

# Linking Indigenous peoples' knowledge and Western science in natural resource management: A dialogue

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Henry Michel<sup>1</sup> and Don Gayton<sup>2</sup>

## Abstract

First Nations knowledge keeper Henry Michel and ecologist Don Gayton, both extension specialists with FORREX–Forest Research Extension Partnership, engage in an extended dialogue on the prospects of linking Indigenous peoples' knowledge and Western science. Along the way, they discuss the philosophy surrounding each world view, and some practical guidelines for linking the two knowledge systems—something seen by Michel and Gayton as crucial to the future of forest and natural resource management in British Columbia.

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## Editor's Note

This is an extended interview with a First Nations knowledge keeper, **Henry Michel (HM)** and a Western scientist, **Don Gayton (DG)**. Michel and Gayton maintain an active collaboration, and believe that linking these two knowledge systems is crucial to the future of forest and natural resource management in British Columbia. This dialogue stemmed from their work in organizing the Conference, Linking Indigenous Peoples' Knowledge and Western Science in Natural Resources Management, which was held in March 2001.

Henry Michel is Secwepemc (Shuswap) from the small community of Sugar Cane, near Williams Lake, and is the Aboriginal Forestry Extension Specialist for FORREX–Forest Research Extension Partnership. His academic training is as an educator (BEd, University of British Columbia). Michel also has extensive cultural and spiritual training as an Indigenous knowledge keeper and combines these two schools of thought in the work he does in incorporating Indigenous peoples' knowledge into natural resource management.

Don Gayton is an ecosystem management specialist with FORREX, based in Nelson. His academic training includes a BSc in agronomy (Washington State University) and an MSc in plant ecology (University of Saskatchewan). His areas of specialization are grassland ecology and fire ecology. He is also a published author, specializing in nature and natural resource subjects.

## A Dialogue

**JEM:** What is Indigenous peoples' knowledge?

**HM:** A complicated, but very important question! In answering, I'd first have to place myself in the context of Indigenous peoples' knowledge (IPK), and then explore the positioning of IPK in relation to Western-based knowledge systems. I would then need to consider process-based thinking as opposed to product-based thinking, and finally explore what this holistic, all-inclusive system of knowledge—that we call IPK—looks like in its various applications. Oh yes! I almost forgot. I would also need to place IPK as a knowledge system into its own place and context.

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*Michel and Gayton believe that linking Indigenous peoples' knowledge and Western science is crucial to the future of forest and natural resource management in British Columbia.*

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**JEM:** Okay, so let's begin with your connection to IPK.

**HM:** I had always thought that because I never knew my Secwepemc (Shuswap) language, that I hadn't learned the Secwepemc teachings either. This was always a source of much anger for me—not knowing the Secwepemc language. I was angry with my parents, the schooling, and the system. It wasn't until I started raising a family and had to get them thinking about their Secwepemc training, that I began to realize the depth of what I did know. I have to give credit to my parents, my grandparents, and my community for my traditional training, but it has also been a very personal spiritual exploration.

**JEM:** So Don, I'll ask you an equivalent question: what is Western science, and how did you come to it?

**DG:** It's a daunting task—to speak about all of Western science—but it's a tool, a process, and a way of



Tim Lezard

Secwepemc knowledge keeper, Henry Michel.



looking at the world. I think one of the big problems for Western culture is to remember that science is not the only true way of looking at the world. Science has been a spectacularly effective tool, but it's just a tool nonetheless, and there are others. I came to science through an interest in nature and through my father, who was an engineer and amateur mathematician. As a boy, I always associated my dad with two things: slide rules and big reference books filled with mathematical formulae. I guess the books and slide rule were like talismans of science for me. I imagine Henry would have some equivalent symbols from his childhood.

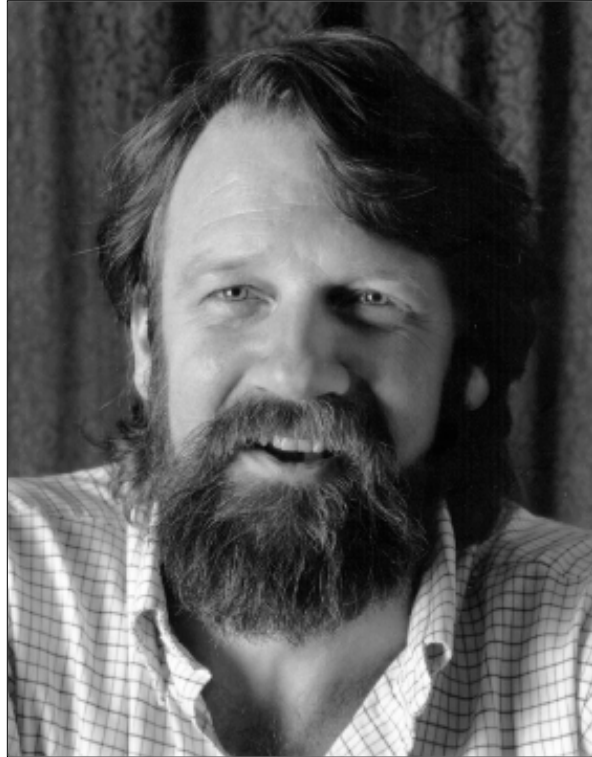
**HM:** As a child, the symbols of IPK were activities rather than things. My early memories of the sweat lodge would be one; listening to my grandfather's stories and doing the many, wonderful activities that grandfathers and grandsons do together would be another.

**JEM:** Henry, how would the loss of language you describe affect IPK?

**HM:** It is a huge problem, and is part of what we refer to as the "colonized mind." Throughout the colonial period—if it has ever ended, and many people claim colonizing of the Indigenous mind persists today—generations of Indigenous people lost their language, and along with that their cultural and spiritual practices, and their dignity. And so all facets of traditional Indigenous knowledge were eroded. Even today, many Indigenous languages are endangered: language is considered "endangered" if less than two percent of that people's population can speak their mother tongue. This is the case for Secwepemc and many other Indigenous languages. You can imagine the devastation that was caused by the deliberate taking away of everything that was important to Indigenous peoples of the Americas.

**JEM:** Did you experience this loss of language and culture at a personal level?

**HM:** My grandfather and both of my parents attended residential schools. We were practising Catholics when I was a child, but my parents, especially my Dad, ensured that we received some basic Indigenous training as well. Both my



Ecologist, Don Gayton.

grandparents and my parents were fluent Secwepemc speakers, so I grew up listening to the language, even though I didn't understand it. As a child I had a voracious appetite for knowledge, especially stuff about Indigenous people, the Secwepemc in particular. Each Sunday my Dad would take us children to visit the Elders in the little Secwepemc community of Sugar Cane, near Williams Lake, where we lived. I now consider those visits very important to my current understanding of my people's knowledge. Yet, for many years my perspective was that I had lost everything that was Secwepemc in me because I did not know our language.

**JEM:** I can see how both you and Don are placed within the context of a tradition, one that is at least partly carried on through families. Henry, do you consider yourself a "knowledge keeper?"

**HM:** I suppose you could say that I am still in training, still a candystriper, as we refer to ourselves. But then the people whom I consider as *my* teachers



and mentors also think of themselves as candystripers so, needless to say, becoming a knowledge keeper requires a long training process. At the highest level would be our Elders and others who have been chosen to take care of specific sacred responsibilities. These people are our healers and our medicine people. They would be given a “healing way,” such as working with an altar or with certain medicines, or some other specific position to work from. These people are our most cherished and respected knowledge keepers. However, many other people live as practitioners of IPK and some are highly skilled, but they are not chosen to carry a song or a healing altar. This does not position them in lower rankings—in fact, there is no such thing as a ranking, just different sets of responsibilities. Some are specialists in plants, animals, social conditions, teaching, and leadership. This is another outcome of the colonized mind—today we tend to see only the medicine people; all other knowledge keepers are in the background, a kind of blur. Anyway, I fit in there somewhere. I’ve been given some responsibilities, but I still consider myself to be at the candystriper level!

**DG:** I suppose science’s equivalent training would be the university graduate school. In spite of its competitive, institutionalized, publish-or-perish environment, the fundamental graduate research experience contains positive aspects. It provides the opportunity to deeply and passionately explore a subject, to temporarily devote oneself completely to learning, and to develop ideas about how some small part of the world works.

**JEM:** Let’s “deconstruct” these two knowledge systems a bit, so we can compare and contrast them. Don, how does this process you call “science” work?

**DG:** Before we do any comparing and contrasting, it’s important to point out that we’re not attempting to build a hierarchy of knowledge systems here, to put one above the other. Indigenous peoples’ knowledge and Western science are products of two vastly different cultures and as such, are not subject to comparison. The other caution here is that it is difficult to talk about a world view from within a world view. Having dealt with those

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cautions though, I’ll go on to say that Western science has one strong commonality with IPK and that is the overwhelming importance of direct observation. One area in which the systems diverge, however, is in what constitutes “proof.” Scientific disciplines, such as biology or forestry, have an elaborate, scripted process for arriving at proof that proceeds from hypothesis to null hypothesis, to the isolation of variables, to experimental design, replication, and quantification, and finally to statistical analysis. Our system is heavily reliant on numerical data—to prove things, we use numbers. Indigenous peoples’ knowledge, as far as I understand it, relies on experience as a proof. Western science, in contrast, tends to use experience as raw material for the construction of theories.

**HM:** I believe that IPK has a structure of checks and balances that is similar to the scientific method. To understand this process, you need to understand how IPK comes about, where new knowledge comes from, and how a new kernel of knowledge—much like a new scientific discovery—becomes accepted practice in society and the community at large.

**JEM:** Henry, can you provide an example of how new knowledge is acquired?

**HM:** Knowledge systems require a point of entry for new knowledge. With IPK, that point of entry is the “vision” phase, and new knowledge is coming in all the time. Within IPK training, there is constant contact with the spirit world. The sweat lodge, dreams, and vision quests are all vehicles for visioning. In the spirit realm, medicine people will be given instructions to cure a disease, then they must carry out the instructions received.



**JEM:** Henry, what about training? How do you prepare to be a knowledge keeper?

**HM:** My training currently includes a number of spiritual activities that allow me to learn about myself. Each year I take time off from work to engage in different types of training. Some of the training involves spending specific amounts of time in prayer and seclusion. As a child, activities like the sweat lodge and visits to village Elders were essential components, and as an adolescent my father and uncles put me through a vigorous physical training. Other training is more stringent such as engaging in prayer for a certain number of days without food or water. From this cultural and spiritual training, I feel that I have received instructions on what things are important to work toward, and this has led to some responsibilities I must carry out throughout my life. I believe one of those responsibilities is the kind of work I do for FORREX—facilitating the incorporation of IPK into the planning, management, and decision-making processes of Western society that affect the health of the land and all living things. I think this is particularly important in the areas of natural resources, water, environment, and forests, as well as any other area where the decision making has an effect on Mother Earth.

**JEM:** Henry, you spoke before about “the positioning of IPK in relation to Western-based knowledge systems.” What do you mean by “positioning”?

**HM:** The Western world view is pervasive, and we tend to measure all other knowledge systems by it. If we do not start by acknowledging this point, then we will continue this conversation by positioning IPK as some esoteric subset of the Western knowledge system, rather than positioning it as a knowledge system in its own right. That’s what I meant by “positioning.”

**JEM:** Can you give me an example of a difference between IPK and Western science?

**HM:** The Western world somehow got out of step with all Indigenous cultures by changing the basic premise of its interactions with the natural world. In my view, an Indigenous knowledge system is one that still maintains its connection to natural

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*An Indigenous knowledge system is one that still maintains its connection to natural processes; its technologies work with nature in a sustaining balance.*

— Henry Michel

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processes; its technologies work with nature in a sustaining balance. Within IPK are methodologies for the caretaking and stewardship of Mother Earth that are essential to sustaining her natural life systems. Science has shifted Western culture’s focus from one of working with nature to one of the present industrial society’s domination of nature. Indigenous peoples contend that this shift has created an alarming drain on the natural resources of Mother Earth.

**DG:** I’m going to take issue with that. Science has not dictated the overuse of our natural resources; overuse has been driven by the desire for economic gain and, in some cases, by sheer ignorance. Science has certainly facilitated natural resource overuse in many ways, but the fundamental decisions were made by society, in its quest for jobs and financial return. I also believe that there are disciplines within the scientific community, represented by ecologists and conservation biologists, that are overtly sympathetic to the concepts that Henry expresses.

**HM:** I have heard this line of reasoning before. I suppose what I am speaking about is not necessarily the application of science, but the overall pervasiveness of scientific methodology in Western management systems. I feel that “management” is a Western practice derived from academia. My perspective is that the scientific method is a way of life that transcends science and is far-reaching in government, policy development, and land use decision making. It is the process of imposing non-natural systems of resource use (in which Western science has played a major role) that Indigenous peoples see as being so destructive. Indigenous peoples feel that process has been heavily influenced and driven by the scientific method.





**DG:** Henry just opened a huge can of worms. In a certain sense, “science” is a much more straightforward issue than “management.” Science and management are both rational processes, but the similarity ends there. Management—as in the management of natural resources—includes science, but it also includes economic and political considerations. Scientists might look at a situation and conclude that  $x$  amount of intact habitat is required for a species to survive; whereas managers would look at the same situation and take the habitat information into consideration, but would go on to look at other criteria, such as jobs, community sustainability, votes, and so on.

**JEM:** Henry, what would you consider as the Western world’s main impact on the Indigenous world?

**HM:** I like your use of the phrase “Indigenous world”—it has many positive connotations for me. I suppose the displacement of Indigenous peoples through the colonizing process and its destructive force on Mother Earth’s life systems stands as the main impact of the Western world.

**JEM:** Henry, you indicated that ecological sustainability is integral to IPK, and that this sets it apart from Western science. Are there other differences between the two systems?

**HM:** Certainly—Western science is concerned about ecological sustainability, but in practice, the decision-making authority gives a much higher priority to resource extraction than to ecosystem health. As far as other differences, Western knowledge does not recognize knowledge that stands outside its various disciplines. If it isn’t biology, chemistry, physics, or some other predefined discipline, then it doesn’t exist. In fact, the fundamental basis of IPK systems, which is a spiritual connection to all natural life systems, has been discarded as being superstitious and irrelevant. And until recently, Western science saw its application as being strictly neutral, empirical, and quantitative.

**JEM:** Is science absolutely neutral, Don?

**DG:** On the face of it, yes. Science works only as far as it is perceived to be neutral and value free. However, I can point to dozens of instances of theories that

were proposed, submitted to rigorous testing, and accepted, only to be thrown out later when new information came along. So, you could say that the old theory was biased and imperfect, or else you could say that science is simply a process by which we draw progressively more accurate conclusions about our view of reality.

**HM:** I must continue to emphasize history—the history of science’s continual discrediting of Indigenous knowledge through colonial processes, only to then expropriate Indigenous knowledge through patent and copyright. This has silenced generations of potential Indigenous knowledge keepers and practitioners and severely curtailed any integration of IPK with Western science. Now, when it is fashionable to incorporate IPK methodologies into ecological restoration and conservation efforts, few avenues exist to do this successfully.

**DG:** I do think we have been guilty of “data mining”—of wanting only the specific bits of Indigenous knowledge, but not wanting to deal with the cultural and spiritual context that is so fundamental to that knowledge.

**JEM:** So can we now begin to explore IPK as a system of knowledge?

**HM:** We have already covered the separation of IPK from the Western world view. What I should address now is the concept of IPK as a system of knowing the world because Western science also covers the same territory—how do we know the world and what is our place in it? However, IPK provides a complete world view. All Indigenous peoples have creation stories, philosophies, histories, science, and math, and have built structures into their knowledge systems to make them self-sustaining. Indigenous peoples’ knowledge systems are developing and evolving and continually renewing themselves to face the challenges of the future.

**JEM:** Can you elaborate?

**HM:** One approach for delving into this rather large concept is to explore the holistic nature of IPK, as opposed to the fragmented nature of Western science. Holistic systems are very different from the hierarchical systems of the Western world. Holisms see knowledge as a continuum rather



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— Don Gayton

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than as a linear hierarchy, and therefore can incorporate a lot that hierarchies can not. So politics, economics, science, religion, medicine, philosophy, and all other categories of knowledge are seen from a holistic position with IPK systems. In my view, Western systems break each of these categories of knowledge into parts, and within each category specialists emerge for specific topical areas.

**DG:** The concept of holism is indeed the Achilles' heel of science. Most ecologists and natural resource scientists recognize the importance of considering all of the factors in a situation, but experimental science is essentially designed to deal with one variable at a time. We can think holistically, we can model, and do multivariate analysis, but the core enterprise of science is to determine whether there is a causal relationship between  $x$  and  $y$ , and if there is, to quantify it. But there's nothing to prevent that single-variable, fragmented scientific information from feeding into a holistic planning or management process. For me, one of the real arguments for linking Western science and IPK is that you would put a set of people who are really good at looking at things in the single-variable microscale, together with another set whose talents lie in working in the multi-variable macroscale. That conjunction is bound to produce some very interesting results.

**HM:** I agree with Don on that point. What I see happening is a movement toward the convergence of knowledge in science today. I feel that Western science—at least the sciences that deal with the environment and ecosystems—is shifting to more

holistic approaches. The cumulative effect of this shift will result in a holistic perspective of ecosystem health.

**JEM:** Henry, tell me about the spiritual aspects of IPK.

**HM:** In the Western world view, the metaphysical, or supernatural, or non-physical, world is viewed as non-scientific, based on superstition and thus, unimportant. The metaphysical world is actually the foundation of IPK; it is the place where knowledge originates.

**JEM:** Henry, can we stop for a minute and define your use of the term “metaphysical?”

**HM:** I think the easiest way to address the idea of the metaphysical is to think of a whole being as composed of spiritual, emotional, physical, and mental or intellectual parts. In Indigenous philosophy, everything emerges from the spiritual realm—that part of the being that is incorporeal, or non-physical. Thought, intellect, creativity, intuition, and spirit all reside in this non-physical, or metaphysical, world. Within Indigenous culture important processes exist to incorporate the non-physical world into decision making. Our belief is that knowledge originates in the non-physical world, and that you seek it there. This is what spiritual training is essentially all about: to seek new knowledge through processes that help you to enter the metaphysical world.

**DG:** We both wrestle with these terms “metaphysical” and “spiritual.” Neither one really fits. Metaphysics is a branch of philosophy, and the word “spiritual” automatically references religion, which may or may not play a part. I'd like to see a new word that falls somewhere between the two!

**JEM:** Okay, we'll use the term “spiritual” for now, with that qualifier. Henry, tell me more about the spiritual aspects of IPK.

**HM:** When an Indigenous person reaches a certain age, they must undergo a spiritual quest to find their place in the world, much like the current education but much more directed by culture. This training period is a journey into the metaphysical, or supernatural, world. If successful, the person will make contact, communicate, and be given



instructions for their lifelong quest. These instructions are transmitted by spiritual beings that have counterparts in the physical world—be they plant, animal, water, air, or rock. In essence, the knowledge received in these spiritual quests provides for a lifelong responsibility to the physical world within your community, including all life forms. Your responsibility upon returning from your spiritual quest is to actualize the instructions that you received during your journey. In the view of many Indigenous scholars, this process of knowledge acquisition is not that different from the scientific process. The similarities are many. For instance, the information received during the vision stage is similar to the formation of a hypothesis. Carrying out the instructions you receive is similar to the testing and re-testing of a hypothesis. If, as in the case of highly respected Indigenous medicine people, they have earned their respect by carrying out the vision received in their quest and are perceived within the community-at-large as a medicine person, then the moving from hypothesis to theory stage has been completed. Seeking these parallels is important in order to establish that IPK can stand on its own as a knowledge system because within that knowledge system is embedded a math, science, education, governance, history, and any other category of knowledge that any system possesses.

**JEM:** Are there any analogues to the Indigenous view of the world in Western science?

**DG:** The Gaia hypothesis of Lovelock and Margulis might be considered similar. In this hypothesis, the animate and inanimate elements of the Earth are seen as working together to maintain appropriate conditions for continued life. Although the Earth doesn't meet the criteria to be called "an organism," as Lovelock and Margulis propose, there is no doubt that the Gaia hypothesis resonates with many scientists, particularly with ecologists and biologists.

**JEM:** Can you give me an example of that resonance?

**DG:** One of Canada's own pre-eminent ecologists, Dr. Stan Rowe, has criticized our traditional notion of assuming that life is contained within organisms: a fish is alive, a river is not alive; a tree is alive,

soil is not alive; and so on. What Stan says is that the essence of life resides in the habitat or the ecosystem, not in the organism. Life is defined as the air, the water, the soil, and all the other things that a tree needs to function. It's a radical concept, but intuitively we all know the fish is nothing without the river.

**HM:** That concept is very close to the world view encompassed by IPK. In this era of convergence of knowledge, I hear that science is much closer to where alchemy was 1500 years ago in its belief that all life has spirit. This is the holistic aspect that Indigenous Elders operate from. The work of physicists like Fritjof Capra in his Centre for Ecoliteracy, as well as the Gaia Theory and Deep Ecology work are other examples of this convergence.

**DG:** I know this discussion seems odd—here we are talking about metaphysics when the real issue is management of our natural resources. But the simple fact is the linking of separate knowledge systems is something that is almost unprecedented in human history. I think it's important to spend some time getting the philosophical issues clear in our minds before we jump into practical application.

**JEM:** Henry, you have explained that IPK is a system of knowledge originating from non-human life on the land, and that it is communicated by oral traditions. Could you give me a specific example of how this works?

**HM:** When the Vikings sailed from their Scandinavian homelands to the Grand Banks a thousand years ago, their maps were in the form of heroic poems, or sagas, that were sung during the journey. Through these songs, the complex route information was transferred from person to person and from generation to generation. That, for me, has always served as an example of how the oral tradition works as a system of knowledge transfer between individuals and generations. The position of the Orator and the Story are critical to the knowledge transfer. In Salishan, of which the Secwepemc language is a member, the Coyote Stories make up a large portion of our Creation Stories. The Orator not only recites the Story, but also has the responsibility of placing the





Story in the context of the audience's experiential place. I think that you have to understand how the spoken language of oral traditions operates as opposed to the English language, which has evolved into a written record. The use of symbol and metaphor is much more prevalent in the oral tradition. The storyteller has enormous creative leeway as long as the metaphor and the symbolism stay intact. Our children grow up with the Coyote Stories and carry them into their adult lives. The same story is heard, but the information they hear later in life carries much more meaning because they have greater life experience with which to decode the metaphoric and symbolic language. Cultural and spiritual as well as vital survival information is passed on through the story.

**JEM:** Perhaps each of you can give an example of how knowledge is communicated within your respective world views.

**HM:** Our oral tradition is more action-oriented; the English language is more subject-oriented. For example, if I were to orally describe a hunting expedition that my family took some time ago, you would get great detail about place and activity. The information would be so detailed that you could use it to replicate the journey and point out exact locations where certain activities took place. In the particular Coyote Story that addresses something similar to biogeoclimatic zones, for example, Coyote tosses his eyes in the air and thieves steal them. So, Coyote is blind and he decides to make his way to the "gathering place" that the thieves talked about. As he journeys from the high alpine country where he was to the lowlands where the thieves have travelled, he bumps and stumbles into many trees and other plant life. This story, therefore, provides detail about the various ecosystems that occur from the valley bottom to the high mountain biogeoclimatic zones.

**DG:** The classic mode of scientific communication is the journal paper, which follows a rigorous structure of Abstract, Introduction, Materials and Methods, Results, Discussion, and Conclusions. The personal pronoun is studiously avoided, the language is highly condensed, and every effort is made to let the data speak for itself.

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*Processes involved in forest certification, innovative forest practices agreements, and community forestry are very promising approaches to incorporate IPK into natural resource management.*

— Henry Michel

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The average person finds scientific literature incomprehensible, but for us, reading journal articles is not only essential, it's almost relaxing, like reading trashy novels.

**JEM:** Do you have any observations to share based on your own personal relationship? How does the Indigenous knowledge keeper get along with the Western scientist, and vice versa?

**HM:** I think there is a great promise in relationship-building. I credit that to the great work that our Indigenous scholars and politicians have accomplished at the local, national, and international levels. For example, the UN Convention on Biodiversity, of which Canada is a signatory, binds government, industry, and science to work with the Indigenous peoples of Canada in developing strategies to conserve and restore biodiversity. I think that we are just beginning to feel the effects of this international work. I feel that processes involved in forest certification, innovative forest practices agreements, and community forestry are also very promising approaches to incorporate IPK into natural resource management. I also feel that extension organizations such as FORREX are vital for developing knowledge transfer capacity between Indigenous people and Western science. So to answer your question, I feel that IPK and Western science are just now, at least in British Columbia, developing a closer relationship. I see many good models developing. At the conference<sup>1</sup> that Don and I organized, "Linking Indigenous Peoples' Knowledge and Western Science in

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<sup>1</sup> The Conference, hosted by FORREX in Chase, BC on March 14–16, 2001, was attended by 125 participants. Proceedings are available on-line at [www.forrex.org/pubs/siferpseries/SS4.pdf](http://www.forrex.org/pubs/siferpseries/SS4.pdf). Hard copies may be obtained by contacting FORREX [provide e-mail address].



Natural Resource Management,” a number of outstanding examples were presented. To me, that was very promising.

**DG:** One thing is clear to me based on our experience. You might set the stage for bridging between knowledge systems through policy, legislation, and so on, but the actual work—the concrete successes and failures—is only going to happen at the level of individuals and small groups.

**JEM:** **Have you come up with any guidelines or principles that should be respected in any practical attempts to link IPK and Western science in natural resource management?**

**HM:** A lot of work is currently ongoing in this area. I’m always faced with this question. Processes such as “participatory research” or “community-directed science” provide great opportunities for integrated research. However, right now these processes are still being developed. We need to bring together projects that provide good models of community-directed research because they are presently fragmented isolated projects. The other great need is to get community-directed science to be the norm rather than the exception. My feeling is that the whole community desires a greater involvement in natural resource management, not just Indigenous people, and so the benefits gained by Indigenous people will be felt by the whole community.

**JEM:** **Can either of you cite any actual examples of the integration of IPK into natural resource management?**

**HM:** We heard of several examples during our IPK/WS Conference. In the Merritt Timber Supply Area, for instance, the Nicola-Similkameen Innovative Forestry Society includes the participation of the Nicola Tribal Association and other First Nation bands. In this example, the Society is making great strides in using traditional land-use studies conducted by the Nicola Tribal Association to develop a Predictive Ecosystem Model for their Innovative Forest Practices Agreement lands. Thirty years ago, the Tl’azt’én First Nation was the first native group to acquire a tree farm license [TFL]. Through being thrust into industrial forestry, the Tl’azt’én have gained experience in managing their TFL, but have also maintained

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— Don Gayton

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their traditional land-use values and life style.

**DG:** Ken Lertzman of Simon Fraser University also spoke to us about the lessons learned by the Clayoquot Scientific Panel, which was a pioneer attempt at linking knowledge systems. The scientists and the Nuu-Chah-Nulth developed a couple of key guidelines: respect and open discussion in the pursuit of consensus; and respect for each other, for different values, and for data founded in both science and traditional knowledge. One of the guidelines that I found most interesting was that the Panel avoided concentrating on past examples of resource mismanagement in either culture. Their motto was: “We are here to represent the best of each of our traditions.”

**JEM:** **Is there a risk that, by linking IPK and Western science, you might do violence to either one or both? Perhaps they are better left separate?**

**HM:** Obviously, the whole notion of appropriating IPK practices for short-term financial gain poses the risk of violence to the system. There are risks of the misuse and abuse of IPK because these systems originate in a world where industry and global economics do not yet tread. The general question of intellectual property rights, and more specifically the question of who owns genetic information, is an example of the two worlds in collision. However, I also believe there are great risks in not linking IPK and Western science. If, as we often hear, IPK systems contain vital information for ecosystem conservation and recovery and for developing ecosystem-sustaining natural resource management practices that will provide a balance between the needs of each living organism inhabiting the forest and those of human industrial and economics, then I think it is



important that knowledge and practices be shared. There is one huge caveat here though—IPK must be integrated fairly and not consumed as an esoteric subset of Western knowledge systems and processes. As my Elders say, Western science has had 250 years in the Interior to manage the natural resources and these resources are, in their view, in serious decline and are endangered. It is now time to allow Indigenous people to resume their stewardship practices over these resources. In our current Western science-dominated management system, incorporating IPK principles is the main avenue for this to happen.

**DG:** From my perspective, I see a great deal of resistance to diluting Western science with other world views. I don't believe the two systems will ever satisfactorily merge, and perhaps they shouldn't. What could happen is that the two systems become more aware of each other, and exchange more information with each other. This linkage should probably not take place at the *knowledge generation* stage, but at the *knowledge application* stage. In other words, we don't mingle our separate ways of comprehending nature and natural resources, but we allow the knowledge gained from our respective sources to feed into a socially inclusive, holistic, community-driven resource management process. Wow—I just pushed a lot of social-democrat hot buttons there! But so be it, I think this is the way of the future for the province. The process we really need to be engaged in is what California native Elder Dennis Martinez calls: “the intercultural verification of ecosystem states and processes.”

**JEM:** Do either of you have any advice for people who are contemplating practical applications of the linking of Indigenous peoples' knowledge and Western science in natural resource management?

**HM:** Yes. There are some practical “to do's” that could help managers link IPK and Western science. I have observed that the best linkages take place in “participatory research” projects. Participatory research is a process that allows a community to be an integral part of the whole research project from the development of the initial concept and the definition of the research question to the on-the-ground implementation of the research

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*As my Elders say, Western science has had 250 years to manage natural resources and these resources are, in their view, in serious decline. It is now time to allow Indigenous people to resume their stewardship practices over these resources.*

— Henry Michel

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project. And the community must, of course, assist in interpreting the results. I believe participatory research is a very good first step in the process of incorporating IPK into natural resource management. It means that Western science must give up some of its control to the IPK community and make some compromises as to the direction that research programs will take. However, I feel that the long-term result will be positive and healthy and satisfying for both sides. As well, I think that community involvement has far-reaching effects on relationship-building and on educational skill-building. My sense is that participatory research will lead to more reliance on the community in defining researchable topic areas, and it will be within this milieu of co-operative, community-driven research that the issue of IPK and science will emerge.

**DG:** A lot of good points have been brought up already. There are some obvious cautions: start small, and give the project plenty of time to get through the initial input, consensus-building, and planning stages. And approach the project as an experiment—don't predetermine the outcome.

**JEM:** Any concluding thoughts?

**HM:** For me this dialogue is very important to my work, and a bit risky. I have never seen myself “going public” with claims that I hold any knowledge, but I think it is important that I accept that truth about myself. The work of developing sustaining ecosystem management—FORREX's goal—will take every ounce of knowledge that society can muster. Indigenous peoples have a lot to offer to that process. I believe that the



trend toward holism, as expressed through such organizations as the Forest Stewardship Council and community forests, and the convergence of science, spirituality, and governance as exemplified by the work of the Centre for Ecoliteracy, will continue to provide avenues for incorporating IPK into natural resource management. My sense is that we are talking about process rather than product. How we *do* things is very important. At the conference, for example, I approached the community Elders and requested that they spiritually take care of the conference. They agreed to look after that responsibility. We opened the conference with a sacred fire and prayed over each day and each meal. That process is very important to how Indigenous systems work. And that recognition of spirit is very absent from the Western world's way of being. I believe that if we take the time to acknowledge that the non-physical world is yet another part of the life force we experience daily, as we did at the conference, it will change the way we interact with each other and with all other living things in nature. The key for me is the health and integrity of nature. My family's life and health—and therefore my community's—depends on how I interact with all living systems in nature. My children and grandchildren are my future and they deserve plenty of clean water and healthy air, as well as a diversity of plants, animals, fish, and birds. All future generations deserve this. I must do whatever I can to ensure that legacy.

**DG:** I don't think I can add much to that. We will need patience, we will need small working groups, and an enthusiasm for experimentation. Indigenous people will need to understand that Western scientists are rarely in charge. And Western scientists will need to develop a tolerance for metaphor.

## Selected Readings

- Capra, F. 1996. *The web of life: a new scientific understanding of living systems*. Anchor Books, New York N.Y.
- Deloria Jr., V. 1995. *Red earth, white lies: Native Americans and the myth of scientific fact*. Scribner, New York, N.Y.
- Kimmerer, R.W. 2000. Native knowledge for native ecosystems. *Journal of Forestry* 98:4–9.
- Lovelock, J.E. 1979. *Gaia*. Oxford University Press, London.
- Michel, H. and D. Gayton (Editors). 2002. *Linking Indigenous peoples' knowledge and Western science in natural resource management: conference proceedings*. FORREX–Forest Research Extension Partnership, Kamloops, BC. FORREX Series No. 4 [http://www.siferp.org/pubs/siferpseries/ss4.pdf].
- O'Murchu, D. 2000. *Quantum theology: spiritual implications of the new physics*. The Crossroad Publishing Company, New York, N.Y.
- Rowe, S. 2001. What on Earth is life? An ecological view. *Ecosystem Health* 7:141–146.
- Smith, L.T. 1999. *Decolonizing methodologies: research and Indigenous peoples*. Zed Books Ltd., London & New York, N.Y.

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