

## AN IMPRESSIONISTIC BIG PICTURE, OR IS IT A MIRAGE?

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### Foreword

Colleagues at the Institute for Agriculture and Trade Policy, IATP, of Minneapolis have produced a study titled 'Impacts of Food Production to Water Quantity in the Great Lakes Basin.' This study has extra-basin trade in water as a commodity as a sub-theme. The present essay was cobbled together in response to an invitation to provide a 'big picture' to which the IATP study related, implicitly. I have chosen to write this essay in a style of a dialectical complement to that of the IATP study without implying anything negative about the latter.

First, bits of an auto-biography as a way of exposing my credentials, such as they are.

In 1943 my parents with us children moved to Ontario's Niagara region and onto a farm that bounded the south shore of Lake Ontario, except for a row of summer cottages perched on a clay cliff at the water's edge. In 1944 almost all of those cottages slid into the lake and broke apart during spring storms due to erosion because of the high water level in that year. Years later I met Ben Cooke whose algorithm was used for the protocol to regulate, more or less, Lake Ontario's water levels through water releases at the St. Lawrence Seaway dams on the St. Lawrence River.

We were warned to stay away from Lake Ontario's beaches because of contamination by the poliomyelitis virus. Acquaintances were partly crippled by polio. Jonas Salk invented his vaccine in 1953 and the problem with contamination abated for those who had been vaccinated. Years later I met Salk at a systems workshop in his Institute in La Jolla, CA.

The commercial fishers in Niagara were catching and marketing blue pike in those years. I was struck by the 'unfishy' taste of high quality blue pike of the Great Lakes. This sibling species of walleye and sauger became extinct in the mid 1950s. Years later I helped to write a scientific memorial to the blue pike of Lakes Erie and Ontario.

As teenagers we paddled canoes, trying personally not to come in contact with the water itself, in the reservoir near the mouth of Twelve Mile Creek that was subsequently developed as the course for the Henley Regatta. In the 1940s it was a cesspool into which raw industrial and domestic wastes from St. Catharines and Thorold were loaded. A. Berry, of Ontario's public health agency, had begun his campaign to have sewage treatment plants built and then improved over numerous stages. In 1954 I met Berry: as a field crew assessing the ecosystemic quality of the Credit River we collected grossly polluted water from Black Creek for his analysis. My grandchildren now live near Black Creek.

Since those early experiences as a teenager, I have lived near the lakes and streams of the Great Lakes Basin. I have observed, used and studied these aquatic ecosystems for six decades, almost. The present essay draws on those memories. I haven't gone back to check all the 'facts' so there will be errors of detail here and there. And presumably also errors of inference and interpretation.

This essay emphasizes perceptions related to the northern half of this vast Basin ecosystem. I have lived in the US part of the Basin on two occasions for a total of seven years. We entered as immigrants for the second period in the 1960s during which I was seconded, as a resident alien

academic, to a US federal agency. So I am a tempered Americanophile, with admiration for US internal democratic proclivities and less admiration for US external imperialistic propensities.

If this were a respectable essay it would be sprinkled with scores of citations to the works of many colleagues. In its present draft form it may be better not to acknowledge anyone for fear of committing offence.

### **Hitting the Wall, Groping for Recovery and Back-Sliding?**

Here in the Great Lakes / St. Lawrence River Basin we 'hit the wall' ecologically in the 1950s, or about then. Under Progressive Modernism humans of the dominant cultures of this Basin had exceeded the assimilative capacity of these waters for sewage and many kinds of industrial wastes. Rainfall flushed the copious filth in our towns and cities into the streams and lakes. Large wetlands were drained and converted to carelessly-managed farms. Valued fish had been exploited beyond maximum sustainable levels: we rendered the blue pike extinct. Fishery experts had released alewife which they had mistaken for American shad, and had introduced rainbow smelt to feed the previously-introduced rainbow trout. Ship canals and commerce had opened the lakes to exotic pests like the sea lamprey. And so, on and on.

After hitting the wall in the 1950s remediative programs were initiated, first with respect to sewage, the fish association and the toxics of the steel and chemical industries. Many billions of dollars were subsequently spent in many remediative programs, and some but not all indicators of ecosystemic rehabilitation have demonstrated positive results. Adverse consequences of many cultural stresses interact with positive feedback and adaptive ecosystemic responses that exhibit hysteresis, so that ecosystemic recovery has been slow and spotty, where it has occurred. Awareness of such complexity led to initiation of various versions of an ecosystem approach.

At the Canada-US Inter-University Seminar, CUSIS, at Ann Arbor, MI, on June 21, 2001 I offered a personal assessment of our current stewardship of our Ecosystem, or BE. Here BE includes humans and other animate and inanimate things each perceived as relatively open but with a degree of closure due to self-organization into nested holonocracies or 'hierarchies' as eco-phenomena, see below. At the Ann Arbor meeting my friend the manager of the Great Lakes industry association teasingly labeled my views as 'liberal;' I responded that my approach was more 'conservative' than his. Of course for both of us those terms had no more intrinsic meaning than do cuss words in general. Other colleagues hoped that I was too pessimistic. Since then I have been looking for evidence, pro and con, for that tentative assessment and have become less tentative about it.

### **This Essay's Schema**

I inferred then and still do that, on balance, we have **regressed decrementally** since 1985 in our joint stewardship of the BE in ways that include:

Our **understanding** of our cultural-natural BE, including what is provided by traditional knowledge and western science, is now less sufficient for 'management purposes' than it may have been two decades ago. We are continuing to change these ecosystems so that many features to which traditional knowledge once related no longer exist. Also we are generating brand-new ignorance through science-based inventions faster than our scientists dissipate the extant old plus new ignorance.

Our **governance capabilities** including formalized aspects of management are waning. We are expanding shakily from bi-national to penta-national participatory governance, relying more on poorly-organized participatory than on overly-organized bureaucratic approaches. Self-policing of voluntary codes of ethics in different sectors of the BE's users and abusers is lax, in part because professional auditors may not be as sceptical about creative accounting methods, including environmental accounting as risk assessment, as they once were.

The **quantity and quality of natural goods and services of these ecosystems**, as they relate to human values are diminishing on balance. We are continuing to induce unwanted organizational degradation, bubbles and flips in eco-reality at all levels from global to regional to local while our efforts to remediate past degradation at local and lake-wide levels seem to have stalled.

I have taken into account extant information on local, regional and global processes like:

- *climate change* now underway;
- *atmospheric transport* of particulates and contaminants;
- the creation and widespread use of poorly-tested *genetically modified organisms*;
- *human population growth* mostly through net migration into a warm, wet Basin;
- *clashing scientific approaches*, e.g., positivistic normal vs. constructivist post-normal science;
- legitimization of new exploitive freedoms for entrepreneurs and new abusive constraints on others as with *global free trade* perceived simplistically;
- *poorly-audited ethics* professed voluntarily by the leaders of industry and commerce;
- *cooling commitment* to voluntarism even by activists;
- *early retirement* of disillusioned civil servants as ecosystem stewards; and
- *shit happening* here, there and everywhere.

Subsequent sections of this essay include three meta-narratives on selected aspects of eco-phenomena as interacting in our Basin :

1. **Ecosystemic inquiry;**
2. **Policy emphases in governance; and**
3. **Adaptive evolution of ecosystemic features.**

Things like ecosystem, inquiry, policy, governance and evolution are perceived here in an inter-compatible way, I hope. My approach in this essay – from overall perspective or mindscape to each of the three meta-narratives and their details – may be labeled '**pragmatic descriptive**' as opposed, say, to 'idealistic conceptual' or 'mechanistic abstractive' or 'fundamentalistic ideological.' From an ethical perspective, consequentialist utilitarian guidelines are important but do not automatically trump a priori deontological guidelines. Hence bureaucratic techniques like benefit-cost or comprehensive risk assessments of a utilitarian hew do not trump consideration of distributional justice among humans of different nations and classes, and between humans and other creatures, say. Stand-alone procrustean scientific techniques are no more legitimate than are stand-alone procrustean ethics related to eco-justice, say.

#### **HEURISTIC NARRATIVE A: INQUIRY AS DIALOGUE AND DIALECTIC?**

Dialogue implies conversation and dialectics implies difference and debate, more or less, so the former may imply discourse that is less formal than the latter. Dialogue may be favored for

consensus building as in voluntary planning, and dialectics for conflict resolution as with legal action. Both forms of discourse are commonly used in democracies.

The prefix 'dia' comes from the Greek for 'through' or 'apart.' 'Dia' may have some conceptual relationship to 'di' for 'two,' and dialogues and dialectics among protagonists of a number of positions may often collapse into two simplistic polarities, e.g. conservative vs liberal in popular political slanging matches. In the present sketch of an essay I focus more on bi-polarization than on multi-polarization, in order to keep the text wieldy.

An ecosystem, as an eco-phenomenon, may be characterized by the properties 'self-organizing, hierarchic or holonocratic, and open' or SOHO. Both the SO and the H initials imply that an ecosystem is not fully open but has autonomous constraints that may be adapted through evolution to exogenous constraints. Thus the definition of SOHO is implicitly dialectical: open and not open.

Similarly, an ecosystem may be perceived holistically as a whole or reductionistically as made up of parts or 'ons.' Or one may be able to transcend this hol vs on dialectic and perceive an ecosystem as a 'holon' with some features that may look like separate parts and other features that look like new emergent properties of the whole, when viewed simplistically.

Some parts of an ecosystem are themselves holons which are nested within a bigger holon. And so through several levels of organization that is sometimes described as being 'hierarchic.' The latter term has some connotations of the top-down exercise of power that are antithetical to 'democratic' in the sense of a form of governance with reciprocal responsibilities among different political holons, say. So a 'democracy,' as a special kind of 'holonocracy,' relates to how holons at different organizational levels interact horizontally and vertically. Thus 'holonocratic' may be more descriptive and less ambiguous than 'hierarchic' for the form of self-governance in a healthy natural-cultural ecosystem. Further, a hierarchy may be a desirable form of organization only in occasional transient circumstances as in 'police action,' except for coercive fundamentalistic ideologues.

Early in the 21<sup>st</sup> Century we appear to be phasing out of inquiry and discourse favored in the Modernist Era and phasing into broader discourse not yet well characterized conceptually and methodologically. Sometimes the distinction is characterized in a bi-polar way as normal vs post-normal.

Concerning environmental issues, here viewed in a bi-polar way:

(a) Modernist science or recent centuries emphasized universalistic, positivistic and quantitative conventions based on an assumption that nature is simple and that Occam's razor should be used to trim away unnecessarily complicated inferences. Such science provided information appropriate for setting universal criteria for regulation by government. It also provided information for artificially condensed assessments by bureaucracies serving formal governance that relied on consequentialist utilitarian ethics for making decisions.

(b) The new or re-newed discourse may favour contextual, constructivist and qualitative science based on an assumption that nature has some irreducible complexity. Such discourse may be crafted to be pre-adapted to a priori, deontological ethics as related, say, to distributive justice, with participatory governance including some mix of cooperation and competition among actors and governments. 'Co-management' arrangements among people of different cultures is an example, with 'traditional ecological knowledge' accorded status in the proceedings.

We may currently be in a transitional period with noisy meta -dialectical interactions between these two types of inquiry, one waning and the other waxing. Again, some scholarly participants may apply the term 'ecosystem approach' to the meta-dialectic as such while others may apply it to a new mindscape that may be appearing. In this essay, I will apply the term 'ecosystem approach' to the meta-dialectic between the old and the new, with a useful role for each in a pragmatic context, since I infer that to be the more common implicit connotation in use in recent decades in our Basin.

In the meta-dialectic of the present essay, the two mindscapes may be perceived as cultural phases or attractors and our governance conventions may have been shifting noisily from the influence of one attractor to that of the other. Governance complexes or regimes for four different time periods are sketched in the following section. The first attractor, i.e, modernist science, relates most directly to the first governance regime; the second attractor, i.e., emergent inquiry, relates to the fourth regime; and the putatively transitional meta-dialectic to the middle two periods. Maybe!

### **Empirical Sketches of Instances of Dialectical Discourse**

I have had opportunity to work in various institutional contexts within the Great Lakes Basin, and beyond, in recent decades. With respect to the extant conventions on inquiry in these contexts I hypothesize an implicit dialectic between positivist utilitarian and constructivist deontological polarities. These settings include:

1. The Institute for Environmental Studies, IES, at UToronto where any member of UToronto's graduate faculty was/is implicitly welcome to participate inter-actively with any other member. Geographers, civil and chemical engineers, public health professionals and resource ecologists led the way within IES, because they were already working dialectically, in a rudimentary way. For a couple of decades the more positivistic chemists and physicists, mostly educated in England, tried to maintain disciplinary purity, but eventually found that there could be more fun and fecundity following loss of that purity. Most social scientists including economists and anthropologists, mostly educated in USA, had lost interest in positivistic efforts within their disciplines, though may have been trying to create pseudo-positivistic Kuhnian paradigms, to the consternation of Thomas Kuhn himself. (I was associated with IES for many years in various roles, including Director for five years, and tried to communicate with colleagues of all academic persuasions.)
2. Since 1970, an open network of self-selected academics in the Great Lakes / St. Lawrence River Basin has facilitated the emergence of a natural/cultural meta-dialectic termed an 'ecosystem approach', we may note in retrospect. This informal network has never named itself, but it has referred to its episodic initiatives as Canada-US Inter-University Seminars, CUSIS. Funding has come mostly from private foundations such as Joyce, Donner and Gunn, and from the Canadian Consulates in Detroit and Buffalo. 'Free riders' from government agencies were welcomed but mostly sat and listened, though there were notable exceptions. CUSIS's meta-dialectics emerged in part from transdisciplinary programs concerning 'the environment' in some of the Basin's universities, notably Cornell, Waterloo, Michigan, Indiana, Wisconsin's Madison and Green Bay campuses, Toronto and Windsor. (I was the Canadian co-leader in several of the six series of CUSIS initiatives so far; other leaders included Leonard Dworsky, George Francis, Lee Botts, Hallett (Bud) and Vicky Harris and Michael Donahue.)
3. The second CUSIS series ran its course in 1975-8. CUSIS organized Phase I of the Great Lakes Ecosystem Rehabilitation, GLER, using Green Bay, Wisconsin and Long Point Bay,

Ontario as case studies. GLER was dialectical in the sense of the present essay, i.e. melding both positivist and constructivist approaches. Phase I of this CUSIS initiative is generally credited with providing some of the stimulus for the 'ecosystem approach' made explicit in the 1978 Great Lakes Water Quality Agreement, GLWQA, which was overseen by the International Joint Commission, IJC. Major funding for GLER had come the Max Bell Foundation and from the Great Lakes Fisheries Commission, GLFC. GLER cooperators continued with Phases II and III of GLER into the early 1980s, but with waning levels of funding. When Ray Arnett, Assistant to Secretary James Watt of the Department of the Interior of the Reagan Administration, joined GLFC as a Commissioner, he announced his priorities loudly and with obvious pride: "If you can't shoot 'em, if you can't eat 'em, if you can't fuck 'em, forget 'em." GLER protagonists had other priorities, and Arnett didn't tolerate the GLER stuff well so GLFC funding petered out. (I was a GLFC Commissioner in 1980-89.)

4. An 'ecosystem approach' or EA emerged from various origins in the 1970s within the Great Lakes / St. Lawrence River Basin. Several inter-jurisdictional commissions – Great Lakes Basin Commission, GLBC, Great Lakes Fisheries Commission, GLFC, International Joint Commission, IJC, and Great Lakes Commission, GLC, – chose to foster this EA, and tacitly in a cooperative way. For example: the IJC was given a standing reference by the US and Canadian governments, with subsequent revisions and protocols, concerning Great Lakes water quality, i.e. the GLWQA starting in 1972 with major revisions in 1978 and 1987. The programs instituted in connection with this staged reference included several at the basin level that were facilitated by IJC's Great Lakes Regional Office, GLRO. The 1978 version of the GLWQA called for an ecosystem approach and this call was elaborated further in the 1987 revision. Under GLRO, efforts within the ecosystem approach proceeded as an implicit dialectic, I infer. In the late 1980s, under the leadership of the GL Water Quality Board a version of top-down, command-and-control governance incorporating quantitative criteria based on positivistic science was initially proposed by some federal and state agencies, but not in Wisconsin. Under the leadership of the GL Science Advisory Board a version of bottom-up, participatory qualitative constructivist praxis was proposed with which Wisconsin concurred. Of course, that is a simplistic sketch! The IJC Commissioners may have intervened to prevent the suppression of the GLSAB initiative by the empowered GLWQB. Many versions of this dialectic emerged within the various Remedial Action Plans related to each of the 42 designated Areas of Concern. A 'Policy Exercise' led by Richard Duke and Steve Underwood of UMichigan may have tried to transcend this dialectic with an appropriate 'synthesis' but this initiative may have been ahead of its time. The Council of Great Lakes Research Managers may have been tempted now and then to explore other opportunities toward a further conceptual evolution, but successfully fought that temptation. There is a copious literature on all of this, though none of it treats this inferred dialectic directly and explicitly. (I was a member of the GL Science Advisory Board in the late 1980s when the acrimony concerning the proper governance process for remediating the Areas of Concern peaked. The acrimony involved more than the conceptual dimension sketched above, - e.g. did 'zero discharge and virtual elimination' have more that just inspirational meaning?)

5. The Canada Fisheries Act includes two sections on fish habitat, one on water quality and one on water quantity. The federal and Ontario provincial governments have been fiddling, politically and legally, with these two sections for over a century and can't seem to get it right. The water quality section has been delegated, more or less, to Environment Canada which has then temporarily delegated parts of it to the Ontario Ministry of the Environment, MOE, under occasional five-year arrangements termed Canada-Ontario Agreements, COAs, and focussing mostly on Canadian commitments under the binational GLWQA. A new COA is being negotiated in 2001-2 and may be endorsed formally in 2002. The draft new COA seemed to straddle the fence between the two conceptual attractors sketched above, and did not fully favour

a technocratic risk assessment approach over a democratic impaired uses approach consistent with the 1987 GLWQA. (I critiqued the draft COA and found a less than coherent mix of the two themes addressed here.)

6. Still with the Canada Fisheries Act, in the 1980s Fisheries and Oceans Canada (or whatever it was called then) announced a fish habitat policy and developed technical methods to implement it. Both positivist and constructivist scientific approaches contributed to the technical standards created to implement the habitat policy. The federal agency then negotiated an agreement to devolve some water quantity and related fish habitat issues to the Ontario Ministry of Natural Resources, OMNR, but the feds then withheld funding. In the mid-1990s the provincial regime cancelled the agreement, ostensibly because of this funding inequity but perhaps also under its categorical imperatives to cut the red tape in order to free-up enterprise and cut the bureaucracy and the budget deficit. This fish habitat / water quantity responsibility then reverted to the federal fisheries agency, just at the time when some negotiations between the federal fisheries and environment departments to re-align their joint responsibilities aborted. The federal agency then negotiated an agreement with Ontario's Conservation Authorities Association (ostensibly accountable to that same OMNR) to devolve some of the 'softer' responsibilities to the CAs, while retaining some of the 'harder' responsibilities for a new branch of the agency created for that purpose over a number of years. In 2002, this arrangement between the federal fisheries agencies and some of Ontario's CAs may be nearly operational and may have internalized a positivist-constructivist dialectic. (In the years 1961- 1975 I was employed for intervals by each of the provincial and the federal fisheries agencies; and since 1999 I am a member of the Grand River Conservation Authority's Canagagigue Creek Committee in Elmira.)

7. In the early 1990s the Canadian and US governments again referred the fluctuating flows and levels aspect of the water quantity theme to the IJC. Over the ensuing five years the IJC reference study ran through two stages each with a complex of interacting study groups and some interesting inter-personal dynamics at the senior level of the study. (Machiavellians knew that if the reference studies were spun out long enough, that the lakes would return to normal levels again.) The reference study was conducted as an implicit dialectic between: (a) members of an interest group who had built too close to the shore and wanted governments to compensate them for having failed to prevent them from building on sand or to stop the fluctuations, and (b) environmentalists who knew that the wetlands of the coastal zone thrived when water levels fluctuated markedly on a decadal time scale. To the relief of politicians and bureaucrats of the two higher levels of government, the IJC recommended that the issue be devolved to the municipal level where formal zoning should exclude from development those shores prone to flooding. (In about 1990 I served on the 'Spaghetti Committee' of Phase I of that IJC reference; this committee treated the whole issue as being wondrously complex.)

8. In Elmira efforts have long been underway to remediate a legacy of six decades of hazardous contamination by a chemical company and trying to reform the current manufacturing practices all toward a distant goal (circa 2040) of zero discharge and virtual elimination of hazardous chemicals. Here the Hamilton Regional Office of the Ontario Ministry of the Environment has relied mostly on out-dated, quantitative, criteria based on positivism for top-down enforcement. Meanwhile the participating activists rely on more recent research findings and on the qualitative constructivist ethic of Responsible Care being fostered, perhaps with Machiavellian intent, by the Canadian Chemical Producers Association. Gail Krantzberg with others in MOE may have worked to internalize this dialectic within that ministry, by designing a set of technical tools that included both comprehensive risk assessment and the more ecosystemic impaired-uses approach, as sketched above, with both contributing to the negotiation of Environmental Management

Agreements, say. (Since 1997 I am a member of the Crompton Public Advisory Committee; and I'm a friend of Gail's who is now at the IJC's GLRO in Windsor.)

9. The Anishinabek/Ontario Fisheries Resource Centre, a not-for-profit private corporation created in the early 1990s jointly by the Rae Ontario government and the Union of Ontario Indians, is assisting with information services relevant to conflict resolution and consensus building concerning fisheries disputes that involve some 43 different Anishinabek First Nations and interested anglers and commercial fishers of the Second Nation. Within A/OFRC a more-or-less explicit dialectic is emerging, with the usual quantitative positivistic approach of some lingering technocrats within OMNR and the more qualitative traditional knowledge approach of the FN experts who find traditional knowledge as well as the constructivist evolutionary science of 'western naturalists' to be relevant and helpful. (I was a member of the Board of A/OFRC in 1996-2001.)

10. Canada's National Energy Board and the Canadian Environmental Assessment Agency instituted a Joint Panel to conduct an engineering / economic / environmental / social assessment of a proposed Millennium gas pipeline which was tentatively routed across southwestern Ontario and Lake Erie. Here conventional quantitative positivistic traditions of NEB staff dominated in the engineering and economic aspects and qualitative constructivist efforts dominated in the environmental and social aspects, especially as the latter related to some Aboriginal issues. The Millennium proponents withdrew their proposal in 2001 and the Joint Panel was dissolved. (I was a member of that Joint Panel during 1999-2001.)

11. Canada's Office of the Auditor General in cooperation with the Commissioner of Environment and Sustainable Development in 2000-1 conducted an audit / study of six of the federal government's meta-programs in the Great Lakes/St. Lawrence River Basin. Here some OAG experts, none of whom may have graduated from the Arthur Andersen school of auditing, may have tried to remain true to their earlier quantitative positivist traditions that flowed from financial auditing conventions when disinterested objectivity of auditors was valued more highly than may be the case currently. In turn, some CESD experts may have pioneered with qualitative constructivist studies that flow from UN's Agenda 21, the Ecosystem Approach of the GL/SLR Basin, etc. (I was an advisor in this OAG/CESD initiative of 2000-1.)

I offer these eleven examples – I have been involved with additional cases – as evidence that a kind of meta-dialectics between old and new approaches to science as inquiry has been in play in recent decades with respect to governance of features of the Great Lakes / St. Lawrence River Basin Ecosystem.

## **HEURISTIC NARRATIVE B: NATIONS AND POLICIES IN GOVERNANCE?**

### **Five Nations?**

Governance in our Basin involves hundreds of 'jurisdictions' of differing levels of geographic scope and institutional formality. An informal governance regime at the level of the whole Basin has been emerging and evolving in recent decades. The various inter-jurisdictional commissions have each contributed to this implicit ecosystem-based governance regime, as implied above. About two decades ago IJC Commissioner Charles Ross took note of this implicit process and called for a Great Lakes citizens' assembly to convene. Two decades ago Edith Brown Weiss suggested that an office of Great Lakes ombudsperson be established. Also two decades ago CUSIS colleagues collaborating first with the Rawson Academy and then with the Great Lakes



Commission led in an effort to formulate a voluntaristic Great Lakes / St. Lawrence River Basin Ecosystem Charter. This implicit ecosystem regime now has sub-regimes for each of the following ecological phenomena, in approximate order of conventional institutional maturity: migratory fish; migratory birds; water quality; water quantity; biodiversity including exotic species; air quality; and land quality, including soil and groundwater of derelict brownfields.

Within this emerging Basin Ecosystem Regime, BER, are nested several levels of spatially smaller regimes, e.g., state or provincial and municipal, to keep it simple. All of these have undergone evolutionary changes that are coherent, more or less, with the nation-level changes addressed in this essay. Sometimes innovations in the governance regimes at a lower level induced changes in higher levels, and vice versa. But the evolutionary trends in governance were broadly consistent, if extremely noisy, up and down these organizational levels.

From a perspective of the whole Basin, five 'nations' may be perceived to be formal stakeholders in the BER. These are: Anishinabek; Haudenaushaunee; Quebec; Canada; and USA, - in order of seniority, more or less. The two junior 'nations' may be termed Anglo-Canada and Anglo-USA because both owe important aspects of their governance traditions to England and because the English language is the only one used within Basin-relevant governance within these two similar cultures. Quebec's governance regime owes something to its French provenance, though this important legacy has attracted little attention elsewhere. Quebec and the more senior two Aboriginal nations are attempting to preserve their cultural distinctives including language and governance traditions.

Each of these five nations currently has a democratic form of governance. The number of organizational levels in the vertical nesting or stacking is highest in the Anglo nations, intermediate in Quebec, and lowest in the two Aboriginal nations. The extent of lateral diversity within these democracies may be in inverse order to that of the vertical complexity. Within the two Aboriginal nations, as perceived here, historical confederal capabilities that operated laterally among tribes have persisted with difficulty and may now be re-emerging, again with difficulty. Whether these Aboriginal nations will continue along such an historical trend is up to them, of course, but that such capabilities are now being practiced informally should be noted.

The terms 'native, nation and nature' all derive from the French and ultimately the Latin term for 'birth.' One can become a member of a nation through being born to a parent who is a citizen of that nation or through being naturalized, i.e., being born again through a ritual induction into citizenship. Some individuals hold formal joint citizenship in two formal nations, and many more hold informal joint citizenship in two nations as implied in this essay. This demonstrates a bit of the complexity of this whole issue. The present sketch is not intended to simplify any of this complexity, but rather to offer a perspective or heuristic to help with consideration of it.

Apparently, no explicit attention has yet been directed to national distinctives such as those sketched above. 'Inter-nationally' in our Basin our negotiations and governance have been of the 'muddling through' type, but helped informally by the visioning of a few 'seers' like Bruce Bandurski, Lee Botts, Glenda Daniels, George Francis, Kent Fuller, Andy Hamilton, Vicky Harris, John Jackson, Barbara Knuth, Henry Lickers, Jack Manno, Charles Ross, Ron Shimizu and Jack Vallentyne, - to name a few, in alphabetic order.

#### **Formal Boundaries?**

With respect to formal spatial boundaries, the two Aboriginal nations as identified here are each now separated into many small enclaves or 'reserves.' (In the northern part of the Basin many

small reserves call themselves First Nations, but that particular interpretation of 'nation' is not used in this essay.) So with these two peoples, a 'nation' can exist without exercising the power of formal jurisdiction over a large contiguous land and water area. With the other three 'nations,' formal spatial boundaries designated through measurement of angles of starlight by surveyors are abstractions with respect to eco-phenomena. Many features of the atmosphere, hydrosphere, biosphere and pollutosphere ignore such boundaries completely.

And of course, the formal boundaries mean less with passing decades with respect to human cultural features, now that basinization and globalization is underway. But some cultural differences remain important, especially to traditionalists and nationalists. Many creatures besides humans have evolved adaptations to ecosystemic features of particular locales and regions. And governance of a nation includes safeguarding of such distinctives.

There are always troublesome, divisive hierarchists who fuss about whether two 'nations' of comparable standing can share jurisdiction of a particular area of 'permanent land.' Hierarchists tend to be intolerant of sharing. Since nations routinely find ways to share many other eco-features of our Basin, and since locations and lines on land are ultimately not permanent anyway because of the earth's crustal movements, the issue of the true meaning of such inter-jurisdictional boundaries can safely be left to philosophers of abstract logic with a request for a preliminary report a decade or two hence. Or three decades, if their services are rendered pro bono.

### **Narrative Schema of Governance Regimes**

Here, with apologies about political incorrectness, the perspective on governance of this Basin ecosystem focuses mostly on processes shared by the Anglo-American and the Anglo-Canadian nations. The narratives for the other three more senior nations in this Basin – Anishinabek, Haudenashaunee and Quebec – would likely show that each accommodated in part and over time to the militarily-dominant Anglo-American and Anglo-Canadian 'nations' in each period but each also retained important distinctives which may be re-emerging with political re-empowerment. In turn, it may be that the Anglo-Canadians have accommodated more to the Anglo-American than vice versa.

The schema of four historical periods sketched below starts about 1800. Two earlier historical periods might be designated: centuries of pre-contact with Europeans until about 1600; and destructive invasions and scattered settlements by Europeans with harm done more by exotic pathogens and religions than by weapons, 1600-1800. There obviously were ecological consequences to human activities in our Basin in these periods, with corresponding forms of governance to try to 'manage' those consequences, but these are not addressed here. The current manifestations of governance regimes within the two Aboriginal nations owe something to what happened in those earlier periods, just as the governance regimes of the three junior nations owe something to what happened in Europe centuries earlier. But such historical roots are not addressed in this essay, for lack of knowledge.

Abstracted and simplified, some four periods may be perceived within the history of the joint, though partial, governance of this Basin while the two Anglo nations have been dominant politically, i.e., since about 1800. For each period, four general kinds of governance instrumentalities are shown, and all four have always been in play. But the relative dominance of a particular instrumentality has varied. Bold-face type identifies the instrumentality that was most dominant in that particular period, on the basis of hindsight that isn't all that clear!

As above, the emerging five-nation, inter-national governance regime in our Basin already includes a number of sub-regimes that have evolved in parallel. These exhibit some differences, e.g. with respect to a basic ethic of how the relevant ecosystemic goods and services, as well as bads and disservices, are shared among the jurisdictions, though on balance an ethic of 'might is right' may always apply to some extent. Conquest by bloody warfare still seems the ultimate way to establish sovereignty in a jurisdictional area. So there may be a pecking order to the sharing conventions. Also the different sub-regimes have developed to different levels of institutional maturity, in a conventional sense. All such differences imply that the following schema is fuzzy, necessarily. Some may wonder whether it is too fuzzy to offer even heuristic value.

To emphasize: each of these five nations has complex governance regimes which have distinctives to fit in with other distinctive features of their cultures as related also to the distinctives of natural ecosystems to which they relate. With self-organizational living systems, complexity is generally hidden from innocent eyes. Cultural and natural systems both hide their self-organizational secrets from the uninitiated. So the term 'rudimentary,' if applied to some governance regime, would imply that the observer's eyes do not see the complexity rather than that there is no complexity to be seen.

Opportunistic Exploitation and Development, 1800-1955:  
*laissez faire*; formal permits; codes of ethics; criminalization of abuse

1. Governance limited to a local focus, related to an individual, settlement or city;
2. Laissez faire applies to use of nature's goods and services;
3. Externalization of costs of bads and disservices by users to others;
4. Onus on victim to seek redress for harm in judicial process with unfair laws.

Hitting the Wall and Picking up the Pieces, 1955-78:  
*laissez faire*; *formal permits*; codes of ethics; criminalization of abuse

4. Governance extends to lake-wide focus, related to sectors and settlements;
5. Formal permits, 'licences to abuse', for larger users of nature's goods and services;
6. Major costs, especially of remediation of past abuses, assumed by governments;
7. Onus on regulator as referee to balance benefits/costs or limit risks, in aggregate.

Ecosystem Approach to Sustainable Development, 1978-2000:  
*laissez faire*; formal permits; *codes of ethics*; criminalization of abuse

1. Governance extends to a sub-continental level, such as the GL/SLR Basin;
2. Voluntary codes of ethics as a pre-condition to a 'license to operate';
3. Major cost internalized by user, perhaps through insurance or re-design;
4. Onus on user to take precautions, to 'negotiate risk sharing' or compensate victims.

Reciprocal Responsibility or Caring Sharing, after 2000?:  
*laissez faire*; formal permits; codes of ethics; *criminalization of abuse*

1. Governance extends to a global level, with trade-related and natural processes;
2. Criminalization of the more egregious environmental abuses, by 'free riders';
3. Policing and court costs covered partly by fines but mostly by governments;
4. Onus on government as enforcer to ensure compensation of victims, maybe!

### **Closing Comments on Governance**

The second half, 1987-2000, of the third period above may have involved a concerted attempt by some political ideologues in the two Anglo nations to use pseudo-democratic ruses to flip governance in these Anglo nations back into the conventions of the first of the four periods described above. Such may have been a deliberate intention of some conceptual ideologues as handlers of 'active politicians,' or an unfortunate consequence of thoughtless and indiscriminate cutting of red tape, budgets and constraints on free-enterprise by poorly-informed ideologues. Perhaps both of those causes acted, mutualistically. That major back-sliding event may have run its course. Even the main proponents of global free trade may now be widely suspected of being irresponsible fundamentalistic ideologues. Anyway, Pax Americana as imposed globally may find global free trade bothersome and 'domestic' peace a good thing.

A nation's culture is important and influences what that nation finds appropriate as a governance regime. In the Great Lakes / St. Lawrence River Basin a number of trans-boundary Commissions have fostered movement toward a shared common regime in which all five nations participate, though with markedly different levels of enthusiasm. Different Commissions have fostered such trans-national governance in different 'sectors.' Thus the International Joint Commission focussed on water quality, water quantity, and a bit on air quality and biodiversity. The Great Lakes Fishery Commission addressed migratory fish, some exotic species and aspects of biodiversity. The Great Lakes Commission, inheriting the mantle of the Great Lakes Basin Commission, has fostered efforts on polluted lands like the leaking brownfields of the coastal zone, on agricultural practices in tributary basins and on water-borne trade.

Since 1970, the Canada-US Inter-University Seminars have helped informally with the evolution of all of this trans-boundary governance. Maybe the time has come to try to comprehend the whole inter-national governance process in this Basin and where it seems to be headed. This essay may be the first brash attempt toward this end.

### **FROM SUSTAINABLE DEVELOPMENT TO CARING SHARING?**

In the Great Lakes Basin since the 1950s, some and perhaps most of the key environmental victories have been won with leadership by women. Many of the women were unpaid volunteers or underpaid activists. Mostly it has been well-paid men who then led with the implementation, partial as it has been heretofore.

In the UN conferences of the 1970s and since then, increasingly sharp attention was also focused on the injustices directed toward Indigenous Peoples the world over as a consequence of invasions of their lands and waters by Modern Progressives. As with empowerment of women, re-empowerment of Indigenous Peoples should enrich our impoverished culture.

Though I'm not an American, i.e. not an United Statian, and thus am not entitled to a fully informed opinion on the subject, it seems to me that what I refer to here as Caring Sharing or Reciprocal Responsibility is consistent with Aldo Leopold's writings as in the "Sand County Almanac" of 1949. I once sat around a fire with Aldo's daughter Stella when she recounted some of the events in that Almanac in which she had participated personally, which experience gave the Almanac additional credibility for me. Leopold's ethic extends to natural things far beyond cultured humans.

That Aldo Leopold could not find a publisher in the USA for his Almanac but did find one in England may indicate just how firmly the USA was bound in the Era of Progressive Modernism

in the 1940s. But that Almanac is now revered by many United Statesians as sacred text in this emerging Era of Something Else.

So what follows a dialectical policy of Sustainable Development? Caring Sharing or Responsible Reciprocity? Is this where we are headed with the fourth manifestation of governance of Narrative B above?

### **RELATIONSHIP OF AGRICULTURE, TRADE AND THE ENVIRONMENT TO SURFACE AND GROUND WATER MANAGEMENT IN THE GREAT LAKES BASIN**

So how does the topic of the IATP Workshop relate to all the preceding pragmatic descriptions of inquiry, governance and evolutionary reality in our Great Lakes / St. Lawrence River Basin? A list of comments and queries follows in no particular order, all from a meta-dialectical perspective like that sketched in the preceding sections.

1. The Great Lakes / St. Lawrence River Basin is not a frontier region where there are raw resources scattered about or sloshing around just waiting to be exploited. Any proponent for further new exploitation and commodification of natural resources such as water quantity and quality can expect to run into opposition from existing users who might be adversely affected. That there would be adverse effects to some current users from such developments goes without saying.
2. In recent years some new developers, including agro-industrialists, have been practicing stealth and pre-emptive strikes to capture and legitimate uses of lands and waters before adversely-affected existing users can mobilize to stop them. Some jurisdictions have enjoyed political regimes in recent years that seem to have encouraged such lawless and free enterprise. A relapse to frontier-region behaviour in our Basin may have already run its course.
3. Some 40 million people live in the Basin, mostly in the downstream half. In many ways These people implicitly expect a normal quantity of water of normal quality to flowing downstream to them and past them in normal ecological regimes. In effect, a macro-version of the riparian doctrine is invoked and was legitimated in 1909 as Article IV of the Boundary Waters Treaty.
4. The Great Lakes Basin is the upstream part of the Great Lakes / St. Lawrence River Basin. The lower part depends naturally and culturally on a normal quantitative regime of water levels and flows and of normal qualitative regime of relative purity. Such dependence on upstream flows continues into the Gulf of St. Lawrence ecosystem and to its fish and fisheries, in a complex way. Increased consumption or diversion in the upstream part of the Basin would have natural and cultural consequences 1000 km away in the downstream part.
5. Ground and surface waters are intimately interconnected in ways important to the Basin's ecosystems. Thus groundwater flows into streams in the southern half of the Basin at a temperature of about 10 C year round and thus provides habitat for stream trout with relatively warm water in winter and relatively cold water in summer for these stenothermal creatures. The less groundwater flow, the less trout habitat, presumably. Increasing the amount of water 'consumed' through irrigation and/or export will likely act in complex ways to exacerbate some adverse consequences of existing uses and abuses to ground and surface water regimes.

6. In nature, no water is wasted; all water contributes something to living systems within the Basin or downstream in the Gulf of St. Lawrence and beyond. The question "How much water is necessary for a healthy ecosystem?" may be perceived to imply that some water is wasted or used for non-essential natural purposes? What would such non-essential purposes be in a natural ecosystem? What kind of criteria can be invoked to judge such 'essentiality'?

7. From a cultural perspective, what kind of criteria can be invoked to judge whether a surplus exists? Aggregated comprehensive risk and benefit-cost assessments usually ignore distributional aspects of the inevitable risks and costs. Often it is the already marginalized Aboriginals and other artisanal users of these ecosystems whose uses are judged to be unimportant, if they are considered at all. It seems unlikely that any boiler-plate protocols for comprehensive risk assessment without credible assessment of distributional effects would now attract favorable attention in our Basin.

8. Aboriginals have treaty rights to living resources that thrive under normal quantity and quality regimes of water in a locale. Reduction in quality and quantity of water results in diminished quantity and quality of living resources to which their treaty rights referred. So if new developments related to agriculture and/or trade were to lead to reductions in quality and quantity of the habitats and thus the living resources for the Aboriginals, how would the latter be compensated, in perpetuity?

9. Aboriginal treaty rights generally relate, inter alia, to aquatic resources such as wild rice, fish and waterfowl that thrive in inshore waters. The traditional knowledge that Aboriginals apply in harvesting these resources relate to earlier normal regimes of water and water-dependent biota. Nearshore waters are likely to be adversely affected by new agro-industrial and trade initiatives, to the detriment of the living things there and causing changes in their behaviour not reflected in traditional knowledge.

10. Agro-industry does not now enjoy a good reputation for environmental stewardship, at least in the northern half of the Basin. Their aggressive free enterprise ways have alienated many rural communities as well as uppity urbanites who may have second homes in the country. With a guideline that an industrial or commercial sector should only seek a larger allocation of water use when it has demonstrated that it is operating in a fully ethical way, it is unlikely that agro-industry would now qualify for additional allocations.

11. Additional food production is not now a priority in Canada and the US. With existing governmental subsidies, too much is already being produced. Any new water-intensive agro-industrial initiatives in our Basin would presumably seek government subsidies, perhaps of nearly free water brought to their farms through government-subsidized infrastructure. The 'elasticity' of food production may be high with respect to a number of factors of supply, so that more food could presumably be produced quickly without major water supplies, if the need were to arise.

12. If a market were to be established for consumptive water use, say, how would the term 'consumptive' be defined? How would the total allocation of consumptive uses be capped? Could such a limit be inferred by aggregating all existing consumptive uses as having de facto legitimacy? Who and on what basis could make a case for an increase in the total existing, implicit quota for consumptive use? Could a new agro-industry making special cheese with GMOs in Wisconsin buy the allocation of a steel mill in Hamilton, if the latter were to shut down?

13. The climate it is a-changing! Meteorological and ecological researcher are finding empirical signatures of various climatic oscillations in our Basin. These include the: ENSO or El Nino Southern Oscillation; the AO or Arctic Oscillation; the NAO or North Atlantic Oscillation; and perhaps a NPO or North Pacific Oscillation. There may be dynamic teleconnections between these oscillations and other atmospheric effects. Also, climate change has recently been linked to ozone depletion over the north polar region. The Great Lakes / St. Lawrence River Basin lies in a part of the globe in which a number of different natural oscillations and related phenomena can occur. Extreme events of these interacting regimes may become more intense and erratic with climate warming. Thus meteorological forecasts for more than a few days into the future may continue to be difficult, with improved understanding of the various oscillatory regimes being offset by less understanding of extreme events triggered by climate warming. So what does this imply for the water regime of our Basin and any new uses related to agro-industry and trade?

14. Concerning numbers of people in the Basin: would the present inhabitants prefer that the in-migration be minimal? If so, would they willingly forego benefits from some water and provide it to out-of-Basin settlements where in-migration is desired and could be accommodated?

15. The current stampede to globalize trade, with a highly simplistic regime, of almost anything that can be commodified may be running out of hubris. The more rational proponents of globalization, e.g. at Harvard, are calling for a more nuanced approach than the entrepreneurial fundamentalists may be able to comprehend. In any case, the military imperatives of Pax Americana may not find tolerable the banking and shipping freedoms necessary for free trade. And robust action concerning Pax Americana might well help to win its imperial leaders the next couple of US federal elections, thanks to the initiatives of Osama bin Laden. And what's more important than winning elections and, upon political retirement, appointment to a new generation of post-conceptual corporations, now that creative conceptual companies like Enron, Andersen and Global are no longer attractive?