Case study Summary sheet

Context

COMPANY'S IDENTITY

AFD
AGENCE FRANÇAISE DE DÉVELOPPEMENT

Industry
Financial institution

Turnover over 2011-2017
EUR 32.75 billion

CASE STUDY

Footprint use category: Project or site
Assessment time: 2014-2018

Business application: Biodiversity management & performance

Perimeter		LUEFN Pressures	CC Pressure	Aquatic Pressures	Direct measurement of biodiversity state
Scope 1		☐	☐	☐	✓
Scope 2		☐	☐	☐	☐
Scope 3	Tier 1	☐	☐	☐	☐
Scope 3	Rest of value chain	☐	☐	☐	☐
Scope 3	Downstream	☐	☐	☐	☐

Why?

EXPLORE THE EVALUATION OF THE BIODIVERSITY FOOTPRINT OF AFD-FUNDED PROJECTS

When?

EX POST ASSESSMENT OF PERFORMANCE OF THE ENTIRE PROJECT (2014-2018)

How often?

ONCE, AT THE END OF THE PROJECT

What?

SCOPE 1 IMPACTS OF THE ECOLOGICAL RESTORATION PROJECT DEDICATED TO THE 6500 HA WOLONG LAKE BASED ON DIRECT MEASUREMENT OF BIODIVERSITY STATE

For who?

INTERNAL USE FOR *EX POST* PERFORMANCE ASSESSMENT AND POTENTIAL USE IN *EX ANTE* EVALUATIONS

How detailed?

RESULTS ARE REPORTED FOR THE PROJECT AS A WHOLE

DATA COLLECTED

Item	Details	Source
Bird counts	Weekly or bi-monthly bird counts from ecological surveys between 2015 and 2018 for 11 bird species screened as good "indicator species".	AFD & project technical assistance
Estimation of the abundance in an undisturbed ecosystem	Assessment by the ornithologist of the abundance the 11 species would reach under undisturbed conditions	Ornithologist from the project technical assistance

Footprint analysis

RESULTS

Total **Dynamic** footprint
-4.5
MSA.km²

Total **Static** footprint
64.0
MSA.km²

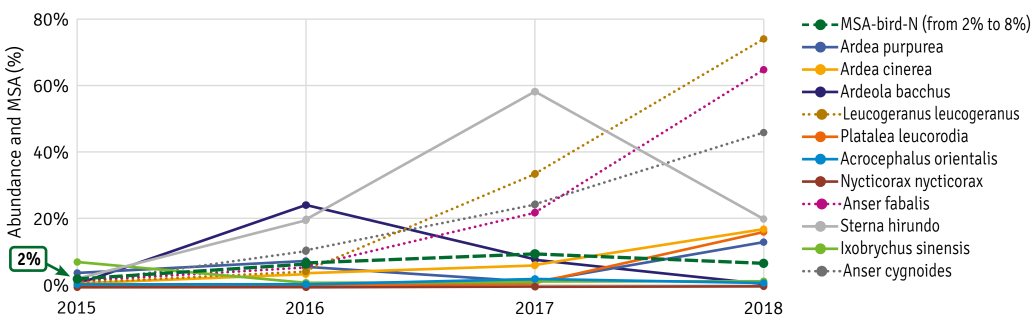

Figure 28: Evolution of the relative abundance of the indicator bird species (solid lines) used to calculate MSA-bird-N, a partial MSA based on the bird taxa (dashed line)

(source: GBS calculations, May 2020)

KEY MESSAGES

→ The GBS can take direct measurements of biodiversity state as input to assess biodiversity footprints.

→ The use of the GBS provides an order of magnitude for *ex ante* screening of projects based on the "cost of restoration" or "return on investment"

→ A relatively conservative *ex post* assessment of the project demonstrates significant biodiversity gains of 4.5 MSA.km², equivalent to 640 football pitches or to the yearly Scope 1 impact of 1 million tons of wheat produced in France

IMPROVEMENTS

→ The study highlights the need to collect comprehensive surveys of mammals, reptiles, amphibians, invertebrates and vascular plants, not just birds, but also of pressure data on land use, climate change, etc.

→ With more time and budget, the following elements could be improved: other ornithologists could be involved in the choice of indicator species and the estimation of undisturbed abundances and the coverage of habitats by the indicator species could be more comprehensive. Some technical challenges require more thoughts: how to deal with species with global population below the carrying capacity of the assessed ecosystems? And what should be considered as the undisturbed state in practice?

4.1 French Development Agency

4.1.1 Context and objectives

The Wolong lake, situated in the Kangping district, Liaoning province, China, is an important stopover site for migratory birds on the Asia-Australia route, namely the flyway from the Arctic Circle through Southeast Asia to Australia and New Zealand. It is located at a chokepoint between the desert in the west and small mountains in the east, meaning most migratory birds have to fly over the lake during their migration (Figure 29). Past management of the lake had led to an increase of water levels, destroying habitats favourable to birds and causing a very significant drop of bird populations. In 2013, the AFD (French Development Agency) agreed to fund the Wolong Lake Ecological Restoration Project aiming to contribute to the sustainable development of the area and restore biodiversity habitats. The project led to the building of a dyke to allow a differentiated management of water level, splitting the lake into a water reservoir in its northern part and a wetland in its southern part.

The case study seeks to explore the evaluation of the biodiversity footprint of AFD-funded projects through the Wolong lake example. The objective is to refine the current internal indicators used by the AFD (Rio markers, biodiversity elements in Project Performance Management Systems or PPMS, etc.).

The perimeter of the case study is that of the AFD-financed project, *i.e.* the 2014-2018 period and the 6500 ha of the Wolong lake and its immediate surrounding. Only the Scope 1, *i.e.* the "direct operations" of the project is assessed (from the AFD perspective, it is the impact of a loan, and thus belongs to Scope 3 downstream).

UNEP/GEF Siberian Crane Wetland Project Sites
UNEP/GEF Siberian Crane Wetland Project Countries
Primary Migration Corridors for Siberian Cranes

Figure 29: ***The Wolong lake is located near site 3 (Xianghai) on the map****

**https://www.cms.int/siberian-crane/sites/default/files/uploads/SiberianCrane/SCWP_final_low_spreads-reduced.pdf*

4.1.2 Methodology

A refined *ex post*[54] assessment based on direct biodiversity state measures is conducted.

This is the first GBS case study involving (partial) MSA assessment based on direct measurements of the state of biodiversity. Usually, data from ecological surveys are too incomplete or inaccurate to be used directly to assess MSA values. The Wolong project included an ecological monitoring component which provided a wealth of data on birds. This allowed to assess bird abundances with enough confidence to pilot a protocol for the assessment of MSA based on biodiversity state data and apply it with the case of Wolong birds.

MSA is defined theoretically as:

$$MSA = \frac{1}{N_{reference\ species}} \sum_{i=1}^{N_{reference\ species}} \text{Min}\left(\frac{A_{observed}(i)}{A_{intact}(i)}, 100\%\right),$$

Where

MSA = mean abundance of original species (those found in undisturbed ecosystems, thus excluding invasive species),

$N_{reference\ species}$ = total number of species in an undisturbed ecosystem,

$A_{observed}(i)$ = abundance of species *i* in the observed ecosystem,

$A_{intact}(i)$ = abundance of species *i* in an undisturbed ecosystem,

In order to assess the MSA of an ecosystem, three steps should therefore be followed:

- Determine the originally occurring species (and the invasive species which should be excluded from counts)
- Assess $A_{intact}(i)$ for each species
- Count populations to determine $A_{observed}(i)$

In practice, assessing the population of each original species would be near impossible and extremely costly. Two simplifications are thus considered: 1) only birds are included in the calculations for this case study (mammals, reptiles, amphibians, terrestrial invertebrates and vascular plants are usually considered to assess the MSA), 2) only some indicator species are monitored and are considered to represent the whole taxa.

(54) *Ex post* impact assessment of a project occurs after the project implementation, in opposition to *ex ante* impact assessment, which is a preliminary study of the future project impacts.

All three steps have to be conducted by biodiversity specialists. For the case study, a bird specialist familiar with the project was interviewed. If a full-scale assessment (and not an exploratory case study) was conducted, involving more biodiversity experts would have been necessary to prevent any bias.

The **first step** and the choice of indicator species rely on the guidelines provided by reports issued by RIVM, a Dutch public environment agency (Ten Brink et al. 2000). In particular, the reports define 12 criteria to choose indicator species.

In the **second step**, the assessment of $A_{intact}(i)$ can also be called the "assessment of the 100% abundance" for each species. The Important Bird Areas (IBA) framework of BirdLife provides guidelines on how to assess the "optimum [population size] for the site": it can be calculated as the *estimated extent of potential habitat* multiplied by the *population density in undisturbed conditions* (BirdLife International 2006). The estimated extent of potential habitat has to be assessed by biodiversity specialists based on the characteristics of the area evaluated. Ideally, population density in undisturbed conditions could be found in global databases gathering such information to facilitate assessments. However, such databases do not exist yet and assessments need to rely on published literature and expert knowledge.

The **third step** is more straightforward: all individuals of the indicator species chosen must be counted over a relevant period. Double counting must be avoided.

11 bird species were shortlisted by the expert to conduct the assessment. After a further screening during step 1, the 3 migratory species were excluded from the assessment as the variation of their populations may be due to factors uncorrelated with the site (*e.g.* pressures in their wintering or breeding sites). To derive MSA.km² from % MSA, % MSA values are multiplied by the corresponding surface.

4.1.3 Results and discussion

Figure 29 shows the evolution of the relative abundance of the 8 bird species between 2015[55] and 2018. The dashed line illustrates the evolution of the calculated MSA: MSA-bird-N which is based on nesting species.

Despite year on year variations for some species, the overall trend is clear: MSA-bird-N is multiplied by 4 between 2015 and 2018.

The increase from 2% MSA to 8% MSA translates into a gain of 4.5 MSA.km², an area comparable to an average "arrondissement" of Paris (Table 8). The static footprint is 92% MSA or 64 MSA.km² and can be seen as the potential gains of biodiversity which could be tapped if the restoration was expanded to the rest of the lake.

This first case study is an exploration of assessments based on direct measurements of biodiversity state (ecological survey) data. It highlights a number of limitations, providing guidance for potential future field-based assessments:

- Comprehensive assessments would require surveys which also include mammals, reptiles, amphibians, invertebrates and vascular plants;
- Multiplying assessments conducted by ornithologists on the list of species considered, their extent of suitable habitat and their undisturbed density should reduce the possible assessor bias;
- Gains of biodiversity take time and there is a time lag between ecological restoration projects and the recovery of species populations. Measuring the progress over a long time period is thus necessary to monitor gains;
- The coverage of species from all types of habitats need to be adequate to limit possible bias due to some species' specificities (in this case, more than one mudflat species should have been monitored);
- Technical difficulty to deal with species for which the global population is a limiting factor (a situation often faced by critically endangered species such as Siberian cranes): should their undisturbed population be capped by the current global population or should it be assessed as an hypothetical population (higher than the current global population)?
- Technical questions regarding the definition of the 100% undisturbed state: what should be considered as the reference in practice?

Most of these limitations could be alleviated if more time and budget was available to conduct the biodiversity footprint assessment.

4.1.4 Lessons learnt

The case study demonstrates that the GBS can take direct measurements of biodiversity state as input to assess biodiversity footprints.

It provides guidance on data requirements and order of magnitude for *ex ante* screening of projects (*i.e.* the AFD was able to calculate a "cost of restoration" or "return on investment" for the project, including from *ex ante* assessments of the project).

The *ex post* assessment of the project demonstrates that significant biodiversity gains are achieved. A relatively conservative evaluation shows a gain of **4.5 MSA.km²**, equivalent to 640 football pitches or to the yearly Scope 1 impact of 1 million tons of wheat produced in France.

(55) The project situation did not evolve much between 2014 and 2015 and the 2015 bird data is thus considered representative of the beginning of the project.

		2015 (baseline)	2018
Mean abundance of nesting birds	*% MSA*	2%	8%
	MSA.km²	1.0	5.5
Static footprint (100% - MSA-bird-N)	*% MSA*	98%	92%
	MSA.km²	64.0	59.5

Table 8: ***Evolution of the abundance of the 8 nesting bird species in Wolong lake area between 2015 and 2018 and associated static impact***

Oriental storks and restored habitats of Wolong Lake © X. Rufray/Biotope