



OCCASIONAL PAPER NO. 7

VALUING PUBLIC AND SCIENTIFIC INVOLVEMENT WITH ECOLOGICAL AREAS

**Plenary Talk to the 8th Annual Meeting of the Canadian Council
on Ecological Areas, 1989**

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GEORGE FRANCIS

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INTRODUCTION

I was asked to make some comments on the above theme and in doing so, I was also asked to draw upon some of my own experiences with natural heritage protection and related activities. Regarding the latter, much of it came from my involvements with three groups at different times over the years: [1] as a member and Chairman of an Advisory Committee to the Council of the Regional Municipality of Waterloo in Ontario; this municipality was the first in the province to be successful in having remnant natural areas recognized (as "environmentally sensitive areas") under provisions in the provincial Planning Act; [2] membership on the Board (and Executive) of the Nature Conservancy of Canada; and [3] membership on the Canadian national committee for the UNESCO "Man and the Biosphere" (MAB) program, and through it, participation in UNESCO's efforts to develop a global network of "biosphere reserves".

Municipal, private sector and United Nations efforts are of growing importance to the overall goal of securing effective conservation for natural heritage and biological diversity. Although they don't deal directly with ecological reserves, which I perceive to be the primary interest of Council, they supplement them.

That said, I will also make a few introductory comments to help orient what follows. First, I interpret "valuing" in this context to mean any actions which help with the establishment and management of ecological reserves, or otherwise contribute to the larger goals of conservation to which ecological areas themselves contribute. Second, I don't find it helpful to draw a sharp distinction between "public" and "scientist". Instead, we should think of a range of expertise and experience that could be called upon to complement that of staff in ecological area programs. Finally, whether or not to draw upon "outside" help depends on the job to be done, and whether or not an ecological area program has sufficient staff expertise and budget to do it all themselves. Even if a program is well funded, there is still merit in involving volunteer "Friends of" particular sites if for no other reasons that it might be a good investment in developing program support.

THE JOB TO BE DONE

We would probably all agree that one immediate job is to complete the provincial and territorial systems of ecological reserves or their equivalents (such as ANSIs in Ontario) throughout Canada. There is also a need to complete the system of national parks and wildlife areas as noted recently in the "Greenprint for Canada" report, and about which we will soon hear much more from the WWF (Canada).

Council outlined the agenda for ecological reserves in Occasional Paper #1 ("Guidelines on Management and Research in Ecological Reserves"), and is monitoring progress through annual meetings and through the National Registry of Ecological Areas. We have all been heartened by the signs of momentum in working towards this goal, notably in Alberta and Quebec, while British Columbia still leads in what has been accomplished. Nevertheless, much remains to be done to add new sites, manage the existing ones, and develop the research and monitoring programs which Council deemed to be top priority functions for ecological reserves.

Most ecological reserve programs concern only public lands. However, as the Carolinian Canada program in southwestern Ontario, the Wild West program proposed for the prairies, and the Atlantic Coastal Region program (currently seeking funding and other support) remind us, a number of important ecosystems and species are threatened in the most settled parts of Canada. No system of ecological reserves can ignore this. Some of the most important sites which fulfil ecological reserve criteria are privately owned, often by multiple owners. It is neither possible nor desirable for governments to buy all these, hence the active search for effective alternatives: landowner contacts to encourage private stewardship, conservation easements, land or nature trusts, tax rebates and so on. All require access to a range of expertise and constituency support. Protecting ecological areas in the territories will undoubtedly require new kinds of arrangements involving native peoples.

The conclusion simply is that the job to be done now requires a wide range of management capabilities and skills, all to be performed during an era of budget cuts, hiring freezes and the "downsizing" of governments generally. When we also address the question of "beyond ecological reserves" to bring a much broader perspective to the question of the job to be done (which I'll return to later), then we must realize that no one agency or private organization, and no one scientific or professional specialism can handle what is needed on their own. It is collaboration or failure.

WHAT CAN "THEY" (THE OUTSIDERS) DO?

As most of you who are associated with ecological reserve programs already know, when you go about it right, you can get valuable outside help for almost anything you may have to do. Here are some of the things:

- identification of candidate sites and compiling field information about them;
- help with decisions about priorities and site management objectives;
- watch over the ecological well-being of the sites;
- contribute to research and monitoring activities;
- build program support and a recognizable constituency.

Rather than comment on each of these in turn, I'll discuss a few examples from situations I have known of that "outsiders" can (or must) contribute.

Natural Areas in Municipal Plans

Some 15 years ago, in the Regional Municipality of Waterloo where I live, this newly created government was under a statutory requirement to complete a set of Regional Official Policy Plans within two years. At the urging of academics and students, the Regional Council appointed an Ecological and Environmental Advisory Committee to work with planners on devising environmental policies. The committee had 20 members that included developers, academics, local naturalists, environmental consultants, and representatives of provincial agencies and the local watershed Conservation Authority.

From the start, we urged that remnant natural areas in the Region be somehow recognized and protected. The identification of the areas most worthy of protection drew almost entirely upon the knowledge of three local naturalists and two local field biologists. The information about these sites was compiled at the university, and policies to protect them through a kind of local EIA process were drawn up on consultation with the Advisory Committee and others. They became politically acceptable in large measure because they had the support of the local developers on the committee, and drew few criticisms when they were first announced publicly. More surprisingly (with a few exceptions), there was support from the owners of the properties on or adjacent to the 69 sites after the owners were individually notified that their property would come under the provisions of the proposed policies.

After the Regional Plan was approved, the Advisory Committee advised on the implementation of the policies for these remnant natural areas. A number of interesting questions came up -- I was chairman of the advisory committee at the time -- but one in particular is significant for the topic today. Whenever there was a query or a stronger legal challenge from someone who wanted development approvals that would affect one of these sites, the challenge was not about whether a particular habitat, plant or animal species really occurred there, as was reported in technical summary reports for each site. Rather, it was a query about where else they were found, and in effect, how thorough was our knowledge about the regional occurrences of natural communities and species. Well, it was not thorough at all. Most of our countryside was, in effect, quite unexplored and it was rather embarrassing given what we (especially in southern Ontario) thought we already knew about our place.

Atlas Surveys

Now, about a decade later, we're better informed. Without going into details, we have an annotated Regional flora, updated with many new additions from the only previous one which had been published in 1945. This updating was done as a volunteer project by local botanists. Two of us organized a six-year field survey of the occurrences of herpetofauna in the Region, in part because of a dispute about the status of a rare salamander found in one of the environmentally sensitive areas, but an allegedly rare anything could have been disputed just as well. Our survey information was compiled with reference

to occurrences of species in each of a 2 km x 2 km square defined by a grid overlying topographic maps for the Region. This degree of resolution was suitable to reveal local distribution patterns, and determine what was relatively rare and what was not.

Our herpetofauna survey was an atlas survey. The UTM reference grid printed directly on our national topographic maps can be used to organize field work so that each area defined by a grid square can be systematically searched over a period of say, 5 years, to find out which species are there. I had a hand in organizing the Ontario Atlas of Breeding Birds, a 5-year survey that compiled data referenced to a 10 km x 10 km grid overlying southern Ontario and for samples within 100 km x 100 km in northern Ontario. The Book that resulted has write-ups for almost 300 species and the computer-generated occurrence maps (hence "atlas") for most of these, were based on over 400,000 sight records from 1,300 observers who spent an estimated 180,000 hours in the field.

Atlas surveys for breeding birds are underway in Alberta, Quebec and the Maritimes. A provincial herpetofaunal atlas survey is underway in Ontario and I believe also in Quebec. This information about current distributions of fauna (and hopefully at some point, flora too) is useful for environmental impact assessments; for determining the conservation status of species; for setting priorities for site protection; and as baseline information to determine changes in the distributions of certain species in the future. Atlas surveys also generate surprises when eventually we can compare the results with what we thought we knew before the surveys were done. That's part of the fun. No single agency could possibly afford to collect this kind of information on the scales it is found useful, but partnerships among funders, sponsors and networks of volunteers make it possible. It also lays the basis for other kinds of volunteer-based programs.

Setting Regional and Site Specific Strategies

Setting priorities for site protection is not only a matter of information, it should also be a matter of process. We appear to rely mainly on people in official positions to exercise their best judgement based on the best available information, presumably because the decisions come formally under their mandate. Nevertheless, it is useful to canvas a number of experienced people to arrive at such judgements because this can balance the partial perspectives brought by individual specialists. At the same time, it serves to broaden the basis of acceptance and support for the outcome. The advisory committees for some of the ecological reserve programs would likely share this observation.

The two regional conservation strategies initiated by WWF (Canada) took this approach. Carolinian Canada ultimately identified 38 priority areas from reviews of information on about 1,000 candidate sites through reiterative consultations involving about 60 people altogether. The fact that there was information on about 1,000 sites in southwestern Ontario is worthy of note. In many cases the information was gathered by non-governmental groups doing surveys of remnant natural areas in their county, Region or watershed. The Wild West program also drew upon the expertise of many individuals. Given the large component of private lands involved in both regions, the securing of adequate protection will require diverse approaches to be applied over a number of years.

Individual sites may be owned by dozens of individuals. Some in southern Ontario which would qualify as ecological reserves are owned by more than 100 people. Under these circumstances, thought has to be given to devising a protection strategy for the long-term. If a few key landowners chose to use their lands in ways that destroy the significant ecological features through development, or certain logging practices, the ecological significance of the entire site may be destroyed, or so lowered that it can be written off. This is a major concern of mine for the Nature Conservancy. It receives continual requests (often from government agencies) to help buy properties associated, but sometimes only peripherally, with important natural areas because they suddenly appeared on the market and its "now or never". We have much to learn about how best to strategize in these kinds of situations.

Ecological reserves are expected to receive quite strict protection. The stewardship plans that the Council recommends for each reserve gives good guidance on what to aim for, and Council also notes a role for "outside" specialists and reviewers, and the need to take account of "public concerns". This may be an understatement. Once again, if the site involves an element of private ownership or a local tradition of resource use on it, the local public concerns should be translated into local involvement in preparing the stewardship plan. Without it, the plan will be on paper only, since top-down policing of its intent by ecological reserve staff is probably out of the question. Volunteer wardens is certainly a good idea, but their job would likely be difficult if local disputes about the site had not been resolved as part of drawing up a stewardship plan.

This is an issue that the Nature Conservancy also has to tackle. It is definitely a learning process. The NCC for example, has participated with government agencies and local naturalist groups in developing a management plan for Alfred Bog (which elsewhere would be an ecological reserve) in southeastern Ontario. Issues include whether or not to cull the moose herd, develop access roads for firefighting should this become necessary, what if anything can be done to enhance habitat for spotted turtles, and so on.

At Brier's Island off the south tip of the Digby Neck in Nova Scotia, The Conservancy has met with the commercial fishing community of Westport to allay their concerns about being fenced out of recently acquired lands which the community long took to be a commons. The Conservancy in turn wants to find a solution to random intrusions of all-terrain vehicles and garbage dumping. The challenge to NCC is to decide whether and to what extent the protection of rare plants, shorebird habitat and waterfowl staging areas can be reconciled with the locals' desires to graze sheep, kill brush wolves, camp on weekends, shoot geese, catch eels, and wander at will as they have long done. There is no way that the Conservancy could unilaterally decide on this and then impose it from Toronto. Most of you could probably one-up me with other examples.

Biosphere Reserves

It was these kinds of situations combined with questions about research and monitoring that attracted me to the concept of a "biosphere reserve" when I first became aware of it a decade ago. The concept was well ahead of its time then, and only in the last few years does it seem to be gaining a wider acceptance. It is still frustratingly difficult to apply in practice.

Let me delve into this a bit. A formal definition of a "biosphere reserve" would state that it is an international designation of recognition from UNESCO under the "Man and the Biosphere Programme" (MAB). The designation signifies that such an area is a good example of some of the ways in which conservation can be balanced with development. The term "biosphere" refers to the association with MAB and "reserve" means that there are relatively undisturbed protected areas within the biosphere reserve. For example, a biosphere reserve may be made up of forests protected as a national or provincial park or ecological reserve along with adjacent forests managed for wood products, or it could be a core or remnant grasslands together with adjacent agricultural crops or grazing lands. The actual configuration of lands can vary greatly, but the resulting mix or mosaic provides opportunities to discover some of the accumulative consequences of particular land use or resource management practices by making selective comparisons with site conditions in the undisturbed core areas.

Fully functioning biosphere reserves are intended to perform three main roles: [a] conservation of ecosystems and biota of particular interest; [b] establishment of demonstration areas for ecologically sustainable land and resource use; and [c] provision of logistic support for research, monitoring, education and training related to conservation and sustainability issues. This requires cooperation among resource managers, scientists and local residents on activities directed towards priority issues of concern in the biosphere reserve or other nearby areas in the surrounding region. Local organizational arrangements bring together people who own or manage different properties within a biosphere reserve to talk about issues of common concern and decide upon research, education or other activities to address them.

The long range goal of MAB is to create a world-wide network of biosphere reserves to include examples of all the world's main ecosystems with their different patterns of human use and adaptations of them. At present, there are 276 biosphere reserves in 71 countries, including five in Canada. Most are still developing the various functions biosphere reserves are meant to perform.

In Canada, one biosphere reserve, Mont St.-Hilaire, is privately owned (by McGill University). Others such as the Charlevoix and the proposed Niagara Escarpment biosphere reserves are based on provincial planning regions focused on watersheds and an escarpment formation respectively. Two others are based on National Parks at Riding Mountain and Waterton Lakes, and one at Long Point was formed around a National Wildlife Area.

The experience that is beginning to emerge is that, despite the lack of a biosphere reserve agency with development funds, the local arrangements (although they differ in each case) are leading to a wider measure of local understanding of the importance of protected areas and cooperation on tackling local problems of concern. Some research has been initiated or reformulated to make use of the biosphere reserve arrangements. Last year, the Canadian Parks Service evaluated their experience with the two national park based biosphere reserves and concluded that overall it was beneficial for CPS.

I don't propose that everything now has to be "biosphere reserved". However, I do think there is great potential for considering similar kinds of arrangements around ecological areas as a basis for developing the research and monitoring roles they are meant to serve.

Research and Monitoring

Research and monitoring is more often talked about than done. I don't think there is enough recognition of the extent to which we're flying blind in our efforts to conserve species and ecosystems. Securing areas and leaving them alone is probably the best we can do now, because we have such a poor ecological knowledge base for managing them. Decades of fish, wildlife and forestry research have virtually ignored the non-economic, "non-game" species which constitute the vast majority of the ones we are trying to protect in ecological areas. To its credit, the Carolinian Canada project recognized this with a small research fund component that went towards ecological studies of selected Carolinian species.

We have to find ways to fund conservation biology and management-oriented field studies on a firm, continuing basis. The scope should include support for atlas surveys where these are needed, and for research on policy and institutional issues associated with ecological areas. I don't see research and monitoring as a luxury; instead, it is the only way we can safeguard the considerable and growing investments that have been made in securing and protecting ecological areas.

Council has already taken up the question of monitoring at earlier meetings, although we seem not to have pursued it. There is an enormous literature on environmental and biological monitoring. It's long on cautionary tales about different pitfalls to avoid.

Over the last year or so, I tried to get a clearer sense of what is being done in biosphere reserves around the world, because it has been repeatedly said that monitoring is one of their major functions. Biosphere reserves are being used especially in the USSR and Eastern Europe to develop "integrated environmental monitoring" programs which try to relate measurements of atmospheric pollutants to their uptake by soil invertebrates and to their possible effects on tree growth and other vegetation. Practical and theoretical difficulties are inherent in all this, and it can be expensive.

The Smithsonian Institution, in cooperation with other agencies, has taken a lead in monitoring for biodiversity, using biosphere reserves in the Amazon as test sites. Twenty-five hectare sample plots are marked off in each of the major vegetation/forest types within these biosphere reserves so that they can be revisited from time to time. The high degree of co-evolution in the tropical rain forests draws the interest of taxonomic specialists so that individually marked trees, each of which might support its own distinctive communities of insects and epiphytic plants, are convenient sampling sites. U.S. MAB wants to see whether this approach to sampling could be adapted for monitoring fluctuations and trends in certain factors, and MAB and the Smithsonian are cooperating on the establishment of test sites in the southern Appalachians, using the approach developed in the Amazon.

The Long Point biosphere reserve on the north shore of Lake Erie seems well situated for monitoring certain aspects of "ecosystem health" in the region, including trends that might be associated with climate change. What, then, should be monitored and how? In the attached chart, I have summarized the questions this raises. There have been many data collected in this area over the years. Most agencies continue to collect whatever they need to back up their particular mandate. I have two creative graduate students looking into how these data might be integrated in some matter, using a new SPANS/GIS. In addition,

as part of the biosphere reserve rationale, monitoring should address concerns that local people have. We have had informal discussions with people affiliated with over 20 local organizations to identify their particular interests and concerns about the Long Point complex. A number of people would be willing to serve as volunteer monitors, provided someone could explain to them what information should be collected, why it is important and how one should go at it. But these questions remain to be thought through, not only for Long Point, but for many, if not most ecological reserves. I invite Council to return to the issue of monitoring in ecological areas.

THE EFFECTIVE INVOLVEMENT OF VOLUNTEERS

There has been a renewed attention to the volunteer sector of society in recent years as governments have been cut back, and the corporate sector has failed to increase significantly its support for philanthropy. Volunteer groups have arisen in the conservation and environmental protection fields, in some cases with encouragement and incentive from government agencies.

From various people's experience with volunteer groups and my own more casual observations, in part as a volunteer in various endeavours, guidelines for the effective involvement of volunteers would include the following:

- o use to the extent possible the activities volunteers would be doing anyway for recreational purposes, such as hiking, fishing, birding, photographing;
- o keep the tasks or information gathering as clear cut and simple as possible. Special volunteers with advanced skills and/or more dedication to the cause can be organized for selective use in more difficult tasks;
- o be prepared to cover some of the out-of-pocket expenses which volunteers incur in order to participate;
- o provide regular feedback on the collective results of volunteer activities and show how these results are actually being used beneficially;
- o have a fixed completion date or final product for whatever volunteers are being asked to do. A three year commitment is about the average for most volunteers;
- o give individual recognition by name in progress reports as well as in or on the final product (report or building facility) and provide small awards at recognition events for those who participate the most.

These are at least necessary. I am not sure whether they are sufficient. The key to it all is organization and communication with sponsors to provide backup support. For other than small, local, short-term projects, provision should be made for recruitment events, short

training workshops and supporting information such as ho-to-do-it manuals. For example, the Federation of Ontario Naturalists has a pilot project underway to have local groups monitor particular wetlands. The groups were conceived as "watchdog" groups initially, but some did not want to be seen as political, and they preferred instead to be thought of as "wetland ambassadors" who created awareness and goodwill about wetlands. These groups, some 15 in all, have apparently required considerable nurturing to the point that a full-time staff person and other volunteers were required to provide backup.

It was mainly a question of the groups learning what could be done IN different circumstances, gaining the confidence to do it, and knowing who to turn to when something happened, especially if it was controversial. The FON has been running workshops on these questions for their local affiliated clubs. In a related initiative, the University of Guelph has had a landowner contact program to promote private stewardship for Carolinian Canada sites and other sites on the Niagara Escarpment. From about six years of experience, it has prepared a draft "Landowner Contact Training Manual" (currently out for review) so that eventually other agencies can continue with the program.

There are various ways of organizing the participation of "outsiders" for work in ecological areas. Much could be done through partnerships with non-governmental organizations such as the WWF (Canada) and NCC. For example, I would personally like to see the NCC more closely associated with ecological reserves on private lands where the NCC can often help with acquisitions, easements, donations, or some combinations of the above. It would not be difficult to go through some collective best judgement consultations to identify priority sites to consider in each province and this could guide collaborative efforts. The NCC's efforts at developing "biological conservation data" systems at the provincial level -- discussed at length during last year's meeting of Council -- can provide the refinements for choice in the future. Much can be done in the meantime.

A few years ago, the Ontario Natural Heritage League was created and it now has 29 member organizations, half of which are governmental and half non-governmental. The intent was to find common ground for collaboration on matters no one organization could deal with effectively on their own. This has been a useful forum to deal with policy issues as well as site specific ones. While it has had its growing pains, mainly at the level of inter-agency support for it, the League has proven useful. Its greatest success so far has been its role in the passing of the *Conservation Land Act* which provides 100% property tax rebates to owners of provincially significant wetlands and areas of natural and scientific interest (a kind of ecological reserve). The experience of the League, as well as comparable arrangements such as the Conservation Councils of New Brunswick and Ontario, could usefully be reviewed for adaptation elsewhere.

Besides the non-governmental organizations, there are volunteer stewardship groups that are "self-organized" at the local level. Such groups see themselves as having a special interest in preserving, remediating or otherwise working for the betterment of a specific geographic area, natural feature or amenity. Such groups pursue their objectives through a variety of activities. Often then are reacting against what they see as a failure of government or corporate responsibility or accountability. Nevertheless, they can be constructive in obtaining corrective results. Not much seems to be known about these groups in terms of their origins, involvements, experiences and evolution over time.

As part of some Great Lakes studies I am also involved in, a colleague recently conducted a preliminary survey of local volunteer stewardship groups along the Canadian side of the Great Lakes. So far, 168 of them have been identified. Most are engaged in some kind of monitoring, or watching over, local situations of concern to them. Some focus on pollution, some on coastal natural areas and others on "our place", i.e., a bay or peninsula with which the groups identify quite strongly and involve themselves in any matter relating to it.

Government and business administrators may understandably react negatively to groups who emerge to challenge their decisions or lethargy, but in the longer view we should see most of them as not only healthy manifestations of a democratic society, but also the basis for building constituencies of support. In the Great Lakes case, the long-term commitment needed to rehabilitate badly contaminated nearshore areas, and to assure protection for the ecologically valuable sites will only come about if strong local support is assured. For example, while 123 Great Lakes coastal ecological areas (in Ontario) have been brought under one of several categories of protected areas administered by various agencies, another 209 sites have been flagged over the years as ecologically valuable, but nothing was done about them. Many may already be lost.

SOME CONCLUDING THOUGHTS

If ecological areas programs are going to draw effectively upon "outsiders", they will need staff who have the "people skills" to achieve this. Increasingly, those skilled in the processes of negotiation, mediation and facilitation will have to assume leadership responsibilities. Scientific and other special expertise is needed to be sure, but much of the specialized expertise might be on contract or on call. This is not such a radical suggestion when one examines successful businesses, and for that matter, successful non-governmental organizations.

There will also be a need to make sure that the contributions of the outsiders are used fairly and they are directed towards the overall objectives of ecological areas. If they are perceived as substituting for the lack of effort or commitment from paid staff, used in ways that are not consistent with the overall objectives of ecological areas, or just discarded, then the adversarial relationship which could then develop would be quite justified. There is little doubt that this new mode of working and achieving is demanding on time and patience, and awkward personalities are to be found everywhere. Perhaps it is salutary to consider the alternative of "going it alone" in terms of the required budget and staff.

Are there good working models of how to go about this? I'm inclined to say yes, but hasten to note my own lack of knowledge of where best to turn. Besides the experience from ecological area programs themselves, there would seem to be much to learn about collaborative endeavours from:

- o non-governmental organizations such as the WWF, NCC, WHC AND DU;

- o the natural heritage trusts such as the Island Nature Trust In P.E.I.;
- o coalitions of natural heritage organizations such and ONHL;
- o cooperative associations for national parks and some provincial parks;
- o community involvement programs for fish and wildlife, such as CFIP and CWIP in Ontario;
- o spontaneous "Friends of the ..." stewardship groups;
- o applications of the concept of a "biosphere reserve".

Perhaps this is something that Council should take up. It becomes even more significant and urgent if we revisit the question about the job to be done.

"Beyond Ecological Areas"

The term "ecological area" embraces some, but not all categories of protected natural areas that contribute towards the protection of natural diversity in some larger region. The "larger region" is often defined primarily by jurisdictional or administrative boundaries which, with rare exceptions, are ecologically meaningless. Ecoregion classifications have been developed as if they were subsets of jurisdictions. Differences in scale and detail, and the relative emphases placed on climate, landforms and vegetation give rise to incompatibilities among the systems. The work of the Canadian Committee on Ecological Land Classification to develop a common framework with which to reference different systems merits more attention for ecological areas work than it seems to have received. But this is another issue.

In looking ahead, here are two directions to pursue. One is to consider what remains to be done to protect the full range of biodiversity referenced to some ecoregion or bioregion (variously defined) after an evaluation has been made of the extent to which components of this biodiversity have been sufficiently well protected under all of the categories of protected areas and by arrangements for private stewardship. This implies that some classification of the components of natural diversity, viewed at the levels of landscape or ecosystem, natural communities, species and populations of species of particular interest can be developed. It would then have to be applied to assess a multi-jurisdictional and multi-organizational set of protected areas viewed collectively in terms of their conservation achievements.

The other direction to pursue is to look beyond protected areas viewed as isolated patches (or as "islands of green" as an editor retitled an article I wrote some years ago) to the larger landscape mosaic of which they are a part. The management of surrounding lands, and especially of watersheds, can influence these islands of green, and the islands can serve -- as we have long argued, but not done much about -- as the reference sites for monitoring what's happening around us.

It is also now recognized that biodiversity is related to larger landscape mosaics, often in situations where no one component of the mosaic would qualify for protection as an

ecological area. Landscape ecology is beginning to bring these spatial dimensions more clearly to view. Protection of diversity requires differentiated site management practices all of which would have to be worked out and accepted by landowners and other public agencies. Strictly protected ecological areas still have a crucial role to play, but this must be identified and viewed from some larger ecoregional perspective, and become part of a larger suite of policies and practices. Ecosystem rehabilitation for the degraded pieces of mosaics would also have to be part of an approach that is used.

The implications of these broader perspectives are only just beginning to be explored. But one thing is clear. Going it alone is out of the question. Everyone will need the help of "outsiders" and we ourselves are all "outsiders". It is no longer a helpful distinction to make.

GENERAL SPECIFICATIONS FOR MONITORING AT LONG POINT
[Decisions to be made]

1.Purpose(s)

- *describe/explain fluctuations, trends, cumulative impacts
- *information to carry out particular mandates
- *identify causes of phenomena
- *modelling and prediction

2.For whom? With whom?

- *resource user/interest groups
- *agencies with particular mandates
- *binational/international programs
- *research groups

3.Scope

- *ecosystemic, i.e., abiotic, biotic, cultural ('effects')
- *institutions and decision processes ('causes')
- *"statement of the environment"

4.Organizing concepts

- *ecosystem integrity/health
- *actor systems dynamics
- *hierarchy/self-organization theory
- *time/space scales

5.Implementation guidelines

- *involvement of local "constituency" of agencies/groups
- *eclectic, using existing data gathering to extent possible
- *consider issues of statistical design from outset
- *link monitoring (time) to GIS (space)
- *range of methods, e.g., remote-sensing; volunteers