

Joint Soviet-American Research In the Oka Biosphere Reserve

By David M. Graber and Raymond Herrmann

There are many tales of glasnost. This is one: The short, hopeful story of how the opening of Soviet society and the intensifying concern of ecologists in the United States, in the U.S.S.R., and just about everywhere else led four American and seventeen Soviet scientists into three weeks of old-fashioned fieldwork in the Russian backwoods. It's a story featuring mud and mosquitoes; the marriage of a Soviet diesel generator and a Japanese laptop computer; the clash of American versus European ecological thinking; and the gratifying discovery that the joy of working with nature and a passion for saving it from humankind's toxic foolhardiness are a cultural common ground perhaps more potent than nationality.

This was "U.S./U.S.S.R. Bilateral Exchange, 14 August - 9 September 1989, Project 02.05-41: Biosphere Reserves." For fifteen years, the governments of the two countries have been signatories to an agreement promoting the mutual development of environmental monitoring and protection schemes in their respective nature preserves. Like many - maybe most - such international agreements, "progress" had been marked by alternate visits of officials highlighted by tours, toasts, and occasionally productive conversation. The fortunes of the working scientists on both sides rose and fell with the international political climate. These days that climate, like the meteorological one, is warming precipitously.

Last May, meeting first in Idaho Falls and continuing in the Wind River mountains of Wyoming and in the middle of the River of No Return Wilderness, we finally achieved the political and scientific common ground to work together. There would be joint work on environmental monitoring - specifically to track and measure pollutants in air and water. That is a relatively straightforward business where Americans have held the high ground for years through our global superiority in science and technology. And we would seek to find standards for describing and monitoring "biological diversity." This 1980s talisman for slowing the extinction of species and the loss of whole ecosystems goes to the heart of the science of ecology. It is an arena in which European - and Russian - ecologists have marched to a different drummer than the Americans... and one in which the Russians are far better apprised of our work than we of theirs.

But before we embark on our scientific expedition to the Oka Biosphere Reserve, a digression: For two decades, UNESCO's Man and the Biosphere (MAB) program has attempted to foster more harmonious relations between people and the natural world. Its International Biosphere Reserve designation seeks to link fully protected "core" areas with adjacent lands where agriculture, forestry, or other human endeavors may be taking place. The selection of biosphere reserves was intended to cover the spectrum of ecosystems planetwide, from tundra to tropical rainforest - although politics has had a certain moderating effect on the character of the network. The ecological lessons learned in the core areas are to be applied to improve management in the occupied lands, as well as to provide a protective buffer for the natural areas. Typically, some of the finest natural preserves the world has to offer have been designated Biosphere Reserves. Understandably, a great deal of global effort

toward nature conservation has taken place in and on behalf of this network of biosphere reserves.

In America, many of the dedicated biosphere reserves have been national parks. But for a few notable exceptions - southern Appalachia is one - little effort has been made thus far to reach beyond the core parks to surrounding buffer areas. And only quite recently has the biosphere designation produced much more in the national parks than a brass plaque. The national parks have become increasingly critical as fully-protected nature reserves, yet the agency that manages them must devote much of its energy to satisfying the recreational needs of park visitors.

The Soviet Union has largely avoided this problem. "Parks" in the Soviet Union are designed principally for recreation, although this typically is accomplished in rustic surroundings. A special nature reserve designation, "zapovednik," was established more than 50 years ago; these are entirely closed and protected except for non-manipulative scientific investigation. Most Biosphere Reserves in the U.S.S.R. are zapovedniks. In America the reserve designation has most often been bestowed upon the relatively unmodified wilderness parks that form the "crown jewels" of our system, where we have been able to imagine that "wild nature" still functions. In the Soviet Union, as in Eurasia in general, nearly all landscapes have been occupied, modified, and re-modified by human beings for centuries - "wilderness" is a peculiarly American abstraction. And occupation patterns in Europe are such that establishing an inclusive reserve of 50-100 square miles is a substantial challenge.

For the August joint scientific expedition our Russian hosts selected the Oka Biosphere Reserve, just a few hundred kilometers south of Moscow. The Oka Reserve consists of 22,846 ha of floodplain, bogs, and alternating sand ridges between the Oka and Pra rivers. This complex landscape has resulted from the reworking of fine sand-sized glacial outwash deposits by eolian and hydrologic processes. Once farmed, once logged, it is now densely forested with birch, pine, and oak. Every spring, the rivers Pra and Oka swell and - blocked by ice downstream - flood the reserve. By late summer, only the boggy ground betrays the Oka's seasonally underwater existence. Although a biological island surrounded by farms, the Oka supports moose, wolves, beaver, and a rare giant aquatic insectivore, the desman, *Desmana moschata*. This zapovednik, closed to tourism, is linked to a surrounding agricultural buffer zone used for forestry, farming, cattle grazing, and some hunting; much of its dedi-

cated research and monitoring is intended to improve stewardship of the entire region.

The 4 American scientists participating in the joint field program were Robert Pierce of the Forest Service (Hubbard Brook), Lindsay Boring of the University of Georgia, and David Graber and Ray Herrmann of NPS. The sociology of our Russian colleagues bore some curious parallels to our own experiences as park versus university or institute scientist. The lead Soviet scientists work for the Institute of Evolutionary Morphology and Animal Ecology, a division of the Soviet Academy of Science in Moscow - city folks. Joining us at Oka were some of the Reserve's biologists - country folks. One group had the connections, the other the study site. They worked well together, but I was reminded of similar competition at home. After introductions to the little village, Brikin Bor, that serves as reserve headquarters, a lovely place delightfully named in honor of an ancient highwayman who robbed travellers from Moscow, we set up camp in the interior of the reserve.

Participants agreed to use an established ecological transect of 116 25 m segments as the basis for their investigations. This transect extends from the Pra River to Svjatoe Lake. It crosses high and low floodplain of the Pra, a sand ridge, the edge of a large swamp, two more ridges, and a moist birch forest near the lake. The transect intersects oak, birch, pine, aspen, and alder forests, both old growth and stands of moderate age. The range of elevation is 6.9 m, and within short distances (e.g. 25 m), microtopographical differences of 0.5 to 2 m are correlated with radical changes in vegetation.

We soon settled into a pattern of work. During the day we collected field data on the species present in different plant communities, on forest structure, on soil and moisture characteristics. In the evening we confronted our profound differences in scientific education and perspective. Just what are the important ecological parameters that can be measured and compared in Oka, in the Smoky Mountains, the rainforest, the taiga? Just what is "biological diversity," anyhow? The Russians - senior scientists and graduate students alike - read and understand some English. We Americans were hopeless in Russian. Translating abstruse points of ecological theory back and forth is time consuming and wearying, particularly after a full day. Sometimes we all got frustrated and testy. American scientists are accustomed to spirited questioning. Russians are not. We occasionally detected a look somewhere between shock and illicit glee in the eyes of the young Russian biologists when we scrimmaged with their elders. But an overriding concern that we must succeed, that our two nations cannot afford to remain isolated in their pressing environmental problems, drove us to learn from one another and to adopt the best points of both perspectives. And we did.

The Soviets had energetically mined information theory and biogeographical theory of the 1960s and 1970s to develop indices of biological diversity based on the relative number of individuals of each species present within and between sites (alpha and beta diversity). They were particularly interested in using these measures to distinguish "equilibrium" from "dis-

Glen Mittelhauser, co-author of the article "Monitoring Harlequin Ducks at Acadia" (*Park Science*, 10:1, p. 18), writes that "since the article was submitted, hunting regulations were changed for the 1989-90 hunting season. The current regulations completely protect the Harlequin in Maine."

Pat Corr of the Maine Department of Inland Fisheries and Wildlife also wrote *Park Science* calling attention to the change in regulations.

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equilibrium" systems. The Americans were anxious to include biotic structural and temporal diversity dimensions. Where the Soviets saw distinct communities composed of species with a common ecological history, we saw environmental gradients producing a continually changing array of species over space and time. We were particularly impressed by one site along the transect where a tornado had ripped out the old stand of oaks, providing an important gap for the invasion of other species; and another site where beaver cutting and flooding had converted an aspen forest to birch and pine. All along the transect, minor differences in relief and underlying near-surface groundwater produced dramatic and sudden transitions in vegetation. We gradually concluded that both approaches are complementary, and together yield important parameters of biological diversity.

Of course, although we were truly in the boondocks, the sensation of a Soviet society in abrupt transition, a revolution, was pervasive. Our hosts were candid in their discussions of Soviet politics and social problems. No one cared what we looked at or photographed, or said. Our conversations took on an added significance since we all knew a social revolution was occurring all around us. One memorable evening an intense argument occurred among the Russians over whether the awful condition of Russian highways was a consequence of the Communist government or intrinsic to the Russian character. The terrible bind of a highly sophisticated culture with a non-functioning economy – where there simply is no money for scientific tools or for social amenities – is intensely frustrating.

It is most important that those managing and conserving nature reserves around the world find common currencies for comparison. "Biological diversity," although an abstraction, can be defined quantitatively within a watershed context and along a variety of axes. The work at Oka, and future such joint ventures, will help us select which parameters are most useful for conservation.

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