

DEVELOPING AGILE TRIBAL LEADERS AND AGILE TRIBAL INSTITUTIONS TO ADAPTIVELY MANAGE AND MITIGATE THE IMPACTS OF GLOBAL CLIMATE CHANGE IN INDIAN COUNTRY

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*Agile: 1: characterized by ready ability to move quickly and easily . . . 2: characterized by quickness or liveliness of mind, resourcefulness, or adaptability in coping with new and varied situations.*²

BACKGROUND

That the earth is currently experiencing a warming trend is scientifically well documented. In the main, the uncertainty that exists about global warming is primarily about how severe this warming trend will be and, to a lesser extent, whether the scientific evidence suggests primarily a human, rather than a natural cause. For example, according to the United Nations Intergovernmental Panel on Climate Change, the average temperature around the world will increase by 1.8 to 10.4 degrees Fahrenheit, depending on what humans do to decrease greenhouse emissions.³

Generally, for Indian tribes⁴ and tribal decision-makers, climate change issues should be considered to be part of the larger challenge of tribal development and should be very seldom considered separately if they are considered at all. Our sense is that tribal decision-making on climate policies will be more effective when they are embedded within broader strategies designed to make tribal development paths more socially, economically, environmentally, culturally, and politically appropriate.

There are two reasons for adopting this approach. The first is a pragmatic one. Generally, the magnitude of industrial, commercial, agricultural, and domestic activities occurring on tribal lands will have an imperceptible impact on global climate variability and change. Practically, the costs of creating, staffing, and operating tribal evaluation and assessment systems to measure reductions in emissions of greenhouse gases or the impacts on climate variability will be time-consuming, cost-prohibitive, and more importantly, unnecessary.

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² *Webster's Third New International Dictionary of the English Language Unabridged*, G. & C. Merriam Co., Springfield, MA (1971)

³ Bryan Keefer, *The Rhetoric of Uncertainty, Science, global warming, and shaping a political debate*, April 30, 2001, <<http://www.spinsanity.org/columns/20010430.html>>, (last viewed November 14, 2006).

⁴ For the purposes of this article, Indian tribe means any Indian tribe, band, nation, or other organized group or community, including any Alaskan Native village or regional or village corporation as defined in or established pursuant to the Alaskan Native Claims Settlement Act [43 U.S.C. 1601 et seq.], which is recognized as eligible for the special programs and services provided by the United States to Indians because of their status as Indians, U.S.C. 25 §1801(a)(2).

Time, personnel, and financial resources are never in great supply in Indian country. Those resources are better directed toward the adoption of sustainable tribal development trajectories and the building of the tribal scientific, legal, management, and technical institutions and staff that are able to identify and monitor reservation and regional environmental changes and adaptively manage and mitigate the untoward impacts of those development trajectories. If these institutions and personnel are able to install optimum mitigation and adaptation strategies to protect or advance tribal interests, then it matters not that the untoward impacts are caused by climate variability or even if that variability is man-induced.

The second reason is based in notions of sovereignty, identity, self-determination, and autonomy. The point is, as Vine Deloria, Jr. and Cliff Lytle state, that “[a]s far back as we can take American history, the non-Indian has been fascinated with Indian lands and resources and has demanded that they be used in the same manner as he uses his property.”⁵ For example, for non-Indian reformers, the communal ownership of tribal land had to be overcome by imposing a system of private property rights. Senator Henry Dawes of Massachusetts was convinced that the white man's ways were superior to the historical ways of the Native Americans and he gainsayed the idea of communal property, although he did express sympathy for the Natives themselves. “The common field is the seat of barbarism, while the separate farm is the door to civilization,” he said. Dawes explained that selfishness was the root of advanced civilization and he could not understand why the Native Americans were not motivated to possess and achieve more than their neighbors.⁶

Thus, on February 8, 1887, the Dawes Act or the General Allotment Act⁷ was passed. That Act gave the president of the United States authority to assign parcels of land on reservations to individual Indians. Indians lost almost half of their lands by 1900, from 140 million acres to 78 million acres and more than half the people within tribes affected by the Dawes Act were landless and economically devastated.⁸

States have fiercely contested the right to assert influence and control over the regulation and management of tribal environmental and natural resources.⁹ But the contest is not just between competing state and tribal governmental interests. Powerful and well-heeled non-governmental organizations often wage extensive public relations and legislative campaigns to retain their influence on the management of tribal lands and resources. For example, the Natural Resources Defense Council led the fight against Title V of the Energy Policy Act of 2005. The NRDC

⁵ Vine Deloria, Jr. and Cliff Lytle, *The Nations Within: The Past and Future of American Indian Sovereignty*, Knopf, New York, 1984.

⁶ Delos Sacket Otis, *The Dawes Act and the Allotment of Indian Land (The Civilization of the American Indian Series, v. 123)*, University of Oklahoma Press, Norman (1973), p. 10-11.

⁷ Ch. 119, Laws 1887, 24 Stat. 388, 25 U.S.C. §331 *et seq.* (2000).

⁸ *See*, Delos Sacket Otis, *The Dawes Act and the Allotment of Indian Land (The Civilization of the American Indian Series, v. 123)*, University of Oklahoma Press, Norman (1973), Chap. IX and Kirke Kickingbird and Karen Ducheneaux, *One Hundred Million Acres*, MacMillan, New York (1973).

⁹ *See*, for example, *Montana v. United States*, 450 U.S. 544, 547 (1981), tribes' inherent authority may support tribal regulation of non-Indian activities affecting reservation water quality, and other areas of environmental concern; *Confederated Salish & Kootenai Tribes v. Namen*, 665 F.2d 951 (9th Cir.), cert. denied, 459 U.S. 977 (1982), shoreline protection ordinance; *Lummi Indian Tribe v. Hallauer*, 9 Ind. L. Rep. 3025, 3026 (W.D. Wash. 1982), tribal sewage treatment; and *City of Albuquerque v. Browner*, 97 F.3d 415, 424 (10th Cir. 1996), affirming EPA's power to approve tribal water quality standards notwithstanding the impact on upstream sources.

objected to the provision of the Act that creates a new lease negotiation regime whereby tribes can negotiate and enter into leases or business arrangements for energy exploration, extraction, processing or development of energy on tribal land, and can do these things without requiring the approval of the Secretary of Interior. Consistent with the policies of self-determination of the past 30 years, the provision frees tribes from direct federal control over the use of their lands and resources.¹⁰ The NRDC characterized the provision as “[w]aiv[ing] existing National Environmental Policy Act (NEPA) environmental review and public participation process for all types of energy development projects on Indian lands in favor of an unspecified new process”¹¹ notwithstanding that a tribe, in order to take advantage of the provision, will need to demonstrate to the Secretary of the Department of the Interior, that it has the capacity to regulate and manage its energy resources and its environment in a responsible way. In making this demonstration the tribe will also be required to identify and evaluate all significant environmental impacts, establish an environmental review process, consult with local communities and afford these communities the opportunity to comment on the environmental impacts of the proposed actions.¹²

The relationship between NGOs, federal agencies, and Indian tribes in the global climate change context is even more instructive.

The most high-profile attempt to address global climate change today is the Kyoto Protocol, a 1997 treaty.¹³ The provisions of the Kyoto Protocol address climate change by setting caps on the quantity of greenhouse gases developed countries can emit. Article 2 of the Protocol provides that:

¹⁰ A. David Lester, Tribal energy bill rests on Indian self-determination, *Indian Country Today*, May 17, 2005, <<http://www.indiancountry.com/content.cfm?id=1096410942>>, (last viewed October 23, 2006).

¹¹ Natural Resources Defense Council, *Factsheet: Harmful Provisions in the Senate Energy Bill, An analysis of the damaging environmental provisions in the energy bill passed to the full Senate by the Energy and Natural Resources Committee on May 26, 2005*, <http://www.nrdc.org/legislation/factsheets/0506_energy.pdf>, (last viewed October 23, 2006).

¹² DEPARTMENT OF THE INTERIOR, Bureau of Indian Affairs 25 CFR Part 224 are the proposed rules for Tribal Energy Resource Agreements Under the Indian Tribal Energy Development and Self-Determination Act, Federal Register: August 21, 2006 (Volume 71, Number 161), Page 48625-48645. Sec. 224.63 provides that an agreement must contain the following:

(a) Provisions for periodic review and evaluation of the tribe's performance under the agreement and recognizing the authority of the Secretary, upon a finding of imminent jeopardy to a physical trust asset, to take actions the Secretary determines to be necessary to protect the asset, including reassumption under subparts F and G.

(b) Provisions ensuring:

(1) Appropriate evaluation of all significant environmental effects (as compared to a no-action alternative), including effects on cultural resources, arising from leases, business agreements, or rights-of-way, and measures ensuring that appropriate mitigation measures will be identified and implemented in performance of activities under leases, business agreements, or rights-of-way;

(2) A process for informing the public and providing opportunity for public comment on the environmental impacts of the proposed action;

(3) A process for providing tribal responses to relevant and substantive public comments before tribal approval of the lease, business agreement or right-of-way;

(4) Sufficient tribal administrative support and technical capability to carry out the environmental review process; and

(5) The tribe's oversight of energy resource development activities any other party conducts to determine whether the activities comply with the agreement and applicable Federal environmental laws.

¹³ Kyoto Protocol to the United Nations Framework Convention on Climate Change, U.N., 1998, <<http://unfccc.int/resource/docs/convkp/kpeng.pdf>> (last viewed October 24, 2006)

1. Each Party included in Annex I, in achieving its quantified emission limitation and reduction commitments under Article 3, in order to promote sustainable development, shall:

(a) Implement and/or further elaborate policies and measures in accordance with its national circumstances, such as:

- (i) Enhancement of energy efficiency in relevant sectors of the national economy;
- (ii) Protection and enhancement of sinks and reservoirs of greenhouse gases not controlled by the Montreal Protocol, taking into account its commitments under relevant international environmental agreements; promotion of sustainable forest management practices, afforestation and reforestation;
- (iii) Promotion of sustainable forms of agriculture in light of climate change considerations;
- (iv) Research on, and promotion, development and increased use of, new and renewable forms of energy, of carbon dioxide sequestration technologies and of advanced and innovative environmentally sound technologies;
- (v) Progressive reduction or phasing out of market imperfections, fiscal incentives, tax and duty exemptions and subsidies in all greenhouse gas emitting sectors that run counter to the objective of the Convention and application of market instruments;
- (vi) Encouragement of appropriate reforms in relevant sectors aimed at promoting policies and measures which limit or reduce emissions of greenhouse gases not controlled by the Montreal Protocol;
- (vii) Measures to limit and/or reduce emissions of greenhouse gases not controlled by the Montreal Protocol in the transport sector;
- (viii) Limitation and/or reduction of methane emissions through recovery and use in waste management, as well as in the production, transport and distribution of energy.¹⁴

Although the United States leads the nations of the world in carbon emissions—with 5 percent of the world’s population, the United States emits 25 percent of the world’s greenhouse gases—it is not a signatory to the Kyoto Protocol.¹⁵ However, thus far, NGOs and federal agencies have defined the climate change issue in Indian country as one of limiting the emission of greenhouse gases and have adopted, in greater part, the Kyoto Protocol paradigm as the fix. In the main, tribes and tribal organizations have followed the NGO and federal lead.¹⁶ For example, at a recent conference sponsored in part by environmental NGOs, Indian and tribal organizations, the discussions on tribal solutions for addressing climate change focused on such emission limiting

¹⁴ *ibid*, Article 2.

¹⁵ See, Intergovernmental Panel on Climate Change *Special Report on The Regional Impacts of Climate Change An Assessment of Vulnerability*, <<http://www.grida.no/climate/ipcc/regional/index.htm>> (last viewed November 24, 2006)..

¹⁶ See, for example, Office of Technology Assessment, *Preparing for an Uncertain Climate, Vol. 1*, OTA-0-567, G.P.O., Washington, (1993), the U.S. Environmental Protection Agency *Clean Energy-Environment State Partnership*, a voluntary state-federal partnership that encourages states to develop and implement cost-effective clean energy and environmental strategies; *Climate Leaders*, partnership program with individual companies to develop long-term, comprehensive climate change strategies. Under this program, partners set corporate-wide greenhouse gas reduction goals and inventory their emissions to measure progress; and ENERGY STAR, a voluntary labeling program designed to identify and promote energy-efficient products to reduce greenhouse gas emissions, <<http://epa.gov/climatechange/policy/neartermghgreduction.html>>, (last viewed November 1, 2006).

approaches as carbon sequestration, solar, wind and other renewable energy technologies, and carbon trading.¹⁷

IMPACTS OF GLOBAL CLIMATE CHANGE ON INDIAN TRIBES

Global climate change is fraught with clichés. The current warming trend is either simply another phase in the recurring cycle of naturally occurring warming and cooling or the greatest threat to human existence. One cliché that is especially insidious for Indian tribes posits that notwithstanding scientific uncertainties, we have enough evidence to make policy decisions and to take action.

The impacts of global warming may include: higher maximum temperatures, greater frequency of extreme hot days, higher minimum temperatures. Additionally, coastal cities can expect rising sea levels of four inches to as much as three feet due to the thermal expansion of sea water and melting glaciers. Changes in climate could exacerbate periodic and chronic shortfalls of water, particularly in arid and semi-arid areas of the world. There is evidence that flooding is likely to become a larger problem in many temperate and humid regions, requiring adaptations not only to droughts and chronic water shortages but also to floods and associated damages, raising concerns about dam and levee failures.¹⁸

There is actually a great deal of information regarding the effects of global climate change on Indian tribes. Some information is specifically identified as climate-related. For example, native peoples in the Arctic are already experiencing and observing some of those effects including major economic and cultural impacts caused by reduced sea ice, thawing permafrost, and coastal erosion due to storms. Caleb Pongoylwi, a Siberian Yupik, reported the following observed changes in the Bering Straits region:

- Wetter summer and fall seasons with drier winters.
- Sea ice forms later in fall.
- Sea ice melts and disintegrates earlier in spring.
- Sea birds dying from starvation.
- Lots of beaver moving into area streams.
- Western Arctic caribou increasing and migrating into Seward Peninsula (These conditions may be good for hunters, but bad for reindeer herders who have lost at least 35% of their herds, which have joined with caribou migrations).¹⁹

However, most other available information such as timber and fish harvests, and the like are important climate change markers but are generally not collected, characterized, and analyzed as such. Herein lies the problem for decision-makers in Indian country. This information and these

¹⁷ Tribal Lands Climate Conference, Cocopah Indian Reservation, Somerton, Arizona (December 5-6), <<http://www.tribalclimate.org/agenda.htm>> (last viewed November 28, 2006).

¹⁸ See, Intergovernmental Panel on Climate Change *Special Report on The Regional Impacts of Climate Change An Assessment of Vulnerability*, <<http://www.grida.no/climate/ipcc/regional/index.htm>> (last viewed November 5, 2006).

¹⁹ Nancy G. Maynard, ed., *Final Report: Native Peoples-Native Homelands Climate Change Workshop*, U.S. Global Climate Change Program, Albuquerque, (October 28-November 1, 1998), p. ii, <<http://www.usgcrp.gov/usgcrp/Library/nationalassessment/native.pdf>> (last viewed November 20, 2006).

observations are obviously much more than Pooh-Bah's²⁰ “merely corroborative detail.” Certainly the United States of America has enough evidence to make policy decisions and to take action.²¹ However, although Caleb Pongoylwi's observations “give artistic verisimilitude” to support a national emissions capping strategy, they do very little to support localized decision-making on tribal sustainable development strategies or more importantly, on adaptive responses to local climate change impacts. Similarly, although tribal emission limiting approaches such as carbon sequestration, solar, wind and other renewable energy technologies, and carbon trading may help (albeit in a small way) attain the global aims of the Kyoto Protocol, these approaches are not very helpful in monitoring, measuring and managing local environmental, social, economic, educational, public health, political, and other local impacts of climate change.

What these observations demonstrate is that Indian tribes are living in an era of permanent change, a turbulent global environment that is complex, uncertain, and that will undoubtedly be fiercely competitive. Tribes need leaders and institutions to match these challenges—to help unravel complex problems, to introduce a degree of certainty, and to facilitate the kind of decision-making required by tribes to not only survive, but to thrive in a globally competitive environment. What they need, in short, is agile leadership and agile institutions.

WHAT IS AGILITY?

The term “agile” was first used in the business context in the 1990s to describe manufacturing organizations that could adapt quickly to changing customer needs. That term, however, can easily be applied to Indian tribes of the past. Dr. Nancy G. Maynard of the National Aeronautics and Space Administration noted:

The fact that North American indigenous societies have survived into the 21st century, with cultures, traditions, languages, and portions of their Native Homelands relatively intact, speaks of a respectful and enduring reliance upon traditional ecological knowledge, spiritual strength, and cultural adaptations unsurpassed in North America.²²

Examples of early tribal agility abound. For example, Cheyenne life on the Plains early in the nineteenth century was well adapted to tribal existence. Their institutions were both meaningful and integrated. They had worked out a practical governmental system and a religion related directly to the environment in which they lived, established a satisfying economy, maintained an

²⁰ A character in the W.S. Gilbert and Arthur Sullivan operetta, *The Mikado*. The full quotation is: “Merely corroborative detail, intended to give artistic verisimilitude to an otherwise bald and unconvincing narrative,” in *The Mikado: Full Score*, Dover Publications (1999).

²¹ The Committee on Science, Engineering, and Public Policy (COSEPUP) concluded that it is theoretically possible to put technology and practices into place to adjust to the changing climate as it happens **if the change is gradual enough**. . . . Waiting to react to climate change may be unsatisfactory if it is possible that climate change impacts will be very costly. Of greatest concern may be those systems where there is the possibility of surprise—of facing the potential for high costs without time to react—or where the climate change will be irreversible. See, Office of Technology Assessment, *Preparing for an Uncertain Climate, Vol. 1*, OTA-0-567, G.P.O., Washington, (1993), p. 4.

²² Nancy G. Maynard, ed., *Final Report: Native Peoples-Native Homelands Climate Change Workshop*, U.S. Global Climate Change Program, Albuquerque, (October 28-November 1, 1998), p. ii, <<http://www.usgcrp.gov/usgcrp/Library/nationalassessment/native.pdf>> (last viewed November 20, 2006).

orderly family and kinship system, and made alliances with powerful and friendly tribes which assured that they would not be exterminated by their native foes.²³

The term “nimble” is sometimes used as a synonym for agile. It conjures up the correct image—the ability to move rapidly, but sure-footedly. Note that effectiveness (mission accomplishment) is an implicit assumption. As such, effectiveness is measured on a separate dimension from agility. Similarly, speed is not an end in itself, but a means to an end. Speed can make a response more effective or even make it possible for an organization to respond at all. But speed only enables effectiveness; it does not guarantee it. Hence, moving quickly, but not intelligently (in ways that improve the likelihood of success) would not constitute agility.²⁴

This discussion of the attributes of agility derives primarily from David S. Alberts and Richard E. Hayes, *Power to the Edge: Command and Control in the Information Age*.²⁵ Agile leaders and institutions possess and demonstrate a synergistic combination of the following six attributes, the key dimensions of agility:

1. Robustness: the ability to maintain effectiveness across a range of tasks, situations, and conditions;
2. Resilience: the ability to recover from or adjust to misfortune, damage, or a destabilizing perturbation in the environment;
3. Responsiveness: the ability to react to a change in the environment in a timely manner;
4. Flexibility: the ability to employ multiple ways to succeed and the capacity to move seamlessly between them;
5. Innovation: the ability to do new things and the ability to do old things in new ways; and
6. Adaptation: the ability to change work processes and the ability to change the organization.

While these attributes of agility are analytically distinct and often must be measured in different domains and contexts, in practice they are often interdependent. Moreover, when one of these attributes is lacking, the others are much more difficult to achieve. When they are all present, however, the likelihood of success (mission accomplishment) increases greatly. Each of these attributes is defined and discussed below.

Robustness

Robustness is the ability to retain a level of effectiveness across a range of missions that span the spectrum of projects, programs, activities, operating environments, and/or circumstances.

Resilience

Resilience is the ability to recover from or adjust to misfortune, damage, or a destabilizing perturbation in the environment.

Resilience is also enhanced by networked communications systems which provide greater inherent resilience, and are increasingly characterized by self-organizing and self-healing

²³ Donald J. Berthrong, *The Southern Cheyennes*, University of Oklahoma Press, Norman, (1963), p. 75.

²⁴ David S. Alberts and Richard E. Hayes, *Power to the Edge: Command and Control in the Information Age*, U.S. Department of Defense, Command and Control Research Program, Washington, (2003), p. 125.

²⁵ *Ibid.*

properties; and by the use of collaborative decision-making which not only improves the quality of the decisions, but also ensures a broader and deeper understanding of the reasons behind project or program objectives.

Resilience is also a property of individuals. Research has shown that some individuals “bear up” better under pressure and stress than others. In particular, individuals have been shown to “bounce back” more quickly and more effectively when they can (1) see cause and effect as arising from local conditions rather than global conditions, (2) see themselves as having more control over events than others, and (3) see problems as temporary rather than permanent, in short, when they have reason to hope.

Finally, resilience is interdependent with other dimensions of agility. In particular, adaptable work processes and organizational structures as well as flexible and innovative decision-making will tend to correlate with resilience.

Responsiveness

In some ways, responsiveness is the simplest dimension of agility. It refers to the ability of institutions to act (or react) effectively in a timely manner.

Flexibility

Flexibility refers to the capability to achieve success in different ways. Flexible leaders and institutions are able to generate, consider, and undertake a variety of methods to accomplish assigned missions. Flexible leaders and institutions are more successful. As courses of action or strategies are foreclosed, flexible leaders and institutions are able to shift seamlessly to alternatives.

The generation of multiple solutions to a problem can become an impediment to effective performance if it becomes an end in itself or causes a tribal institution to miss important windows of opportunity. However, the agile leadership will be characterized by the ability to identify more alternatives in any given situation, and an agile institution will be able to implement them efficiently.

Note also that being able to generate more alternatives is not going to be useful unless they can be processed (assessed), perhaps integrated, and certainly put into action by clear and prompt dissemination and implementation. Here again, the social network enabled by a rich set of communications and collaboration tools improves the likelihood of success.

Innovation

Innovation is the ability to do things in new ways or to undertake new things to do, particularly new ways to achieve desired ends. This involves the ability to learn over time (across projects or other courses of action about missions and operational environments) and to take advantage of the lessons learned to create and maintain competitive advantages.

No matter how many times a task or mission has successfully been accomplished, nor how flexible tribal leaders and institutions are, creative changes will be needed in any sustained operation in order to exploit opportunities and to avoid pitfalls. Experiences should be mined for lessons learned that advance success or avoid failure.

Adaptation

Adaptation is the ability to alter force structure and work processes when necessary as the situation and/or environment changes. Where the other elements of agility are focused outward, adaptation is focused inward. However, it is not unrelated to those other elements. The capacity to change the organization and business rules by which institutions operate can make them more effective and efficient when dealing with different types of projects. This capacity also makes it more likely that we can be responsive, flexible, and innovative across new and emerging situations and conditions.

Adaptive organizations (1) alter the way information is distributed and involve different participants in collaboration or planning sessions based on changes in the operating environment, (2) create new ways of dealing with coalition, interagency, and nongovernmental partners, (3) flatten organizational structures, and (4) develop and adapt more efficient work processes based on experience over time.

WHAT ARE AGILE LEADERS?

Agile leaders realize that tribes exist in an era of permanent change, a turbulent global environment that is complex, uncertain, and fiercely competitive. They know that these realities require them and their institutions to adapt again and again to constantly changing conditions. They have an intentional, proactive approach to change. They anticipate emerging threats and opportunities by continually scanning their organization's environment for new developments. They view the challenges they face with fresh eyes and a willingness to rethink past assumptions.

Agile leaders are creative thinkers with a deep sense of purpose. They actively engage diverse stakeholders, influencing and learning from them at the same time. Their ability to examine situations from multiple perspectives and to "connect the dots" between seemingly disparate issues allows them to generate novel strategic insights. As a result, their visions for the future are innovative, purposeful, and compelling.

Agile leaders have a broad repertoire of behaviors that allows them to rapidly adjust their leadership style to the demands of any given situation. They give appropriately balanced attention to short-term and long-term priorities, to top-down direction-setting and meaningful participation, and to fostering individual initiative and strong teamwork.

Agile leaders are resilient in responding to the difficulty and discomfort that change and uncertainty can bring. They seek feedback from multiple sources and use both mistakes and successes as fodder for continual learning and development. Finally, they are committed to creating agile teams and organizations and to helping those around them become more effective leaders.²⁶

WHAT ARE AGILE INSTITUTIONS?

Historically, the economic environment has always been changing, and the goal of increasing adaptability in business is not a new one. Executives and researchers have been describing the adaptive nature of economies and companies for more than 100 years. In 1899, for example,

²⁶ Changewise, Leadership Agility: Definition, (2005), <<http://www.changewise.biz/la-definition.html>> (last viewed September 19, 2006).

economist Thorstein Veblen wrote a paper titled: “Why is Economics not an Adaptive Science?” In his landmark book, *The Theory of the Leisure Class*, Veblen wrote: Institutions must change with changing circumstances, since they are of the nature of a habitual method of responding to the stimuli which these changing circumstances afford.²⁷

Mankin and Chakrabarti, in their study of financial market volatility cite Alvin Toffler’s 1985 book, *The Adaptive Corporation*, which came from a consulting study he had done helping AT&T during its divestiture in the early 1970s. Toffler highlighted the importance of adaptability in decision-making in rapidly changing business environments:

Many companies—not just AT&T—face rising levels of novelty in the external, as well as internal, environment . . . While some of the specifics I alluded to now seem to me to be dated, the general argument about rising levels of uncertainty in the environment is, I believe, more than ever correct . . .

While relying on [making decisions by] the book may be entirely appropriate in a familiar or stable environment, it may well be disastrous in a novel, fast-changing environment in which the problems are themselves novel and fast-changing.²⁸

Mankin and Chakrabarti developed a set of markers associated with adaptability that they hypothesized would be present in organizations that proved to be successful in periods of high volatility. They studied the performance of companies over 14 different industries in the closing decade of the 20th century, a period of relatively high volatility. They found that firms that had markers associated with adaptability significantly outperformed firms that did not. This result was even more convincing upon closer examination because firms that did not have markers associated with adaptability failed more often, and failed firms were excluded from the final tabulations. Agility (in this case, adaptability) did not just result in increased survival, but actually resulted in increased operating performance including sales growth, earnings growth, return on assets, and return on equity.²⁹

Gerd Junne refers to a similar “fundamental change” that has occurred in economic and political institutions due in large measure to recent technological innovations. He notes that smaller and flatter organizational entities have begun replacing outmoded mass corporations and monolithic political parties of the Industrial Era. In contrast to the mega-mergers and acquisitions of the 1970s and 80s, more recent trends have contributed to a splintering of corporations and other hierarchical organizations. Responding to a variety of social and economic forces, many corporate executives have opted to create semi-autonomous units, joint partnerships, and other kinds of small-scale contractual arrangements. Junne contends that these companies have

²⁷ In, Perspectives on Business Innovation, No. 9, The Adaptive Imperative, Cap Gemini Ernst and Young Center for Business Innovation, (January 2003), <http://www.leader-values.com/Downloads/CBI/Journal_Issue_9.pdf> (last viewed, December 1, 2006).

²⁸ Alvin Toffler, *The Adaptive Corporation* in Eric Mankin and Prabal Chakrabarti, *Valuing Adaptability: Markers for Managing in Financial Volatility*, in Perspectives on Business Innovation, No. 9, The Adaptive Imperative, Cap Gemini Ernst and Young Center for Business Innovation, (January 2003), <http://www.leader-values.com/Downloads/CBI/Journal_Issue_9.pdf> (last viewed, December 1, 2006).

²⁹ Eric Mankin and Prabal Chakrabarti, *Valuing Adaptability: Markers for Managing in Financial Volatility*, in Perspectives on Business Innovation, No. 9, The Adaptive Imperative, Cap Gemini Ernst and Young Center for Business Innovation, (January 2003), <http://www.leader-values.com/Downloads/CBI/Journal_Issue_9.pdf> (last viewed, December 1, 2006).

attempted to facilitate quicker responses to micro-economic market developments by devolving power and shortening the length of time involved in the decision-making process. Such trends reputedly fuel the creation not only of “virtual corporations” (i.e., autonomous actors engaging in temporary partnerships online), but also comparable sociopolitical coalitions of distinct yet consanguineous NGOs and social movements. Such virtual networks, whether focusing solely on financial gain or otherwise altruistic pursuits such as human rights or ecology, are designed to maximize ephemeral opportunities that may emerge quickly in distant locales.³⁰

THE NEED FOR AGILE TRIBAL LEADERS AND AGILE TRIBAL INSTITUTIONS

For nearly two decades, most of the research on climate change has been focused on the causes and rates of climate change. The emphasis of this research has been on understanding what is occurring at the global scale. As stated earlier, research findings at the global scale can rationalize Kyoto-like national emission-capping strategies, but are totally inadequate for decision-making at the regional, much less, tribal level. And it is at the regional and sub-regional scales that research needs to be conducted.

The need for research at smaller scales was recognized almost ten years ago by the U.S. Global Change Research Program. Some of the key research challenges identified by the USGCRP included enhancing efforts to develop:

- *Regional-scale estimates* of the timing and magnitude of climate change and other aspects of global change
- *Regional analyses of the environmental and socio-economic consequences* of climate change and other aspects of global change, in the context of other stresses
- *Integrated assessments of the implications* for society and the environment of climate change and other aspects of global change.³¹

The causes, manifestations, and effects of climate change at the global scale are enormously complex. At the regional and sub-regional scale, they are complex and complicated.³² Conducting the research and managing research findings and other information at regional and sub-regional scales will also be characterized by complexity and complications. Note that complexity would not be a problem in and of itself unless increasing complexity increased risk. Unfortunately, this is precisely the case.

³⁰ Gerd Junne, in M. Talalay, C. Farrands, and R. Tooze (eds.) *Technology, Culture, and Competitiveness: Change and the World Political Economy*, Routledge, London (1997) in David Drissel, Computer-Mediated Global Networks: Mobilizing Indigenous Movements Online, Policy & Politics International Conference on Policy and Politics in a Globalising World, Bristol, United Kingdom. (July 24-26 2003), <<http://www.bristol.ac.uk/sps/papers/stream2/drissel.doc>> (last viewed November 29, 2006).

³¹ Subcommittee on Global Change Research, Committee on Environment and Natural Resources of the National Science and Technology Council, *Our Changing Planet: The FY 1998 U.S. Global Change Research Program: An Investment in Science for the Nation's Future*, Washington, (1997).

³² A complicated system contains many components, yet displays linear, predictable behaviors. A complex system displays nonlinear unpredictable behaviors, which may in fact be unrepeatable. See Edward A. Smith, “Effects Based Operations: The Way Ahead.” Presented at the 9th International Command and Control Research and Technology Symposium, Copenhagen, Denmark, (September 14-16, 2004), <http://www.au.af.mil/au/awc/awcgate/ccrp/ebo_way_ahead.pdf> (last viewed December 4, 2006).

Complexity clearly contributes directly and indirectly to the level of risk associated with climate change. It contributes directly because it makes predictions far more uncertain and thus changes the parameters of a situation (increasing the variances of the estimated probabilities associated with specific outcomes). This makes it more difficult and risky to adopt a decision approach based on expected value and increases the uncertainty and, hence, the risk associated with any decision approach. Complexity also contributes indirectly to the level of risk associated with a situation because, in general, individuals' tolerance of uncertainty is nonlinear, with increasing uncertainty (real and/or perceived) resulting in a perception of disproportionately higher risk.³³

Given that complexity increases risk resulting from tribal adaptive management decisions, it is imperative that tribal leaders understand the factors that contribute to that complexity and that they understand what can be done to counter the adverse effects of the increased complexity of tribal scale research, data management, data analysis, and adaptive management approaches. For example, we know that fisheries' yields depend on many effects of climate on the oceans. These effects include atmospheric and oceanic temperatures and temperature changes, precipitation, runoff, salinity, primary production, and ice dynamics. Due to this complexity of effects, predicting the responses to global change of marine animal populations—both the resource fisheries and the prey upon which they feed—is a difficult challenge for research.³⁴ Some of these factors, like runoff, at least in part, lie within a tribe's control while others, such as atmospheric and oceanic temperatures are totally beyond a tribe's, region's or even a nation's control. Regional or tribal adaptive management approaches are ideally suited to deal with this kind of uncertainty and with the fluid circumstances that will inevitably accompany climate change.

Adaptive management is a systematic approach for improving environmental management and building knowledge by learning from management outcomes. Contrary to common belief, adaptive management is much more than simply "adapting as you go." It involves exploring alternative ways to meet management objectives, predicting the outcomes of each alternative based on the current state of knowledge, implementing one or more of these alternatives, monitoring to learn which alternative best meets the management objectives (and testing predictions), and then using these results to update knowledge and adjust management actions. Adaptive management differs from traditional management approaches in that it allows management activities to proceed despite uncertainty regarding how best to achieve desired outcomes, and despite inevitable change and surprises.³⁵ Adaptive management approaches can also be applied to the management of social, economic, cultural, political, and other effects of climate change.

³³ David S. Alberts and Richard E. Hayes, *Understanding Command and Control*, U.S. Department of Defense, Command and Control Research Program, Washington, (2006), p. 204.

³⁴ Subcommittee on Global Change Research, Committee on Environment and Natural Resources of the National Science and Technology Council, *Our Changing Planet: The FY 1998 U.S. Global Change Research Program: An Investment in Science for the Nation's Future*, Washington, (1997), p. 19.

³⁵ Carol Murray and David Marmorek, *Adaptive Management: A Science-Based Approach to Managing Ecosystems in the Face of Uncertainty*, Fifth International Conference on Science and Management of Protected Areas: Making Ecosystem Based Management Work, Victoria, British Columbia, (May 11-16, 2003), <http://www.essa.com/downloads/AM_paper_Fifth_International_SAMPAA_Conference.pdf> (last viewed December 4, 2006).

Making Adaptive Management Work #1: Information and Information Systems

In general, modern society is awash in information. American society, especially, positively wallows in information. And, the flood of information shows no sign of abating. But while information is the lifeblood of adaptive management strategies and operations, the problems for tribal decision-makers, are that, one, much of the available information is simply irrelevant to such adaptive management strategies or operations and two, that needed information is either not collected or unavailable.

The superabundance of information presents other problems. Decision-making may be delayed by managers who are reluctant to make decisions without consulting vertically and horizontally with holders of relevant information or expertise.³⁶ The proliferation of inexpensive wireless sensors also present tribes with opportunities and potential problems. The sensors make sense and respond a very attractive way to filter and act on new information. Sensors can help tribes discard their reliance on forecasting as they equip themselves with the technology that can provide real-time sensing of the environment, and to respond immediately, accurately, and appropriately to environmental shifts.³⁷ However, national programs such as NEON, the National Ecological Observatory Network³⁸ have the potential of overwhelming tribal decision-makers and their information systems with massive amounts of irrelevant data.

These problems of superabundant information lie in the compartmentalization of information collection, analysis, and access due, in no small part, to the uncoordinated, project-specific funding of tribal programs by federal agencies. For example, even small tribes may have two or more incompatible geographic information systems; metrological data collected for tribal wind energy programs are not shared with or even made accessible to other tribal environmental or natural resource management programs. To date, more information seems to lead to increased centralization of decision-making. Tribal leaders should recognize that decisions on the questions of what, how, and when information is amassed, filtered, aggregated, made accessible, and reported are attributes of sovereignty.³⁹

³⁶ See, Frederic J. Brown, Lt. Gen., U.S. Army, ret., Perpetual Transitions, *Military Review* (November-December 2002), <http://usacac.army.mil/CAC/milreview/English/NovDec02/NovDec02/brown.pdf>. (last viewed November 15, 2006).

³⁷ Christopher Meyer and Stan Davis, *Embracing Evolution: Business from the Bottom Up*, in Perspectives on Business Innovation, No. 9, The Adaptive Imperative, Cap Gemini Ernst and Young Center for Business Innovation, (January 2003), <http://www.leader-values.com/Downloads/CBI/Journal_Issue_9.pdf> (last viewed, December 1, 2006).

³⁸ NEON is envisioned as "a continental scale research instrument consisting of geographically distributed infrastructure, networked via state-of-the-art communications. Cutting-edge lab and field instrumentation, site-based experimental infrastructure, natural history archive facilities and/or computational, analytical and modeling capabilities, linked via a computational network will comprise NEON. NEON will transform ecological research by enabling studies on major environmental challenges at regional to continental scales. Scientists and engineers will use NEON to conduct real-time ecological studies spanning all levels of biological organization and temporal and geographical scales. <<http://www.neoninc.org/about/>>, (last viewed December 9, 2006).

³⁹ Neal Postman was one of the first critics of information technology to raise these issues. In his *Technopoly: The Surrender of Culture to Technology*, Knopf, New York, (1993), he argues that the post-industrial "deification" of technology has generated a new kind of social order ("technopoly") that is devoid of traditional checks and balances. Postman argued that social institutions based primarily on ethical and/or scientific criteria (e.g., public education, organized religion, legislatures, courts, families,

Making Adaptive Management Work #2: Looking Backward to Look Forward

Why do climate change scientists look to the past? As snow falls, it picks up whatever chemicals and particulate matter present in the atmosphere. Over time, new snow falls and older snow turns to ice, trapping tiny pockets of air in the process thereby recording the history of the particles, chemicals, and gases. Studying this historical record allows scientists to see how the global climate responded to variations of greenhouse gases in the past.

“The past is the key to the future, because only if we know how the climate system works can we more accurately predict how it will behave in the future.”⁴⁰

Why should Indian tribes look backward before embarking on examining climate change impacts and establishing sustainable development and adaptive management strategies to deal with those impacts? One of the best answers to that question can be found in a slight work on historiography intended for the beginning historian by Robert V. Daniels entitled *Studying History: How and Why*. In it he states:

History is the memory of human group experience. If it is forgotten or ignored, we cease in that measure to be human. Without history we have no knowledge of who we are or how we came to be, like victims of collective amnesia groping in the dark for our identity. It is the events recorded in history that have generated all the emotions, the values, the ideals that make life meaningful, that have given men something to live for, struggle over, die for. History is a source of inspiration, as it holds up to us the tradition and the glory, the clashing passions and heroic exploits of past generations. In it we find the drama of true life.⁴¹

There should be discernible differences in strategies, staffing, and approaches between tribal and non-tribal institutions charged with managing the effects of climate change. The essence and uniqueness of tribal institutions lie in their connection with the past.⁴²

Part of that past is traditional knowledge, that information that people in a given community, based on experience and adaptation to a local culture and environment, have developed over time, and continue to develop. This knowledge is used to sustain the community and its culture and to maintain the genetic resources necessary for the continued survival of the community.

Traditional knowledge includes mental inventories of local biological resources, animal breeds, and local plant, crop and tree species. It may include such information as trees and plants that grow well together, and indicator plants, such as plants that show the soil salinity or that are known to flower at the beginning of the rains. It includes practices and technologies, such as seed

political parties, healthcare) historically have functioned as information control mechanisms, acting to defend society against information saturation and glut.

⁴⁰ John Roach, *Climate-Change Forecast? Ask the Antarctic Ice*, National Geographic News, (November 10, 2004), <http://news.nationalgeographic.com/news/2004/11/1110_041110_antarctic_ice.html>, (last viewed December 9, 2006).

⁴¹ Robert Vincent Daniels, *Studying History: How and Why*, Prentice Hall, Englewood Cliffs, NJ, (1972).

⁴² Mervyn L. Tano, *On Becoming A Tribal Natural Resource Manager: Some Friendly Advice from a Long-Time Observer*, International Institute for Indigenous Resource Management, <<http://www.iiirm.org/publications/Articles%20Reports%20Papers/Environmental%20Protection/onbecom i.pdf>> (last viewed November 29, 2006).

treatment and storage methods and tools used for planting and harvesting. Traditional knowledge also encompasses belief systems that play a fundamental role in a people's livelihood, maintaining their health, and protecting and replenishing the environment. Traditional knowledge is dynamic in nature and may include experimentation in the integration of new plant or tree species into existing farming systems or a traditional healer's tests of new plant medicines.⁴³

The challenge for tribes is to integrate history and traditional knowledge with the information, science, and technology of today to adaptively manage the consequence of climate change. History does not necessarily occur in cycles. So, failure to learn from the past does not necessarily condemn one to repeat it, or to fail in the future. Yet, an organization that cannot, or will not, learn from its past is not likely to prepare itself very well for the future either, except by chance. Assessing what worked and what did not from historical data is integral to critical analysis. Learning from the past and preparing for the future require an ability to evaluate events as rigorously and objectively as possible. The study of history, perhaps more than any other discipline, can help develop the requisite critical thinking skills which underpin these abilities.⁴⁴

Looking backward is necessary also because we cannot somehow separate the future from our past and our present. Furthermore, we cannot develop leaders and build institutions assuming we have only one future for which to prepare. The fact is that agility is more about the past and present than the future. We can only imagine tomorrow through the lenses we have available today; the future is just as distorted by our biases and perspectives as is the past or the present. In effect, the future is always plural, never singular. Each future will depend, as it must, on the tools, skills, and biases of the individual forecasters. Without a historical context, much of the information we receive would remain unintelligible. What tribal leaders and tribal institutions need, then, are the means and the willingness to recognize their biases, and to test them—to filter their filters.⁴⁵ Procedures that ensure continuous consultation with tribal elders, spiritual and cultural leaders is perhaps the best way to do that.

Making Adaptive Management Work #3: Collaboration and Connectivity

Collaboration. The challenges of living in an era of global climate change, a turbulent global environment that is complex, and uncertain will require tribes and tribal institutions to build the capacity to respond to these changes by creating an adaptive organization whose size, competencies, and organizational structure evolve with the threats and opportunities.

Effective collaboration engages a broader and more diverse range of expertise and assets that the traditional model of decision-making. The creativity of thought unleashed by collaborative processes are extremely well-suited for complex issues wrought by climate change.

⁴³ Stephen A. Hansen and Justin W. VanFleet, *Traditional Knowledge and Intellectual Property: A Handbook on Issues and Options for Traditional Knowledge Holders in Protecting their Intellectual Property and Maintaining Biological Diversity*, American Association for the Advancement of Science, Washington, (2003), p. 3, <<http://shr.aaas.org/tek/handbook/handbook.pdf>>, (last viewed December 2, 2006).

⁴⁴ Antulio J. Echevarria II, Transformation's Uncontested Truths, November 2006 Newsletter, Strategic Studies Institute of the U.S. Army War College, Carlisle, Pennsylvania, <<http://www.strategicstudiesinstitute.army.mil/pdffiles/pub739.pdf>> (last viewed November 4, 2006).

⁴⁵ *Ibid.*

What is complexity? The word is derived from the Latin *plexus*, which means braided or entwined. *Complexus* means braided or entwined together, inseparable, or interdependent. The question then is, what organizational approaches are better suited to support decision-making in an era fraught with complex situations with the resultant increased degree of uncertainty and increased levels of risk? No tribe or tribal organization or tribal institutions has the facilities, personnel, and other resources to conduct the necessary research and analyses that tribal decision-makers will require. We think a network-centric approach that is agile and can take full advantage of all of the available information and strengths of the tribes, tribal institutions, and other partners within the network can reduce uncertainties and unbraid complexities.

The network-centric approach is the embodiment of information age concepts. Studies have shown that networking enables organizations to undertake a different range of missions than non-networked forces, by improving both efficiency and effectiveness of operations. Network-centric approaches use computers and communications to link people through information flows that depend on the interoperability of systems used by all network members. It requires collaboration and sharing of information to ensure that all appropriate assets can be quickly brought to bear on a situation or project. Objectives of network-centric approaches include the following:

1. Self-synchronization, or doing what needs to be done without command and control organizational structures;
2. Improved understanding of project or program objectives;
3. Improved understanding of the project or program status at all nodes of the network,; and,
4. Increased ability to tap into the collective knowledge of all networked organizations and institutions to improve effectiveness.⁴⁶

Connectivity. Historically, progress in connectivity has shrunk the globe in space, in time, and in the effort required to support interactions among people, companies, and ideas. Each leap of connectivity has contributed to a shrinkage in cycle time as well as an increase in the rate at which ideas spread. In typical hierarchical-centric operations, situational awareness steadily deteriorates. It is reestablished periodically through staff meetings, briefings, and reports, but it only then deteriorates again. Network-centric operations create a higher and more timely awareness, and allow it to be maintained throughout the entire life-cycle of a project or program. Although advances in information and other technologies enable network-centric approaches, this is not just a matter of introducing new technology. What is called for is the co-evolution of that technology with operational concepts, doctrine, training, and organization.⁴⁷

Some of those operational concepts, doctrine, training and organization include:

- Assuring access to information through a well networked and interoperable tribes, tribal organizations and institutions and other collaborators.
- Decrease our own information needs, especially in volume, by increasing our ability to access and analyze information collected from networked tribes, organizations, and institutions, including sensor networks.

⁴⁶ See, Clay Wilson, *Network Centric Warfare: Background and Oversight Issues for Congress*, Congressional Research Service, Washington, DC, (June 2, 2004), <<http://www.fas.org/man/crs/RL32411.pdf>> (last viewed November 29, 2006).

⁴⁷ Vice Admiral Arthur K. Cebrowski, U.S. Navy, and John J. Garstka, *Network-Centric Warfare: Its Origin and Future*, *Proceedings*, U.S. Naval Institute, Annapolis, MD, (January 1998), <<http://www.usni.org/Proceedings/Articles98/PROcebwski.htm>> (last viewed November 29, 2006).

- Routinely analyze information and translate knowledge into the levels required for common understanding and situational awareness across the network.
- Build a collaborative network of networks, populated and refreshed with quality data, both raw and processed, to enable network tribes, organizations, and institutions to build a shared awareness relevant to their needs.
- Information users must also become information suppliers, responsible for posting information without delay. Allow access to the data regardless of location.
- High-quality shared awareness requires trusted, secure and assured networks and information.
- Increase the opportunity for all network tribes, organizations, and institutions to operate nearly autonomously and to re-task themselves through exploitation of shared awareness of situations.
- Rapidly adapt when important developments occur and eliminate the bureaucratic, hierarchical character of typical command and control operations.

AN APPROACH TO DEVELOPING AGILE TRIBAL LEADERS AND AGILE TRIBAL INSTITUTIONS

For the past twelve months, the International Institute for Indigenous Resource Management has been a participant in a climate change working group organized by Dr. Dan Wildcat of the Haskell Indian Nations University, in Lawrence, Kansas.⁴⁸ The Institute is also working with the Confederated Tribes of the Umatilla Indian Reservation in Pendleton, Oregon, and Kwiaht, a science and Kwiaht, a research center based in Lopez, Washington on the Puget Sound to develop and deliver training and technical assistance on science-based and risk-based decision-making and adaptive management strategies to address impacts of climate change on Indian lands..

The consensus of the working group and the scientists at the CTUIR and Kwiaht is that a network-centric approach is required if tribes are to successfully assess threats and opportunities brought on by changes in climate and to design and implement adaptive management strategies to mitigate the threats or to benefit from the opportunities.

Strategy for Implementation

The overall strategy for the implementation of a network-centric approach is based upon: 1) Setting priorities to enable, develop, and implement network-centric concepts and capabilities; 2) Establishing specific goals and measuring progress toward these goals; and 3) Overcoming impediments to progress.

Setting Priorities: Participating tribes, organizations, and institutions must be robustly networked. This requires a focus on and commitment to interoperability both within and among participating tribes, organizations, and institutions.

This also means that existing and acquired assets (personnel, sensors, data) must be designed to be “network-ready.” In addition, increased emphasis must be placed upon research in developing shared situational awareness and new organizational approaches to achieving synchronization.

Establishing Goals and Measuring Progress: We recognizes the need to establish measurable goals, to develop an investment and implementation plan to achieve these goals, and to measure

⁴⁸ Participating organizations and institutions include: Haskell Indian Nations University, Diné College, Northwest Indian College, Sinte Gleska University, University of Kansas, National Center for Atmospheric Research, and the International Institute for Indigenous Resource Management.

progress. An immediate goal must be the creation of a robust network composed of at least the members of the Haskell working group. To measure progress, metrics are needed. The Haskell working group will undertake efforts to develop measures of key aspects of the network-centric approach, including the quality of information, collaboration, awareness, and shared situational awareness, synchronization, and, ultimately, measures of project or program effectiveness.

Overcoming Impediments to Progress: We foresee technical, cultural, and organizational impediments to the development and execution of a network-centric approach. We think these can be overcome through focused efforts in areas such as developing a “trusted” network, network interoperability, examination of the human and organizational incentives and disincentives to participation, and key network-centric-enabling technologies.⁴⁹

The network-centric project components are presented below as phases but could, to some extent, run concurrently.

Establishing the Analytical Baseline

- Codifying traditional knowledge
 - Oral Histories
 - Ethnology, Anthropology, Sociology
 - Films
 - Best Practices
 - Integrating western and traditional science
 - Resource inventories
- Identify and assess extant data sets
- Assess economic development infrastructure
- Assess legal and regulatory institutions and frameworks
- Assess tribal human resource development institutions
- Assess intergovernmental linkages and relationships

Establishing Operational Concepts, Doctrine, Training, and Organizational Structure

- Establish and get agreement on operational concepts
- Create information network
- Create science and technology network
- Create economic development network
- Create forward studies network
- Create human resource development network
- Create law and policy network
- Create cultural network
- Create grants management network

⁴⁹ U.S. Department of Defense, Office of Force Transformation, *The Implementation of Network-Centric Warfare*, Washington, (January 5, 2005), p. 14-18, <http://www.of.t.osd.mil/library/library_files/document_387_NCW_Book_LowRes.pdf>, (last viewed December 4, 2006).

CONCLUDING THOUGHTS

Changes in climate will result in changes to the environment whether such changes are rapid or long-term. Tribal leaders and tribal institutions will have to design and implement adaptive management strategies in response to the problems and opportunities wrought by such changes. Tribal leaders and tribal institutions will have to be agile to respond efficiently and effectively. Network-centric approaches provide the best means by which tribal leaders and tribal institutions can attain the requisite degree of agility. But as Dr. Daniel Wildcat of the Haskell Indian Nations University stated, “We’ve got to remember that network approaches are not just about building nodes, and interconnectivity, doctrine, protocols, and sensors. It’s really about having a common purpose, about taking responsibility, and about building a community.”⁵⁰

⁵⁰ Author’s notes of Haskell climate change meeting, December 8, 2006