A sustainable plan for conserving forest biodiversity in far East Russia and northeast China

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An ongoing, trinational project is providing the first environmentally sustainable economic development plan for the Ussuri River watershed (URW) in Far East Russia and northeast China. The URW is host to a unique mix of northern taiga and southern subtropical biota, and contains many endemic, relict, and highly threatened species of plants and animals. In Russia, severe monetary inflation and a shift to a market economy have left some aspects of forest biodiversity in jeopardy, particularly policing for wildlife poachers, regulating CITES (international wildlife trafficking) violations, ensuring long-term *sustained* production of timber and non-timber forest products, protecting unique habitats, and adequately staffing scientific reserves and funding needed research. In China, broad scale conversion of remaining wetlands to agriculture and rice paddies, and of diverse native forests to intensively managed, monocultural plantations, is helping to sustain the economy but is sacrificing biodiversity. A proposed sustainable land use plan has (1) mapped resource use areas, including both proposed and existing transborder nature areas, (2) encouraged foreign investment in both countries, and (3) encouraged sustainable development of natural resource markets that will be compatible with long-term conservation of biodiversity. A hallmark of this plan is integrating the needs of the people with the capacity of the land through both environmental protection and wise resource use.

Key words: Russia, China, Far East, Ussuri River watershed, biodiversity, sustainable, land use plan, wildlife

Un projet continu impliquant trois pays cherche à établir un premier plan de développement économique environnementalement durable pour le bassin de la rivière Ussuri (URW) situé dans extrême est de la Russie et au nord-est de la Chine. Le URW constitue une association unique de la taïga nordique et des biotopes subtropiquaux du sud, et contient plusieurs espèces de plantes et d'animaux endémiques, reliques et grandement menacées. En Russie, l'importante inflation monétaire et le passage à une économie de marché ont mis en péril certains aspects de la biodiversité, notamment le contrôle des braconniers, le règlement des infractions sous les ententes CITES (trafic international de la faune), le maintien d'une production durable de bois et de produits forestiers non-ligneux, la protection d'habitats uniques, et l'embauche de personnel dans les réserves scientifiques ainsi que le financement requis pour la recherche. En Chine, la conversion à grande échelle des marécages encore disponibles en champs agricoles ou en rizières, ainsi que des diverses forêts naturelles en monocultures hautement aménagées, permet de maintenir l'économie mais sacrifie la biodiversité. Un plan de gestion durable des terres a été proposé permettant (1) de cartographier les zones d'utilisation des ressources, incluant à la fois les réserves naturelles envisagées et existantes de chaque côté de la frontière, (2) d'encourager les investissements étrangers dans les deux pays, et (3) d'encourager le développement durable de marchés à base de ressources naturelles qui sera compatible avec la conservation à long terme de la biodiversité. Un fait saillant de ce plan comprend l'intégration des besoins des gens en fonction de la capacité des terres en tenant compte de la protection de l'environnement et d'une saine utilisation des ressources.

Mots clés: Russie, Chine, Extrême-Orient, Bassin de la rivière Ussuri, biodiversité, durable, plan de gestion des terres

Introduction

In 1993, a project initiated by Ecologically Sustainable Development (ESD) of New York, U.S.A., and the National Committee on United States-China Relations sought to bring Russia and China into close cooperation in environmental and land use planning in the Far East. This landmark project has resulted in the first sustainable land use plan developed jointly for a portion of Far East Russia and northeast China. In this paper the major methods and results of the project are summarized, related issues of forest management and protection are discussed, and some lessons for forest biodiversity planning in North America are drawn.

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Project Area

The project area in the Far East consisted of the watershed of the Ussuri River (Wusuli Jiang in Chinese), a major river flowing north into the Amur River and defining a portion of the Sino-Russian border (Fig. 1). Following discussions with administrators and government planning organizations in both countries, the Ussuri River watershed (URW) project area was expanded to include several adjacent portions of these provinces. The term URW will refer to this expanded project area.

The URW spans 26.2 million ha — an area larger than the United Kingdom — and includes significant portions of Khabarovski Krai (or province; 17% of URW) and Primorski Krai (51%) in Russia, and Heilongjiang Province (32%) in China. URW includes a wide variety of ecosystems including: broad, unconstrained flood plains of the Ussuri River and its many tributaries; old native and young managed forests of conifers and hardwoods; and grasslands, peatlands, and vast freshwater wetlands. URW is a unique region of the Far East where the boreal taiga conifer forest ecosystems from the Siberian north intermingle with the temperate hardwood forest ecosystems from the south. It is the only place on Earth where brown bears (*Ursus arctos*) occur with Siberian tigers (*Panthera tigris altaica*) (Dinerstein et al. 1995). Along with plant and animal species

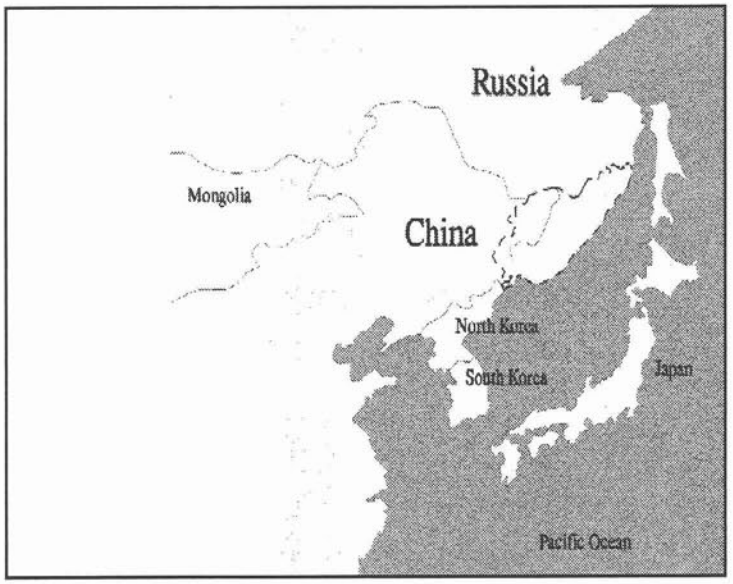

Fig. 1. Far East showing national boundaries (light dotted lines) and the Ussuri River watershed planning area (heavier dashed line).

derived also from Manchurian and Pacific influences, this intermix has resulted in remarkably rich forests with nine conifer tree species and well over 40 hardwood tree species.

At the genus level, the taiga forests of URW closely resemble those of southeastern Canada and northeastern US. Some of the dominant tree species of URW include larches (*Larix gmelinii*, *L. olgensis*) and spruces (*Picea ajanensis*); and, among the hardwoods, birches and poplars (e.g. *Betula dahurica*, *B. costata*, *B. mandshurica*; *Populus davidiana*, *P. maximowiczii*), maples (e.g. *Acer tegmentosum*, *A. mono*, *A. ukurunduense*), elms (*Ulmus* spp.), willows (*Salix* spp.), the regionally endemic basswood (*Tilia amurensis*), and many others. During this century, many of the forests have been selectively high-graded for old Korean pines (*Pinus koraiensis*) and firs (*Abies nephroleopis*, *A. holophylla*). Korean pine, also called cedar in Russia and red pine in China, is a regional endemic and is particularly valuable for its wood and seeds. In fact, one indigenous peoples group of the URW, the Udege of Russia, have established a Pine Nut Zone in the central Bikin River basin to protect future nut crops. Such areas of traditional resource use by indigenous peoples of URW were included in the planning effort to recognize their special nature.

Wildlife and fish of URW constitute a third of all Red Book threatened species of Russia, including the highly endangered Siberian tiger and the nearly-extinct Far East leopard (*P. pardus orientalis*), both of which are shared with China and North Korea although in numbers greatly reduced from historic levels (Li and Zhao 1989). Other Red Book wildlife includes the little-known long-legged or lungless salamander (*Onychodactylus fischeri*), soft-shell turtles (*Trionyx chinensis*), several snakes (*Rabdophis tigrina*, *Dinodon rufozonatum*, *Elaphe taniura*, and *Coluber spinalis*), a number of birds, and other mammals.

In the Chinese portion, about a thousand species of plants have been identified. Many plant and animal species occurring in both the Chinese and Russian portions of URW have great medical and cultural value. For example, China raises the soft-shell turtle in captivity as a gastronomic delicacy, and has captive-breeding programs for mink, bear, and other animals for their pelts and the medicinal value of their body parts.

Throughout URW, a large number of regionally or locally endemic rare plants and animals persist in Pleistocene and even Tertiary or Neogene refugia of lowland grasslands, mountain forests, and inland wetlands. Among the trees, such rarities and relicts include the maples *Acer ginnala* and *A. pseudosieboldianum*, the alder *Alnus japonica*, and the so-called funeral pine *Pinus funebris*.

The URW also contains a wide variety of commercial forests and wild game animals and fish. The region's rivers have China's only known spawning ground for sturgeon and salmon. Along with a large variety of non-timber forest products such as mushrooms and ferns, the river fish and other wild game such as squirrels (*Sciurus vulgaris*) and sables (*Mustela zibellina*) provide a major source of sustenance and income for many of the traditional hunters, trappers, gatherers, and indigenous peoples of the region. The non-timber resources often have equal or greater local cultural and economic value than does the timber.

The vast natural and genetic resources of the URW are but some of the values of the region (Newell and Wilson 1996). The URW also contains large cities, strategic transportation and economic corridors, and great mineral resources. The Russian portion contains large areas of home farms or dachas. In the northeast corner of the Chinese portion, large state farms dominate, reclaimed from extensive floodplains in the Sanjiang (Three Rivers) Plain and settled during the Cultural Revolution beginning in 1957. Following this period, cultivation of the entire URW region increased steadily, stabilizing by the mid-1980's at about 22% of the region, with a greater proportion of the land base in intensive agricultural land occurring in the Chinese portion.

As a result of increased economic industrial growth in China, great economic and social changes in Russia (Levin 1992), and the continued opening to world markets in both countries, the truly native and undisturbed forest, wetland, and grassland ecosystems of the URW have continued to dwindle. At present, the future of sustainable resource use seems at best uncertain (Krever et al. 1994). Large areas of native forests and wetlands, particularly in China, have been cleared or altered for intensive commercial and agricultural use, to the near-exclu-

sion of biodiversity conservation. Rapid industrial development and intensive logging of native forests have threatened native resident and anadromous (ocean-going) fish stocks, and have polluted many river systems. Ongoing and unsustainable logging, with either no replanting or with replanting with monocultures, has threatened the remaining diverse, native forests. Ironically, many of these forests persist along the international border as a relict of cold-war exclusion. As well, transborder conflicts over extraction of increasingly rare plants of economic value such as ginseng (*Panax ginseng*) and fishing and hunting, and concern for violation of national and international trade laws on timber, plants, and animals, have incited the dire need for a long-term sustainable land use plan in the URW.

Fortunately, these days more and more people in Russia and China, especially scientists, experts, and high-ranking officials, recognize such problems and acknowledge the importance to human society of sustaining biodiversity and native ecosystems. Development of the URW plan has resulted from efforts by over a hundred experts and officials in Russia, China, and the U.S. Their participation in this project marks their need and interest in providing for long-term sustained economic development and protection of biodiversity.

Methods

The concept of sustainability as used for this project was based on the World Commission on Environment and Development's (1987) definition: sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. The plan focuses on sustainable use of resources, not sustainable growth which is unattainable. Sustainable development is defined herein as improving the quality of human life while living within the carrying capacity of supporting ecosystems. It is assumed that our methods will provide at least a first approximation to carrying capacity of URW by identifying areas needed to maintain biodiversity, to avoid geologic hazards, and to provide for continued grazing, forestry, orchard, industrial, urban, and agricultural use throughout the long term.

The first phase of the project entailed scientists and experts collecting and preparing base maps of resource conditions within the study area (Table 1). These included maps of existing land use, forest types and productivity, vegetation cover, water systems, soils, geology and geomorphology, protected territories, landscape types, and wildlife distribution including rare or endangered species. As a whole, these maps made it possible to present a full picture of natural conditions and traditional land use throughout URW. Most maps included detailed notes giving additional information and analyses. For instance, the animal biodiversity maps of Khabarovski Krai were accompanied with 40 pages of written material explaining zoogeography and ecological conditions of the region, its biological value and species diversity, existing protection measures, and assessments of endangered species. Similar reports accompanied the maps of vegetation cover and endangered plant species.

For this new assessment, the Chinese participants purchased 12 Landsat Thematic Mapper (TM) images and created a TM image mosaic at 1:500,000 for the China portion of the study area. Both Russia and China used many new and existing maps, as well as existing ecological assessments and resource plans within the URW. This is certainly not the first land-use plan developed for Russia or China within the URW — part of the challenge is to incorporate existing resource plans — but it is the first that spans both countries.

Table 1. List of selected base maps collected on the project; most were developed at 1:500,000 or 1:1,000,000 scale.

1. Existing land use
2. Socio-economics
3. Morphogenetical types of relief (Russian; from new cartographic environmental analyses, based on geology, topography, and landscape types)
4. Industrial land (mineral resources)
5. Geodynamical risk
6. Recreation sites
7. Distribution of Red Book (endangered) and rare plants and animals, and refugia for Pleistocene and Tertiary plant relict species
8. Optimal growth sites of *Pinus koraiensis*
9. Soils
10. Forest type and productivity categories
11. Zoning of the Ussuri River by extent of ecological stability of landscapes and types of natural resources use
12. Water use and hydrology
13. Restriction of water-use (watershed protection areas)
14. Political boundaries
15. Geology
16. Aerophotogeology (Russia)
17. Existing protected territories (reserves, national parks, zakazniks, natural parks, others)
18. Satellite images

As one example, the project built upon the existing Ecological Program of Primorski Krai, completed in 1993 (PGI 1992–93), which had identified the more ecologically damaged territories in Primorski Krai and suggested ways for improving their ecological situations. This Ecological Program, however, provided many resource maps of the krai at various scales — some based on Russian satellite imagery — and did not provide a single composite map interpreting resource sustainability. Thus, the URW project combined these maps to zonate territories based on current land use ("nature use"), and to delineate ecologically unstable territories where high geological hazards (including flooding, landslides, erosion, and other mass-wasting events) would prevent sustained, long-term resource development and use. These maps of ecologically unstable territories, as overlaid by the other thematic maps, helped identify territories where human activity could proceed sustainably, or should be constrained or fully banned.

Secondly, numerous international field expeditions[5] were conducted in Russia and China for reconnaissance and inspection, and to refine and correct the initial maps of resource conditions. The field visits included low-elevation aerial surveys by ME-8 helicopter in China and AN-2 biplane in Russia, using GPS units to validate ground conditions and boundaries among existing land use categories (forests, arable farmlands, urban areas, wetlands, water bodies, and major transportation corridors).

Next, the updated field maps were combined by scientists and experts into a draft sustainable land-use allocation map, and a draft report was written describing existing resource con-

[5]For example, in Primorski Krai, these included two trilateral (Russian, Chinese, American), three Russian-Chinese, and four Russian-American ground expeditions and three aerial surveys; and in Khabarovski Krai, these included an additional three trilateral and seven bilateral expeditions with seven aerial surveys.

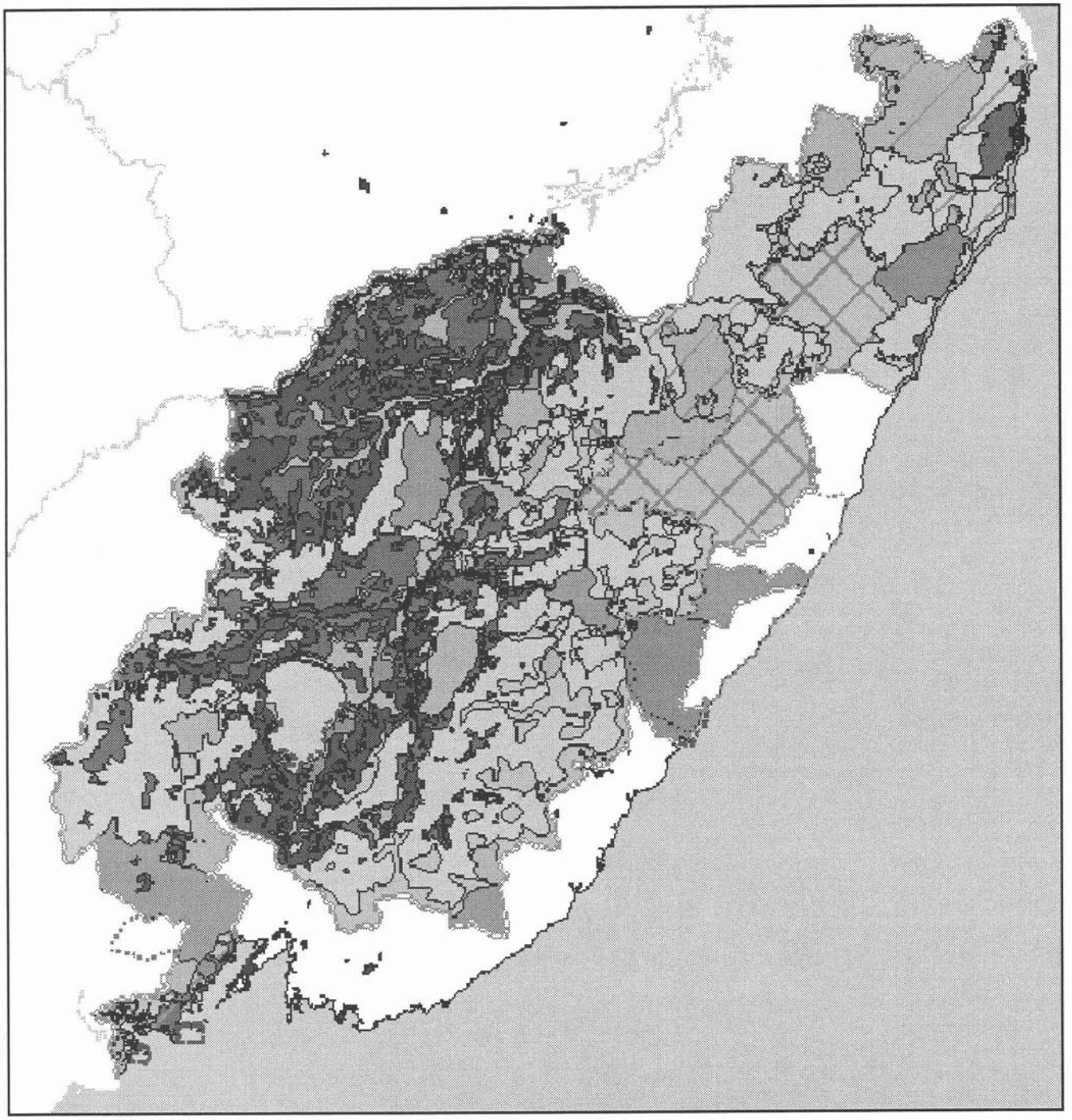

Fig. 2. Final land use allocation recommended for the Ussuri River watershed of Russia and China. Dark grays: agricultural lands (arable, grazing, orchards, and cottage gardens or dochas); medium grays: nature conservation, recreational, and cultural lands (strict nature reserves, national and natural parks, habitat and species management areas, protected landscapes, protected seascapes, territories of traditional use, natural monuments, and cultural monuments); light grays: forests (watershed protection and limited production forests, and commercially managed forests); additional allocations: wetlands, cities, rural settlements, industrial, and mining lands. (Map produced by Northern Cartographic, South Burlington, VT, USA. Copyright 1997 Ecologically Sustainable Development, Inc., Elizabethtown, NY, USA. Used by permission.)

ditions and potential management standards and guidelines for each future land-use allocation. During this step, some traditional land use planning methods from all three countries were adopted. For example, in Russia the traditional "Plan for Land Arrangement" was used, which identifies land use emphasis and objectives for each raion (analogous to counties in China), as well as related planning adjuncts (IUCN 1978). The Chinese participants incorporated some of their existing planning assessment methods as used by the Heilongjiang Planning Commission.

Fig. 3. A comparison of forest management techniques in the Far East. (a) Forests of the Wandashan Mountains, China, are typically planted to a single species, often larch, and intensively managed for maximum bole volume growth. Pruned and fallen limbs on the forest floor have been raked, gathered, and bundled for transport, to be used as fuelwood. (b) Forests just across the border in Russia have often been high-graded with selection cutting, resulting in a floristically diverse but structurally altered condition. Much wood residue remains behind. Also, much more of the Russian forests are protected in nature reserves. The difference in forest use intensity results from differences in economies, logging systems, and even cultural attitudes on resource use. (Photos by B. G. Marcot.)

After the map and report were drafted, several public hearings were held in Russia and China to solicit suggestions and determine attitudes from local people. The use of public meetings to discuss and revise proposed land use allocations is largely a new feature of planning to both countries in the URW. It draws from the public participation process for land-use planning as mandated by the U.S.'s National Environmental Policy Act. Public meetings resulted in changing some of the map allocations and management guidelines to better meet the needs and traditional resource use habits of local peoples. The final map and report were written by late 1996.

Results

The final products from the project include a land use allocation map and a report with management standards and guidelines (ESD et al. 1996). The final land use allocation map (Fig. 2) presents some remarkable changes to the URW human landscape to protect native biodiversity and allow for sustainable use of land and resources. To allow for sustainable resource use, it includes cities, rural, recreational, and industrial lands; commercially managed forests; grazing lands; and arable lands, orchards, and gardens. These land allocations total some 80% of URW in China and 50% in Russia (Fig. 4). The remainder of the land area is to be dedicated to areas of watershed protection and limited production forests (Russia only; Table 2), and protected areas for nature conservation and cultural lands (Russia and China). Reserves, parks, habitats, and wetlands constitute 34% of the total URW area (20% of URW in China and 39% in Russia).

Perhaps most remarkable are the four proposed transborder reserves for protection of key forest and wetland ecosystems. For the first time, under this plan nature reserves would span the border and be managed in cooperation to maintain biodiversity values rather than being unintended consequences of national defense objectives. The transborder reserves include the proposed Three Rivers International Peace Park and Wildlife Refuge, the Lake Khanka/Xingkai International Wildlife Refuge, the Big Cat (Panthera) International Park and Wildlife Refuge, and the Wandashan National Park and International Tiger Refuge. These areas plus other nature protection sites cover the URW biodiversity hot spots as identified in this project and by Newell and Wilson (1996).

For each land allocation (Fig. 4), the planning report provides management standards and guidelines; information on purposes, policies, and objectives; and specific guidelines for selection, management responsibility, allowable uses, preferred uses, conditional uses, and recommended designations. An example is presented (Table 2).

One land allocation important to indigenous peoples of both countries is that of the territories of traditional nature-use. These allocations provide for such native cultures as the Nanai, Udege, and Orochi (of the Tungus-Manchu group) in Russia.

Next Steps

There remain several major challenges in moving into a new millennium of cooperative land use planning in this portion of the Far East. Not the least of the problems is addressing, and allowing for, the vast cultural difference in traditional land use practice and expectation between the two countries. In the URW, China has tended to maximize natural resource production whereas Russia has protected more of its forests or engaged in less intensive silviculture (Fig. 3), although this is now changing with an opening of world forest economies and foreign participation in local Russian forestry operations. Indeed, one of the motivations for the URW Plan was the threat of unchecked forest destruction and extinction of endangered plant and animal populations of the region, including some species of key economic and cultural value. In Russia, privatization of forests and other lands may actually provide a golden but brief window of opportunity to effect new land allocations but, if unresolved, likely will lead to continued resource degradation (Shvidenko and Nilsson 1994; Levin 1992). In China, the challenge is to realign the existing, strongly hierarchical planning process, to account for transborder conditions and the differing cultural values of Russia.

Table 2. An example of land allocation management — for Watershed Protection Lands and Limited Production Forests — from the Ussuri River Watershed Plan.

Watershed Protection Lands and Limited Production Forests

Purposes, policies, and objectives

The primary purpose of these areas is to protect forest and critical non-forest areas vital to the continued supply of pure water. High elevation forests and meadows, dark taiga over permafrost, and dry southern exposure forests difficult to regenerate are included, as are erosion prone lands, riparian zones, and some large wetlands which are not otherwise designated a park, refuge, or reserve.

A secondary purpose is to provide food and usable products from forests where tree cover will be maintained but where plant materials such as seeds, fruits, nuts, forage, tubers, berries, and mushrooms can be collected, or animals harvested, on a sustainable basis. For example, a grove of "cedar" (Siberian pine — *Pinus sibirica*) could be protected in this zone to maintain a source of nuts and oil for individuals, local communities, or export. This zone also provides for protection of habitats and species diversity in fragile headwater and high elevation environments, particularly forests.

These forests will be managed for food and vegetable products rather than lumber or pulpwood. They will generally not be grazed except in natural meadows during specified times of the year. Trees, shrubs, vines, and root crops may be interplanted as understory crops.

New roads should not be constructed in these areas except those necessary for forest protection. When not in use, roads built for forest protection should be "put to bed" with drainage structures such as waterbars, covered with slash (organic logging debris) and, where appropriate, seeded or planted.

Finally, these areas often serve the additional function of buffering national parks and other protected areas from more intensive land uses.

Guidelines for selection

- Steep, forested lands (slopes exceeding 30%)
- High elevation lands (over 1,000 m elevation)
- Forests on highly erosive soils
- Forests in river headwaters and above community water supplies
- Forests unlikely to regenerate naturally if harvested
- Forests with high biologic and botanical diversity and species endemism
- Forests relied on by native people for non-commercial uses

Allowable uses

Preferred uses:

1. Open space recreation
2. Wildlife production and management
3. Gathering plant materials such as nuts, berries, fiddleheads (edible ferns), mushrooms, and medicinal plants
4. Environmental education and scientific research
5. Hunting and fishing
6. Sanitation cutting for forest protection
7. Forest restoration
8. Restoration of degraded ecosystems

Conditional uses:

1. Salvage and firewood cutting
2. Livestock grazing
3. Caretaker residence on approved homesite
4. Roads
5. Existing uses (if requisite ecological passport issued)

Recommended designations

A total of 1,966,100 ha of watershed protection lands and limited production forests is recommended in Russia. This land allocation already exists in Russia but does not pertain to China, which includes lands serving similar purposes in other land allocation categories (e.g., Commercially Managed Forest Ecosystems).

The next stages of the project pertain to acceptance and implementation. First, designation and management of the international, cross-border protected areas, including new national parks and refuges, will need to be organized. This includes difficult decisions for balancing national defense with biodiversity, forest conservation, and perhaps even ecotourism. For example, a tall fence runs along the terrestrial portion of the border in the south of the study area. The fence has served purposes of national defense, but also has likely harmed wildlife of the region by severing already-endangered populations of tigers, leopards, their prey, and other species. The border parks are a major step toward joint protection of highly endangered forest and wetland ecosystems and their plant and animal resources.

The second major step in implementation is thus to establish new laws in each country at the krai and province level that will enact the Ussuri Basin Plan. We anticipate that cross-border management will succeed with development of similar but not necessarily identical land use laws in Russia and China. Developing laws in each country that would provide the necessary legal vehicles for implementing the Plan in similar ways is a difficult task, as the legal and planning structures in each country could hardly differ more.

Then, the third major step is to organize an Ussuri International Commission to be comprised of the governmental administrations of the two Russian krais and the one Chinese province. This Commission would replace the current steering committee and would help to solve transborder disputes in land use, and to mobilize the Ussuri Basin Plan through enacting the new laws. The Commission would have the authority to guide provincial and local planning to ensure long-term, sustainable development of its forests, wetlands, and other resources, both for land use by the people and for nature protection. Eventually, the Commission would prevail upon local governments (raions in Russia and counties in China), as well as national land use agencies and bureaus, to ensure consistent and long-term implementation at all spatial scales.

Lessons for North American Forest Management

What can be learned from this project to help inform forest resource management in North America? For one, the cul-

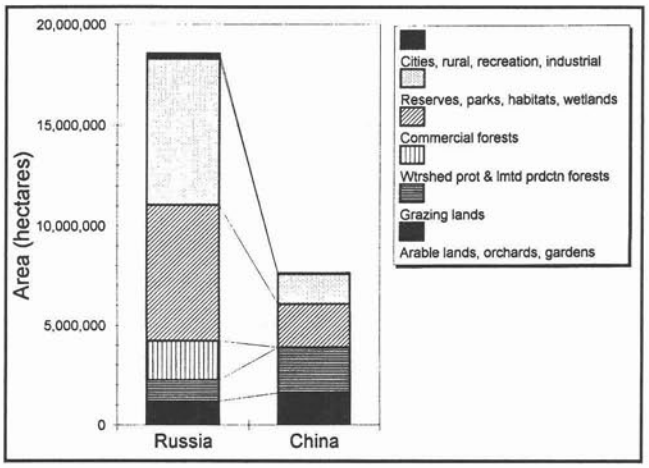

Fig. 4. Areas of land allocations suggested in the Ussuri River watershed sustainable development plan, in Russia and China. See Table 2 for an example of specifications for one of these allocations.

tural and environmental conditions of URW provide a peek into the future for some of us, showing long-term effects on sundry ecosystems from various forms of land management. For example, much of western North America has yet to experience extensive and very long-term conversion of native forests into even-aged monocultures, such as the forests of larch and exotic pine (*Pinus sylvestris*) in the Chinese portion of URW. This may help inform the longer-term environmental effects of such activities as the watershed-wide clearcutting in parts of British Columbia and on some western lands of the U.S. In the intensively managed, row-crop larch and pine forests of the Chinese portion of URW, most of the native vertebrate biodiversity has been lost. In China, a few pockets of selectively-logged, old-growth Korean pine persist in the higher peaks (Wandashan, Lao Ling, and Mudanjiang Mountains). These hold refugia for some of the older-forest fauna including blue-and-white flycatchers (*Muscicapa* [*Cyanoptila*] *cyanomelana*), white-backed woodpeckers (*Dendrocopos leucotos*), and a few sables and tigers. In contrast, the Russian portion of URW can inform us on long-term effects of hunting and trapping of game and selection-harvesting of large overstory conifers. Such land use has served to retain an extensive forest cover of residual hardwoods and larch, but has reduced or locally eliminated wildlife closely associated with the old Korean pine and old fir forests, such as tigers, leopards, wild boar (*Sus scrofa*), red deer (*Cervus elaphus*), and sable.

Another lesson is that of the cultural and economic value of nontimber forest resources. Besides wildlife trapping, hunting, and fishing, the gathering of wild plants for medicines, foods, and international trade is a vital part of both indigenous peoples and those living close to the land. The science of ethnobotany is well developed in the URW in both Russia and China, with many texts and papers that inventory the hundreds of species of cultural and economic significance.

A third lesson deals with cooperation amidst major social differences. The development of the Ussuri Basin Plan is a landmark and historic event in breaking the bonds of cold-war relations and entering a new millennium of land use cooperation between Russia and China. The Plan marks the potential for a new era that begins to solve the difficult problems inherent in major cultural differences in land use traditions and resource use practices. Elsewhere, as in Canada and the U.S., an adversarial litigation system has often formed the basis for resolving differences in resource use expectations, such as the battles in western North America over timber rights and endangered species protection. However, we can look to the URW project for inspiration that such vast differences can be solved through peaceful, cooperative, and sustainable means.

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