missing information. The EPA issued default recommendations in 1980, and the 6.5 gram/day value has formed the basis of numerous state and federal agencies' water quality and cleanup standards since that time. Contrast this willingness with the skepticism applied by the EPA to the "beliefs" of the Mattaponi and Pamunkey leaders about the fish consumption rates of their members.⁵¹

Even when Native sources of knowledge would appear to fare better than non-Native sources according to the dominant society's own criteria for reliability, Native sources may be ignored or rejected in favor of the competing non-Native sources. With respect to fish consumption data, for example, the possibility for study bias is believed to be minimized when the data is gathered for longer periods of time, when it is gathered throughout the course of a year's seasonal fluctuations

46. See HAROLD JAVITZ, SRI INTERNATIONAL, SEAFOOD CONSUMPTION DATA ANALYSIS 18-20 (1980).

47. See *id.*

48. See Memorandum from Charles E. Stephan, Environmental Scientist, Environmental Research Laboratory—Duluth, U.S. Environmental Protection Agency, to Dr. Jerry Stara, Director, Environmental Criteria & Assessment Office, U.S. Environmental Protection Agency (July 30, 1980).

49. See *id.*

50. Although overestimation of exposure is also a possible error, this seems less likely given that the method described appeared to err on the side of overinclusion of species in the category "marine."

51. See discussion *supra* notes 27-33 and accompanying text.

in food availability and intake. The fish consumption study on which the EPA proposes to base its revised water quality criteria was conducted in three successive years over a three-day period—that is, the study drew its conclusions from nine days' worth of data provided by survey participants.⁵² Compare this to the EPA's earlier rejection of data presented by the Mattaponi and Pamunkey tribal leaders, which was likely based on daily observation over the course of years.⁵³

Similarly, the United States Fish and Wildlife Service ("FWS") designated critical habitat under the Endangered Species Act ("ESA") for the razorback sucker on a particular reach of the Salt River within the White Mountain Apache reservation in the absence of surveys providing support for designation and in the face of the White Mountain Apache Fish Biologist's data refuting designation.⁵⁴ Critical habitat may include areas currently occupied by an endangered species or areas outside of a species' current range so long as such areas are "essential to the conservation of the species."⁵⁵ The FWS' own Draft Biological Support Document indicated that there were no historical records of the razorback sucker's presence in the reach.⁵⁶ Moreover, the FWS had no surveys evidencing that the reach was currently occupied by the species—despite efforts during the 1980s to stock the razorback sucker in the reach.⁵⁷ The White Mountain Apache Fish Biologist attested that not only was the reach currently unoccupied by razorback sucker, but also it was unlikely to support razorback sucker populations in the future, citing poor quality habitat and the presence of exotic predators,

52. See Draft Water Quality Criteria Methodology Revisions: Human Health, 63 Fed. Reg. 43,756 (1998); U.S. DEP'T OF AGRICULTURE, CONTINUING SURVEY OF FOOD INTAKE BY INDIVIDUALS I (1998).

53. While the EPA offered justifications for its rejection, citing the facts that the tribal leaders' knowledge was both oral and non-quantified (see discussion *supra* notes 31–33 and accompanying text, and *infra* Part III.C), it is nonetheless noteworthy that they appear more willing to overlook weaknesses in non-Native sources, and less willing to locate value in and use Native sources.

54. Endangered and Threatened Wildlife and Plants: Determination of Critical Habitat for the Colorado River Endangered Fishes, 59 Fed. Reg. 13,374 (1994) [hereinafter Endangered and Threatened Wildlife]; COMMENTS OF THE WHITE MOUNTAIN APACHE TRIBE ON THE PROPOSED DESIGNATION OF CRITICAL HABITAT FOR THE RAZORBACK SUCKER (1994) [hereinafter WHITE MOUNTAIN APACHE COMMENTS].

55. "Critical habitat" is defined to include specific areas *within* the geographical area occupied by the species at the time it is listed as endangered, "on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection;" and specific areas *outside* the geographical area occupied by the species at the time it is listed "upon a determination by the Secretary that such areas are essential to the conservation of the species." 16 U.S.C. § 1532(5)(A) (1994).

56. See WHITE MOUNTAIN APACHE COMMENTS, *supra* note 54, at 10.

57. See *id.* at 9–10.

among other factors.⁵⁸ The tribal biologist supported his conclusions by reference to years of direct observation. The FWS nonetheless rejected these conclusions, and included the reach as critical habitat, explaining that “the Service believes that some of the introduced fish have survived in these systems where the razorback historically was a native fish.”⁵⁹

F. Native Scientists Not Consulted as Experts

The dominant society has often passed over Native scientists in its efforts to consult the “experts.” It has, on the one hand, declined to turn to Native knowledge holders even on matters having to do with tribal resources with which Native managers are intimately familiar and where Native peoples have developed an extensive and profound knowledge as a result of having resided in place for millenia.⁶⁰ The dominant society has, on the other hand, declined to turn to Native scientists even when these individuals have training and credentials of the sort recognized by the dominant society.

The number of Native people that have obtained scientific training and credentials in the manner recognized by the dominant society has increased in recent years.⁶¹ Yet many report that individuals in state and federal agencies, as well as academics and other members of the dominant society, persist in their reluctance to look to tribal scientists and environmental managers as experts.⁶² Sometimes, these individuals have indicated their discomfort with Native expertise by looking exclusively or primarily to any non-Native participant in a discussion

58. *Id.* at app. Letter from Ronnie Lupe, Chairman, White Mountain Apache Tribe, to Bruce Babbitt, Secretary of the Interior (April 14, 1993).

59. *See* Endangered and Threatened Wildlife, *supra* note 54, at 13,392 (1994). In addition to this explanation, FWS offered that “for those few [selected river reaches] that do not have a historical or recent record, information from species experts was used, in addition to examination of nearest known locations and of the predevelopment river system to determine if the species was likely to have been present.” *Id.* Note that it is not possible to pinpoint precisely which of the agency’s responses addresses the White Mountain Apache’s comments, because the final rule treats like comments together. The responses cited here appear, however, to constitute the FWS’ justification for rejecting the White Mountain Apache Fish Biologist’s data. Note, too, that surveys undertaken subsequent to designation have not turned up any razorback sucker. Telephone Interview with Sylvia Cates, Special Counsel, White Mountain Apache Tribe (Oct. 22, 1999).

60. *See* Winona LaDuke, An Indigenous View of North America, Address at North Carolina State University (Nov. 13, 1995) (audiotape on file with author) (recounting Native knowledge of 70-year migration cycles and noting that such knowledge is not easily obtained by a settler, visitor, or scientist who typically spends a few months or seasons there; even those who spend their entire professional lives studying a single area will not match the depth and nuance of Native peoples who have resided in place for millenia).

61. *See* DELORIA, *supra* note 15, at 34.

62. Telephone Interview with Marty Loesch, Staff Attorney, Swinomish Housing Authority (Feb. 9, 2000). Furthermore, this reluctance extends to non-Native employees of tribal government or tribal environmental management divisions. *See id.*

(even when the non-Native is not a scientist and the question is one for scientific expertise).⁶³ Sometimes, these individuals simply do not include Native scientists on the roster of experts to be consulted on a particular question.⁶⁴

III. OCCASIONS FOR DISCRIMINATION AGAINST NATIVE ECOLOGICAL SCIENCE

The denial of Native knowledge, especially Native ecological knowledge, has a long and complex pedigree. There is an undeniable history in the United States of efforts to colonize, exterminate, and assimilate Native peoples.⁶⁵ While it is not necessary to canvas this history here, it is notable that these efforts have often involved denying and denigrating the land- and resource-based facets of Native cultures. Among the myths employed and perpetuated in service of colonialist ambitions were myths about Native ecological knowledge and land management. Specifically, colonial apologists invigorated the notions that Native peoples did not shape, cultivate, or manage the land⁶⁶ and that Native management methods, to the extent they did exist, were unsophisticated, inefficient, and generally inferior to non-Native methods.⁶⁷

63. Telephone Interview with Sylvia Cates, Esquire (Oct. 22, 1999).

64. This practice, however, is changing, at least for some divisions or regions within some agencies. Interview with Sylvia Cates, Esquire (Feb. 14, 2000).

65. See generally ROBERT A. WILLIAMS, JR., *THE AMERICAN INDIAN IN WESTERN LEGAL THOUGHT: THE DISCOURSES OF CONQUEST* (1990) (discussing the history of “the West’s conquest of American Indians”).

66. See *Johnson v. M’Intosh*, 21 U.S. (8 Wheat.) 543 (1823) (invoking differences in “character and religion” between the European colonizers and the Native Americans to justify colonialist outcomes and noting that the former were “agriculturalists, merchants, and manufacturers” whereas the latter’s “subsistence was drawn chiefly from the forest”); JOHN LOCKE, *SECOND TREATISE OF GOVERNMENT* 16–30 (Thomas P. Peardon ed., Bobbs-Merrill Company, Inc. 1952) (1690) (describing America as comprising “wild woods and uncultivated waste” and equating lands tended by Native Americans with lands in the “state that nature has placed them in”); WILLIAMS, *supra* note 65, at 248 (“Locke’s discourse thus legitimated the appropriation of the American wilderness as a right, and even as an imperative, under natural law.”). Cf. Allison M. Dussias, *Squaw Drudges, Farm Wives, and the Dann Sisters’ Last Stand: American Indian Women’s Resistance to Domestication and the Denial of Their Property Rights* 77 N.C. L. REV. 637, 644–54 (1999) (pointing out that books available at the time—including one cited by the Court in its opinion in *Johnson v. M’Intosh*—accurately depicted at least some aspects of Indian agriculture, e.g., describing the Iroquois Confederacy’s cultivation of corn, and noting that Chief Justice Marshall was likely to have been aware of Native agriculture from his life experience if not from having read about it in books).

67. See *Tee-Hit-Ton Indians v. United States*, 348 U.S. 272, 287 (1955) (characterizing Tee-Hit-Ton resource use and management as primitive, noting that they “were in a hunting and fishing stage of civilization”); LOCKE, *supra* note 66, at 22–25 (contrasting efficiencies of enclosure and cultivation with inefficiencies and mismanagement of equally rich lands in the hands of American Indians, who “for want of improving it by labor have not one-hundredth part of the conveniences that we enjoy”);

While the racist ideology and colonialist ambitions invigorating these myths have been formally disclaimed,⁶⁸ Vine Deloria and others have identified the racist underpinnings of a view that dismisses knowledge that is non-white in origin, simply *because* it is non-white in origin.⁶⁹ Similarly, racist assumptions undergird a view that suspects the conclusions of a Native scientist to be unreliable, unsubstantiated or unuseful, simply *because* they are the conclusions of a Native scientist. When federal, state, or local environmental agencies whose decisions affect tribal resources dismiss Native knowledge or suspect the conclusions of tribal scientists on these bases, this is properly viewed as an instance of environmental racism.⁷⁰

Environmental racism in environmental decisionmaking may also take less obvious forms. That is, even well-intentioned agency decisionmakers may proceed according to processes, methods of analysis, and assumptions that may appear to them to be “objective,” rigorous, rational, or necessary to ensure “scientific defensibility” but that have the effect of denying or discriminating against Native knowledge. It will be important to identify instances in which current regulatory approaches work to exclude, devalue or discriminate against Native science if agencies are to avoid environmental racism.

To this end, it will be important to ask whether there are particular features of current approaches that present likely occasions for this discriminatory effect on tribal science. My chief aim here is to raise the question and to call for further efforts—ideally, efforts undertaken as part of an intercultural conversation—to identify likely occasions for discrimination. It seems that several aspects of current non-Native approaches may be candidates; however, I offer the following modest list of possibilities to encourage further work.

WILLIAMS, *supra* note 65, at 248 (observing that Locke’s assumptions invigorated the myth of Native Americans “as idle wastrals of the vast American wilderness”). *Cf.* Jan Timbrook et al., *Vegetation Burning by the Chumash*, in *BEFORE THE WILDERNESS*, *supra* note 20, at 117, 117 (pointing out that for Native Californians, “true agriculture was not adopted by most peoples in the state because it would have been not only unnecessary but a step backward in efficiency”).

68. See generally DAVID H. GETCHES ET AL., *CASES AND MATERIALS ON FEDERAL INDIAN LAW* 41–72 (4th ed. 1998) (describing past federal policies of assimilation, reorganization, and termination, and the present federal policy of self-determination).

69. See DELORIA, *supra* note 15, at 34.

70. Environmental racism encompasses a different constellation of issues for Native peoples than it does for other affected groups. For Native Americans in the United States, environmental racism often encompasses both exclusionary and cultural discrimination, see discussion *infra* Part IV.A, and implicates the interrelated issues of religious freedom, sovereignty, political self-determination, economic development, cultural flourishing, and observance of treaty and trust obligations. See, e.g., Dean B. Suagee, *Turtle’s War Party: An Indian Allegory on Environmental Justice*, 9 J. ENVTL. L. & LITIG. 461 (1994); Robert A. Williams, Jr., *Large Binocular Telescopes, Red Squirrel Piñatas, and Apache Sacred Mountains: Decolonizing Environmental Law in a Multicultural World*, 96 W. VA. L. REV. 1133 (1994).

A. Sustained Rhetoric of Denigration and Denial

Despite the educative efforts of indigenous people and others, members of the dominant society often perpetuate a rhetoric that denigrates or denies Native ecological knowledge. To the extent that members of the dominant society make no effort to reexamine and reform their language, it will continue to express disdain for and distrust of Native science and may thus be the first barrier to an intercultural conversation. The examples that follow are meant to be illustrative, not exhaustive.

1. We Should Return an Ecosystem to Its Condition Prior to Disturbance by Humans

When members of the dominant society speak of the baseline for restorative efforts, they typically posit a "natural state" to which an ecosystem ought be returned, one that is "untouched by humans," undisturbed, pristine. These individuals may go on to describe such an unaltered ecosystem as one that would have existed at the time of contact. Duncan Patten, for example, attributes to "explorers from eastern North America" in the early 1800s the first significant alteration of western ecosystems.⁷¹ While he allows that "[p]reviously these ecosystems were occasionally modified by indigenous peoples through fire, small irrigation projects, and limited timber cutting," he states that "[o]nly when these populations stayed in one locale for long times did their impact have ecological consequences; these areas usually returned to near-original states upon the demise or migration of the people."⁷² Having offered the definition of restoration as "the return of an ecosystem to a close approximation of its condition prior to disturbance," he concludes that such predisturbance conditions existed at the time of contact. Patten states:

Although it is difficult to assign a primeval label to areas that appear never to have been disturbed, we can use the word pristine for those areas that have little or no evidence of disturbance by modern man (i.e., post-1800s in the West). This means that these areas still maintain their original biological communities and ecological processes, and show no evidence of nonnative vegetation or significant human disturbance. This describes conditions discovered by Lewis and Clark as they passed through what is now Montana,

71. Patten, *supra* note 4, at 32. *But see generally* SHEPARD KRECH III, *THE ECOLOGICAL INDIAN: MYTH AND HISTORY* (1999). Dennis Martinez and others have criticized the dichotomous stereotypes typically applied to Native environmental management: *either* Native peoples lacked expertise and sophistication, and so had no impact on their ecosystems *or* they were profligate and rapacious, and so wreaked havoc on their ecosystems. *See* Martinez, *supra* note 20, at 50.

72. Patten, *supra* note 4, at 32 (describing example of extensive irrigation by Hohokam and other tribes of the desert Southwest).

and probably depicts conditions found by early Spanish explorers in the Southwest.⁷³

Such formulations may usefully emphasize the sheer magnitude of the disturbances wrought by European-American settlers, or the use of the word “disturb” may suggest the callousness and inattention with which these settlers interacted with their new environment.⁷⁴ However, they may also work to obscure the highly sophisticated environmental management practices of Native peoples. Statements to the effect that at the time of contact, ecosystems and landscapes had not been altered by humans are in myriad instances inaccurate.⁷⁵ A considerable and growing body of evidence supports the fact that Native peoples indeed did significantly alter their environments; among other things, they managed and worked with their environments to facilitate production of food and other material resources.⁷⁶ Statements to the effect that at the time of contact most areas “showed no evidence of” normative vegetation or other significant environmental management are misleading.⁷⁷ It may well be that some researchers have not been able or inclined to recognize evidence of Native management when they have encountered it. Although there are surely important qualitative distinctions to be made among European-American and the various Native environmental management approaches, statements that portray Native efforts as occasional, of limited effect, and non-normative seem to suggest also that Native management efforts were not methodically and purposefully undertaken, that Native management efforts were haphazard and ineffective, that Native management

73. *See id.* But *see supra* notes 20–21 and accompanying text.

74. This also may be the case with the Wilderness Act, an oft-cited example of the differences among European-American and the various Native understandings of the human-Earth relationship and approaches to environmental management. 16 U.S.C. § 1131 (1994) (defining and setting aside for protection “wilderness” areas as places “untrammeled by man”); Williams, *supra* note 70, at 1155.

75. *See, e.g.*, Timbrook et al., *supra* note 67, at 117; M. Kat Anderson, *Tending the Wilderness*, 14 RESTORATION & MGMT. NOTES 154, 158–61 (1996).

76. *See, e.g.*, Anderson, *supra* note 75, at 157–61 (“North American Indians were skillful wildland ecologists who practiced both plant husbandry and wildlife management as well as agriculture and plant and animal domestication for prolonged periods.”); Blackburn & Anderson, *supra* note 20, at 18 (discussing the compelling and unequivocal evidence that has emerged that deliberate Native intervention maintained and regenerated “the extremely rich, diverse, and apparently ‘wild’ landscape that so impressed Europeans at the time of contact—and which traditionally has been viewed as a ‘natural, untrammeled wilderness’ ever since”); Timbrook et al., *supra* note 67, at 148 (arguing that, for the Chumash at least, “burning was not an ‘energy extraction process’ in the sense of exploiting something that already existed, but truly a food production technique more efficient than agriculture in this ecological setting”).

77. Patten, *supra* note 4, at 32. *See also supra* note 73 and accompanying text.

efforts were technologically unsophisticated, and that Native managers were not really managers at all, but gatherers of that which nature provided unattended.⁷⁸

2. *We Have Only Just Begun to Study This Ecosystem*

When members of the dominant society preface their observations about a particular ecosystem, when they highlight the considerable uncertainties against which restoration plans are fashioned, or especially when they emphasize the need for further study before restoration efforts can confidently go forward, they often invoke some version of the statement that “we” have only just begun to study this ecosystem.⁷⁹

Such statements may remind humans of the need for humility, usefully countering decades of rhetoric in the dominant society extolling man’s ability to duplicate and even “improve” upon natural systems.⁸⁰ Such statements may

78. In addition, the intimation that all Native peoples who stayed in one locale for long times met their demise or migrated is problematic. While it is true that most Native populations were considerably diminished in numbers (through massacre, war, disease) as a result of the colonialist ambitions of the European-Americans, and some Native nations indeed have been lost or displaced, many Native peoples have continued to employ and develop the environmental management practices of their ancestors, passed down through the generations; in fact, it is precisely because these Native peoples have resided in place for generations and have tended and transferred the ecological knowledge that this intergenerational residency has afforded that these peoples are often the keepers of a wealth of scientific information. See, e.g., LaDuke, *supra* note 60.

79. See, e.g., Michael Blumm et al., *Beyond the Parity Promise: Struggling to Save Columbia Basin Salmon in the Mid-1990s*, 27 ENVTL. L. 21, 117–18 (1997) (recounting Senator Slade Gorton’s efforts, through a “science rider” to the Northwest Power Act, to require “scientific evaluation” of any salmon restoration recommendations, and arguing that this requirement was largely redundant and “might be viewed as an effort to impose a check on fishery agency and tribal recommendations”); Harry N. Scheiber, *From Science to Law to Politics: An Historical View of the Ecosystem Idea and Its Effect on Resource Management*, 24 ECOLOGY L.Q. 631, 644 (1997) (pointing out that “[f]rom the standpoint of political actors with an interest in delaying or killing plans for regulation of a fishery...it is a joy to be able to refer to the incompleteness of information that ineluctably goes along with a study [such as ecosystem science] whose conceptual boundaries are continuously expanding”).

80. To give one prescient example, proponents of dam construction on the Snake River and its tributaries argued emphatically during congressional hearings that the slackwater reservoirs impounded behind the proposed dams would actually create better spawning habitat for salmon than existed naturally, even as the dams flooded established spawning grounds:

[A] new reservoir almost invariably has more shoreline and is more likely to provide new and more extensive shallow spawning waters than can be expected in the narrow, rock cradle of the turbulent, highly fluctuating Salmon River. The Salmon River is far from being a perfect stream for raising fish. It is a flooder, with extremes of flow at White Bird ranging from 1,580 second-feet in December 1932 to 120,000

emphasize the complexities of ecosystems, usefully counseling attention to the interrelatedness of the various parts of natural systems. However, these sorts of statements may work at the same time to obscure the existence of Native knowledge about the place or natural system in question, or to deny its relevance. By universalizing the inattention of the dominant society, moreover, such statements are not only misleading but offensive to peoples for whom attention and reciprocal relationships are fundamental to their ways of living.⁸¹

By continuing to invoke words that denigrate and deny Native knowledge, by leaving unexamined the effects of formal and informal remarks and thus failing to correct long-held misperceptions, the rhetoric that frames restoration efforts may itself serve as an obstacle to non-discriminatory interaction among federal, state, and Native environmental managers.

B. Affection for Quantitative Methods of Analysis

Quantitative methods of analysis such as quantitative risk assessment and cost-benefit analysis have enjoyed a spectacular ascendancy in recent years, and are now a staple of federal and state regulatory approaches. These methods exclude or discount information or understandings that are not readily quantified.

For example, when the EPA in the 1980s and 1990s set cleanup standards for a stretch of the St. Lawrence River under the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA"), they used quantitative risk assessment to determine the amount of polychlorinated biphenyls ("PCBs") that they would permit to remain in the environment after remedial action.⁸² Among those affected by the contamination and cleanup are the Mohawk people and their Akwesasne homeland. A snapping turtle was found on the reservation with 3,067 parts per million PCBs in its fatty tissue.⁸³ This finding was recorded by the EPA as a factor influencing its quantification of uptake and bioconcentration of toxins, with the aim of gauging human exposure to the contaminants contained in the water and sediments and concentrated in aquatic species that humans might consume.⁸⁴ However, the EPA's quantitative methods did not provide a place to reflect the profound cultural affront to the Mohawk resulting from the contamination of their homeland and, especially, of a turtle,

second-feet in June 1894....Man should certainly be able to improve this reckless river into a better habitat for salmon.

Columbia River Basin Fishery Resources: Hearing on S. Con. Res. 35, S. 2586, S. 1420 Before the Senate Comm. on Interstate and Foreign Commerce, 86th Cong. 208 (1960).

81. See Tsosie, *supra* note 6, at 268-87.

82. See Ross, *supra* note 8; LaDuke, *supra* note 7, at 8-23.

83. See LaDuke, *supra* note 7, at 12.

84. See Ross, *supra* note 8.

which occupies an important place in their traditional understandings of the world.⁸⁵

In another example, the United States Army Corps of Engineers is considering whether to breach the four lower Snake River dams, which would restore free-flowing conditions to some 140 miles of the Snake, in order to revitalize several endangered salmon runs. As part of its decisionmaking process, the Corps has attempted to assess the costs and benefits of this controversial measure. It has recently employed contingent valuation in an effort to put a dollar value on the salmon's existence.⁸⁶ The contingent valuation methods used by the Corps ask people how much they would be willing (and able) to pay to save the salmon (one poll, for example, asked Seattle-area residents how much they would be willing to add to their monthly electricity bill).⁸⁷ While numerous commentators have taken issue with various aspects of the design of surveys such as those employed by the Corps, contingent valuation and cost-benefit analysis in general are susceptible to the more fundamental complaint that attempts to put a price on the salmon at all are incompatible with some understandings of the world. The quarrel here is not with the amount derived from valuation but with human endeavors to value the salmon at all. The Native peoples of the Columbia River basin, for whom the salmon are culturally important, have evidenced quite different understandings of their relationship to the salmon than the one required by contingent valuation. In their restoration plan for the Columbia River salmon, *Wy-Kan-Ush-Mi Wa-Kish-Wit*, the Nez Perce, Umatilla, Warm Springs and Yakama Tribes emphasize the difference between the non-Native approaches and "the tribal conviction that not all societal decisions can be properly weighed in terms of costs and economics."⁸⁸ According to these Native peoples, "[the value of restoration] includes the spirit of the salmon (*Wy-Kan-Ush-Mi Wa-Kish-Wit*). Tribal peoples can feel the yearning of salmon to serve its life purpose. There is no model that can factor in spirituality nor the ultimate value of living creatures."⁸⁹

85. Note that the presence of PCBs and other chemical contaminants in fish had already put the Mohawk people in the untenable position of having to reduce their traditional consumption of fish or else be exposed to the contaminants concentrated in the fish tissue. A tribal press release emphasized the consequent cultural affront: "Our traditional lifestyle has been completely disrupted and we have been forced to make choices to protect our future generations. We feel anger at not being able to eat the fish." Ross, *supra* note 8. EPA's quantitative methods also did not provide a place to reflect the cultural aspects of the harm from contaminated fish. *Id. Accord LaDuke, supra* note 7, at 8-23.

86. See Sam Howe Verhovek, *They Exist. Therefore They Are. But, Do You Care?*, N.Y. TIMES, Oct. 17, 1999, sec.4, at 5.

87. See *id.*

88. COLUMBIA RIVER INTER-TRIBAL FISH COMMISSION, 1 *WY-KAN-USH-MI WA-KISH-WIT*, SPIRIT OF THE SALMON: THE COLUMBIA RIVER ANADRAMOUS FISH RESTORATION PLAN OF THE NEZ PERCE, UMATILLA, WARM SPRINGS AND YAKAMA TRIBES iv-vi (1995) [hereinafter *SPIRIT OF THE SALMON*].

89. *Id.*

To the extent that Native knowledge exists in a non-quantifiable form, the choice of quantitative methods excludes Native knowledge. To the extent that quantification would do violence to the way that Native peoples perceive the world and their relationship to it, the request for quantification may not only ask an unintelligible question, but also be deeply insulting. To the extent that federal and state agencies nonetheless choose such quantitative tools for decisions affecting tribal resources, these agencies require Native people either to transform their knowledge and experience into quantitative form in order to have it counted or to decline this transformation and leave Native experience unaccounted for in decisions affecting the resources on which they depend. Thus, the choice of quantitative methods may provide occasions for discrimination against Native ecological knowledge.

C. Suspicion of Orality

Another likely occasion for discrimination stems from the fact that agency regulators, along with the general dominant society, are suspicious of orality. Many agency decisionmakers believe that information in written form is more trustworthy, more reliable, and more likely to be true than information in oral form.⁹⁰

As recounted above, when leaders of the Mattaponi and Pamunkey tribes attempted to explain, orally, to federal and state agencies that their members consumed vastly greater quantities of fish than the "average American" assumed by these agencies, the Native leaders' statements were largely ignored.⁹¹ The resulting water quality standards were challenged in court, and the EPA in the course of argument chided the plaintiffs for their "misplaced" reliance on "oral statements."⁹² Although part of the problem here, from the agencies' point of view, stemmed from the fact that the information provided by the tribal leaders was qualitative rather than quantitative, their arguments indicate that they were also troubled by the fact that this information was collected and presented by means of oral transmission.

Native knowledge is often—although in modern times, not exclusively—cultivated and presented in oral form.⁹³ The oral tradition is a vital repository of Native knowledge and teachings, transferred from generation to generation over uncounted centuries. Vine Deloria equates the oral tradition with Western

90. See Glen Stohr, *The Repercussions of Orality in Federal Indian Law*, 31 ARIZ. ST. L.J. 679, 680–81 (1999) (discussing these points in the context of Native Americans' claims to religious freedom).

91. See discussion *supra* notes 27–33 and accompanying text.

92. Brief for Appellees at 31, *Natural Resources Defense Council v. EPA*, 16 F.3d 1395 (4th Cir. 1993) (No. 92-2520).

93. See, e.g., Roht-Arriaza, *supra* note 18, at 261 ("[M]uch [indigenous] knowledge about the qualities and uses of plants, animals, and microorganisms is transmitted orally, often through stories and songs.").

science.⁹⁴ He notes that the oral tradition “explains the nature of the physical world” and recounts, among other things, “precise knowledge of birds, animals, plants, geologic features, and religious experiences” of a particular Native people.⁹⁵ He elaborates: “Storytelling was a precise art because of the nature of Indian languages. Some tribal languages had as many as twenty words to describe rain, snow, wind, and other natural elements.”⁹⁶ However, because this knowledge is not written, not documented, and not presented according to formal conventions familiar to agency regulators trained in the tradition of western science, this Native knowledge is less likely to be recognized and counted as “data,” “knowledge,” or “science.”⁹⁷

Yet Native people may maintain just the opposite view. They may find it unnecessary and cumbersome to have to put knowledge in writing.⁹⁸ They may object that reducing information to writing is indeed reductionist, that much is lost in the process. They may find that writing does not increase reliability, but in fact decreases it; they may distrust written sources or at least prefer oral sources.⁹⁹ Moreover, because Native people may be particularly attuned to the loss that occurs when oral tradition is reduced to writing,¹⁰⁰ to the extent that federal and state agencies insist that knowledge and experience be presented in written form, they may erect a barrier that is difficult, if not impossible, to surmount.

D. Preoccupation with “Objectivity”

A fourth occasion for discrimination may arise because non-Native scientists, even those working in applied fields or in the regulatory context where “science” is often difficult to separate from “policy,” tend to pride themselves on their “objectivity.” Objectivity depends on the claim that the scientist’s own values

94. See DELORIA, *supra* note 15, at 36.

95. *Id.*

96. *Id.* at 37. Accord EUGENE S. HUNN WITH JAMES SELAM AND FAMILY, NCH’I-WANA, “THE BIG RIVER”: MID-COLUMBIA INDIANS AND THEIR LAND 151–52 (1990) (enumerating Sahaptin words for salmon).

97. See generally DELORIA, *supra* note 15; Stohr, *supra* note 90.

98. See, e.g., Douglas George-Kanentio, *Traditional Knowledge Conference Answers the Question of American Indian Origins*, AKWESASNE NOTES: J. FOR NATIVE & NAT. PEOPLE, Winter 1996, at 45 (describing conference series on Traditional Knowledge sponsored in part by the American Indian Science and Engineering Society). “The sessions were conducted without note taking, tape recording or filming. The intent, as is true with regards to all Traditional Knowledge gatherings, is to encourage the listeners to pay extraordinary attention to the words of the presenters without having intrusions of any kind.” *Id.*

99. See *id.*

100. Thomas Alcoze-Goulard has emphasized just this point and has cited it as an impediment to blending conventional knowledge with traditional indigenous knowledge in forestry and other resource management efforts. See Program Delivery Panel, *Indigenous Perspectives in Forestry Education Workshop*, University of British Columbia (visited Oct. 15, 1999) <http://www.forestry.ubc.ca/firstnat/del_pres.html>.

and commitments do not affect the observations she makes nor the questions she frames in the first place.¹⁰¹ Numerous commentators have expressed serious doubt that humans can be such bias-free participants in inquiry.¹⁰² Yet non-Native society continues to attach authority to those conclusions that don the mantle of objectivity. It speaks of "objective truths" on the one hand, and conclusions "marred by subjectivity" on the other.¹⁰³ There is no place in this either/or discourse for conceding that a person inevitably brings a host of biases, values, and commitments to her work: to own up to one's values would be tantamount to admitting that one had fudged a conclusion.

Moreover, Vine Deloria marks the loss that accompanies this preoccupation with objectivity:

[Western s]cience insists, albeit at a great price in understanding, that the observer be as detached as possible from the event that he or she is observing. Indians know that human beings must participate in events, not isolate themselves from occurrences in the physical world. Indians thus obtain information from birds, animals, rivers, and mountains, which is inaccessible to modern science.¹⁰⁴

Because of this preoccupation with objectivity, non-Native decisionmakers may discount any results or ways of knowing that do not deny the participation of the person seeking knowledge.

Non-Native decisionmakers may also be uncomfortable with the results of any inquiry that has a self-consciously spiritual or ethical component.¹⁰⁵ They may believe such results to be unreliable or unsophisticated; they may worry that those conducting such an inquiry will not be sufficiently open-minded. Whereas the various non-Native decisionmakers have each claimed objectivity (and so

101. See, e.g., FEYERABEND, *supra* note 13, at 5 ("To say that a procedure or a point of view is objective[ly true] is to claim that it is valid irrespective of human expectations, ideas, attitudes, wishes. This is one of the fundamental claims which today's scientists and intellectuals make about their work.").

102. Compare FEYERABEND, *supra* note 13, at 4 (arguing that subjective or cultural biases imbue inquiry into even the most technical questions) with NATIONAL ACADEMY OF SCIENCES, ON BEING A SCIENTIST 2, 6-7 (1989) (maintaining that the goal of scientific methods "is to coax the facts, untainted by human bias, from a scientific investigation," but conceding that scientists cannot observe the physical world freed from all perspective and that "social and personal values unrelated to epistemological criteria...can shape scientific judgment in fundamental ways").

103. See, e.g., NATIONAL ACADEMY OF SCIENCES, *supra* note 102, at 2, 6-8, 14-15; Holly Doremus, *Listing Decisions Under the Endangered Species Act: Why Better Science Isn't Always Better Policy*, 75 WASH. U. L.Q. 1029, 1037-38 (1997); Daniel S. Greenberg, *Thumbs Up for Science*, WASH. POST, July 8, 1996, at A15.

104. See DELORIA, *supra* note 15, at 40.

105. See, Roht-Arriaza, *supra* note 18, at 261 ("Descriptions of uses of plants, animals, or soils for medicinal purposes may be dismissed because the corresponding maladies or diseases are described in ways that integrate the physical, mental, and spiritual and so are alien to Western researchers.").

authority) for their “science” while the salmon runs of the Pacific Northwest have continued to dwindle on their watch, the Nez Perce, Umatilla, Warm Springs, and Yakama Tribes claim profound involvement with and respect for the salmon and so preface their project of restoration:

The salmon’s spirit—Wy-Kan-Ush-Mi Wa-Kish-Wit—is sacred life. The salmon was provided a perfect world in which to enjoy its existence. For thousands of years, the salmon unselfishly gave of itself for the physical and spiritual sustenance of humans. The salmon’s spirit has not changed; the human spirit has.

Today the perfect world of the salmon is in total disarray. Even its very existence and worth are being debated. Human arrogance has brought man to the brink of extinction....

The four Columbia River treaty tribes, who are keepers of ancient truths and laws of nature, employ the depths of their hearts and the expanse of their minds to save the salmon.

Respect and reverence for this perfect creation are the foundation of this plan.¹⁰⁶

The Tribes’ Restoration Plan goes on to comprise two volumes of highly sophisticated analysis and recommendations to restore the salmon.

E. Presupposition of the Universality of Knowledge

The dominant society presupposes that knowledge is universal and impersonal, available equally to all who choose to access it.¹⁰⁷ This presupposition often goes unstated among scientists and policymakers in the dominant society, yet determines a host of practices regarding information collection, use, and dissemination.¹⁰⁸ This presupposition may itself introduce occasions for misunderstanding and discrimination.¹⁰⁹

106. See SPIRIT OF THE SALMON, *supra* note 88, at ii.

107. See, e.g., James D. Nason, *Native American Intellectual Property Rights: Issues in the Control of Esoteric Knowledge*, in BORROWED POWER, *supra* note 18, at 237, 245 (“From the traditional Western scientific perspective, knowledge is and should be essentially ‘free’ and open; this notion remains a cornerstone of many of the professional attitudes, training, and ethics maintained by scholarly societies.”).

108. See, e.g., NATIONAL ACADEMY OF SCIENCES, *supra* note 102, at 10–12. Consider, for example, the process of peer review, ideally undertaken, on the view of Western science, by reviewers with no connection to or personal knowledge about the particular observations at issue. *Id.*

109. Compare Nason, *supra* note 107, at 245 (pointing out that, from a Western scientific perspective, “research that results in classified or restricted access to data is usually abjured, if not condemned”), with WHITE MOUNTAIN APACHE TRIBE & U.S. FISH AND WILDLIFE SERVICE, PROTOCOL FOR INFORMATION MANAGEMENT (1994) (establishing guidelines to protect “potentially sensitive Tribal information” regarding or collected on the Fort Apache Indian Reservation, and defining as “potentially sensitive,” *inter alia*, any

On Native understandings, knowledge is often local. It is place-based. It often results from "generations of careful observation within an ecosystem of continuous residence."¹¹⁰ Knowledge is user-based. It often must be practiced in order to be regenerated. On Native understandings, some knowledge may be specialized and personal, properly usable only by the individual, or group, that has come to possess it.¹¹¹

Helen McCarthy explains that, in addition to highly developed harvesting, pruning, and burning practices, Native expertise in managing oaks and acorns in California was only effective within the context of "spiritual relationships between themselves, the land, and the resources it provides."¹¹²

The first point that needs to be emphasized is that these relationships operate on a daily basis and can and must be fulfilled by each person individually. These relationships require the *regular use of and respect for* plants and resources. I have often heard it expressed that many plants are gone today and that oaks do not bear good crops any more because the people no longer use them.¹¹³

In sum, current regulatory approaches may work to discriminate against Native ecological knowledge in a variety of ways. Among the features of current approaches that are candidates for scrutiny are the use of formal and informal rhetoric denying or denigrating Native knowledge, an affection for quantitative methods of analysis, a suspicion of orality, a preoccupation with objectivity, and a presupposition of the universality of knowledge. This list, moreover, may well be partial. Thus, efforts toward dismantling occasions for discrimination in regulatory science would require not only further scrutiny of the candidates enumerated here, but also further work to identify other candidates.

Agency decisionmakers might counter that the discriminatory features of the approaches identified in this Part are not designed to exclude Native science, but rather to exclude all science—Native or non-Native—that is not sufficiently rigorous, rational, or "scientific." They might argue that these features are neutral—indeed, that they and other aspects of the scientific method are the only

information regarding ecological conditions and natural resource management practices or plans) (copy on file with the Author) and U.S. Fish and Wildlife Service, Determination of Critical Habitat for the Mexican Spotted Owl, 60 Fed. Reg. 29,914, 29,920 (June 6, 1995) (noting that "[d]etails of the Mescalero Apache conservation plan are considered proprietary by the Tribe and are not available for release by the Service").

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

111. See DELORIA, *supra* note 15, at 38 (describing acquisition of specialized knowledge, often through vision quests and other directed spiritual or ceremonial undertakings, and contrasting Native views that such knowledge is personal with non-Native views that knowledge is impersonal, that "anyone can use knowledge").

112. See Helen McCarthy, *Managing Oaks and the Acorn Crop*, in BEFORE THE WILDERNESS, *supra* note 20, at 213, 225.

113. *Id.* at 225 (emphasis in original).

value-free arbiters of truth. The response to this contention is several-fold. First, the discussion thus far has afforded a sense of the sophistication, precision and nuance of Native science, and of the disdain, misunderstanding or ignorance with which the dominant society nonetheless continues to regard Native ecological science. That disdain, misunderstanding, and ignorance linger in the face of increased access to the contributions of Native science calls into question claims that the identity of the knowledge holder is irrelevant.

Second, even assuming that the myths of Native inferiority have indeed been expelled, the reference to science as a neutral arbiter is misleading on several counts. In the first place, what counts as "science" is itself contested terrain. To speak as if there existed a single definition of science (one that, on neutral bases, turns out to exclude Native science) misrepresents this ongoing contest. Moreover, within this contest, several critiques challenge the conventional claim that science is a value-free arbiter of truth. Rather, some critics note, to refer decisions to science, at least Western understandings of science, is not to remove decisions from a clash among competing sets of values, but instead to instate one set of values and to deny all others. To speak of science as if it were neutral or objective fails to acknowledge these contemporary critiques.

Specifically, the conventional Western view of science holds that nature's truths are available for discovery by scientists through careful, repeated interrogation via "the scientific method," and that the product of this inquiry then contributes to the accumulated body of scientific knowledge about the world.¹¹⁴ Science, on this view, is "good" or "bad" according to the fidelity with which it represents the way nature "actually, objectively, is;" this determination is to be made by scientists, who are the only ones believed capable of making it.¹¹⁵ Peer scientists police this boundary by reference to the scientific method, which relies heavily on controlled testing and replicable results to ferret out error;¹¹⁶ they give serious critical attention to the theories, experimental data, and interpretations of these data as part of the peer review process.¹¹⁷

Some critics of this conventional view have questioned science's claimed objectivity, and have argued that science is largely socially constructed. As Sheila Jasonoff summarizes, on this view, "[t]ruth emerges not because nature, when interrogated by the scientific method, unambiguously reveals the answers, but because discipline-based scientists agree, through complex processes of negotiation and compromise, how they should choose from among different

114. See, e.g., Sheila Jasonoff, *Procedural Choices in Regulatory Science*, 4 RISK: ISSUES IN HEALTH & SAFETY 143 (1993), available at <<http://www.fplc.edu/risk/vol4/spring/jasanoff.htm>>; Cf. NATIONAL ACADEMY OF SCIENCES, *supra* note 102, at 2.

115. See Jasonoff, *supra* note 114. Accord NATIONAL ACADEMY OF SCIENCES, *supra* note 102, at 3-4.

116. See Jasonoff, *supra* note 114. Accord NATIONAL ACADEMY OF SCIENCES, *supra* note 102, at 5-6, 10-12.

117. See DELORIA, *supra* note 15, at 27-28. Accord NATIONAL ACADEMY OF SCIENCES, *supra* note 102, at 5-6, 10-12.

possible readings of observations and experiments...[and among] alternative scientific methods, theories and claims...."¹¹⁸ Other, more radical critics argue that science is itself a tool of colonialism or imperialism, that science has been used to make intellectually respectable the imposition the dominant culture's ways of living and knowing and to legitimate the oppression of non-Western peoples.¹¹⁹

Third, and finally, research science and regulatory science are arguably quite different enterprises; while this view may be widely shared, it may at the same time be forgotten when it comes time to justify decisions that exclude Native science. As Jasonoff has argued, it is important to keep in mind the differing characteristics of "bench science" or "academic research science," on the one hand, and "regulatory science," on the other.¹²⁰ She points out that one needn't "believe rigidly in the constructivist account of science or adopt the most radical form of ontological skepticism to conclude that regulatory science is particularly susceptible to divergent, socially conditioned interpretations."¹²¹ Jasonoff notes that bench or academic science "tends to be conducted in environments of reasonably strong consensus, governed by established paradigms and relatively uncontested methodological and quality control standards."¹²² By contrast, in regulatory science "standards for assessing quality tend to be more fluid, controversial and sensitive to political factors."¹²³ In addition, inquiries or studies in regulatory science often straddle disciplinary boundaries, making assessment by the standards of any single discipline problematic.¹²⁴

The insights of the social constructivist and radical critiques, along with Jasonoff's observations that the standards for regulatory science are more fluid than those of research science, may suggest cause for some optimism. As Paul Feyerabend puts it, "there is nothing in the nature of science that excludes cultural variety."¹²⁵ If Native scientists are no longer excluded from the groups of scientists who negotiate "truth" in the regulatory context, and if Native people's observations, methods, and claims are no longer automatically suspected or invalidated, then there is hope that both exclusionary and cultural discrimination can be dismantled. I now turn to questions of how to commence this task.

IV. CONSIDERATIONS FOR DECISIONMAKING

How, then, should decisions about restoration affecting Native resources proceed? Environmental managers from different cultures are likely to give

118. Jasonoff, *supra* note 114.

119. See, e.g., FEYERABEND, *supra* note 13, at 1-17; James Riding In, *Without Ethics and Morality: A Historical Overview of Imperial Archaeology and American Indians*, 24 ARIZ. ST. L.J. 11, 14-23 (1992).

120. Jasonoff, *supra* note 114.

121. *Id.*

122. *Id.*

123. *Id.*

124. See *id.*

125. FEYERABEND, *supra* note 13, at 12.

different answers to this question. Even if they used similar words to name criteria against which decisions might be judged—decisions, they might agree, should be judged against the criteria of justice and effectiveness—they might harbor very different conceptions of justice or effectiveness. I do not purport to presage the criteria or conceptions that would emerge from an intercultural conversation undertaken in light of the particular context at hand. Instead, I offer two considerations meant to facilitate such a conversation. Section A observes that widely shared norms support protection of cultural integrity and suggests that these norms might serve to *frame* intercultural conversations on restoration. That is, protection of cultural integrity might provide a substantive starting point for environmental managers from different cultures, who might then give content to what such protection would entail, in light of their particular understandings. Whereas Section A focuses on this possible area of convergence, Section B highlights a likely source of divergence. This Section reminds decisionmakers that the aspirations and methods of restoration may differ across cultures. To this end, it offers a handful of accounts that highlight various Native and non-Native approaches to environmental management.

A. Protection of Cultural Integrity: A Framework for Decisionmaking

S. James Anaya has identified emerging yet widely shared norms supporting the protection of cultural integrity.¹²⁶ Protection of cultural integrity will mean different things for different groups, depending on their particular histories and circumstances. In the case of Native peoples within the United States,¹²⁷ protection of cultural integrity is likely to require efforts to address both exclusionary and cultural discrimination.¹²⁸ Briefly, exclusionary discrimination involves impeding group members' full participation in the benefits and privileges commonly enjoyed by members of a majority or dominant society.¹²⁹ Cultural discrimination works to obliterate or suppress cultural bonds by stifling expression of non-dominant or minority groups' cultures or by attempting to assimilate them, where abandonment of their cultural identity is not desired by these groups.¹³⁰

126. See S. James Anaya, *On Justifying Special Ethnic Group Rights: Comments on Pogge*, in *ETHNICITY AND GROUP RIGHTS, NOMOS XXXIX*, 222, 223 (Ian Shapiro & Will Kymlicka, eds., 1997) ("Among the important values that are embraced by enlightened societies and now featured in international human rights law is the value attached to the integrity of diverse cultures.").

127. Recognition of the value of cultural integrity counsels attention to the claims of all cultural groups, including majority or dominant cultural groups. But because the integrity of cultural groups in the numerical minority or otherwise in a nondominant position is more likely to be vulnerable to breach, it makes sense to focus on what would be required to protect integrity for these groups. See *id.* at 224.

128. See *id.* at 227–29 (using these terms).

129. See *id.* at 227.

130. See *id.* at 228.

Both kinds of discrimination have profound past and continuing effects for Native Americans.¹³¹ Both kinds of discrimination justify a host of remedial measures.¹³²

Notably, discrimination against Native Americans has often taken the form of dismantling or denigrating those facets of their cultures that connect them to their homelands and resources.¹³³ Not surprisingly, the effects of such acts of cultural discrimination are interrelated. Past practices that dispossessed Native peoples of vast portions of their homelands and resources consequently have diminished opportunities for them to use, develop, and perpetuate their knowledge of these places and natural systems. Similarly, present practices that despoil Native lands and resources also work to deny such opportunities. Thus, for example, when the non-Native society's environmental decisions today permit the degradation of the habitat on which salmon depend, they facilitate not only the decline in salmon numbers or the chemical contamination of those salmon that remain, but also the suppression of the cultural practices of the Native peoples, for whom fish, fishing, and fish consumption are vital. In addition, these decisions diminish and ultimately may obliterate opportunities for the inter-generational transfer of ecological knowledge. The Columbia River Inter-Tribal Fish Commission explains this connection, pointing out that "cultural risk" here includes "ecological impacts that reduce or impair the inter-generational transfer of ecological knowledge used for implementing traditional holistic environmental management practices."¹³⁴ These acts of inter-generational transfer are themselves important to the maintenance of social and cultural bonds.¹³⁵ The use of the knowledge in context is important to its continued vitality. And, in turn, this place-based and user-based knowledge is important to the health of the natural systems that include the fish and the fishing peoples.

In order to eliminate discrimination and to protect the cultural integrity of Native Americans, agencies whose decisions affect Native resources will likely have to consider a variety of measures not necessary when only non-Native

131. *See id.* at 229 ("The cultural suffocation historically experienced by Native Americans...along with other multiple effects of colonialism, have left [them] with deep wounds which manifest themselves in social, political, economic, as well as cultural spheres.").

132. *See id.* at 227-29.

133. *See id.* at 228-29.

134. Columbia River Inter-Tribal Fish Commission, Comments to EPA Administrator Carol Browner on the Draft Revisions to the Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health, January 14, 1999, at 10. (citing Telephone Interview with Stuart Harris, Natural-Cultural Resources Coordinator for the Confederated Tribes of the Umatilla Indian Reservation (Jan. 11, 1999)) [hereinafter CRITFC Comments].

135. Columbia River Inter-Tribal Fish Commission, *Cultural Context* (visited Oct. 18, 1999) <http://www.critfc.org/text/TRP_cul.htm> (describing extensive tribal ecological knowledge that was "transmitted to succeeding generations as part of their inheritance" and noting that "[p]lants, animals, and especially places were...repositories for historical, social, and spiritual lessons").

resources are affected. These measures will often be justified, even if they would in some cases require members of the dominant society to give up something, so long as their own claims to cultural integrity and flourishing are not thereby infringed.

B. Various Aspirations and Methods of Restoration

The aspirations and methods of restoration may be imagined quite differently for different cultures. Native and non-Native environmental managers working on restoration that affects Native resources will need to be alert to possible differences in their understandings, if they are to avoid miscommunication. This Section presents a sampling of accounts meant to illustrate various Native and non-Native views on questions of environmental management.

Kat Anderson has gathered a host of accounts by Native Californians that speak to various aspects of environmental management:

When gathering or hunting plants or animals, [Native people] unite the concept of "home" and the notion of "use". The distinction between nature without humans (wilderness) and nature with humans (home) is not made:

I've always wondered why people call plants 'wild.' We don't think of them that way. They just come up wherever they are, and like us, they are at home in that place [Clara Jones, Chukchansi Yokuts...].

The fact that plants and animals are honored *through* human use reinforces the feeling that plants, animals, and humans all belong to a place....

...There is a common feeling among elders today that plants want to be used. This idea is similar to the concept that the fish and deer want to be caught and eaten. If not gathered they become scarce or disappear altogether:

....

We gathered *dana* in the first part of May or the last part of April.... We'd gather it with a manzanita or mahogany digging stick. We'd go early in the morning and come back by evening because you need a lot of the potatoes to make a meal. Nowadays you hardly see them anymore because nobody goes out and gets them [Ruby

Cordero, Southern Miwok-Chukchansi
Yokuts...].¹³⁶

Chase Hensel and Phyllis Morrow contrast non-Native and Native understandings respecting the regulation of hunting:

[T]o biologists, conservation involves harvest practices, including restraint, that will ensure viable future stocks based upon reasonable assumptions about reproduction and growth. Yup'ik communities are aware that human actions affect animal populations. To them, wasting and other improper behavior cause animals to consciously withhold themselves from hunters. The human-animal relationship has been understood as social and reciprocal. In theory, the more one harvests, the more there would be in the future as long as the animals were not wasted or treated in other disrespectful ways. (Biologists are often appalled at the license to over-harvest this would seem to give. In fact, other beliefs, social practices, and technological constraints mitigated population decimation.) Conservation, for biologists, concerns population numbers and future reproduction. For traditional Yupiit, it concerns proper human behavior.¹³⁷

Gary Nabhan recounts:

Hopi farmers are careful to maintain a certain heterogeneity within each cultivated species or crop variety. Or perhaps, I should say, they are careful not to be too careful, or to act as though they could entirely control a crop's destiny.

On one occasion, I asked a Hopi woman at Moenkopi about seed selection for "trueness to type." I had heard that other people discard any unrepresentative seeds in order to maintain a semblance of purity within each seedstock. I wondered if she regularly selected only the biggest kernels, or ones from one end of the cob, or those consistently of the same hue. The elderly woman listened to my loaded questions, then snapped back at me, "It is not a good habit to be too picky.... We have been given this corn, small seeds, fat seeds, misshapen seeds, all of them. It would show that we are not thankful for what we have received if we plant certain of our seeds and not others."

Her acceptance of heterogeneity contrasts markedly with the prevailing preoccupations of modern agriculture: uniform seed, for standardized field conditions.¹³⁸

136. Kat Anderson, *Native Californians as Ancient and Contemporary Cultivators*, in *BEFORE THE WILDERNESS*, *supra* note 20, at 151, 154-55.

137. Hensel & Morrow, *supra* note 36, at 70.

138. See GARY PAUL NABHAN, *ENDURING SEEDS: NATIVE AMERICAN AGRICULTURE AND WILD PLANT CONSERVATION* 75-76 (1989).

In this Part, I have suggested that, across cultures, there are areas of convergence—shared norms supporting the protection of cultural integrity—and areas of divergence—differing understandings of the aspirations and methods of restoration. Decisionmakers should recognize and pay attention to these areas of common ground and differing perspectives as they work toward an intercultural approach to restoration.

V. TOWARD AN INTERCULTURAL RESTORATION

What would a truly intercultural approach look like? This is not something that any one individual or culture can determine unilaterally; by definition, the contours of an intercultural approach to restoration would need to be worked out with input from various cultural perspectives, with the framework for the conversation to be set in the first place by the various affected peoples in an atmosphere of mutual respect and equality. Past practice and recent efforts, however, enable several observations, meant to identify issues for further work.

A. Identify and Dismantle Occasions for Discrimination Against Native Knowledge

As a prerequisite to intercultural restoration, racist assumptions that work to deny the validity of Native knowledge need to be identified and dismantled. As Part IV suggests, the occasions for discrimination are many and varied. Further work to identify occasions for discrimination and to fashion remedies for the resulting harm should itself be undertaken as part of an intercultural conversation. Environmental decisionmakers at the federal, state, and local levels should then work to dismantle these instances of racism and assist in eco-cultural restoration.

B. Improve Opportunities for Co-Management

Some recent efforts have attempted to feature tribes and federal or state agencies as equal partners or “co-managers” in environmental restoration affecting Native resources. Such efforts recognize tribal people or environmental agencies as managers of these resources, alongside federal or state agencies. As such, they proceed from a quite different conception of the parties’ roles and relationship than efforts that relegate tribal environmental managers to the position of “stakeholders”—an undifferentiated mass of private- and public-serving entities who claim any interest in decisions made ultimately by federal or state agencies.

Efforts to manage and restore the shellfish resource in the Pacific Northwest, for example, have recently been reconfigured to feature co-management by the state of Washington and some of the tribes for whom the right to take shellfish at “usual and accustomed” places is guaranteed by treaty.¹³⁹

139. United States v. Washington, 898 F. Supp. 1453 (W.D. Wash. 1995) (establishing Implementation Plan to administer tribal rights under the Shellfish Proviso of the Stevens Treaties and setting forth framework for management of the shellfish resource

Because the 'usual and accustomed' areas for shellfish are located both within and outside of reservation boundaries, tribes had previously not been fully recognized as managers of the shellfish resource. According to Kelly Toy, Tulalip Tribes shellfish biologist, the tribes' new position as co-manager, as opposed to mere "stakeholder," has enabled tribal biologists and state biologists to present and discuss their respective findings and, importantly, to disagree about these findings—each from a position of an equal claim to validity.¹⁴⁰ Toy notes that while the multiplicity of tribal interests and views, along with the state's interest and view, sometimes causes disagreements on management approaches, the parties endeavor to discuss and resolve their differences in an atmosphere that, increasingly, is respectful and productive.¹⁴¹

In another example, Native land managers have worked with federal and state land managers in California on a variety of management initiatives for culturally significant resources, especially plant resources important to traditional basketweavers.¹⁴² Much of what remains of these resources is located on land that is under the jurisdiction of the United States Forest Service or the California Park Service.¹⁴³ In one recent effort, Yurok, Karuk, and Hupa elders and traditional basketweavers worked with forest managers from the Six Rivers National Forest to enable Native management techniques to guide restoration efforts for beargrass (*Xerophyllum tenax*).¹⁴⁴ These techniques include prescribed burning and harvesting according to traditional practices—techniques which have been unfamiliar to and often controversial in the eyes of some Forest Service land managers. Traditional basketweavers have explained that the beargrass used in basketry needs to come from "the young shoots that come up in the center of clumps after periodic burns,"¹⁴⁵ shoots that are "gathered under the canopy of trees, where it has been burned the previous fall."¹⁴⁶ Elders have noted that where the fire exclusion policies of the Forest Service have been substituted for Native management polices that include prescribed burns, "beargrass stands are not as

by the State of Washington and several Treaty tribes) *aff'd in part, rev'd in part, and remanded*, 157 F.3d 630 (9th Cir. 1998). *See also generally* NORTHWEST INDIAN FISHERIES COMMISSION, COMPREHENSIVE TRIBAL NATURAL RESOURCE MANAGEMENT (1999) (describing tribal shellfish resource management efforts in "The Era of Cooperation").

140. Telephone interview with Kelly Toy, Shellfish Biologist, Tulalip Tribes (Nov. 9, 1999).

141. *Id.*

142. *See generally* PROCEEDINGS OF THE INDIGENOUS ECOLOGY AND CULTURAL RESTORATION WORKSHOP, Sept. 21–22, 1999 [hereinafter CULTURAL RESTORATION WORKSHOP].

143. Kathy Wallace, Presentation, Indigenous Ecology and Cultural Restoration Workshop (Sept. 21, 1999).

144. *See id.*; Anderson, *supra* note 136, at 173–74.

145. Anderson, *supra* note 136, at 173–74.

146. Vivien Risling Hailstone, *Karuk, Yurok, and Hupa Basketry*, CULTURAL RESTORATION WORKSHOP, *supra* note 142, at 9.

plentiful and the old leaves on existing plants are weaker, thicker, and less pliable."¹⁴⁷

Such cooperative efforts have been fashioned in the face of quite different Native and non-Native understandings of how management and use ensure continued abundance and encourage desirable qualities in plants, as well as different views of the goals of environmental management efforts.¹⁴⁸ For example, whereas beargrass must be burned in the fall in order to produce the soft and flexible strands suitable for weaving, the U.S. Forest Service and the local Air Quality Control Management District would prefer cool, slow burns later in the year; whereas beargrass shoots are similarly more suitable when picked from a shady place, the Forest Service would prefer that burning take place in open areas.¹⁴⁹ Nonetheless, Native and non-Native managers have worked together to craft compatible management practices. Importantly, some federal and state land managers have expressly recognized the value of cultural flourishing and have identified protection of Native culture and culturally significant resources among their policy goals.¹⁵⁰ For example, as a result of considerable efforts by Vivien Hailstone and other traditional basketweavers, along with members of the California Park Service,¹⁵¹ the Park Service has put in place a Native California Indian Gathering Policy and Permit system.¹⁵²

Co-management efforts are not, however, without their difficulties and limitations. Traditional basketweavers in the example described above noted that the success of their efforts to work with federal land managers in California has varied among the different National Forests, and among individuals within any given National Forest.¹⁵³ Similarly, other tribal environmental managers have observed that the likelihood of respectful interaction varies greatly among the various federal agencies whose work affects Native resources, although, they have

147. Anderson, *supra* note 136, at 174.

148. *See generally id.*

149. Bev Ortiz, *Contemporary California Indian Basketweavers and the Environment*, in *BEFORE THE WILDERNESS*, *supra* note 67, at 195, 209–10.

150. *See, e.g.*, Ted Hillard, "California Park Service, Native California Indian Gathering Policy and Permit" (June, 1994):

[T]he [D]epartment [of Parks and Recreation] has a responsibility to preserve and interpret California's Native American heritage and traditions. A component of that responsibility is the policy permitting native California Indian individuals or groups to collect, with approval, in units of the State Park System. *The purpose of the gathering permit is to foster cultural continuity and to preserve and interpret California's cultural traditions. The public benefits each and every time a California Indian makes a basket or continues any other cultural tradition since the action helps perpetuate the tradition.*

Id. (emphasis added).

151. *See* Wallace, *supra* note 143.

152. *See* Hillard, *supra* note 150.

153. *See* Wallace, *supra* note 143; Ortiz, *supra* note 149, at 205–11.

noted, there has been improvement at some agencies in recent years.¹⁵⁴ Moreover, Native people have recounted the near-constant call for their educative efforts, as federal and state agency personnel turnover.¹⁵⁵ Such efforts tax Native people and resources and divert time and expertise that might instead be devoted to eco-cultural restoration.¹⁵⁶ Finally, "co-management" sometimes describes efforts managed cooperatively in name only.

More fundamentally, to the extent that efforts at co-management occur within a framework already determined by the dominant society, these efforts will remain partial. To the extent that Native managers' roles are limited by law and practice to "input" into processes preordained by the dominant society, co-management efforts will continue to fall short of a truly intercultural approach. Moreover, to the extent that Native knowledge is decontextualized and portions extracted for incorporation in the methods of federal and state regulators, the Native knowledge may be misunderstood or misused, both of which may have grave consequences for the Native knowledge-holders and their resources.

For example, the fish consumption data generated by the Columbia River Inter-Tribal Fish Commission and the Tulalip and Squaxin Island studies has now been accepted by federal and state environmental agencies,¹⁵⁷ but this Native data is taken to provide a numerical input to agencies' risk assessment equation. This equation is part of an approach to regulating water quality and setting cleanup standards that assumes there is some amount of increased risk of harm—here, risk of death from cancer—to humans that is "acceptable," and that effectively does not inquire about the increased risk of harm to the non-human members of ecosystems. CRITFC and other tribal commentators have challenged these assumptions, offering their data with the caveat that they do not share these

154. See, e.g., Lawrence C. Swamp, *St. Regis Mohawk Tribe Environment Division*, AKWESASNE NOTES: J. FOR NATIVE & NAT. PEOPLE, Spring 1997, at 16.

The relationship between the Tribe and EPA was a little rocky at the beginning because EPA didn't recognize the need to work with the Tribe on a government to government basis. In spite of that initial attitude, the Tribe's persistence paid off. Through tough negotiations the Tribe was able to muscle its way into the process as a legitimate partner. Currently, EPA/Tribal relations are good except for differences in a proposed change in the amount of allowable PCB contaminated materials to remain at the GM [Superfund] site.

Id. Accord Toy, *supra* note 140, and Telephone Interview with Sylvia Cates, Special Counsel, White Mountain Apache Tribe (Oct. 22, 1999).

155. See *Basketweaver Profile: Kathy Wallace, Yurok/Karuk/Member of Hoopa Tribe*, ROOTS & SHOOTS: CALIFORNIA INDIAN BASKETWEAVER ASS'N NEWSLETTER, Winter 1999, at 6.

156. See Wallace, *supra* note 143.

157. See Draft Water Quality Criteria Methodology Revisions: Human Health, 63 Fed. Reg. 43,756 (1998); LESLIE KEILL & LON KISSINGER, WASHINGTON STATE DEP'T OF ECOLOGY, DRAFT ANALYSIS AND SELECTION OF FISH CONSUMPTION RATES FOR WASHINGTON STATE RISK ASSESSMENTS AND RISK-BASED STANDARDS 34-36 (1999).

assumptions and so view the analytic methods founded on them to be inappropriate.¹⁵⁸ As CRITFC argued in its comments to the EPA's current efforts to revise the water quality criteria,

CRITFC maintains a "zero tolerance" and "zero emission" stance on bioaccumulative, persistent, toxic substances, especially into fish bearing waters.... [The] EPA must implement pollution prevention policies and technologies that eliminate these substances from our environment. CRITFC maintains that risk assessments have no useful purpose for making regulatory decisions for persistent, bioaccumulative toxics, known carcinogens, "probable human carcinogens," and substances known to cause reproductive, developmental or neurological effects....¹⁵⁹

Mohawk commentators have similarly criticized these assumptions in the EPA's choice of a remedial action for the St. Lawrence River Superfund site:

When [the] EPA studies a hazardous waste site, they [sic] examine the health impacts on people (Health Risk Assessments), determine how the contamination is impacting the bloodlines (groundwater and surface water) of Mother Earth, and how our brothers and sisters (animal and plant life) are being impacted through fish and wildlife studies.

However, when it comes time to make a decision on cleaning up a hazardous waste site, cost becomes more important than the environment. Risk is calculated...[based] on the number of [human] cancer deaths. Animal and plant life are considered expendable.¹⁶⁰

For these and other reasons, Native environmental managers may be uninterested in co-management, at least as it can get crafted given current inequalities in power. As one group of commentators has summarized: "This leads us to an unsurprising conclusion. In order for co-management to work, power must *really* be shared."¹⁶¹

C. Incompatible Approaches, Incommensurable Understandings

There will almost surely be instances of incompatibility among Native and non-Native understandings and approaches. There will also likely be instances in which understandings are not translatable between cultures—instances of radical incommensurability.

It is likely that in some instances, the result of efforts at intercultural conversation will be the conclusion that Native and non-Native understandings and approaches are incompatible. To effectuate the aspirations of the one would be

158. See CRITFC Comments, *supra* note 134.

159. *Id.*

160. Ross, *supra* note 8, at 6.

161. Hensel & Morrow, *supra* note 36, at 71.

to deny the aspirations of the other. In at least some cases of incompatibility, resolution might be obtained by identifying and giving preference to approaches that facilitate cultural integrity and flourishing. Thus, respect for the cultural integrity might require the dominant society to put aside its own management approach in favor of a particular Native approach, when the resources in question are important to the cultural flourishing of that Native group—so long as this does not infringe the dominant society's claims to cultural integrity. Respect for cultural integrity might conversely require Native peoples to put aside their management approaches in favor of the dominant society's approach, when the resources in question are important to the cultural flourishing of the dominant society—so long as this does not infringe the various Native peoples' claims to cultural integrity.¹⁶² Something like this decisionmaking process may describe the co-management efforts among the Native and non-Native land managers in California regarding resources important to traditional basketweavers. In other cases of incompatibility, however, resolution might be more complex. Where the resources in question are of cultural significance to more than one cultural group, and where the approaches of each are at odds with the other, the task of resolution is daunting.

Finally, there may be instances of non-translatibility or radical incommensurability. Hensel and Morrow observe that “[i]f we examine actual co-management meetings, different participants may use the same words, but with different meanings” and note that it is difficult to identify instances of miscommunication when the participants are of different cultures.¹⁶³

However, if the occasions for discrimination have been identified and dismantled, if Native and non-Native expertise are valued, and if conversations are undertaken in an atmosphere of mutual respect and equality, participants can together determine how to address these cases.

VI. CONCLUSION

Non-Native environmental managers need to be aware of the effects that their decisions have on Native resources. They need to ensure that such decisions are attentive to the eco-cultural concerns of the affected Native peoples. In order to do this, they will need to acknowledge the vital place for Native ecological science and scientists in efforts to articulate the ends and means of environmental management and restoration. Only then can there be hope for truly effective restoration of Native resources—restoration that ensures the flourishing of Native resources, cultures, knowledge, and peoples.

162. See Anaya, *supra* note 126, at 228–29. See discussion *supra* Part IV.A.

163. Hensel & Morrow, *supra* note 36, at 70.