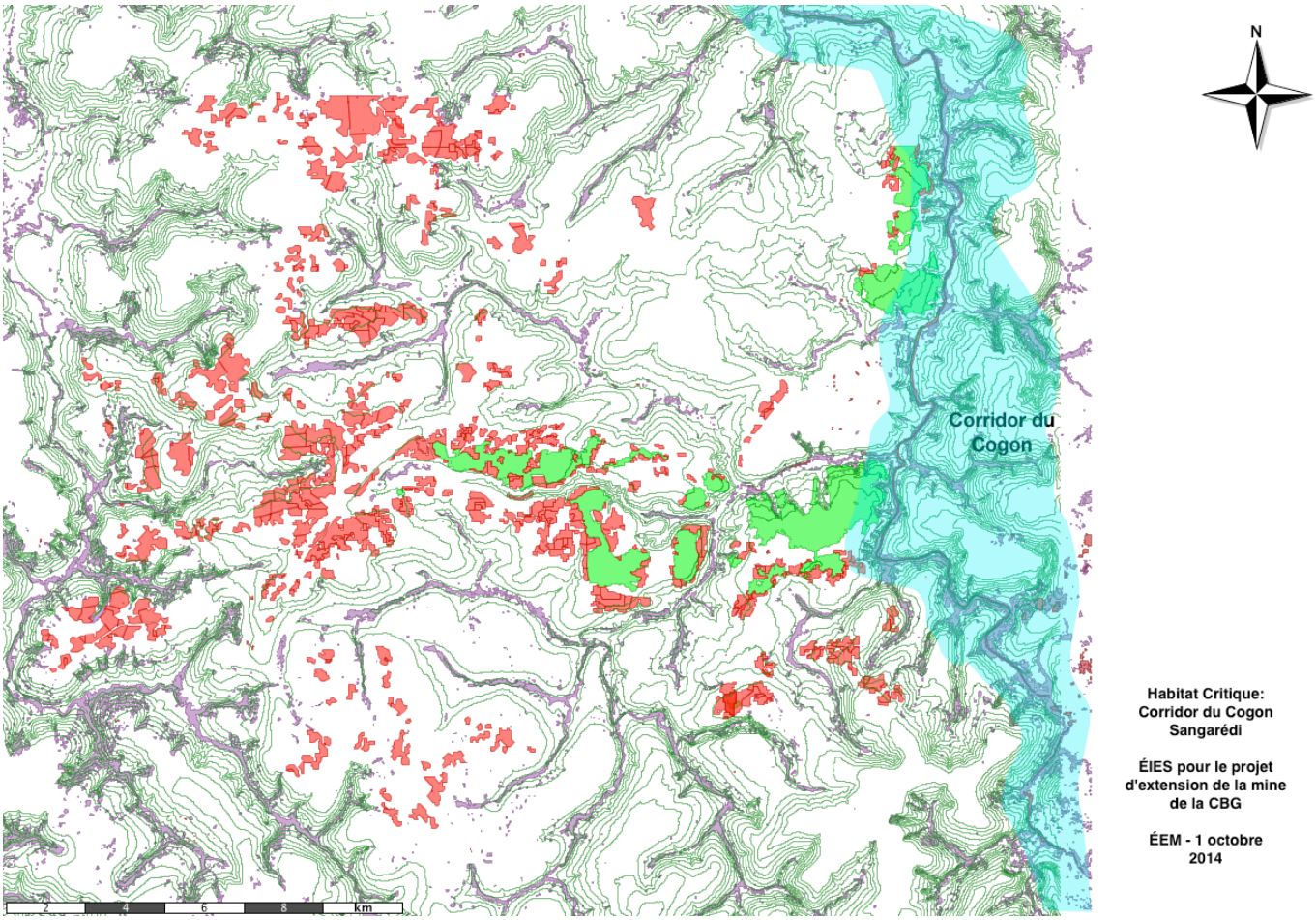
Map 0-17 Critical habitat: the Cogon Corridor



Natural habitats

The question of the distinction between nautral habitats and modified habitats of the IFC is complex in a region where the human population has been present for a long time. Indeed there must be few areas which have not undergone some impact. Even the surviving gallery forests have partly become plantations with certain trees selectively planted or retained.

The question is particularly complex and important for the bowals. Traditionally the bowals and their vegetation have been interpreted as results of degradation following human intervention. However this point of view is not shared by the botanists from Kew Gardens, responsible for the botanical studiy for the ESIA.

Status species were not found in the bowals during fieldwork in the Sangarédi area in 2013, but their presence is not excluded and additional field work will be done before any clearing. In any case, it is clear that the bowal vegetation, even if it is fairly poor, includes species specific to this type of habitat. As a precautionary measure, it was decided to consider bowals as natural habitat in this ESIA, along with fallow areas and other forms of extensive agriculture.

Modified habitats

Performance Standard 6 of the IFC foresees the consideration of modified habitats if these are of high value in terms of biodiversity: "This Performance Standard applies to those areas of modified habitat that include significant biodiversity value…". Since this ESIA has by precaution already considered the potentially modified habitat into natural habitat, there are no remaining modified habitats of "significant biodiversity value". What is left are zones of human housing, industrial zones and mines.

0.3.3.4 Biological resources

Introduction

Performance Standard 6 of the IFC specifies:

> "Performance Standard 6 recognizes that protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources are fundamental to sustainable development."

The two preceding sections dealt specifically with aspects concerning the protection and conservation of biodiversity. The management of ecosystem services is partly handled in the preceding section (in the sense that the protection of habitats is considered by ecosystem protection plans), but also in those sections dealing with physical aspects. This section deals with sustainable management of living natural resources to the extent that the Project may have an impact on these resources.

These resources include notably fishing (in the Rio Nuñez Estuary and the Cogon River in particular), hunting for bushmeat, harvesting of firewood, and the

harvesting of wild plants for food and as medicines. The three most important elements are fishing in the Rio Nuñez estuary, hunting, and firewood harvesting. These aspects are treated in the specific studies (Annexes 3-3, 3-11 and 3-12).

The purely socio-economic aspects of these activities are included in the Social section of the ESIA (Chapter 5). The discussion here involves only the biological aspects.

The fish of the Rio Nuñez

Fishing in the Rio Nuñez Estuary is an important artisanal activity on which depend a considerable number of residents. The fish and other edible animals of the estuary are therefore considered a VEC of "Medium" value.

Bushmeat

The right to hunt is recognized by the Guinean legislation and the consumption of legally obtained animals is a potentially important aspect for residents from the nutritional point of view but also in terms of tradition. The animals likely to be hunted or trapped are therefore considered a VEC of "Medium" value. An important aspect in considering bushmeat as a VEC is that one of the major impacts assessed will in effect be a potential increase in illegal capture following improvement in access to more or less isolated areas. It is mainly a VEC for the Sangarédi region because the principal impacts are there.

Firewood

Firewood is important for residents, being for many the only menas of cooking or heating. It is therefore considered a VEC of "Medium" value. As for bushmeat, one of the key aspects of the assessment will be the impact of an improvement of access to more or less isolated regions. It is mainly a VEC for the Sangarédi region because the principal impacts are there.

0.3.4 Identification and evaluation of the main biological impacts and prevention, improvement and mitigation measures

The identification of impacts on the biological environment is always complex since it can be approached in various ways, especially in a case like that of the Extension Project that covers a large territory and several types of activities. The basic principle is that the assessment deals with the increase in the rate of extraction, transport and treatment of the bauxite. The operations already exist and are considered in the baseline case. For some aspects, notably the new mining areas, the difference between the baseline and the state following the increase can be hard to separate.

The following sections are a summary of the more detailed explanations contained in Chapter 4.

For the important biological species, the analyses must be done species by species, because each species tends to be impacted in a different way (depending on its distribution, its habitat, its ecological niche, its numbers and its characteristics). Each important species (that is, each of the 42 species identified as being of first or second priority in Section 4.6 of Chapter 4), was analyzed individually and the summary results of the analyses by species given on the data sheets in Annexe 4-3. The impact levels by species are given in Section 0.3.8.

0.3.4.1 Zone 1: the mine

Increase of extraction area

The development of new extraction areas for bauxite in the region of Sangarédi will probably be the major source of Project impacts on the biological environment. The most critical direct impacts will obviously be the elimination of individuals during clearing, habitat elimination for a shorter or longer period, and the replacement by possibly less productive or useful habits whose legal situation may remain uncertain.

The loss of habitat is measured by the surface of natural habitat converted. The main habitat losses from the Project are the use of new mining areas which will

eliminate some 3,200 ha of habitat. Other losses will be related to the development of the road network.

There will also be direct impacts outside of the mined areas. These will include impacts associated with air quality, noise, vibrations, water quality and lighting. Most of these impacts can be estimated following the studies and modeling of the physical environment presented in the ESIA (Section 2-2 to 2-4 of Chapter 2).

Changes in the levels of groundwater following the exploitation of new mining areas were another potential impact. In theory, a lowering of groundwater levels could impact springs and stream flow on the slopes of the plateau. However, the hydrogeological analysis (Section 2-4 of Chapter 2) rather suggests that there might be a slight increase in the flow. Therefore this impact was not retained.

Finally, the new mining surfaces will have indirect impacts by changing the structure of nearby natural habitats and by increasing fragmentation.

Development of the road network

The development of new mining areas requires the development of an appropriate road network. Even if in certain cases the mining roads will use the traces of old 4x4 trails, wide ones for large trucks will replace these.

The construction of the network will result in the elimination of natural habitats and potential impacts on aquatic habitats at stream crossings. There will also likely be important fragmentation impacts. The new roads can become effective barriers for animals and plants. For example, a large forest cut in two by a road is reduced to two fragments equivalent in size to half the size of the original habitat. This becomes critical for animals requiring a minimum continuous forest range. In addition, this cutting up increases the length of edge habitat, habitat often less suitable for forest species, and decreases the surface area of deep forest.

The use of the road network for the new mining zones could be the cause of other impacts while being used by the CBG (noise, vibration, dust, use of water, lighting, risks of collisions with animals).

Following the end of the use of certain roads by the CBG, the new roads could have an impact by changing ease of access for hunting and firewood harvesting.

The road network is still at a preliminary planning stage and it is not possible to determine with precision the associated biological impacts.

Gallery forests near Sangarédi – critical habitat

Galley forests are without doubt the most critical habitat in the Sangarédi region. Fortunately, the gallery forests, by definition, are found in the bottom of valleys, whereas the new mining areas are found on the plateau. Therefore, the development of the new mining areas will occur practically entirely outside of the gallery forest zones. In total only 7 ha out of 4,900 ha of gallery forest in the Study Area (0.1%) will be eliminated to make way for mines. These areas of gallery forest that might potentially be eliminated are very small (average size of the 103 parcels = 640 m^2) and these should be confirmed in the field. The estimates presented here are all based on the interpretation of satellite imagery.

Nevertheless, the risk of impact, apart from clearing, is real in view of the proximity of the mining areas and the gallery forest in some case and the likely impacts associated with the development of the mine road network.

Cogon Corridor – critical habitat

The Cogon corridor will not be strongly affected by the Extension Project in the sense that nearly all the new mining areas are relatively far from the corridor. Nevertheless, impacts are possible from small mining areas close to the corridor and by impacts such as the increase of aluminum in the water.

Natural habitats

At least 3,200 ha of natural habitat, in the largest sense of the word as defined earlier, will be cleared for the new mining areas. This represents the mine surface only and could be more if there were needs for additional work areas outside of the mine area *per se*. In addition, clearing will probably be needed during the construction of mine roads.

This entire surface is not attributable to the Extension Project. The baseline for the Project is the continuation of extraction at current levels. Therefore, a good part of this surface would be cleared in any case in the 2014-2027 period. Since the maximum extraction rate (close to twice the current rate) will only be reached

towards the end of the Project, it is conservative to estimate that less than 50% of the clearing will be the result of the Extension Project. A precise estimate is difficult because the mining planning studies are based on volume rather than surface area and the depth of the deposits can vary.

It is also important to consider that the total surface of new mining areas will not be in continuous use during the duration of the Project. Following modifications made to the mining plan in 2014, the use of a zone will take place over a shorter timeframe and if the rehabilitation of the exploited zones is rapid and effective, only a part of the 3,200 ha will be outside of natural habitat at any one time.

More than half of the natural habitats that will be eliminated will be bowals (approximately 1,800 of bowal of the 3,200 ha total). This represents about 12% of the bowal area in the Study Area.

0.3.4.2 Zone 2: the plant and the port

Changes of structures within the plant boundaries

There will be several modifications to the equipment within the boundaries of the plant. This does not result in biological impacts during construction because it will be entirely limited to within the plant boundaries. In the long term there will be certain positive impacts, due to a reduction of dust emissions.

Increase in treated bauxite

The increase in treated bauxite will result in an increase of certain gases following increased fuel needs, but with minor impacts.

Constructions associated with the quay

There will be certain modifications at the quay (enlargement of the quay, new conveyors, dredging of the basin adjacent to the quay). These could have impacts linked to losses of habitat (marine bottom, mangrove) and the disturbance of animals because of submarine noise during construction.

Increase in marine traffic

The increase in marine traffic will increase the risks of collision between ships and marine mammals. There will also be the potential for increases in noise.

Rio Nuñez Estuary – critical habitat

The estuary of the Rio Nuñez will be impacted in two ways.

- Firstly, by activities associated with the enlargement of the port of the plant: the additional dredging of the turning basin, the enlargement of the quay, and potentially the construction of one or several conveyors toward the quay. These are local and short-term activities but with a high level of perturbation and in a critical habitat and with important species.
- Secondly, by long-term changes such as the increase in marine traffic and additional maintenance dredging. These are local long-term activities in a critical habitat with important species.

0.3.4.3 Zone 3: the railroad

Creation of a new sorting yard and sidings

These modifications will eliminate limited surface areas of partly natural habitat but the impacts will be minor.

Increase in the number of trains and the number of locomotives and cars in each train

The number of trains will double with the production at 27.5 MTPA. There will be an extra locomotive and some additional railcars for each train. This will lead to a slight increase in the fragmentation effects of the railroad for sensitive species.

0.3.4.4 Prevention, improvement and mitigation measures

Introduction

Mitigation measures for the biological environment are particularly complex because they consist not only of measures to prevent or reduce impacts, but also

rehabilitation and compensation measures managed through protection plans. Only a very brief summary is given here. The measures are described in more detail in Section 4.8 of Chapter 4.

Additional studies

The additional studies below were not part of the studies undertaken during the ESIA either because of engineering decisions still underway (dredging and mine road network), or because the studies must preferably be done just before opening new quarries:

- Additional study for the deposition zone for dredged sediments (Kamsar);
- Additional study on the mine road network (Sangarédi);
- Additional botanical studies (Sangarédi);
- Additional studies for Endangered vultures (Sangarédi); and
- Additional study for the lizard *Hemidactylus kundaensis.*

Specific measures required

Specific measures are also detailed:

- General measures related to avoiding habitats;
- Measures during clearing (everywhere, but especially Sangarédi);
- Measures associated with work near streams and other surface water features (Sangarédi);
- Measures for noise (especially Sangarédi)
- Measures for dust and air quality (everywhere);
- Measures for lighting (everywhere);
- Measures for dredging (Kamsar);
- Conveyor and quay construction (Kamsar);
- Measures to avoid collisions between animals and ships (Kamsar);
- Measures to avoid collisions between animals and vehicles (Sangarédi);
- Measures concerning invasive species; and
- Rehabilitation measures (everywhere but especially Sangarédi).

Management and action plans for the protection of biodiversity

Performance Standard 6 of the IFC specifies measures to take if the Project impacts natural or critical habitats. The mitigation measures aim to ensure no net loss of biodiversity. A list of plans to put into effect to meet the IFC requests follows. These plans will of course have to be detailed with the advancement of the Project (specifically with the additional studies described previously). Nevertheless, the plans and measures described in Section 4.9 or Chapter 4 give the essential elements of an action plan for biodiversity.

Fieldwork undertaken in 2013 has demonstrated the presence of numerous species considered important from the perspective of biodiversity conservation. The additional studies and monitoring measures will reinforce these data. The presence of these species justifies putting in place a protection and management system in the Study Areas. The action plans described below are of a nature to protect all of the elements of the ecological systems of the Study Areas, even those species whose presence is not yet recognized.

- Elaboration of a mine rehabilitation plan (Sangarédi);
- Elaboration of a bushmeat hunting management plan;
- Elaboration of a firewood harvesting management plan;
- Elaboration of a forest protection plan (Sangarédi);
- Elaboration of a bowal vegetation protection plan;
- Elaboration of a Cogon Corridor protection plan; and
- Elaboration of a Rio Nuñez Estuary protection plan.

Communication Measures

Communication measures are essential:

- Annual report of the environmental inspector; and
- Communications with the public.

Monitoring measures

A biodiversity monitoring program is a necessity to verify the impact predictions and the efficiency of the mitigation measures. Some of the mitigation measures in the preceding section already contain monitoring elements or protection plans that