Concept of the Proposed Project on Fire Management in High Conservation Value Forests of the Amur-Sikhote-Alin Ecoregion (Russian Federation)

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Strategic context and sector issues

Although fires are now commonly recognized as an important element of the natural ecosystem dynamics, they remain the single most important factor threatening Russia's forest resources and ecosystems, especially in Siberia and the Far East with their low population density and large distances, and need to be properly managed. The period of transition from centrally-planned to market-based economy in the 1990s and early 2000s has substantially weakened viability of the formerly strong and highly centralized system of forest management and conservation in Russia, including its fire management system that had been targeted at full fire suppression. The on-going economic and administrative reforms in the country aim to reorient public forest management functions towards a clearer separation of management and oversight activities, with transfer of a broader range of forest management responsibilities to long-term commercial users, including the private sector. This is being accompanied by an increased acceptance of market-driven voluntary compliance mechanisms, such as independent forest certification that requires improved controls over the legality of origin (chain-of-custody) of harvested wood and wood products and introduction of special management regimes in high conservation value forests (HCVF). The government agencies would instead focus on policy and regulatory development, oversight and enforcement, and apply a much stricter prioritization of public expenditures (using a more strategic land-use planning and forest resource use allocation). Redistribution of public forest management responsibilities between federal, regional and local levels of government – including in fire management – is another key element of the on-going reforms that is still being fine-tuned.

The Government of the Russian Federation has already realized the need to focus more strongly on fire prevention in its public financing priorities and, with a strong fiscal position over the last 3 years, it has started to allocate a separate and increasing budget line to fire prevention activities. It has also recognized the importance of ecological functions of natural fires and shifted from the previous policy of total fire suppression to a more modern policy of fire prioritization. All these changes were spelled out in the decisions a high-level international conference "New Approaches to Fire Management at an Ecoregional Level" jointly held by the Ministry of Natural Resources and the Bank in Khabarovsk in September 2003 and subsequently reflected in the new "Concept of Fire Management" that was adopted by the Federal Forestry Agency (FFA) in 2004.

These processes, however, have not yet been properly tailored to meet also the specific requirements of Russia's vast system of federally and locally protected areas that harbor globally important biodiversity and other conservation values. The system was substantially strengthened in 1997-2003 as a result of implementation of the GEF-financed Biodiversity Conservation Project and adoption of the National Biodiversity Conservation Strategy and Action Plan. However, the latest period of reorganizations in the government has left the system in a situation of instability and legal vacuum. As a result, special efforts are required to ensure that fire management in these non-commercial forests don't fall behind the improvements in mainstream fire management activities (which are already supported by a World Bank loan). Without such efforts, these forests will continue to be subject to increasingly severe threats of fires, which are predominantly of anthropogenic origin and spread without respect to administrative and land tenure boundaries. These issues have become particularly acute in the regions that are recognized as global biodiversity hotspots and feature a sizable

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concentration of protected areas, such as the Amur-Sikhote-Alin Ecoregion (ASAE) in the south of the Russian Far East.

Global significance of the Amur-Sikhote-Alin forest ecosystems: The Amur-Sikhote-Alin Ecoregion (including the Primorsky and Khabarovsk Krays and the Jewish Autonomous Oblast) is at a geographical crossroads. It covers an area of 567,000 km^2 (which is larger than any Western European country or Japan), extending 1,200 km from 42 to 54 degrees North. The region escaped glaciation during the last ice age. This feature, combined with the varied topography, with altitudes rising to 2000 meters and a monsoon rainfall pattern unusual for such a northerly area, has led to a uniquely varied pattern of vegetation. Boreal, temperate and sub-tropical populations of plants and animals thrive together, comprising an unusual assemblage of forest ecosystems.

Table 1. Protected Areas and Protection Forests in the Amur-Sikhote-Alin Ecoregion

	Total Land Area	Strict Reserves (Zapovedniks)		Partial Reserves and Other PA's		Areas of Traditional Land Use		Planned Protected Areas		Protection (1st Group) Forests	
	(1000 ha)	(1000 ha)	%	(1000 ha)	%	(1000 ha)	%	(1000 ha)	%	(1000 ha)	%
Khabarovski Kray	36,530.0	839.4	2.3	3,333.1	9.1	11,385.8	31.2	7,800.0	21.4	4,674.9	12.8
Primorsky Kray	16,590.0	684.3	4.1	1,397.8	8.4	407.0	2.5	2,900.0	17.5	3,115.2	18.8
Jewish AO	3,620.0	91.8	2.5	383.5	10.6	0.0	0.0	130.0	3.6	377.6	10.4
Ecoregion Total	56,740.0	1,615.5	2.8	5,114.4	9.0	11,792.8	20.8	10,830.0	19.1	8,167.7	14.4

The region has been classified by the World Wide Fund for Nature (WWF) as one of the "Global 200 Ecoregions". It includes 23 different forest formations and subformations, 150 forest types, over 200 tree and shrub species, and overall – about 2,000 species of vascular plants and an unusually rich fauna with about 20 species of amphibians and reptiles, over 250 species of birds, about 70 species of mammals, including the 'flagship' endangered species – the Amur tiger. Flora and fauna elements of the East Siberian, Okhotsk-Kamchatka, Manchurian and Hindo-Malayan origins share the same habitat in the unique broadleaved-coniferous forests of this ecoregion. The region includes forest ecosystems that have been almost totally destroyed in the neighbouring countries of China, Korea and Japan.

Although wildfire has always been a constituent element of the ecosystem cycle in the ecoregion, this natural cycle has been altered by decades of extensive forest logging, mining and other economic activities. The appeared large tracts of secondary forests with accumulated post-harvest wood debris are much more prone to accidental wild or human-induced fires, and therefore become conduits of more frequent fires to the adjacent natural forests. The frequency, size and intensity of forest fires in the ecoregion, and their damage to natural habitats and biodiversity, have increased dramatically over the last decades. Now over 80% of fires have anthropogenic origin. Catastrophic (massive) fires of the increased magnitude and with shortened return intervals now may lead to losses of up to 3-5% of the total forest cover in one year. As a result, forest fires now represent the gravest threat to the natural status and dynamics of the forest ecosystems and biodiversity.

Project development objective and key indicators

The objective of the proposed project is to strengthen conservation of critical, non-economically accessible forests of high conservation value in the Amur-Sikhote-Alin Ecoregion (ASAE) of the Russian Far East through the improved forest fire management, reducing frequency, size and intensity of catastrophic fires in the areas of the global conservation importance. The project would develop and implement policies and practices for the integrated management, monitoring and prevention of forest fires across boundaries within a landscape matrix of protected and non-protected forest areas of high conservation value (HCVF).
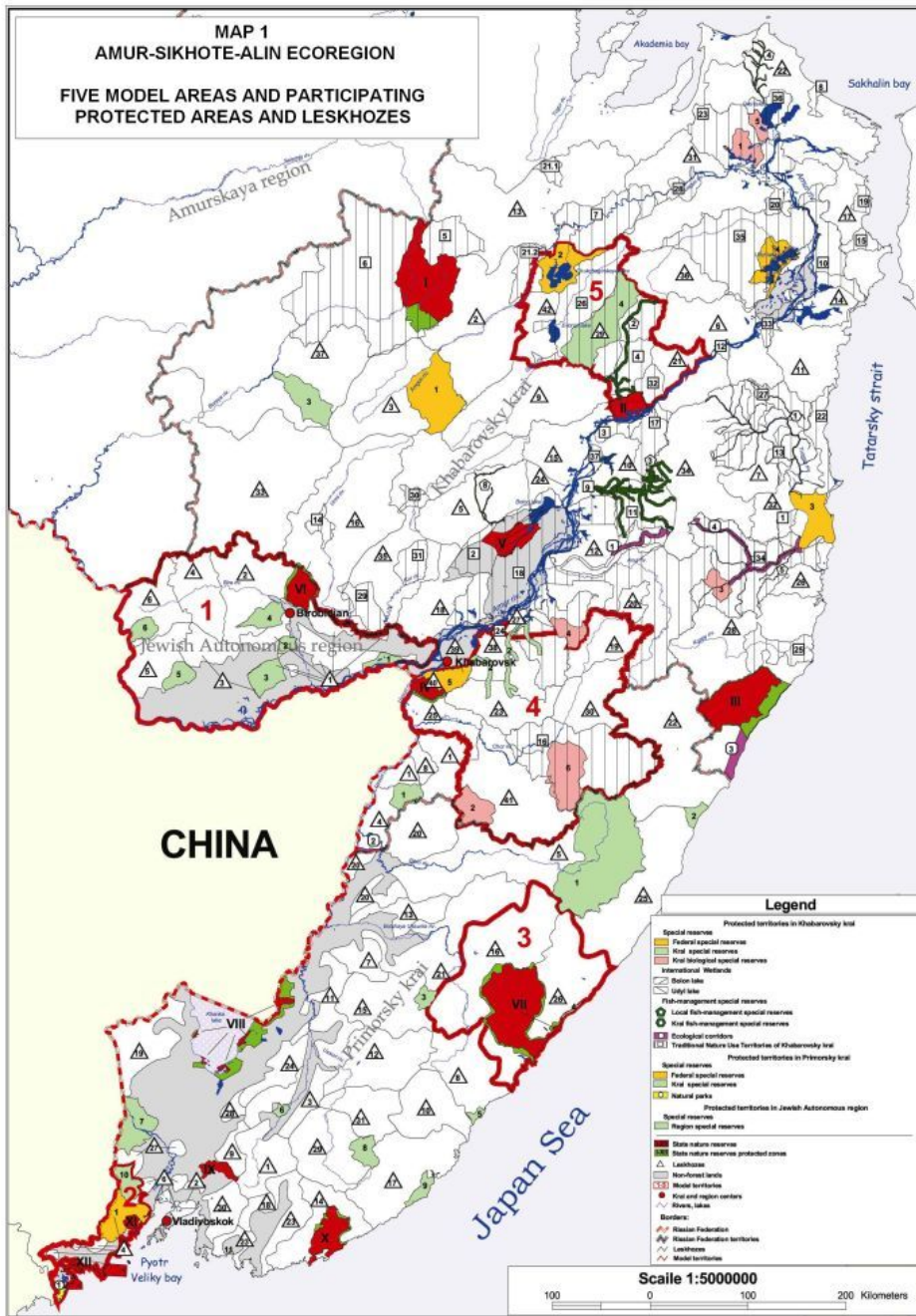
Figure 1: Map of the five model areas and participating protected areas and leskhozes in the Amur-Sikhote-Alin Ecoregion.

Achievement of this objective will be measured by:

(a) establishment of an ecoregion-wide integrated forest fire management system to include high conservation value forests (i.e. increase in the area of protection forests covered by the regional fire dispatch and monitoring system);

(b) increased effectiveness of fire management in high conservation value forests through strengthened regulatory framework and interdepartmental coordination, integrated ecosystem

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management, and increased capacities to address catastrophic fires and their consequences (i.e. reduction in average area burned per fire in model areas); and

(c) raised public awareness and support from the local population and communities to fire prevention and mitigation (i.e. increase in the number of equipped and trained volunteer fire groups and community participants in alternative land/ecosystem management programs).
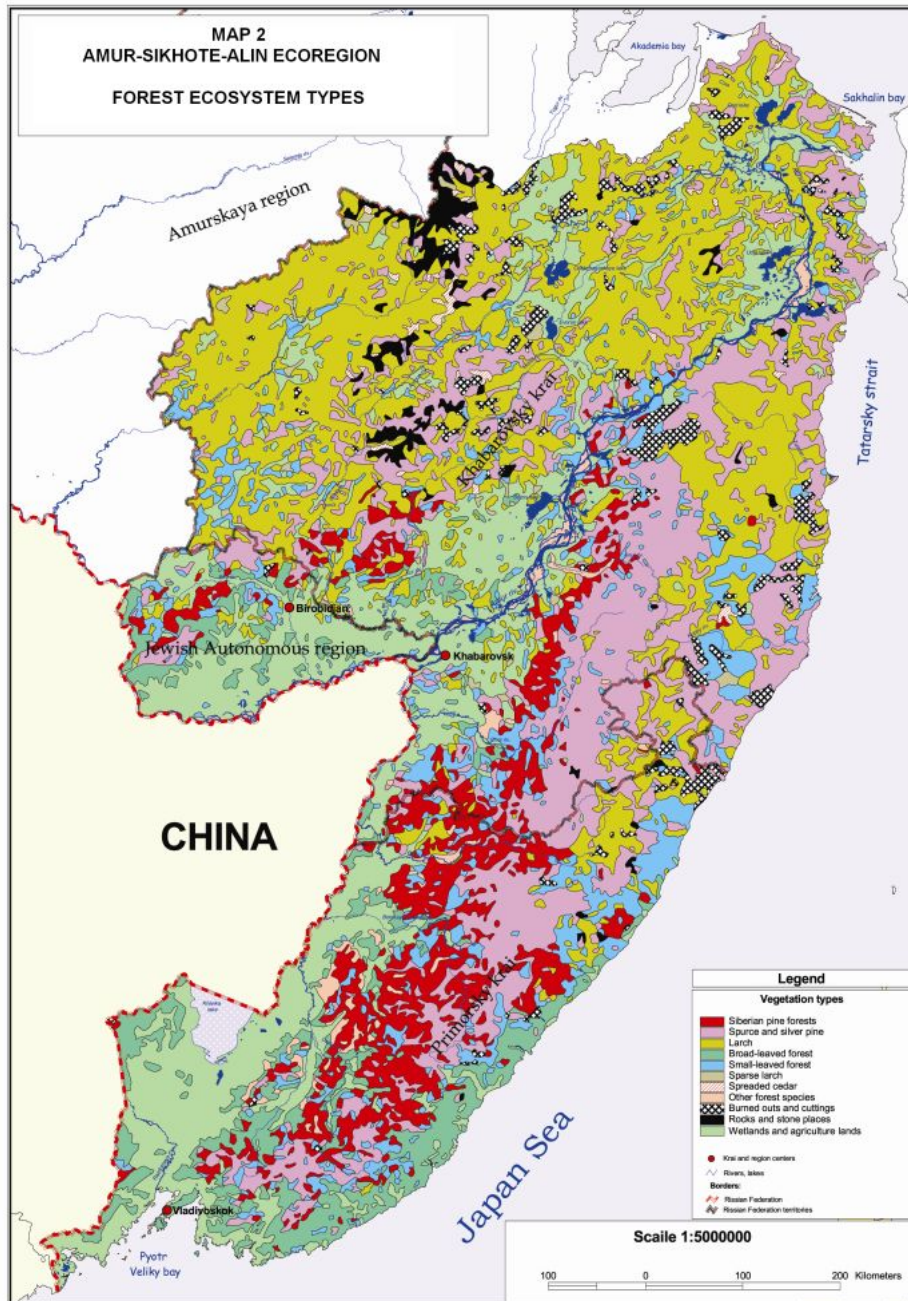

Figure 2: Map of the forest ecosystem types in the Amur-Sikhote-Alin Ecoregion.

Project components

The project will achieve its objectives by supporting improved fire management planning, training, community preparedness and emergency response activities in the selected high conservation value areas of the ASAE region in such a way that they could be subsequently replicated throughout the

Russian Far East (36% of Russia's forests) and in other comparable ecoregions across the country. The project will support:

(i)   fire risk analysis and zoning for the integrated system of command, control and communications in fire management aimed at preserving/restoring natural levels of biodiversity across the ecoregion;

(ii)   support development and implementation of new interagency regulations and standards for regional fire management, emergency fire management operations, and incorporation of forest and fire management as tools for preserving biodiversity in model areas; and

(iii)   increasing public, private sector and community understanding of, support for, and participation in fire and biodiversity management through a local initiatives program.

These activities will help reduce the adverse ecological and socio-economic impacts of catastrophic forest fires on the livelihoods of local communities, including indigenous populations. Furthermore, the project will help the Government fill important gaps in implementation of the on-going forest sector reform at federal and regional levels by developing and testing an adequate regulatory framework and monitoring system for management and protection of non-commercial forests of global significance, thereby assisting Russia in meeting its international obligations under the Convention on Biological Diversity (CBD). It will also strengthen Russia's capacity for participation in global wildfire management and emergency response systems.

Table 1: Project costs

Component	Indicative Costs (US$ m)	% of Total	GEF financing (US$ m)	% of GEF Financing	Govt financing (US$ m)	% of Govt Financing
A. Integration of High Conservation Value Forests into an Ecoregional Fire Management System	3.45	33.2	2.76	80.0	0.69	20.0
B. Improving Effectiveness of Forest Fire Management in High Conservation Value Forests	3.86	37.2	3.09	80.0	0.74	20.0
C. Increasing Public Awareness and Community Participation in Ecoregional Fire Management	1.76	17.0	1.71	97.1	0.05	2.9
D. Project Management, Monitoring and Evaluation	1.30	12.6	1.04	80.0	0.26	20.0
Total Project Costs	**10.37**	**100.0**	**8.60**	**82.9**	**1.77**	**17.1**

The project will be implemented at two levels: (i) region-wide activities – such as fire zoning and dispatch systems, regulations and standards; and (ii) activities in selected model areas – such as validation of fire models, inter-jurisdictional fire management planning and infrastructure, emergency operations and training. The latter will be focused on five areas, each containing a mosaic of protected and non-protected forest units of different jurisdictions and representing the variety of environmental/fire regimes and socioeconomic conditions of the ecoregion. Community participation activities (local initiatives) would be selected for project support from across the entire ecoregion, while ensuring that a critical mass of such activities is happening in and around the five model areas.

Component A. Integration of High Conservation Value Forests into an Ecoregional Fire Management System

The project will strengthen the capacity of the Khabarovsk-based Far Eastern Regional Fire Coordination Center (RFCC) and its branch in Vladivostok to: (i) assemble available data and baseline parameters of fire regimes of the high conservation value forests of the ASAE Region into an integrated database and GIS for fire risk zoning, modelling and prediction; (ii) develop and implement unified ecoregional fire management standards and long-term fire regime monitoring systems; (iii) carry out operational integration of Protected Areas (PA's) and other protection forests of various jurisdictions in the ASAE Region into a centralized ecoregional fire command and communication system; and (iv) translate incoming field and analytical data on baseline, historic and observed fire regimes into site-specific operational guidelines for local fire managers.

The first component will finance consulting services and information technology equipment covering the system-wide data integration needs for the ecoregion as a whole. It will include the following groups of activities.

A.1. Fire Risk Baselines and Zoning – the project will collate and analyze historical data and baseline parameters of HCVF fire regimes and aggregate them in a regional-level fire database and GIS base map at the 1:1,000,000 scale. Similar and hierarchically linked GIS's will be developed at a higher detail for the project's five model areas and specifically for the eleven PA's of the ecoregion (scale 1:50,000-1:100,000). This activity will further develop ands complement the HCVF map of the ecoregion recently completed by WWF-Russia. On its basis, a new regionally adapted methodology and map of forest fire risk zoning of the ecoregion will be developed for the RFCC and territorial Forestry Agencies;

A.2. Fire Regime Monitoring, Modelling and Standards – the project will assist the regional forest authorities and research organizations in developing, field-testing and implementation of a new system of targets, indicators and procedures for post-fire monitoring. The collected field data will be used to develop customized *models of fire impacts on the ecology and biodiversity* that would allow RFCC staff to develop new and update existing fire regime maps and databases in quicker and more cost-effective ways, i.e. covering large poorly accessible areas with least amount of resources. Lastly, the project will develop, publish and disseminate a set of new regional standards for forest fire management, protection and monitoring (which will support better implementation of fire management activities recently transferred from federal to regional responsibility.

A.3. Fire Data Integration and Communications – the project will provide necessary computing and communications equipment and software tools to the RFCC and its partners organizations across the ecoregion, including the forest districts and fire protection units, Protected Areas, municipal administrations, regional Hydrometeorological Service (the latter is being supported through the Bank's Hydromet Modernization Loan and the two projects will be establishing direct information exchange arrangements). The project will support the RFCC in developing fire forecast and behaviour models as a real-time decision-support tool for fire management operations, a single dispatch service of the ecoregion with a unified fire management procedures, as well as provide necessary training and study tours for RFCC dispatchers and line fire managers.;

A.4. Regional Fire Coordination Capacity Building – the project will support strengthening human resources capacity of the RFCC in its regular horizontal interaction with the territorial Forestry Agencies and fire protection units and Protected Areas across the ecoregion and ensure seamless coordination and planning of various project activities in multiple jurisdictions between the participating regions.
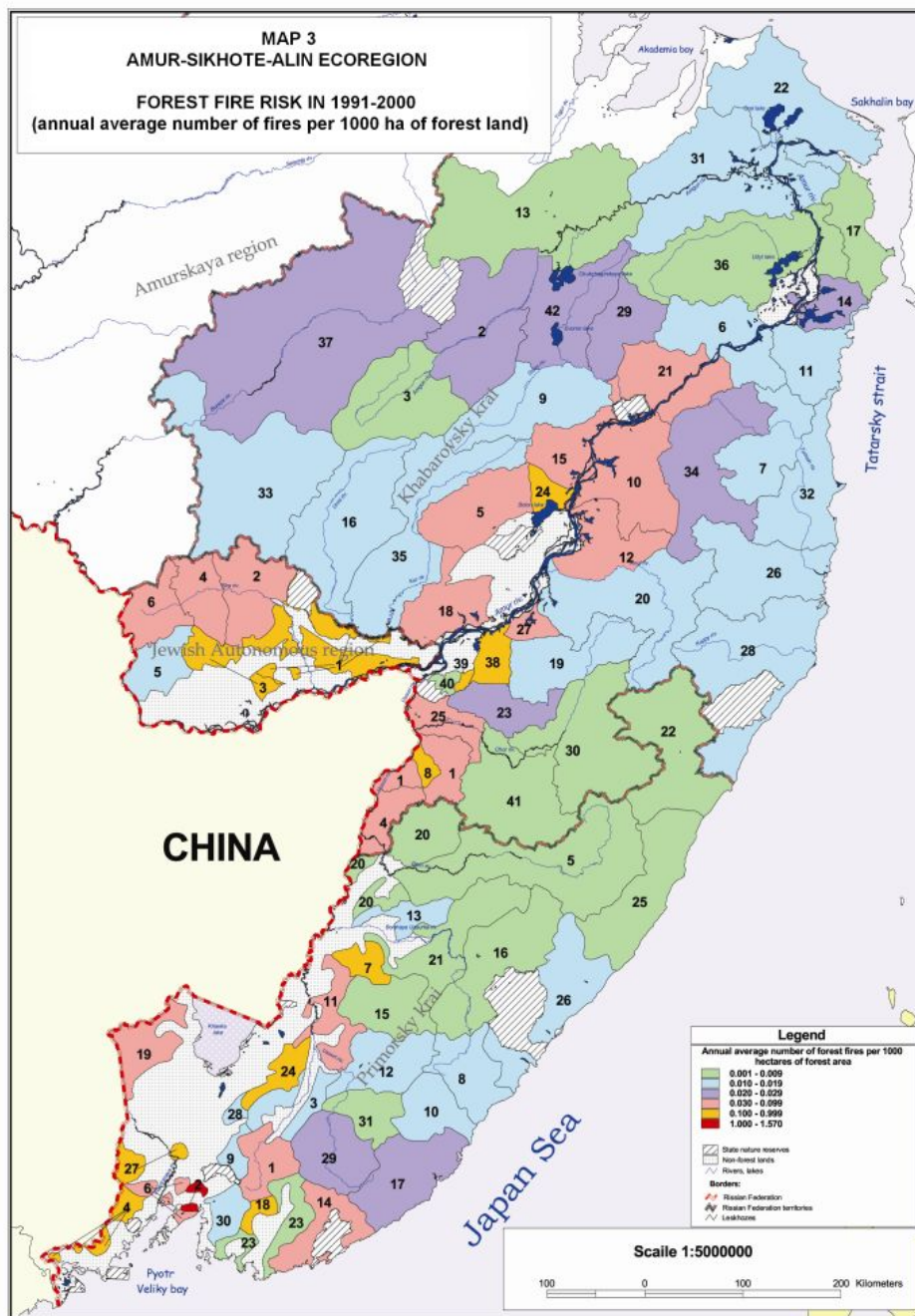
Figure 3: Forest fire risk map for the period 1999-2001 in the Amur-Sikhote-Alin Ecoregion.

Component B. Improving Effectiveness of Forest Fire Management in High Conservation Value Forests of the Ecoregion

This part of the project will be implemented in five pre-selected model areas (MAs)[2] that are: (a) representative of the variety of the ecoregion's conditions; (b) have a high concentration of HCVFs and

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[2] The five model areas include: (MA1) mountain taiga of the Bureya watershed (Jewish Autonomous Oblast), (MA2) mixed forest-steppe of the Khasan-Khalka watershed (southwestern Primorsky Kray); (MA3) mixed mountain forests of the Central Sikhote-Alin watershed (north-central Primorsky Kray); (MA4) mixed forests of the Amur-Ussuri plain (southern Khabarovsk Kray), and (MA5) taiga of the Amur lowlands (central Khabarovsk Kray) – see Maps.

Protected Areas; and (c) have a multi-jurisdictional land tenure pattern within the forest landscape (i.e. with the combination of typical stakeholders). The test cases of these areas will be used to: (i) strengthen regional regulatory incentive framework to prevent and mitigate the wildfire damage; (ii) establish unified regulations and develop sample inter-stakeholder agreements for joint fire management and incident command systems at a local level (district, community); (iii) restore and strengthen technical capacity of staff of Protected Areas of different categories and jurisdictions to carry out effective forest fire management; and (iv) plan and carry out emergency fire management operations, including fuel loads management, fire prevention, suppression, and post-fire rehabilitation in critical HCVF areas.

Component B will finance emergency works, fire management equipment and consulting services under five sub-components:

B.1. Development, testing and submission for regional approval of *regulatory instruments for reconciliation, compensation, and mitigation* for legally enforceable damage to wildfire and biodiversity resources and the related legal training for PA and forest district managers. These, together with regional tax incentive to businesses for funds invested in fire prevention and management, will constitute the main new lever the regional governments will have to promote responsible private sector behaviour in the forest and their participation in fire management;

B 2. Interagency Framework for Wildfire Management in Model Areas – this will include producing the necessary new interagency standards and multi-stakeholder cooperative agreements for collaborative fire management in HCVFs in various model areas and involving a critical mass of interested community- and municipal-level stakeholders in the establishment of *professional (in-house, contracted, and volunteer) fire fighting teams*, addressing: (i) procedures for such teams establishment and deployment; (ii) level of professional skills; (iii) functional requirements to the staff and operational instructions; and (iv) regional and municipal standards (guidelines) for entities participating in fire management including volunteers.

B.3. Wildfire Management - Emergency Operations in Model Areas – This activity will help the line fire managers in the respective model areas plan in advance of fire emergencies. The existing fire management capacity in the MAs will be expanded with the 2 newly established heavy mobile units and 12 light mobile patrol units, and volunteer fire units equipped, trained, and certified, additionally focusing patrols in high conservation value forests. To reduce the threat of large fires in HCVF areas a network of fire breaks will be restored and expanded in the buffer zones of PAs where fire zoning would indicate minimum cultural and biological impacts. It will be complemented with 20 fire lookouts and about 40 strategically placed check points. Specific emergency activities will be carried out in the Southwest Primorsky Model Area to restore pine and hardwood forests – a key habitat for tiger and leopard – that had been lost to chronic fires set by local farmers. Finally, commercially viable forest management alternatives will be tested in selected MA sites as a method to reduce fuels, fire danger, and loss of biodiversity over the greater part of the permanent forest estate.

B.4. Management to Reduce Fuels and Enhance Habitat at the Landscape Level – Activities on-the-ground would (i) test 2 silvicultural (even- and uneven-age) and 2 logging systems for relative impacts on fuels, fire risk, and habitat compatibility; (ii) support re-creation of normative stand structure and composition by testing combinations of thinning and prescribed fire in 3 forest types and measuring effects on fuels and habitats; and (iii) support restoration of the selected fire-modified critical forest habitats of tiger and leopard.;

B 5. The above activities would be complemented by training of line forest managers from the model areas in *Landscape Level Reconstruction and Ecological Restoration*.

Component C. Increasing Public Awareness and Community Participation in Ecoregional Fire Management

As over 80% of forest fires now have anthropogenic origin, it becomes essential to increase public awareness on issues related to forest fire safety and support the informed participation of local population in fire management. The component would address (i) strengthening public education and awareness on issues related to fire management in high conservation value forests; (ii) implementing adaptive patterns of land and non-timber forest use to reduce occurrence of anthropogenic forest fires; and (iii) broadening public and community participation and volunteer on-the-ground support to forest fire management.

A program of small grants will be carried out with project support to assist mobilization of such local and community initiatives (expected between $2,000 and $50,000 each, and not more than 90% of sub-project cost). The governance arrangements for this component will include (i) a multi-stakeholder Steering Committee established in the region with balanced participation of regional and local authorities and civil society (including private sector) that determines specialized selection criteria for each thematic grant round, (ii) a evaluation panel of reputable national and regional experts, and (iii) a small grants administrator – a nongovernmental organization competitively selected on the basis of solid experience of grant-making in Russia. The Small Grants Procedures for this Component, satisfactory to the Bank, will be finalized at the beginning of the project – upon selection of, and with input from, the small grants administrator.

The Social Assessment and Stakeholder Participation Plan have identified the several thematic areas that should be considered as priority topics for support under the Small Grants Program.

Component D. Project Management, Monitoring and Evaluation

The overall project activities are proposed to be directed and monitored by the territorial branch of the Federal Forestry Agency in Khabarovsk Kray. The Khabarovsk Forestry Agency (KFA) has established a project unit comprised of three KFA staff that would monitor and coordinate project implementation with its territorial counterpart agencies, the RFCC and the Regional Governments of Khabarovsk Kray, Primorsky Kray and Jewish Autonomous Oblast. KFA will organize routine monitoring and evaluation of annual performance objectives and interim targets at the ecoregional, regional (Kray) and model area (municipal) levels, combined with midterm and final net impact assessments.

This component will finance the incremental operating costs incurred in relation to the project administration, including procurement, financial management, project reporting and audits. Overall impact of this component will be measured by the increased efficiency in project management and transfer of project planning and administration skills to the KFA.

Lessons learned and reflected in the project design

The project incorporated several important lessons from the World Bank's recent forestry and biodiversity portfolio, and specifically, the Russia Biodiversity Conservation Project.
One lesson is that strong commitment on the part of the sub-national and local governments is a key prerequisite to successful biodiversity conservation initiatives, as it allows to increase financial support to the project from various regional budgets. Therefore, this is structured as a regionally centered and regionally driven project, which is based on the original strong demand and continued support from the regional government in Khabarovsk and the Khabarovsk Regional Fire Coordination Center.

Another lesson is that biodiversity projects yield a much higher and more sustainable sector-wide developmental impact if they are implemented in tandem with other sectoral operations. This project is both thematically (fire management), geographically (Khabarovsk), and in its timing, well coordinated with the World Bank-financed loan for the Sustainable Forestry Pilot Project and is designed to build upon the mainstream policy and institutional capacity improvements at the Federal Forestry Agency supported by the loan.

The earlier project also showed that active involvement of NGO community at all stages of the project cycle is essential to ensure availability of critical professional expertise in specific subject areas, transparency of project governance, and effective utilization of existing public information and dissemination mechanisms. This lesson is reflected in the overall project implementation

arrangements, in that a reputable local NGO has been selected as the PIU for the project, that a Public Council comprised of most active regional NGOs is included in the project governance structure increasing its transparency, and that the administration of the Small Grants Program will be also contracted to a competitively selected local NGO experienced with grant-making.

The need for support of horizontal interactions of protected areas of various jurisdictions is another lesson incorporated in the project design – by establishing model areas as focuses for intensive collaboration in joint fire management between neighboring PA's.

The project design also takes into account key lessons of simplification of the project paper-flow procedures, especially in the context of rather remote regions and project locations. The project proposes to utilize wherever possible shopping and commercial practices procurement procedures for small items.

Although there is a strong commitment on the part of the protected areas' management to employ sound operational practices, the internal capacity to undertake adequate management planning in most protected areas is currently insufficient. A reasonable amount of external advisory support to end-beneficiaries (KFA, protected areas, municipalities, communities) is being planned on the administrative aspects of project implementation.

An important lesson from forestry projects in Croatia and Indonesia is that pure technical solutions in forest (incl. fire) management, if not positioned in the broad sectoral policy agenda, may risks institutional failure and a need for a project restructuring at mid-point. In this project, the technical and institutional aspects of fire management context are tightly integrated in a innovative and dynamic approach of ecoregional fire management that drives institutional change, while key tangible project support interventions are aimed at the lowest (regional and municipal) levels of institutions (usually least prone to all administrative changes).

Partnership arrangements

In addition to being in a strategic 'twin' partnership with the World Bank-financed Sustainable Forestry Pilot Project, the project will enjoy significant in-kind assistance and leverage of donor funds from the existing bilateral technical cooperation between the Federal Forestry Agency of Russia and the *US Forest Service* (development of fire prevention and management plans, fire modeling, ecological role of fires, fuel loads management and prescribed burning techniques, community fire brigades, regional fire coordination centers), as well as with the *Canadian Forest Service* (fire modeling, prescribed burning, model forests network).

The *USAID*-funded Forest Resources and Technologies (FOREST) Project that has been implemented in the Russian Far East provides a strong legacy of partners in fire education and public awareness in both Khabarovsk and Primorsky regions. The Far-Eastern Association of Indigenous Peoples of the North will also be a crucial counterpart in facilitating project implementation in the Territories of Traditional Use.

Another key partner to project implementation is *WWF*, the Bank's partner in the Global Forest Alliance. This partnership is crucial to the project success both because of the Alliance's coordinated approach towards development of HCVFs, and also at the operational dimension – with WWF's Russian Far East Office in Vladivostok being a major regional player leveraging significant donor funded activities within the target ecoregion, including the on-going mapping of the HCVFs of the ecoregion, the results of which will be directly used in the project. WWF will also play an important operational partner role in the field activities in Southwest Primorsky Model Area, where it will support reforestation of burned areas forests and carry out other forest habitat protection activities with the private sector and other NGOs. The Wildlife Conservation Society, Tigris Foundation, Phoenix Foundation, Sikhote-Alin Foundation, ISAR and other local and international NGOs active in the ecoregion will also play important roles in promoting public and community participation in fire management.

Important partnerships also include the *Global Fire Monitoring Center* (Freiburg, Germany) and the Fire Section of the *Global Observation of Forest Cover (GOFC)* International Program (co-chaired by University of Maryland at College Park, U.S.A.), which provide significant interface between the project and the global community of best practice in fire detection, modeling and mapping, as well as the

Regional North East Asia Wildland Fire Network under the UN International Strategy for Disaster Reduction and the Pacific Forest Forum.

Institutional and implementation arrangements

The expected duration of the project is 6 years. The project will be managed – upon authorization from the Ministry of Natural Resources of the Russian Federation and the Federal Forestry Agency – by the Khabarovsk Forestry Agency (KFA), which is already in charge of implementation of baseline forest and fire management investments in Khabarovsk Kray under the Sustainable Forestry Pilot Project (financed by a World Bank loan). KFA has established a Scientific-Technical Innovations Unit comprised of five KFA staff that would also oversee and coordinate GEF project implementation with its territorial counterpart agencies, the RFCC and the Regional Governments of Khabarovsk Kray, Primorsky Kray and Jewish Autonomous Oblast. The latter are co-chairing on a rotation basis the Project Supervisory Committee (PSC) that includes the above-mentioned regional government officials, representatives of the MNR and FFA, directors of the ecoregion's Protected Areas, the regional Indigenous Peoples Association and key regionally active NGOs. The PSC provides guidance on overall project implementation issues, approves annual work programs and budgets.

The bulk of the project activities will be implemented by regional and local (leskhoz) staff of the territorial Forestry Agencies in the three participating regions (Khabarovsk, Primorye, and Jewish Autonomous Oblast) and of the 11 Protected Areas (zapovedniks, zakazniks, wildlife reserves etc.). Specialists of the Regional Fire Coordination Center (located in Khabarovsk) and Aerial Fire Protection Bases (Khabarovsk and Vladivostok) will be also key participants in the project implementation, with assistance and inputs from various experts (national and international). Activities in each of the five model areas will be coordinated by a Local Coordination Team comprised of the relevant municipal (district) authorities, Forestry Agency and aerial fire protection officials, PA managers, indigenous community representatives (where applicable), with assistance of the relevant RFCC regional coordinator.

Technical Issues

While it is generally accepted that fire is part of the ecological cycle, there are differing views on the right fire management approach for forests whose natural cycles have been altered over decades by human intervention. This is an issue more for the forests surrounding the high conservation value forests of the project area.

Landscape management is supported by landscape-level inventories of forest resources, with detailed planning for targeted sites, much like the planned use of pilot areas for this project. This is an approach applied in France, Sweden, and other countries.

The capacity to treat regional fire suppression issues at the landscape level resides with the Far Eastern Regional Forest Protection Air Base and its Forest Fire Coordination Center, the Primorsky Forest Protection Airbase, and the local federally funded MNR forest management authorities. The capacity to deal with the entire fire management cycle such as conducting fuels reduction, burned area rehabilitation and other tasks, would employ similar skills and resources, but would also require an additional mandate and resources to generally address fire management in the landscape. The landscape-level fire management approach is a thesis of this project and the additional human and material resources constitute much of this project. Fuel loads management, fire suppression, and burned area emergency rehabilitation constitute the full approach to fire management (i.e. they are required by the new U.S. National Fire Plan). The proposed investigations of forest practices conducive to both fuels reduction and biodiversity enhancement will command the skills of both local and foreign professionals as the approach is relatively new. Specific application of external experience with prescribed burning of accumulated fuel loads as a fire management tool (even if successful in Central Siberia) should be carefully compared to local vegetative response in the prevailing Amur-Sikhote-Alin forest ecosystems.

Another issue that requires careful analysis within the project is comparative efficiency and sustainability of fire breaks immediately around HCVFs versus comprehensive fuel management at a broader landscape level combined with restoration of previously logged landscapes. In the long run, the latter might have a farther reaching effect.

Social Issues

The Social Assessment (SA) conducted during the project preparation period has determined that the key social issues are related to the significant damage caused by catastrophic forest fires to the livelihoods and health of local population, both in rural communities and larger towns.

Project stakeholders may be broken into the following major groups which can be potential sources of forest fires on the one hand, and provide various opportunities for involvement of the people in fire protection and environmental activities, on the other hand: entire population of individual local areas affected by hazardous discharge resulting from forest fires; indigenous peoples who heavily depend on forest resources and suffer greatly from forest fires; professionals whose job is directly related to forestry (including researchers); forest workers (timber harvesters, forest guards, road workers, hunters, forest managers, and others); students from universities, colleges and technical schools; schoolchildren; recreation visitors; gatherers of non-timber forest products; recreational fishermen; recreational hunters; managers of commercial companies; managers of not-for-profit organizations; office workers; rural businessmen; dacha owners; housewives; pensioners (a particularly impoverished part of the population); the unemployed.

The indigenous peoples (namely, the Nanay and Udege communities) will be specifically targeted through an Indigenous People Participation Plan that is a part of the overall Project Stakeholder Participation Plan developed during the Social Assessment (see Annex 10). The project's main objective of reduction of the risk of such catastrophic fires would be, in part, achieved through more active and participatory involvement of local population and businesses in fire prevention (public awareness campaigns) and fire monitoring and fighting (community fire patrols). Increased cooperation in collaborative fire management between various regional and local authorities, on one hand, and local population, academia and civil society, on the other hand, would also be an important social development outcome.

The Small Grants program (Component C) has been specifically designed to address fire-related social priorities and encourage a variety of suitable forms of stakeholder participation in implementation and monitoring, including community-based fire patrols and other types of local initiatives (see details in Annex 10). Key stakeholders will also participate in project implementation through the Project Supervisory Committee that is already established in the region and includes representatives of the regional and federal authorities, forest and protected area managers, Indigenous Peoples Association, local administrations and communities, research and non-governmental organizations.

Local NGOs (such as the Khabarovsk Wildlife Foundation) have been directly involved in the project preparation. The regional Indigenous Peoples Association and the other NGOs will continue to participate in the Project's Public Council and their representative will be sitting, on a self-selection rotation basis, in the Interregional Project Supervisory Committee. Public consultations on the project design have been held twice - at the startup and completion of project preparation activities. The project is coordinated with activities supported in the region by the World Wide Fund for Nature (WWF) and other international and national NGOs, including Ecodal and Wildlife Conservation Society (WCS).

Environment Issues

The Environmental Assessment (EA) conducted during project preparation has confirmed that the project would generate substantial environmental benefits. No adverse environmental impacts will be caused by the project activities if implemented correctly. The EA report includes the Environmental Management Plan (EMP), which outlines relevant safeguard requirements and provides specific recommendations for various project activities. The project has budgeted appropriate funds to implement the EMP.

Most of the project activities entail no environmental risks and, therefore, require no preventive, mitigation, or compensatory measures. A few activities related to (i) establishment of the fire management infrastructure (firebreaks, lookout towers, helicopter pads, etc.), (ii) prescribed burnings, and (iii) fire management in the protected natural areas, will require implementation of the specific operational safeguards, which were developed by the EA and outlined in the EMP.

The EA has provided substantial input in improving project design to maximize positive environmental impacts of various activities. Those inputs include in particular the following: (i) criteria for defining high conservation value forests were further refined; (ii) additional specific recommendations were provided with respect to forest fire zoning of the ecoregion and model areas; and (iii) an activity was added to the project to facilitate transition of responsibilities for forest fire management on former agricultural lands to the forest authorities.

Based on the recommendation of the EA, a program to monitor project environmental impacts was added to the project.

Project Results Framework

PDO	Outcome Indicators	Use of Outcome Information
Strengthen conservation of critical, non-economically accessible forests of high conservation value in the Amur-Sikhote-Alin Ecoregion	Improved forest fire management, reduced frequency, size and intensity of catastrophic fires in the areas of the global conservation importance	Yr.1-2: gauge effectiveness of project components in initial model areas Yr.3: determine if components and/or model areas need to be changed Yr.4-5: scale up results from model areas to the ecoregion, feed lessons learned into Government policy on regional fire management
Intermediate Results One per Component	**Results Indicators for Each Component**	**Use of Results Monitoring**
Component A: Establishment of an ecoregion-wide integrated forest fire management system to include high conservation value forests	Component A: Increase in the area of protection forests covered by the ecoregional fire dispatch and monitoring system Increase in the number of fire dispatch decisions taken with the use of fire risk zoning maps reflecting biodiversity values	Component A: Yr.3: Low area may flag unjustifiable complexity of monitoring parameters Yr.4: Slow increase may indicate ineffective training of fire managers/dispatchers in comprehensive fire risk assessment
Component B: Increased effectiveness of fire management in high conservation value forests through strengthened regulatory framework and interdepartmental coordination, integrated ecosystem management, and increased capacities to address catastrophic fires and their consequences	Component B: Reduction in average area burned per fire in model areas Increase in the number of effective interagency and municipal fire management agreements in model areas	Component B: Yr.4: No decrease in burned area per fire may signal shortcomings in logistical/equipment arrangements and/or fire crew training quality Yr.3: Low number may flag a disconnect between proclaimed regional policy and existing local capacity for implementation in a selected model area
Component C: Raised public awareness and support from the local population and communities to fire prevention and mitigation	Component C: Increase in the number of equipped and trained volunteer fire groups Increase in the number of indigenous people/community participants in alternative land/ecosystem management programs	Component C: Yr.4: Low number may indicate need to revise regional and local incentive structures for voluntary participation Yr.3: Low number may signal ineffective, poorly targeted project communications