

The Impact of Mining Activities on Mongolia's Protected Areas: A Status Report with Policy Recommendations

John D. Farrington*

Fulbright Fellow, Environmental Studies, Bishkek, Kyrgyzstan

(Received 5 October 2004; Accepted 5 February 2005)

ABSTRACT

Mongolia's protected areas cover 20.5 million ha or 13.1% of its national territory. Existing and proposed protected areas, however, are threatened by mining. Mining impacts on Mongolia's protected areas are diverse and include licensed and unlicensed mineral activities in protected areas, buffer zone disturbance, and prevention of the establishment of proposed protected areas. Review of United States, Canadian, and Australian policies revealed 9 basic approaches to resolving conflicts between protected areas and mining. Four approaches suitable for Mongolia are granting land trades and special dispensations in exchange for mineral licenses in protected areas; granting protected status to all lapsed mineral licenses in protected areas; voluntary forfeiting of mineral licenses in protected areas in exchange for positive corporate publicity; and prohibiting all new mineral activities in existing and proposed protected areas. Mining is Mongolia's most important industry, however, and the long-term benefits of preserving Mongolia's natural heritage must be considered and weighed against the economic benefits and costs of mining activities.

Keywords: Mongolia Protected areas Mining Environment Policy

INTRODUCTION

Mongolia has what is arguably the world's longest tradition of environmental protection, dating back to Chinggis Khan's 13th century legal code, the "Ikh Zasag." This code of law forbade, among other things, the pollution of water and the destruction of soil, the protection of both resources being critical in the pastoral-centric, steppe empire (Jargalyn 2001; Khamaganova 2001). Mongolia also has one of the world's oldest traditions of establishing protected areas, originating with the 3 sacred mountains of Chinggis Khan. Furthermore, Mongolians consider themselves to be founders of the world's 1st national park, established in 1778 with the formal ban on hunting and logging at Bogdkhan Mountain near Ulaanbaatar. In 1818, similar bans were declared at Otgontenger and Bulgan Mountains (Enebish and Myagmarsuren 2000).

Present-day Mongolia is uniquely situated at the convergence of the Gobi Desert, Central Asian Steppe, and Siberian Forest biomes. Because Mongolia's national borders enclose all 3 of these major Central Asian ecological zones, Mongolia has what may be the highest biodiversity of any of the Central Asian nations. Continued preservation of Mongolia's high level of biodiversity is important not only for Mongolia but for the ecological heritage of all of Central Asia because Mongolian species may one day be needed to repopulate fauna and flora that have become locally extinct elsewhere in the region. Such species include the world's last free-roaming populations of wild Bactrian camels and Takhi horses, the world's largest salmonid—the Siberian taimen—and large populations of snow leopards and other threatened mammals, birds, and fish (Finch 1996). The need to preserve Mongolia's biodiversity has long been recognized by the national government, and led Mongolia's delegation to the 1992 United Nations' "Earth Summit" in Rio de Janeiro, Brazil, to propose that the entire nation of Mongolia be declared a

biosphere reserve (MNE 1997). Although in subsequent years a more pragmatic approach to biodiversity conservation has emerged, Mongolia has remained committed to becoming an international model for nature conservation, particularly through its present program to more than double the total area of the nation's protected lands.

Mongolia has created new protected areas incrementally since 1950; however, with the introduction of a democratic system of government in 1990, the rate at which new protected areas have been created has increased rapidly. Since 1992, the total number of Mongolia's protected areas has grown from 19 areas, covering 5.6% of national territory, to 48 areas, covering 20.5 million ha or 13.1% of national territory (MNE 1997; Enebish and Myagmarsuren 2000). In the mid-1990s, the government committed itself to further increasing the total area of Mongolia's protected lands to 30% of national territory by the year 2030 (Enebish and Myagmarsuren 2000). Today, the national-level protected areas include 4 types of reserves: National Parks, Strictly Protected Areas (SPA, wilderness), Nature Reserves, and Natural, Cultural, and Historical monuments.

Mongolia's remoteness, low population density, and traditional nomadic herding culture have, no doubt, played a large part in preserving high levels of biodiversity until the present day. However, in direct conflict with the campaign to preserve Mongolia's unusually high biodiversity through an extensive network of protected areas is the simultaneous rapid expansion of Mongolia's mining industry. Following the break up of the Soviet Union and collapse of the Soviet Bloc markets for Mongolia's animal products industries, mining has become Mongolia's most important industry, and the nation's single, most reliable source of revenue. Over the 10-y span from 1993 to 2003, annual growth of the mineral sector in Mongolia has ranged from 8 to 12%, while cold output of mineral ores has increased 15 times in that period (Jargalsaikhan 2004).

In 2003, Mongolia's mineral sector accounted for 8.6% of gross national product and 66% of exports (Jargalsaikhan 2004).

* To whom correspondence may be addressed doeage@excite.com. The current address of J.D. Farrington is P.O. Box 117, Wilbraham, MA 01095, USA.

With Mongolia's foreign debt already at 75% of gross national product and growing yearly (Oyunbayar 2000), mineral exports will continue to be one of the nation's most important sources of revenue for decades to come, and the government actively sends representatives to international mining trade fairs to encourage foreign mining companies to set up operations in Mongolia. Major new mines in the process of being developed include the Boroo Gold Mine, a hard-rock mine located in northern Mongolia's Lake Baikal watershed, and the Oyu Tolgoi Copper Mine, located near the Chinese border in Omnogobi aimag, which will export copper ore directly to China and, by itself, greatly increase Mongolia's mining revenues.

Today, mineral exploration and extraction licenses cover vast swaths of the Mongolian steppe, totaling 50.3 million ha or 32.3% of Mongolia's national territory (Jargalsaikhan 2004; a map of mineral licenses and protected areas is available at www.mram.mn/map.html). However, the present rapid push to exploit mineral wealth throughout the whole of Mongolia threatens many of Mongolia's existing and proposed protected areas. Ironically, the same vast mountainous landscapes that have been refuges for disappearing Central Asian fauna and flora for centuries, and which provide the backdrop to some of Mongolia's most spectacular scenery, are also treasure troves of largely unexplored mineral wealth. With the simultaneous rapid expansion of both Mongolia's system of protected areas and Mongolia's mining industry, numerous conflicts between mines and protected areas have arisen.

This article examines the interaction between Mongolia's ascendant mining industry and the efforts being made to preserve portions of Mongolia's ecosystems, followed by an overview of American, Canadian, and Australian policies on mines and protected areas and their applicability to Mongolia. Throughout the past decade, the initial balance struck by the newly democratic Mongolian government between conservation and natural resource extraction has shifted in favor of the latter. As the recently elected government begins to deliberate on issues of mining and environmental protection, this is an opportune moment to review lessons learned by other countries with long experiences in these matters. It is hoped that this brief overview of the situation will stimulate debate on this issue and provide insight needed for sound policy formation.

CURRENT STATUS OF MINING ACTIVITIES IN MONGOLIA

Mining impacts on Mongolia's protected areas are diverse and include the following:

- Unlicensed, and therefore illegal, mineral exploration and mining in remote sections of protected areas;
- Disturbance of protected-area buffer zones by licensed mining activities, adversely affecting threatened species that migrate through these areas;
- Existence and continued issuance of mineral licenses partially or wholly within protected areas in violation of relevant laws;
- Existing mineral licenses that prevent establishment of proposed protected areas; and
- Proposing areas for protection encourages mineral exploration in these areas because Mongolia places no moratorium on the issuance of mineral licenses in areas proposed for protection.

Stories of mining impacts on protected areas abound but are largely anecdotal in nature because there is a great deal of fear of formally reporting such matters. One high-profile example includes unlicensed incursions by at least 1 mining company and numerous artisanal miners into the Khan-Khenti SPA along its remote eastern border. A well-known example of buffer zone disturbance affecting a protected area is illustrated by the large number of placer gold mines that operate along the rivers originating on the west slopes of the Khan Khenti SPA, which adversely affect the migration routes of threatened Siberian taimen in the area and also destroy the species' spawning grounds. Proposed expansion of the Khan Khentii SPA has been blocked for years by the existence of these same placer mines, while other mineral licenses continue to block creation of protected areas in the Darkhat Depression, west of Lake Hovsgol. One incident reported in the state-owned press involved a group of 77 gold miners fined 840,000 tugriks (~U.S. \$760) for illegally setting off explosives, extracting up to 340 kg of gold, and destroying 335 ha of land inside the Small Gobi SPA (Mongol Messenger 2004).

Analysis of the Mineral Resources Authority of Mongolia mineral license map for the second quarter of the year 2000 revealed 3 mining licenses and 4 mineral exploration licenses located in protected areas, licenses which were issued after these areas had been declared protected, in clear violation of the Mongolian Law on Protected Areas. An additional 11 mineral licenses that predated protected-area designation were located in the protected areas (MNE 1996; Farrington 2001a).

CURRENT STATUS OF LAND PRESERVATION ACTIVITIES IN MONGOLIA

Although the Mongolian Law on Protected Areas expressly prohibits mineral exploration and extraction activities in protected areas, the agency that creates a protected area with preexisting mineral licenses within its boundaries, in most cases the Ministry of Nature and the Environment, is responsible for extinguishing these licenses by compensating license holders for their losses. However, the ministry receives no special funds from the central government for this purpose, and is, therefore, unable to extinguish mineral licenses that lie within the boundaries of newly protected areas.

In general, the protected-area system is severely underfunded, preventing adequate patrol and law enforcement in protected areas. Protected-area ranger salaries are typically U.S. \$20 to \$30 per month, forcing rangers to spend much of their time raising livestock to make ends meet, rather than patrolling parks. Most rangers have no education beyond the 8th grade, no vehicles or radios, are not authorized to carry weapons while engaged in law enforcement activities, and receive no special training concerning mineral resource issues. Consequently, protected areas are poorly patrolled, and regulations are not systematically enforced, permitting violators to engage in illegal activities in protected areas with relatively little risk. Given their meager salaries, there is also, clearly, the potential for corruption of park rangers. All of which contributes to frequent violations of protected-area regulations concerning mineral activities.

Even proposing a protected area in Mongolia is problematic because, through a legislative oversight, there is no moratorium on the issuance of mineral licenses in areas proposed for protection. Mongolian mineral exploration licenses are inexpensive (U.S. \$0.05 · ha⁻¹ in the 1st y), making it possible for

mining firms and speculators to legally obtain all future mineral rights to a proposed protected area for as little as several thousand dollars (Farrington 2001b).

Whereas the examples cited above illustrate the variety of problems the mining sector directly poses to Mongolia's protected areas, probably the largest, recent threat to the protected-area system from mining has come from within the government itself. Although the national government has a long-standing commitment to protect 30% of the national territory, in June 2002, the Ministry of Nature and the Environment proposed deprotecting 434,000 ha of land in 10 protected areas. At the same time, the Mineral Resources Authority of Mongolia proposed deprotecting an additional 1.5 million ha of land in 8 protected areas, in total nearly 10% of Mongolia's existing protected-area system. Both proposals were made primarily so that these lands could be opened to mining activities (UNDP 2001). Although these motions were rejected by a parliamentary vote in late 2002, just 1 y later, in December 2003, a new proposal from within the government was put before parliament to deprotect 3.1 million ha, approximately 15% of Mongolia's protected-area system, in 4 different protected areas—the Great Gobi SPA, Small Gobi SPA, Mongol Daguur SPA, and Onon Balj National Park—so that these lands could be opened to mineral activities (Bulgamaa 2004). In justification of the proposal, the resolution noted that illegal mining activities were already widespread within these protected areas and implied that deprotecting them would bring mineral activities within the law. This motion was also rejected in January of 2004 by the Mongolian parliament's Standing Committees on Economic Protection and Environment and Rural Development.

LESSONS LEARNED FROM AMERICAN, CANADIAN, AND AUSTRALIAN PROTECTED-AREA POLICY

The mining versus protected areas debate is a relatively new topic in Mongolia. Precedents for resolving conflicts between parks and mines can be found in the long experience of resolving these issues in the United States, Canada, and Australia, which, like Mongolia, have vast areas of sparsely populated lands rich in mineral wealth.

The degree of centralization of policymaking concerning protected areas varies widely between the United States, Canada, and Australia. In the United States, federal protected areas cover about 11.5% of national territory and are managed by the National Park Service, the Forest Service, the Bureau of Land Management, and the Fish and Wildlife Service, all under the administration of the U.S. Department of the Interior (Farrington 2001a). In Canada, only about 3% of territory is currently protected at the national level in the form of National Parks and Wildlife Sanctuaries administered by Parks Canada and the Canadian Wildlife Service, respectively (Parks Canada 2000). However, there is an overall national goal of eventually protecting 12% of national territory, 8% of which will be protected in an extensive, decentralized system of provincial parks (Parks Canada 1994; Parks Canada 2000). Of the 3 nations, however, Australia has, by far, the most decentralized, protected-area system. Although 8% of Australia's national territory is protected, terrestrial protected areas administered directly by the commonwealth parks agency, Parks Australia, constitute only 0.3% of national territory, all located in Australia's Northern Territory (Cresswell and Thomas 1997; ABS 2001). Con-

sequently, in Australia, it is left to provincial governments to independently declare and administer national parks in their jurisdictions, and today, there are 449 provincially designated and managed national parks (Cresswell 1997). Not surprisingly, this degree of decentralization has led to sharp differences in national park mineral policies among Australia's provinces.

To obtain a broad perspective of the wide variation in mining and protected-area policies extant today, the author examined not only the national level policies of the United States, Canada, and Australia but also the protected area and mining policies of the provinces of British Columbia, New South Wales, and Western Australia. Relevant policy information was obtained from documents, laws and regulations, websites, and e-mailed comments provided by the following organizations: U.S. National Park Service, U.S. Forest Service, U.S. Fish and Wildlife Service, U.S. Bureau of Land Management, Environment Canada, Parks Canada, Canadian Wildlife Service, BC Parks, Environment Australia, New South Wales National Parks and Wildlife Service, New South Wales Department of Mineral Resources, and Western Australia Department of Conservation and Land Management.

Although terminology varied greatly, 9 basic approaches to resolving conflicts between mining and protected-area interests were identified (Farrington 2001a):

- Approach 1: Prohibit all new mineral activities in existing and proposed protected areas.
- Approach 2: Eliminate mineral claims in existing and proposed protected areas through land trades.
- Approach 3: Immediately grant protected status to expired mineral claims within or adjacent to existing protected areas.
- Approach 4: Eliminate mineral claims in existing and proposed protected areas through voluntary forfeiture in exchange for positive corporate publicity.
- Approach 5: Eliminate mineral claims in existing and proposed protected areas through fair compensation for a mining firm's investment in a claim.
- Approach 6: Make mineral claims of marginal profitability within protected areas unprofitable by placing prohibitively rigorous environmental protection requirements on them.
- Approach 7: Temporarily draw boundaries of new protected areas to exclude mineral claims, possibly creating "islands" of unprotected land within protected areas. However, subject mineral activities in these unprotected zones within or adjoining protected areas to the strictest environmental controls, and only permit the activity if it is thought that it can be conducted without compromising the purposes for which the protected area was created. Immediately reclaim mined areas and incorporate them into the protected area.
- Approach 8: Permit exploration and mining on valid, preexisting mineral claims within protected areas, but at all times, treat these mineral claims as integral parts of the protected area. However, subject mineral activities on claims within protected areas to the strictest environmental controls, and only permit the activity if it is thought that it can be conducted without compromising the purposes for which the protected area was created. Immediately reclaim mined sites.
- Approach 9: Leave all protected areas open to mineral exploration and mining subject to government approval.

APPLICABILITY OF DIFFERENT LAND MANAGEMENT ALTERNATIVES TO MONGOLIA

Approach 1

Approach 1—prohibiting new mineral activities in existing protected areas—is a fairly standard international practice whereby the purposes of protected areas and mining operations are viewed as being incompatible (Wilderness Act 1964; WSR 1968a; NPWA 1974; ERA 1996; Park Act 1996; NPGR 1999; CFR 2004a). This approach is required by Mongolian law in existing protected areas (LSPA 1994). Prohibiting new mineral activities in proposed protected areas is a practice that has been used in the United States, notably on federal lands in Alaska and for rivers proposed for inclusion in the National Wild and Scenic River System (WSR 1968b; W. Brown, Park Planning and Special Studies Section, U.S. National Park Service, personal communication). Currently, the prohibition on new mineral licensing does not cover proposed protected areas in Mongolia, however, it should be extended to areas proposed for protection to prevent mineral speculation in these areas while the proposal is under study. If the mining prohibition were extended by law to proposed protected areas and uniformly enforced, it could be an effective, low-cost way of preventing new conflicts from arising between mining and protected areas in Mongolia.

Approach 2

Approach 2—eliminating mineral licenses in protected areas through land trades—has been used successfully in the United States and could be an ideal method for eliminating mineral licenses in both existing and proposed protected areas in Mongolia (Humphries 1996; Stanton 1999). In Mongolia, lands of high mineral resource potential for land exchanges could come from the license areas of defunct mining operations, from license areas confiscated from delinquent operations that fail to pay taxes or meet other legal obligations, or from the numerous unlicensed sites that have been studied by the state geological survey and are known to have economically significant mineral deposits. Land trades could also be combined with other special dispensations, such as tax breaks, to provide a relatively low-cost way of resolving conflicts between mining and protected areas in Mongolia. Land exchanges would also have the added benefit of keeping international firms from taking their operations outside the nation.

Approach 3

Approach 3—protecting expired mineral claims in protected areas that have been forfeited by failure to file required fees or paperwork—is a common practice on lands that conservation agencies wish to incorporate into preexisting protected areas (Mining 1976a; USNPS 1995; T. Vold, BC Parks, Land Use Coordination Office, Victoria, Canada, personal communication; C. Mondor, area identification, Park Establishment Branch, Parks Canada, Gatineau, Quebec, personal communication). Legislation could make this change of status automatic in Mongolia and would prevent reselling of rights to a license area, providing a potentially free method for eliminating mineral licenses in Mongolian protected areas.

Approach 4

Approach 4—voluntary forfeiture of mineral licenses in protected areas in exchange for positive corporate publicity—is a method of eliminating mineral licenses in existing and

proposed protected areas that can be brought about by both government and public pressure on mining firms (Stanton 1999; C. Mondor and P. Gregoire, Environmental Conservation Branch, Canadian Wildlife Service, Environment Canada, Prairie and Northern Region, Edmonton, Alberta; personal communication). Voluntary forfeiture can not only improve a company's environmental image and public relations but also increase public awareness of environmental issues concerning mining. Approach 4 is potentially a good option for both the government and mining firms in Mongolia, which could resolve protected area and mining conflicts at virtually no cost to the government. However, at present there is very little pressure on mining firms in Mongolia to improve their environmental performance from either the government or citizens groups, and hence, little motivation for firms to voluntarily relinquish potentially valuable mining licenses (Farrington 2000, 2001a). This is particularly the case with the numerous small, local mining companies that operate in Mongolia.

Approach 5

Approach 5—direct compensation for mineral licenses in protected areas—is a method frequently used by developed nations to eliminate mining claims in existing and proposed protected areas (Stanton 1999; C. Mondor and T. Vold, personal communication). However, compensation is typically limited to a mining firm's investment in a mineral claim area and does not cover the speculative value of undeveloped mineral resources in the claim area (C. Mondor, personal communication). At present, this method should be considered unimplementable in Mongolia simply because there are no public funds available for costly settlements with mining companies in a nation in which a large percentage of the population lives below poverty line, and many communities don't even have such basic services as running water and electricity (UNDP 2004). Furthermore, before this method could be successfully implemented in Mongolia, a prohibition on placement of mineral licenses in proposed protected areas would have to be legislated to prevent speculators obtaining mineral licenses on these lands solely to obtain compensation funds.

Approach 6

Approach 6—making marginal mineral claims in protected areas unprofitable—is an indirect strategy for eliminating mineral licenses that results from enforcing implementation of the sometimes costly environmental protection measures needed to safeguard the ecological integrity of a protected area. Although the intent of this approach is not to shut down mining operations with valid mineral rights within protected areas, this is sometimes the result as companies reevaluate the economics of implementing necessary environmental protection measures and choose to move their operations elsewhere (P. Gregoire, personal communication). In the United States, these measures can include restricting access routes to a claim, requiring that a claim area be restored to the equivalent of its pristine beauty, and requiring that all grey water and other waste be hauled out (Stanton 1999; CFR 2004b). Although Approach 6 might at first seem to be a good option for Mongolia, in practice, even ordinary standards for environmental management of mining activities are largely unenforceable in Mongolia at this time, let alone the more rigorous standards that would be needed to safeguard the ecological

integrity of protected areas (Farrington 2000, 2001a). As discussed above, protected-area staff simply do not have the training or support to develop and enforce implementation of such environmental protection measures. Consequently, Approach 6 should be considered unimplementable in Mongolia at this time.

Approaches 7 and 8

Approaches 7 and 8, like Approach 6, permit mineral activities on preexisting mineral claims within protected areas but place rigorous environmental protection requirements on these activities, over and above those that would occur in an unprotected area. Approach 7—drawing boundaries of new protected areas around mineral claims but increasing the level of environmental protection required on these claims—is generally used when establishing new protected areas in areas of high mineral resource potential. In these situations, it is believed that the protected area and mining operation can coexist without seriously compromising the purposes for which the protected area was created. The boundaries of the new protected area are drawn around the mineral deposit, excluding it from the park until such time as the license has expired, presumably after mining has been completed. Upon expiration of the mineral license, it is expected that the license area will be immediately incorporated into the protected area (Johnston and Needham 1999; Johnston and Prendergast 1999; C. Mondor, personal communication; T. Vold, personal communication; J. McGlynn, New South Wales Department of Mineral Resources, Sydney, Australia, personal communication). In some instances, a mineral discovery actually spurs creation of a new protected area where mining is permitted on claim areas excluded from the protected zone (Johnston and Needham 1999; Johnston and Prendergast 1999).

Approach 8—permitting preexisting mining claims in protected areas but increasing the level of environmental protection required on these claims—is a strategy used in the United States on relict claims that have yet to expire within both long-established and newly protected areas. In these situations, a mineral claim is treated as an integral part of the protected area, and protected-area administrators, such as the National Park Service, are given full authority to determine the environmental protection measures a mining operation must take to continue operating on the claim without compromising the purposes for which the protected area was created (Mining 1976b). As discussed in Approach 6, these environmental protection measures can be extremely rigorous (USFWS 1996; Stanton 1999; CFR 2004b). The intent of this management approach is to fully protect and incorporate mineral claims into protected areas immediately upon their expiration.

Approaches 7 and 8 also appear to be good options for Mongolia, however, for reasons discussed in Approach 6, effective enforcement of required environmental protection measures on preexisting mining claims in Mongolia's protected areas is not possible at this time. Even when attempts at enforcement are made, fines for violation of environmental regulations in protected areas are extremely small and do little to motivate miners to fulfill their environmental obligations (Mongol Messenger 2004).

Approach 9

Approach 9—leaving all protected areas open to negotiation for mining activities—was found to be a policy unique to

Western Australia in this survey, and a policy at odds with those of many national and provincial governments (Batini 1996, 1997). Mongolia already has a large problem with miners operating in and around national-level protected areas and opening up all protected areas to potential mining opportunities would no doubt be counterproductive to conservation efforts in the nation. However, even with the most permissive protected-area mining policy, the government of Western Australia still requires an environmental impact assessment conducted by the provincial Environmental Protection Authority, approval of the provincial Ministers for the Environment and Mines, and approval of both houses of the Western Australian parliament before mining activities in protected areas can be conducted. When permitted, these activities are largely restricted to border regions of protected areas and are held to higher standards of environmental protection than mines on unprotected lands (Batini 1997). Given the present inadequate enforcement of Mongolia's environmental regulations concerning mining and the large potential for abuse of such a policy, adoption of Approach 9 in Mongolia is not recommended.

CONCLUSIONS

Of the 9 identified approaches to resolving conflicts between protected areas and mining activities, only 4 approaches appear suitable for Mongolia at this time: Approach 1, prohibiting all new mineral claims in existing and proposed protected areas; Approach 2, granting land trades in exchange for mineral licenses in existing and proposed protected areas; Approach 3, immediately granting protected status to all expired mineral claims within protected areas; and Approach 4, voluntary forfeiture of mineral claims in existing and proposed protected areas in exchange for positive corporate publicity. The primary advantages of Approaches 1 through 4 for Mongolia are that they can all be implemented with minimum expense to the national government.

Approach 5, direct compensation for mineral claims in existing and proposed protected areas, will not be feasible in Mongolia at any time in the near future because of the nation's burgeoning national debt, which leaves no public funds available for costly settlements with mining companies (Oyunbayar 2000).

Approach 6, making mineral claims unprofitable by requiring rigorous environmental protection measures; Approach 7, redrawing boundaries of new protected areas around mineral claims but increasing the level of environmental protection required on these claims; and Approach 8, permitting preexisting mining claims in protected areas but increasing the level of environmental protection required on these claims, could all be implemented in Mongolia in the near future but would require a large, new environmental inspection staff for the protected areas. These staff members would have to be trained, equipped, and given adequate financial and legal support for these 3 approaches to be effective.

Approach 9, leaving all protected areas open to mineral exploration and mining subject to government approval, is an approach that has a large potential for abuse in Mongolia because it could simply legislate the current status quo, in which many protected areas already have problems with miners operating within their boundaries. This approach has a large potential to erase many of the gains made by Mongolian conservationists over the past 13 y and should be discouraged.

Management recommendations

After analysis of the above policies concerning protected areas and mining, 4 policies are proposed for resolving conflicts between mining activities and protected areas in Mongolia:

1. Place an immediate moratorium on issuance of new mineral licenses in protected areas and areas proposed for protection and increase patrols to prevent unlicensed mineral activities in these areas.
2. Hold mineral exploration and extraction activities legally operating within protected areas or their buffer zones to far higher environmental standards than mines operating outside protected areas, as determined on a case-by-case basis. Costs of intensive monitoring and inspection of these sites should be paid for by the licensed mining entity involved.
3. Immediately grant protected status to all expired mineral licenses within existing and proposed protected areas and prohibit all resale or transfer of mineral licenses in these areas.
4. Promote land trades for mineral licenses on unprotected lands in combination with special dispensations, such as tax breaks, as the ideal way of eliminating mineral licenses within existing and proposed protected areas in Mongolia.

SUMMARY

At present, mining is the Mongolian government's single most important source of tax revenue, and the stability of the nation's economy will be dependent on the mining industry for decades to come. However, if Mongolia's protected areas are to function as intended and achieve their objective of preserving the nation's environmental resources for the benefit of future generations of Mongolians, relevant laws concerning protected areas and mining must be enforced, and views of all concerned stakeholders must be heard when considering mining activities in or near protected areas.

Mongolians are proud of their nation's 800-y-old tradition of protecting their environment, and during the 1990s, the government of Mongolia made the bold step of committing itself to increasing the total area of protected lands to 30% of the nation's territory by the year 2030. If Mongolia succeeds in achieving this goal, it would make the nation a global leader in nature conservation and would also make a large contribution toward fulfilling the International Union for the Conservation of Nature's target of protecting 10% of each of the world's major biomes. However, with the rise of the mining industry in Mongolia conflicts between mines and protected areas are steadily increasing. In many cases, the cost to repair the ecological damage caused by mining to existing or proposed protected areas will probably exceed the economic benefits derived from the mines themselves, particularly in the case of the numerous small, inefficient mines operating in Mongolia today.

Regrettably, progress on expansion of Mongolia's protected-area system virtually ceased from 2000 to 2004. However, with political changes following the June 2004 parliamentary election, it is possible that progress will once again be made in establishing new protected areas. With a broader view as to the long-term benefits of preserving Mongolia's natural heritage in an undisturbed state, it is possible to envision an economy diversified to generate revenues not only from mining but also from sustainable use of the nation's remarkable scenic and biological heritage.

Acknowledgement—The author would like to thank the U.S. Peace Corps—Ulaanbaatar and the Mineral Resources Authority of Mongolia for supporting this study.

REFERENCES

- [ABS] Australian Bureau of Statistics. 2001. AusStats. www.abs.gov.au/Ausstats. Accessed January 2001.
- Batini F. 1996. Briefing notes—Development of mining policy in national parks in 1981–1996. Perth, Australia: Environmental Protection Branch, Western Australia Department of Conservation and Land Management.
- Batini F. 1997. Multiple and sequential use—A land manager's viewpoint on mining and conservation. Perth, Australia: Environmental Protection Branch, Western Australia Department of Conservation and Land Management.
- Bulgamaa B. 2004. Government bid to release protected land squelched by opposition. *The UB Post*, 8 January. Ulaanbaatar, Mongolia.
- [CFR] Code of Federal Regulations. 2004a. Title 36—Parks, Forests, and Public Property. Chapter 1—National Park Service, Department of the Interior. Part 2—Resource Protection, Public Use and Recreation. Subpart 2.1, Section a, Subsection 1(iv). www.access.gpo.gov/nara/cfr/waisidx_04/36cfr2_04.html. Accessed 3 April 2005.
- [CFR] Code of Federal Regulations. 2004b. Title 36—Parks, Forests, and Public Property. Chapter 1—National Park Service, Department of the Interior. Part 9—Minerals Management. www.access.gpo.gov/nara/cfr/waisidx_04/36cfr9_04.html. Accessed 3 April 2005.
- Cresswell ID, Thomas GM. 1997. Terrestrial and marine protected areas in Australia. Canberra: Biodiversity Group, Environment Australia.
- [ERA] Ecological Reserve Act of 1996. Chapter 103, Section 5, Subsection 1. British Columbia, Canada. www.qp.gov.bc.ca/statreg/stat/E/96103_01.htm. Accessed 15 January 2005.
- Enebish D, Myagmarsuren D. 2000. Special protected areas of Mongolia. Ulaanbaatar, Mongolia: Environmental Protection Agency. 102 p.
- Farrington J. 2000. Environmental problems of gold mining in the Zaamar goldfield, Mongolia. *World Placer Journal* 1(1):107–128. www.mine.mn/WPJ1_5_environment.htm. Accessed 17 January 2005.
- Farrington J. 2001a. A report on conflict between mining and special protected areas in Mongolia with models for conflict resolution from the United States, Canada, and Australia. Ulaanbaatar: Mineral Resources Authority of Mongolia.
- Farrington J, editor. 2001b. Mongolia: Discovering new mineral opportunities in the country of Genghis Khan. Ulaanbaatar: Mineral Resources Authority of Mongolia.
- Finch C. 1996. Mongolia's wild heritage: Biological diversity, protected areas, and conservation in the land of Chinggis Khan. Ulaanbaatar, Mongolia: United Nations Development Program. 40 p.
- Humphries M. 1996. New World Gold Mine near Yellowstone National Park: A project abandoned. Report for Congress. Congressional Research Service. Washington, DC. www.ncseonline.org/nle/crsreports/mining/. Accessed 15 January 2005.
- Jargalsaikhan D. 2004. Investing in Mongolian mineral sector. Presentation made at the Mongolia Investment and Business Forum. 22 October. www.mram.mn/english.htm. Accessed 17 January 2005.
- Jargalyn E. 2001. The Mongolian culture of nature reserve: The reasons for its continuance and the challenges it is facing. *Bulletin of the International Association of Mongol Studies*.
- Johnston A, Needham RS. 1999. Protection of the environment near the Ranger Uranium Mine. Canberra: Environment Australia.
- Johnston A, Prendergast JB. 1999. Assessment of the Jabluka Project: Report of the supervising scientist to the World Heritage Committee. Canberra: Environment Australia.
- Khamaganova E. 2001. Understanding Ikh Zasag from the sustainable development perspective. *Bulletin of the International Association of Mongol Studies*.
- [LSPA] Law on Special Protected Areas of 1994. Mongolia. Article 12, Section 1. Article 18, Section 1. Article 21, Section 2. Article 24, Section 2. In: *Mongolian Environmental Laws*. 1996. Ulaanbaatar: Mongolian Ministry of Nature and the Environment. 152 pp.
- [Mining] Mining in the Parks Act of 1976. 1976a. Public Law 94-429, Section 8; 16 United States Code 1901–1912. uscode.house.gov/download/pls/16C39.txt. Accessed 11 January 2005.
- [Mining] Mining in the Parks Act of 1976. 1976b. Public Law 94-429, Section 2; 16 United States Code 1901–1912. uscode.house.gov/download/pls/16C39.txt. Accessed 11 January 2005.

- [MNE] Ministry of Nature and the Environment. 1997. Biodiversity conservation action plan. Ulaanbaatar, Mongolia.
- Mongol Messenger Editors. 2004. Mining in special protection zones halted. *Mongol Messenger* 15:15 April 2004. www.mongolmessenger.mn/issue/040415.php. Accessed 2 January 2005.
- [NPGR] National Parks General Regulations. 1999. Regulation SOR/78-213, Section 10. Canada. laws.justice.gc.ca/en/N-14.01/SOR-78-213/text.html. Accessed 15 January 2005.
- [NPWA] National Parks and Wildlife Act of 1974. 1974. 80:41; 1–2. New South Wales, Australia. www.legislation.nsw.gov.au/viewtop/inforce/act+80+1974+FIRST+0+N. Accessed 15 January 2005.
- Oyunbayar N. 2000. The growing threat of foreign debt. *The UB Post*. No. 24(213). 16 June. Ulaanbaatar, Mongolia.
- Park Act of 1996. 1996. Chapter 344. Section 9, Subsections (1–7). British Columbia, Canada. www.qp.gov.bc.ca/statreg/stat/P/96344_01.htm. Accessed 15 January 2005.
- Parks Canada. 1994. Parks Canada guiding principles and operational policies. Section 2: Leadership and stewardship. www.pc.gc.ca/docs/pc/poli/princip/index_E.asp. Accessed 14 January 2005.
- Parks Canada. 2000. Canadian national parks overview. parkscanada.pch.gc.ca/np/english/nptxt_e.htm. Accessed January 2001.
- Stanton R. 1999. Director's order #41: Wilderness preservation and management. U.S. National Park Service. data2.itc.nps.gov/npspolicy/DOrders.cfm. Accessed 15 January 2005.
- [UNDP] United Nations Development Program. 2001. Mongolia's protected areas threatened. *UNDP News*. 21 November. www.un-mongolia.mn/index.php?name=News&file=article&sid=79. Accessed 17 January 2005.
- [UNDP] United Nations Development Program. 2004. Economic transition and poverty reduction: More than third of Mongolians live in poverty. *UNDP News*. 10 December. www.un-mongolia.mn/index.php?name=News&file=article&sid=309. Accessed 17 January 2005.
- [USFWS] U.S. Fish and Wildlife Service. 1996. Minerals and mining. FWM#: 253 Series: Natural and cultural resources management, Part 612: Minerals management. 29 April. policy.fws.gov/612fw1.html. Accessed 17 January 2005.
- [USNPS] U.S. National Park Service. 1995. Guide to national park service regulations governing mining claims. Sections B, C. Denver, Colorado: Geologic Resources Division. www2.nature.nps.gov/geology/mining/9a_guide.htm. Accessed 15 January 2005.
- [WSR] Wild and Scenic Rivers Act of 1968. 1968a. Public Law 90-542, Section 9, Subsection A(iii); 16 United States Code 1271–1287. www.nps.gov/rivers/wsract.html. Accessed 15 January 2005.
- [WSR] Wild and Scenic Rivers Act of 1968. 1968b. Public Law 90-542, Section 9, Subsection B; 16 United States Code 1271–1287. www.nps.gov/rivers/wsract.html. Accessed 15 January 2005.
- Wilderness Act of 1964. 1964. Public Law 88-577, Section 4, Subsection D(3); 16 United States Code 1121 (note), 1131–1136. www.wilderness.net. Accessed 14 January 2005.