

Title MSc project: Evaluation of the effectiveness of Biodiversity Offsetting scheme in North-Brabant

Assignment number:
24.23

Internal project

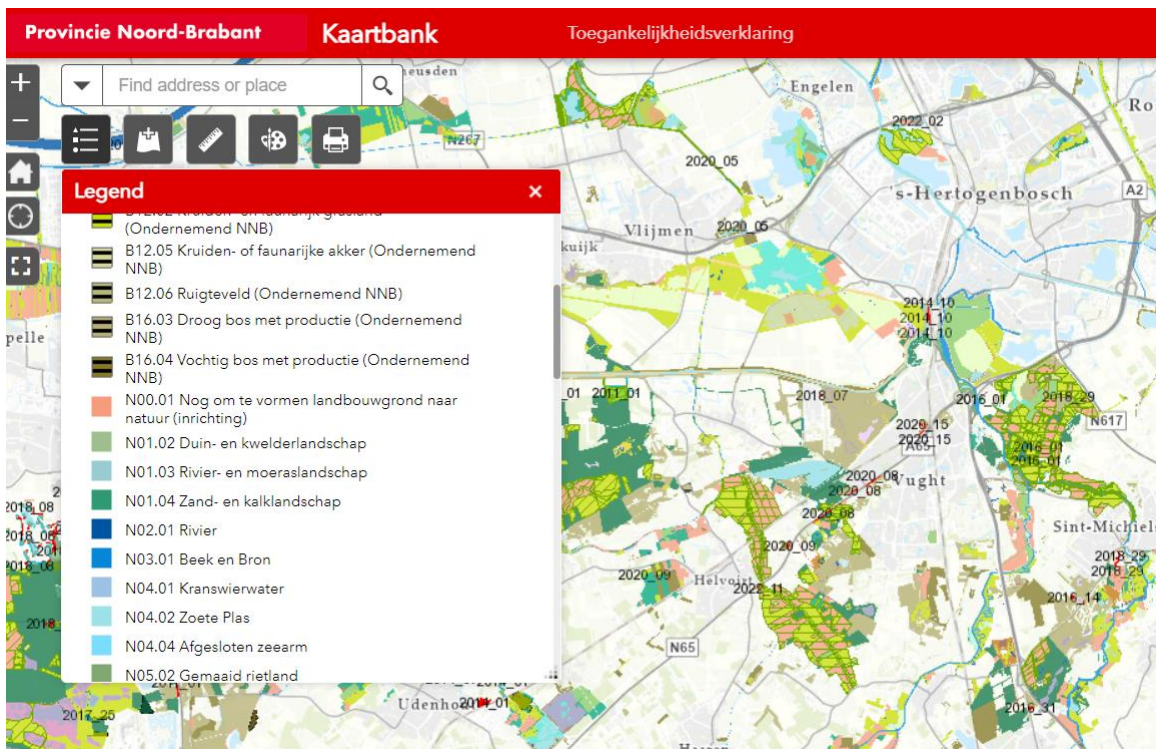
Head graduation committee
TBD

Daily supervision
Dr. Rosalie Arendt, Dr. Egor Prikaziuk (ITC)

Recommended skills/courses: courses entailing remote sensing, experience with GIS software, willingness to engage with legal texts in Dutch

Involved organisations: internal

Start of the project: flexible



Short description of project aim and motive:

Biodiversity loss is one of the main challenges that our society faces today and the current loss of biodiversity caused by human actions is referred to as the 6th great extinction. Biodiversity extinction has many drivers, but land use for agriculture and the development of settlements and infrastructure is the most significant (Newbold et al. 2015, Secretariat of the Convention on Biological Diversity, 2020).

One policy response to halt biodiversity loss is the so-called **no-net-loss policy**, which is usually combined with the mitigation hierarchy. The mitigation hierarchy states that impacts to biodiversity should be avoided, reduced, and only the unavoidable impact should be offset.

The most relevant protection policy in the EU and also in the Netherlands is the 1979 *Birds Directive* and the 1992 *Habitats Directive* based on which Natura 2000 sites are determined. The legislation entails the mitigation hierarchy and a compensation aspect to it, which is also implemented in the Netherlands (Beleidsregel natuurcompensatie, 1998). Therefore, the development of protected ecosystems has to be offset by recreating an ecosystem of similar quality in close proximity to the developed site. Evaluation of no-net-loss and compensation measures in biodiversity offsetting is rare, especially post-implementation and across different countries (zu Ermgassen et al. 2019). This is also related to a lack of data transparency (Bull et al. 2018). The implementation foresaw that every Dutch province is responsible for the implementation of a no-net-loss policy itself, therefore also the province of North-Brabant has its own implementation. North-Brabant is the region with the best documentation of developed and compensated sites in the Netherlands (Province North-Brabant, 2023). In this thesis, you will evaluate if the implementation of biodiversity compensation policy in North-Brabant result in no-net-loss of forest cover and the forest cover diversity, when compared to the destroyed sites.

Research objective

You will get familiar with the biodiversity offsetting scheme in the Netherlands and its implementation in North-Brabant. You will select sites where land development and compensation have taken place, whose development can be evaluated through remote sensing (e.g. forest cover development). You will evaluate developed sites in North-Brabant and the resulting forest cover loss and compare it with the forest cover gain in compensation sites to judge the effectiveness of the scheme.

Method

- Literature analysis to get familiar with the current biodiversity compensation scheme in the Netherlands and in North-Brabant in particular.
- Selection of destroyed vegetation and compensation sites based on provided [spatial data](#) of the North-Brabant province (land cover classification maps, 0.25 m aerial photos).
- Evaluation of forest cover development in destroyed area and selected area for compensation with remote sensing.
- Spectral diversity indices (Rocchini et al., 2022)

Expected result

You quantify the forest cover development in compensation and developed sites in North-Brabant with the help of remote sensing. You match the sites with losses with sites with gains and identify if no-net-loss was achieved. Potentially you develop a visualization tool to identify the effectiveness of the different offsetting sites.

References

- Newbold, T., Hudson, L., Hill, S. et al. Global effects of land use on local terrestrial biodiversity. *Nature* 520, 45–50 (2015). <https://doi.org/10.1038/nature14324>
- Secretariat of the Convention on Biological Diversity (2020) Global Biodiversity Outlook 5. Montreal.
- Beleidsregel natuurcompensatie, (1998, 1 september), accessed at: <https://wetten.overheid.nl/BWBR0009742/1998-09-01/0/informatie>

Bull, J.W., Brauner, K.M., Darbi, M., Teeffelen, A.J., Quétier, F., Brooks, S.E., Dunnett, S., & Strange, N. (2018). Data transparency regarding the implementation of European 'no net loss' biodiversity policies. *Biological Conservation*, 218, 64-72 <https://doi.org/10.1016/j.biocon.2017.12.002>

zu Ermgassen SOSE, Baker J, Griffiths RA, Strange N, Struebig MJ, BullJW. The ecological outcomes of biodiversity off-sets under 'no net loss' policies: A global review. *Conservation Letters*. 2019;12:e12664. <https://doi.org/10.1111/conl.12664>

(Provincie North-Brabant, 2023) Natuurbeheerplan, Natuurcompensatiekaart, accessed at:

<https://georegister.brabant.nl/geonetwork/srv/eng/catalog.search;jsessionid=1F7DCFB35DE2A4FFE7BB1A3A50793EF#/metadata/54ceaacc-3978-4c2d-9572-db33aacbed7e?tab=general> online visualization: <https://noord-brabant.maps.arcgis.com/apps/webappviewer/index.html?id=b6414403ef5e4e9aa8875a7c366209c6>

Rocchini, D., Santos, M. J., Ustin, S. L., Féret, J., Asner, G. P., Beierkuhnlein, C., Dalponte, M., Feilhauer, H., Foody, G. M., Geller, G. N., Gillespie, T. W., He, K. S., Kleijn, D., Leitão, P. J., Malavasi, M., Moudrý, V., Müllerová, J., Nagendra, H., Normand, S., ... Lenoir, J. (2022). The Spectral Species Concept in Living Color. *Journal of Geophysical Research: Biogeosciences*, 127(9). <https://doi.org/10.1029/2022JG007026>