Biodiversity monitoring plan

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1. Introduction

Eneco's biodiversity ambition is that, starting in 2025, all its investment decisions for new renewable assets should have a net positive effect on biodiversity. To enable this, a method has been developed for quantifying and qualifying the steps towards achieving a Biodiversity Net Gain (BNG) goal. A 10% BNG goal will be used for this purpose, although Eneco's target percentage may be changed if necessary. To reach this 10% BNG, the post-intervention asset situation should have a higher biodiversity value than the pre-intervention situation or baseline.

The tool found to be the most suitable for supporting Eneco's purposes was Biodiversity Metric, as used by the UK authorities. The Biodiversity Metric can be used to quantify and qualify nature restoration measures to produce net positive impacts. What nature restoration measures are needed for achieving a net positive situation depends on their impacts, and varies depending on the asset type and the landscape where the asset is situated. Accordingly, nature restoration is given shape as a series of packages designed to **achieve habitat improvement** for impacted species in such a way that a population increase of impacted species can be expected.

IUCN defines four stages in the process of planning and monitoring corporate biodiversity performance (Figure 1-1). Stages 1 and 2 provide the basis for developing a set of linked corporate-level biodiversity performance indicators in Stage 3. Stage 4 supports the implementation of systems to apply the indicators and the data that they produce. Stage 4 also includes evaluating the progress and the lessons learned. That evaluation should lead to periodic reviews of priorities, ambitions and indicators, essentially making this a circular process. Stages 1, 2 and 3 were used for developing the method for Eneco. The link between Stages 3 and 4 is developed in the present report. **Therefore, the development of a general monitoring framework for international use is the subject of this document.**

Figure 1-1. The stages of the guidelines for planning and monitoring corporate biodiversity performance by IUCN.

2. General monitoring framework

The starting point of the general monitoring framework is to know which habitats need to be restored and, therefore, monitored. This can be established once the T1 situation has been defined, with the associated nature restoration packages, since this implies that agreement has been reached on what Defra Biodiversity Metric scores need to be achieved for habitats, quality and projected timeframe. This monitoring plan focuses on habitats, as the Biodiversity Metric is used as a proxy for biodiversity and species diversity. Following the process of habitat restoration requires recurrent monitoring of the T1 situation to track two factors:

- Providing the data needed to verify achievement of the 10% BNG. This also requires defining how the biodiversity should develop over multiple years in a trajectory towards reaching its envisioned quality.
- Making use of adaptive management if it is established that the biodiversity is not developing according to plan.

Figure 2-1 shows an overview of the steps that need to be taken to track these two factors. In some instances, the actual practice might deviate from this general monitoring framework and approach. These instances, which are covered in Chapter 3 of this report, involve either of the following situations:

- Legislation requires additional biodiversity monitoring, and the logical course of action is integration with the required T1 monitoring of the Biodiversity Metric; or
- Adaptive management presents practical challenges, and additional biodiversity indicators need to be monitored in the search for answers. In this situation, biodiversity indicators that are linked directly to the nature restoration packages could provide a solution.

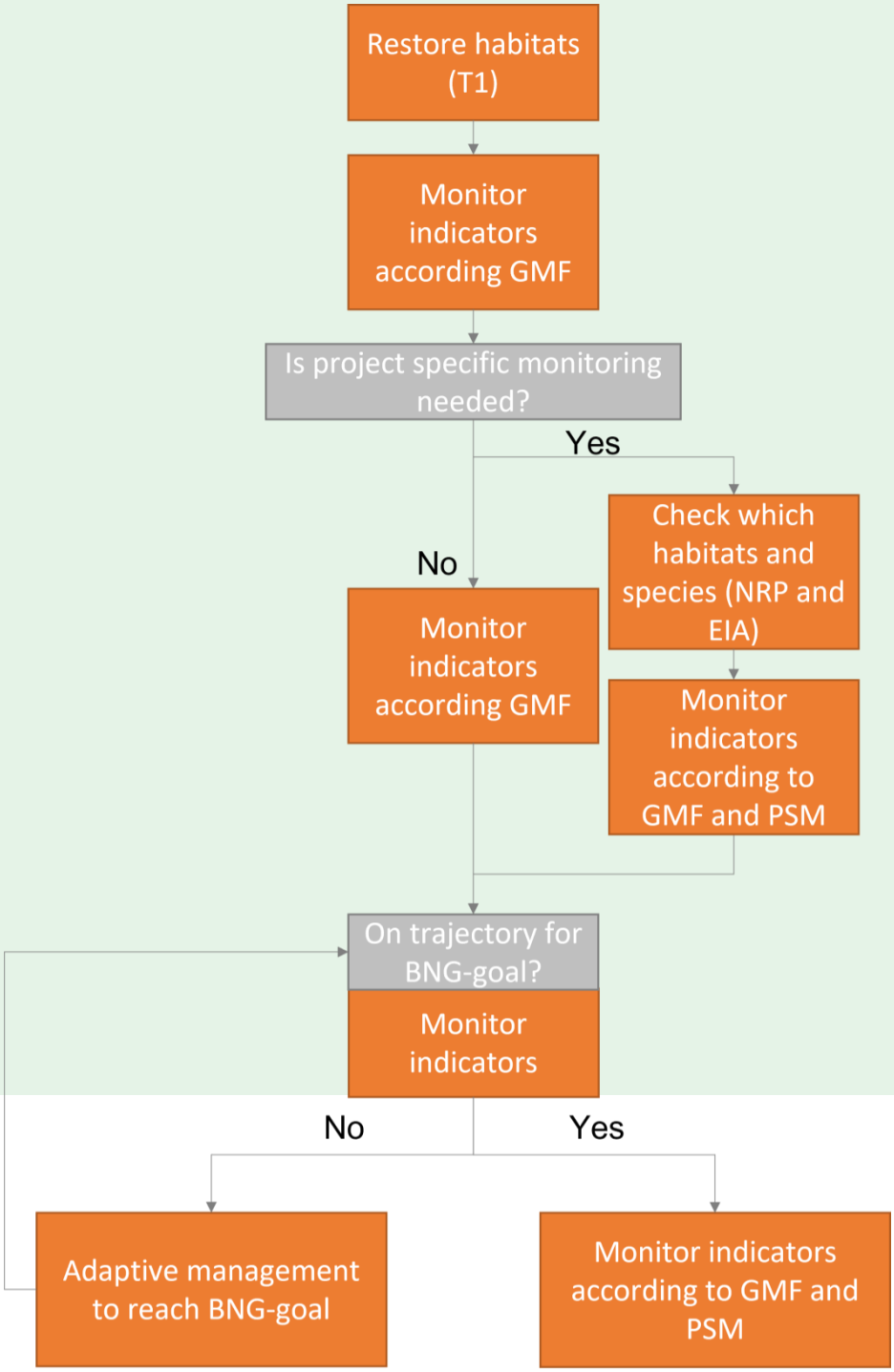

Figure 2-1. Flowchart of the steps defined in this monitoring plan to establish whether the goals are reached. NRP = Nature Restoration Packages, EIA = Environmental Impact Assessment, BNG = Biodiversity Net Gain, GMF = General Monitoring Framework, PSM = Project Specific Monitoring. Regarding the box on adaptive management: the possibility needs to be considered of incorporating additional indicators into the monitoring plan to define adequate adaptive management measures. If so, the additional indicators should provide direct information about the measures in the nature restoration packages.

2.1. T1 monitoring plan

The purpose of a monitoring plan is to ensure that everyone who uses it knows how everything works and who should do what. There are many different templates for monitoring plans, made by organisations such as IUCN, the World Bank, the Foundation of Success (FOS) and the European Investment Bank (EIB). Countries often also have local monitoring protocols. The key elements to establish for each plan are described in the paragraphs below, as follows:

Indicators	What will be measured
Methods	How will the indicators be measured
Timing/Frequency	When and for how long will the indicators be measured
Roles and responsibilities	Who will measure the indicators
Location	Where the indicators will be measured

Additionally, the present monitoring plan incorporates two further elements:

Monitoring report	Report on the biodiversity results (indicators, actions)
Adaptive management	What to do if the BNG goal/trajectory is not achieved

These elements can be different for every project; however, the assumption is that the monitoring plan will be generally applicable across all projects.

2.1.1 Indicators

Choosing the right indicators is crucial. They form the basis for the further elements of the monitoring plan. The methodology constructed for Eneco is based on the Biodiversity Metric, which defines a biodiversity value based on a consideration of various types of habitats and quality indexes for those habitats. The indicators are clear, therefore, and how they should be monitored is detailed in the manuals for the Biodiversity Metric, i.e. where it is explained how to score each of the indicators. The indicators of the Biodiversity Metric are:

1. Condition: score relative to others of the same type
2. Area (measured in hectares)
3. Distinctiveness: habitats that are scarce or declining typically score high
4. Strategic significance: "better" or more "joined-up" habitats situated in the area identified, typically in a relevant local strategy or plan, are considered to be of strategic significance for nature
5. Spatial risk indicators

Of this list, only condition and area are important for the monitoring framework. If the first two indicators, or at least the associated expectations, are met, the BNG goal has been achieved. A short explanation of these two indicators is given below. For detailed descriptions of these indicators and how to assess them, see the Defra User Guide[1] and Technical Supplement.[2]

[1] Panks , White, Newsome, Nash , Potter, Heydon, Mayhew, Alvarez, Russell, Cashon ,Goddard, Scott, Heaver, Scott, Treweek , Butcher and Stone 2022. Biodiversity metric 3.1: Auditing and accounting for biodiversity – User Guide. Natural England. http://publications.naturalengland.org.uk/publication/6049804846366720

[2] Panks , White, Newsome, Nash , Potter, Heydon, Mayhew, Alvarez, Russell, Cashon ,Goddard, Scott, Heaver, Scott, Treweek , Butcher and Stone 2022. Biodiversity metric 3.1: Auditing and accounting for biodiversity – User Guide. Natural England. http://publications.naturalengland.org.uk/publication/6049804846366720

The other three indicators are important for the final biodiversity value. However, they are treated as remaining static over time, and therefore do not need to be monitored.

Condition

As a component of quality, condition measures the biological working order of a habitat type, judged against the perceived ecological optimum for that particular habitat. It is, therefore, a means of measuring quality variations between patches of the same habitat type. The target condition of the restored habitat has an impact on how long the indicator needs to be monitored (e.g. it takes more time for a habitat to reach a good condition than a poor condition). Condition assessments are explained in the Technical Supplement of the Biodiversity Metric manual. Their use is detailed in Part 1a of the Technical Supplement. The Defra Biodiversity Metric

Area

Area measures the surface area of a habitat type. The larger the area is, the higher the biodiversity value will be. A habitat's surface area needs to be measured at every monitoring moment. If the T1 surface area is not attained, this could have a major impact on the biodiversity score. For the frequency of monitoring, see paragraph 2.1.3. Paragraph 2.1.7 describes what to do if the T1 surface area is not attained. Bear in mind that the area will generally have been defined upfront, and will therefore only require a check with the standard expectation that its size will remain static during the monitoring period.

2.1.2 Methods

The present paragraph discusses the methods for assessing and monitoring the T1 indicators. What methods are used will depend on the type of data and the level of detail needed to monitor the indicators. Furthermore, monitoring methods may also change over time. While there are many different methods that can be used, whatever methods are chosen should be:

- Accurate and precise (with minimal margin for error)
- Reliable (consistently repeatable with minimal variation in the results)
- Cost-effective and feasible
- Appropriate

The closest way of approximating these parameters is by giving maximum focus to the methods used in the Defra Biodiversity Metric. As explained in paragraph 2.1.1, condition and area are the indicators that need to be monitored.

Monitoring methods and data sources for biodiversity measurement derive from numerous sources, ranging from ecological field surveys to government databases and corporate disclosures (see Figure 2-2). However, in the context of the general monitoring framework as defined here, a field visit by an ecologist will be the most efficient and most effective way to rate both quality and surface area.

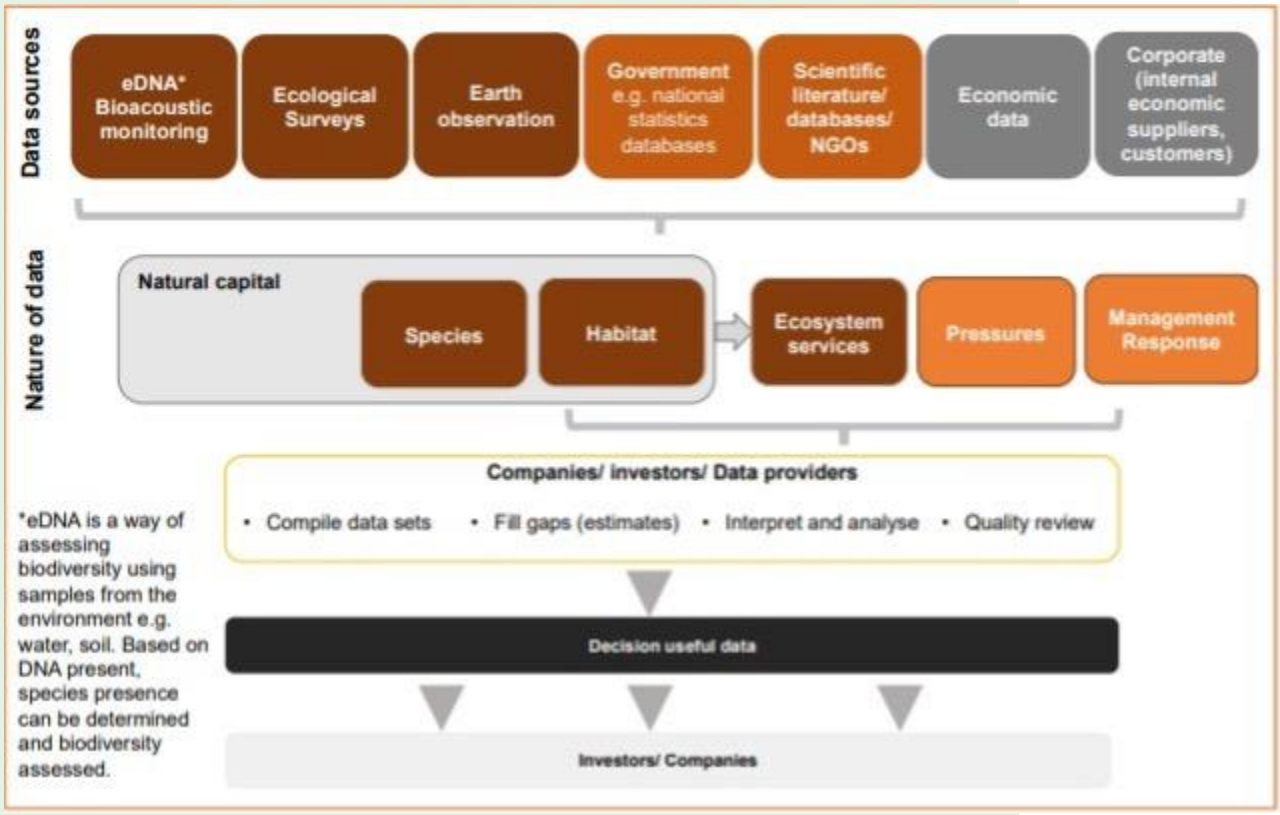

Figure 2-2. The biodiversity data landscape by Arcadis, 2022[3]

Although the methods for measuring condition and area often differ, there are similarities too. Both the indicators can be monitored using ecological surveys, which must be carried out by a qualified ecologist. Each survey should include a condition assessment according to the Defra Biodiversity Metric and, if possible, a measurement of the surface area per habitat. Habitat surveys can be undertaken year-round, though it is important to note that for most habitat types the optimum survey season is from April until the end of September, being the time of year with the greatest presence of biodiversity.

Possible methods for monitoring surface area

As noted above, a habitat's surface area can be measured through an ecological survey. However, depending on the scope of the habitat that is being restored, remote sensing may also be an option to explore. For example, the Intergovernmental Panel on Climate Change (IPCC) recommends combining remote sensing data with field inventories for estimating forest areas[4].

3 Arcadis, 2022. Critical assessment of biodiversity accounting approaches for businesses and financial institutions.

4 Mitchell, Anthea L, Ake Rosenqvist, and Brice Mora. 2017a. "Current Remote Sensing Approaches to Monitoring Forest Degradation in Support of Countries Measurement, Reporting and Verification (MRV) Systems for REDD+." Carbon Balance and Management 12 (1): 9. https://doi.org/10.1186/s13021-017-0078-9.

2.1.3 Frequency of monitoring

The amount of time needed for biodiversity to develop and reach the target condition of a habitat is an important factor, and one that affects the monitoring. The frequency and timeframe of measuring the indicators will depend on the type of habitat. Some habitats take years to develop (e.g. forest habitats), while others develop very quickly (modified grassland, for example).

The Defra Biodiversity Metric gives an indication of the amount of time (in years) that it will take to develop a new habitat to achieve the target condition. Depending on the type of habitat, it may take from 1 year to 30+ years to restore a habitat, based on the parameters of how the Biodiversity Metric has been set up. In concrete terms, this means that condition will initially score low, but gradually improve over multiple years until reaching the target condition. The frequency of monitoring will therefore vary by habitat and location, and should be determined on a project specific level (see Chapter 3).
For every year of the monitoring period, the results should be fed into the Defra Biodiversity Metric to see whether the restoration matches the BNG trajectory. If the results fall short, adaptive management will be required (see paragraph 2.1.7).

2.1.4 Roles and responsibilities

Monitoring should be carried out by an ecologist employed by Eneco or a subcontractor. The ecologist should carry out the habitat survey and condition assessment in accordance with the specifications of the Defra Biodiversity Metric. The ecologist should use the Defra Biodiversity Metric to determine each habitat's biodiversity value to see whether the restoration is proceeding according to the BNG trajectory. This ensures a pragmatic assessment. Habitat surveys can be undertaken year-round, though it is important to note that for most habitat types the optimum survey season is from April until the end of September.

Eneco may want to consider having a subcontractor carry out the monitoring, for greater objectivity.

2.1.5 Locations

It is important to select a good location for nature restoration: a wrong location could mean failure to achieve a potential BNG goal. Monitoring is needed at locations where nature restoration has been allocated close to renewable energy assets, although further monitoring might also be needed at locations further away. For an explanation of when to select a location closer to or further away from a renewable energy asset, see the Code of Conduct.[5]

2.1.6 Monitoring report

Annual reports should be provided on the biodiversity results (indicators, actions), addressing two issues:

- Providing the data needed to verify achievement of the 10% BNG. This also requires defining how the biodiversity should develop over multiple years in a trajectory towards reaching its envisioned quality.
- Making use of adaptive management if it is established that the biodiversity is not developing according to plan. In these situations, the report should also contain an update describing future actions. See also the following paragraph.

5 Draft Code of Conduct (Biodiversity Net positive assets)

2.1.7 Adaptive management

Various reasons exist for a failure to achieve the BNG Goal/trajectory, such as external factors, internal factors and realisation that the location is less suitable than expected. If the BNG trajectory is not on track, this needs to become apparent from monitoring the indicators, and it will be necessary to consider changing (or at least tweaking) the management approach. Reports on the biodiversity results (indicators, actions) must be provided each year, including an update on future actions. Future actions might include:

- Adjust the management at the site (e.g. mow 4 times per year instead of 2 times)
- Restore more habitats or larger areas
- Implement more measures (only for species)
- Restore new habitats (to match the landscape typology that is being restored)

Adaptive management should be implemented as fast as possible as soon as it becomes apparent that the BNG trajectory might not be reached on time. The reason for this is that it is easier to make adjustments early on in the nature restoration process. Following adaptive management, monitoring should take place every year for the next 5 years, to determine whether the adjustments have the desired effect and to ensure that further adaptive management specifics can be implemented where needed.

In a very small number of cases, adaptive management can be challenging in practice, and additional biodiversity indicators need to be monitored to find answers. In these situations, indicators for biodiversity directly linked to the nature restoration packages can provide a solution (see Chapter 3).

3. Project specific monitoring

The general monitoring framework constitutes the basis for developing a monitoring plan specific to each project. Details of how the condition is expected to change over time should be defined at the project level, on a year-to-year basis, across a long-term process towards reaching the target condition. For habitats, the condition will initially score low but gradually improve over multiple years until the target condition is reached. The frequency of monitoring therefore varies per habitat. This can be illustrated using the landscape typologies of agricultural fields and forest.

Agricultural fields contain three types of restored Defra habitats: modified grassland, bracken and mixed shrub. All the habitats of this landscape typology should be restored over a period of three years. The scores for each year are based on scores in the Defra Biodiversity Metric.

- Modified grassland has a final score of 1.62 habitat units, with a duration to the target condition of 3 years
  - After 1 year, ±0.50 (± 33%) habitat units are expected to be restored
  - After 2 years, ±1.12 (± 67%) habitat units are expected to be restored
  - After 3 years, ±1.62 (100%) habitat units are expected to be restored

- Bracken has a final score of 0.29 habitat units, and with a duration to the target condition of 1 year
  - After 1 year, ±0.29 (100%) habitat units are expected to be restored

- Mixed shrub has a final score of 0.35 habitat units, with a duration to the target condition of 3 years
  - After 1 year, ±0.25 (± 70%) habitat units are expected to be restored
  - After 2 years, ±0.30 (± 85%) habitat units are expected to be restored
  - After 3 years, ±.0.35 (100%) habitat units are expected to be restored

The trajectory for modified grassland shows that the habitat is monitored every year until it reaches the target condition. Landscape typologies with habitats that have longer recovery periods, e.g., forests, do not need to be monitored every year.

Like agricultural fields, forests contain three types of restored Defra habitats: other woodland: broadleaved, mixed shrub, and modified grassland. For the other woodland: broadleaved habitat, the time to the target condition can be up to 30 years. This habitat will be monitored at yearly intervals at the start of the restoration, as with the modified grassland example above. After the initial 5 years, the forest may be monitored every 3-5 years, to determine whether the restoration is proceeding according to the BNG trajectory, for example at the following intervals:

- After 5 year, ±40% of the habitat units are expected to be restored
- After 10 years, ±55% of the habitat units are expected to be restored
- After 15 years, ±70% of the habitat units are expected to be restored
- After 20 years, ±85% of the habitat units are expected to be restored
- After 25 years, ±95% of the habitat units are expected to be restored
- After 30 years, ±100% of the habitat units are expected to be restored

For every year when the habitat is monitored, the results should be fed into the Defra Biodiversity Metric, to determine whether the restoration is proceeding according to the BNG trajectory. If the results fall short, adaptive management will be needed (see paragraph 2.1.7).

In addition, some instances might deviate from this general monitoring framework and approach. These instances concern the following situations:

- Legislation requires additional biodiversity monitoring, and the logical course of action is integration with the required T1 monitoring of the Biodiversity Metric; or
- Adaptive management presents practical challenges, and additional biodiversity indicators need to be monitored in the search for answers. In this situation, biodiversity indicators that are linked directly to the nature restoration packages could provide a solution.

Additional requirements for biodiversity monitoring might emerge at the project level, as noted above. Such situations are addressed here, with an explanation of how to handle them.

3.1. Additional biodiversity requirements that follow from legislation, i.e. EIAs

Regardless of the positivity of the biodiversity approach, Eneco needs to comply with EIA requirements. There may be instances where EIA requirements mean that additional biodiversity monitoring is prescribed. In such cases, we recommend integrating that additional monitoring into the monitoring plan as developed for the Biodiversity Metric at the project level, wherever possible. Alignment can be sought about who will conduct the monitoring and about aspects of timing the monitoring, or possible links between EIA-required indicators and the nature restoration packages. Wherever possible, the methods applied should follow established, standardised protocols, to safeguard a harmonised approach and to ensure best practices.

Although this goes beyond the scope of the current report, we wish to highlight the need for standardised methods and for adhering to existing protocols. For a list of protocols that could be useful when incorporating additional indicators, see the IUCN Report (Annex 4).[6] Below is an example describing when a bird species would require specific monitoring based on an EIA.

6 Stephenson, P.J. and Carbone, G. (2021). Guidelines for planning and monitoring corporate biodiversity performance. Gland, Switzerland: IUCN.

Birds
Sovon has a large number of different protocols for monitoring bird groups (e.g. breeding birds[7] and wading birds[8]) and species such as the black-tailed godwit.[9] Those monitoring protocols may be used to identify potential indicators for specific bird species or groups. The measures for the black-tailed godwit focus on supporting breeding populations and increasing foraging areas. These measures mainly concern agricultural fields, focusing on extensive management of fields to increase food supplies and security for chicks. Outside the breeding period, there are measures to improve foraging areas by increasing groundwater levels and reducing eutrophication in fields.[10]

3.2. Adaptive management failing

Adaptive management sometimes presents practical challenges, and additional biodiversity indicators might be monitored in the search for answers about modifying the management. In this situation, biodiversity indicators that are linked directly to the nature restoration packages could provide a solution. Why this is the case, and how it should be approached, is explained below.

Nature restoration packages are tailored to specific species and habitats, using measurements that have been defined and that can be expressed in indicators specific to the follow-up. As a background, after the nature restoration packages were developed using the Biodiversity Metric, these needed to be 'translated' to align with the way in which habitats are described and scored in the Biodiversity Metric. As such, indicators of the Biodiversity Metric only provide indirect information about the specific measures included in the nature restoration packages. Therefore, if biodiversity developments appear not to be evolving according to plan, additional indicators might be incorporated that provide direct information about the measures of the nature restoration packages. Monitoring those additional indicators can provide a better understanding of how to adaptively change the nature management.

7 Boele A., van Bruggen J., Goffin B., Kavelaars M., Kleyheeg E., Koffijberg K., Schoppers J., van Turnhout C., Vergeer J.W. & Jansen D. 2022. Broedvogels in Nederland in 2020. Sovonrapport 2022/05. Sovon Vogelonderzoek Nederland, Nijmegen.

8 Van Roomen M., van den Bremer L., Koffijberg K., Schekkerman H. & Dommerholt G. 2021. Aanpak monitoring van effecten van maatregelen voor broedvogels in kader van Wij&Wadvogels. Sovon-rapport 2021/105. Sovon Vogelonderzoek Nederland, Nijmegen.

9 Van der Wal J. & Teunissen W. 2018. Boerenlandvogels en predatie: een update van de huidige kennis. Sovon-rapport 2018/31. Sovon Vogelonderzoek Nederland, Nijmegen.

10 Bouwsteen ten behoeve van het Strategisch Plan Natura 2000. A156