

Appendix A

Modelling and Mapping regional “no net loss of biodiversity”

CCE Call for Data 2012-2014

This appendix is a reprint of the instructions for the 2012-2014 Call for Data.

Summary

At the last CCE workshop (Warsaw, 16-19 April 2012) a new way forward was proposed to enable the (trans-boundary) comparison of effect indicator-values in a harmonized way. The aim is to assess to which extent “no net loss of biodiversity” is achieved using suitable biodiversity endpoints (e.g. protection of rare species, provisioning, regulating or cultural services) of interest on a regional scale.

This Call for Data – adopted by the Working Group on Effects at its 31st session (Geneva, 20-21 Sep 2012) – aims to respond to the Convention Long-term Strategy and to extend capabilities of NFCs and the CCE to support European environmental policies with information on adverse effects to biodiversity caused by air pollution, including interactions with climate change.

After recapitulating the background for this Call for Data, its objectives are formulated. This is followed by a description of the technical requirements for submitting the requested data to the CCE.

1. Background

At its 25th session in 2007 the Executive Body agreed to encourage the Working Group on Effects “... to increase its work on quantifying effects indicators, in particular for biodiversity. These should also be linked to the integrated assessment modelling activities” (ECE/EB.AIR/91, para. 31). This has been confirmed in the Long-term Strategy of the Convention till 2020 which “set a vision for the next 10 years and beyond to address the remaining issues from existing activities and to meet emerging challenges with the aim of delivering a sustainable optimal long-term balance between the effects of air pollution, climate change and biodiversity” (ECE/EB.AIR/2010/4, para 6a).

In this context it is worth noting that this Call also addresses indicators of the Convention on Biological Diversity (CBD) and the pan-European initiative, launched in January 2005 to develop appropriate indicators to assess achievement of the 2010 biodiversity target at European level - Streamlining

European 2010 Biodiversity Indicators – (SEBI 2010). For example, at its 10th COP meeting (Nagoya, 29 October 2010) the CBD strategic plan for biodiversity 2011–2020, which is the basis for the EU biodiversity strategy to 2020, identified 5 strategic goals for biodiversity (including the so-called “AICHI targets”³). For Europe, the EU specified six 2020-biodiversity targets⁴. For more detailed background information, NFCs may wish to consult the documents listed in the CCE Call for Contributions of 2011-2012.

In particular for EU Member States, results of this work could contribute and support the EU 2020 headline target “halting the loss of biodiversity and the degradation of ecosystem services in the EU by 2010, and restoring them in so far as feasible, while stepping up the EU contribution to averting global biodiversity loss”. This objective has been abbreviated in the EU to “no net loss of biodiversity and ecosystem services” (EU, 2011, p.12, Target 2, Action 7) which we simplified to “no net loss of biodiversity” for the purpose of this Call.

Since 2007, the ICP Modelling and Mapping followed up on the request by the Executive Body by addressing biodiversity in its work programme. The work materialized, *inter alia*, in Task Force Meetings, CCE workshops, CCE Status reports (Hettelingh et al. 2008, 2009), a workshop on the “Review and revision of empirical critical loads and dose response relationships” (Bobbink and Hettelingh 2011) and by means of well-defined calls for data (Slootweg et al. 2011, Posch et al. 2011, 2012) among the ICP M&M network of National Focal Centres (NFCs). The focus of those calls was on familiarizing NFCs with new modelling approaches that address interactions between dynamics of soil chemistry and vegetation at test sites in their countries.

This Call takes this work forward by exploring ways to lay the ground for formulating nitrogen dose-response relationships on a regional (EUNIS) scale, upscaling from individual sites.

A method to explore this was presented and accepted at the 22nd CCE workshop and 28th Task Force M&M Meeting (Warsaw, 16-19 March 2012). A proposal for the Call was then adopted at the 31st session of the Working Group on Effects (Geneva, 20-21 September 2012).

To give NFCs more time to deal with this rather complex task, it was agreed to set the deadline for spring 2014. This will allow an interim review and discussions at the 23rd CCE workshop and 29th Task Force M&M meetings (Copenhagen, 8-11 April 2013).

2. Objectives

The objective of this Call for Data is to compile output variables of soil-vegetation models for every EUNIS class (level 3) within the country (preferably in Natura2000 or other protected areas). This should enable the calculation of (country-specific) biodiversity indicators for (scenario) assessment of changes in biodiversity on a regional scale.

Output variables will depend on the model chosen by the NFC (e.g. species composition, strength, abundance). Countries are encouraged to compute from the model output their selected biodiversity indicator. An overview, written by various authors and ICP M&M participants, of biodiversity indicator concepts and examples can be found in CCE Status reports (Hettelingh et al. 2009 and Slootweg et al. 2011, part 2 & Annex 4A).

The final goal is to derive a harmonized metric from these submitted variables and indicators with the objective to quantify “no net loss of biodiversity” on a regional scale. This harmonized metric allows comparisons of the state of biodiversity between regions and countries. Finally, the indicator should be easily applicable for European policy support in the context of Integrated Assessment Modelling and the GAINS system⁵.

³ <http://www.cbd.int/sp/targets/>

⁴ COM(2011) 244 final: [http://ec.europa.eu/environment/nature/biodiversity/comm2006/pdf/2020/1_EN_ACT_part1_v7\[1\].pdf](http://ec.europa.eu/environment/nature/biodiversity/comm2006/pdf/2020/1_EN_ACT_part1_v7[1].pdf) also see <http://biodiversity.europa.eu/bise/policy/eu-biodiversity-strategy>

⁵ The GAINS-system consists of a combination of both hard linked (embedded in the GAINS computer code) and soft-linked assessment options. The latter is also known as “ex-post”-assessment under the LRTAP Convention. A component of the FP7 ECLAIRE project is also contributing to this task.

3. A possible step-by-step procedure for deriving a biodiversity metric

This section provides a description of the steps to derive simple EUNIS-specific relationships between N deposition and a biodiversity indicator. That is then normalized by the CCE to express “no net loss of biodiversity” (NNLB) for each EUNIS class in a country.

In the following stepwise approach the NFC:

- (1) ... selects (at least) two sites within every (level-3) EUNIS class present in the country (preferably in a Natura 2000 area), for which the chosen soil-vegetation model (‘the model’) can (or has been) calibrated (with historic depositions);
- (2) ... selects the endpoint pertinent to the site and a corresponding biodiversity indicator;
- (3) ...runs the model (e.g. VSD+Veg) (a) with (at least) the background and the GP positions to 2100 (provided by the CCE);
- (4) ...reports the indicator values and other variables computed for 2100 to the CCE (see technical description below).

This submitted data will be used by the CCE to derive the no-net-loss-index for each run by appropriately scaling the results and possibly derive dose-response functions per EUNIS class in each country. The resulting database is aimed assessment of adverse effects to biodiversity for any emission scenario.

References

- Bobbink R and Hettelingh J-P (eds), 2011. Review and revision of empirical critical loads and dose response relationships. Proceedings of an international expert workshop, Noordwijkerhout, 23-25 Juni 2010, RIVM-report 680359002, Coordination Centre for Effects, RIVM, Bilthoven.
- EU, 2011. Communication from the Commission to the European Parliament, the Council, the Economic and Social Committee and the Committee of the Regions: Our life insurance, our natural capital – an EU biodiversity strategy to 2020, SEC(2011) 540 final, SEC(2011)541 final, http://ec.europa.eu/environment/nature/biodiversity/comm2006/pdf/2020/1_EN_ACT_part1_v7%5B1%5D.pdf, consulted 7 November 2012.
- Hettelingh J-P, Posch M, Slootweg J, 2008. Critical load, dynamic modelling and impact assessment in Europe, CCE Status Report 2008, Netherlands Environmental Assessment Agency Report 500090003, ISBN: 978-90-6960-211-0, 230 pp., www.rivm.nl/cce.
- Hettelingh J-P, Posch M, Slootweg J, 2009. Progress in the modelling of critical thresholds, impacts to plant species diversity and ecosystem services in Europe, CCE Status Report 2009, Netherlands Environmental Assessment Agency Report 500090004/2009, ISBN: 978-90-78645-32-0, 130 pp., www.rivm.nl/cce
- Posch M, Slootweg J, Hettelingh J-P (2011), Modelling critical thresholds and temporal changes of geochemistry and vegetation diversity, CCE Status Report 2011, RIVM report680359003, ISBN 978-90-6960-254-7, RIVM, Bilthoven, The Netherlands, www.rivm.nl/cce
- Posch M, Slootweg J, Hettelingh J-P (2012), Modelling and Mapping of atmospherically-induced ecosystem impacts in Europe, CCE Status Report 2012, RIVM, Bilthoven, The Netherlands, *in prep*.
- Slootweg J, Posch M, Hettelingh J-P (eds), 2011. Progress in the modelling of critical thresholds and dynamic modelling, including impacts on vegetation in Europe: CCE Status Report 2010. RIVM Report 680359001/2011, Coordination Centre for Effects, Bilthoven, Netherlands, 182 pp www.rivm.nl/cce

4. Technical requirements

The dataset to be submitted consists of four tables with information on the sites and on each model run. With this call, an Access database is attached including the format of these tables. You are strongly urged to follow exactly this structure and preferably use the provided Access-file. Also accepted as submission are Excel-files or comma-delimited (.csv) files, which have the same structure as the Access database described below.

Every submission should be accompanied with a description of how the data has been derived, preferably in a Word-document. This documentation will be included in the 2014 CCE Status Report as National Report.

In earlier calls that included dynamic modelling the CCE provided the NFCs with depositions of nitrogen and sulphur, historic, from 1880 up to 2010 as well as the 'background' deposition (BKG) - the low scenario for this call. This deposition dataset is now extended with the deposition of the revised Gothenburg Protocol (GP). A dataset will be made available for every country separately.

The **deadline** for the submission is **3 March 2014**. During the 2013 CCE workshop (8-11 April in Copenhagen) issues relating to this call will be on the agenda. It might be useful to make test runs for a few sites before the workshop, in order to flag potential problems.

Please email your **submission** to jaap.slootweg@rivm.nl. Please delete the deposition tables from the database and 'compact and repair' it before submitting. You will find this procedure in the access-help files. You may compress the file, but if you do, please use the plain 'Legacy compression' algorithm from WinZip.

It is important to use 'null' (i.e. "nothing") to indicate **missing or no value**, and **not** (e.g.) '1' or '999' or 'o'. The **software** provided by the CCE (the template Access database) has possibilities for performing consistency checks on your database. You are kindly urged to apply them. Open the form 'tests' and press the button "Run All Tests". Some of the checks verify the values to be in a meaningful range for the variable. It can be that some of the 'records' in your country have exceptional values. In those cases you can regard the messages as mere warnings.

Data structure

A submission consists of four tables. "Ecards" is the usual table for the site information. Every row in the "DRpoint" is a point for the potential dose-response relationship with a species composition in the "Composition" table. The table "RefComposition" holds the reference composition needed for calculating beta-indices, such as similarity. The four tables are related according Figure 1.

Descriptions of the four tables are given below.

Figure 1. Basic data structure for a single site the Call for Data.

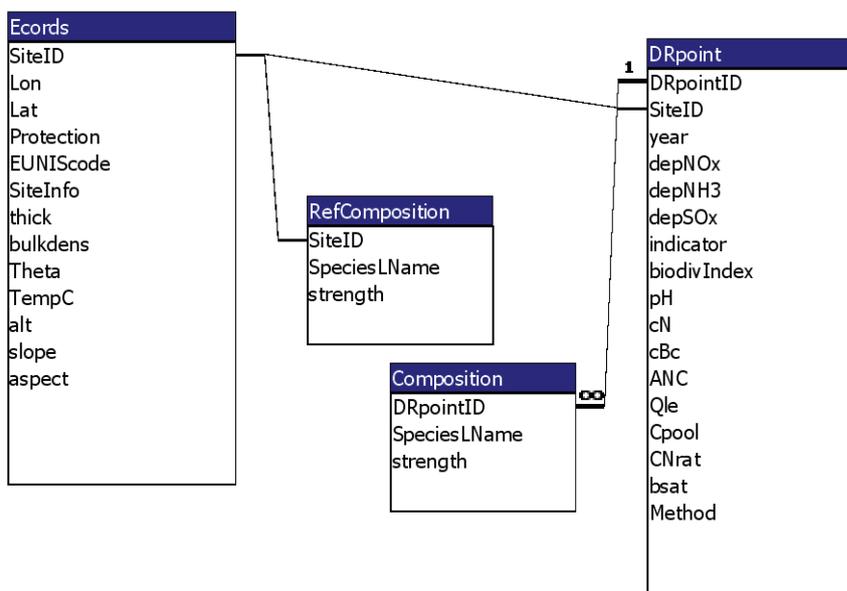


Table 1. Fields of the *Ecords* table.

| | |
|------------|--|
| SiteID | Unique number identifying the site |
| Lon | Longitude (decimal degrees) |
| Lat | Latitude (decimal degrees) |
| Protection | 0: No specific nature protection applies 1: Special Protection Area (SPA), Birds Directive applies 2: Special Area of Conservation (SAC), Habitats Directive applies 3: SPA and SAC (1 and 2) 4: SPA or SAC (1 or 2) [don't know which one(s)] 9: a national nature protection program applies (but not 1 or 2!) -1: protection status unknown |
| EUNIScode | EUNIS code, max. 6 characters (including possible dot) |
| SiteInfo | Optional description/name of the site |
| Thick | Thickness of the root zone [m] |
| Bulkdens | Bulk density of the soil [g/cm ³] |
| Theta | Water/moisture content [m ³ /m ³] |
| TempC | Temperature [°C] |
| Alt | Altitude above sea level [m] |
| Slope | Slope [degrees, <90] |
| Aspect | Angle, clockwise from North, to the projection of the normal vector of the slope onto a horizontal plane [degrees <360] |

Table 2. Fields of the *DRpoint* table.

| | |
|-------------|--|
| DRpointID | Unique number identifying the point |
| SiteID | Reference to <i>Ecords</i> table (see Table 1) |
| Year | Gregorian calendar (A.D.) |
| depNOx | Total deposition of NO _x |
| depNH3 | Total deposition of NH ₃ |
| depSOx | Total deposition of SO _x |
| indicator | 1: Shannon, 2: Simpson, 3: Similarity, 4: Kullback 8: number of species, 9: other [Nat.Report] |
| BiodivIndex | The actual value for the indicator above for this point |
| pH | in soil solution |
| cN | [N] in soil solution [meq/m ³] |
| cBc | [Ca+K+Mg] in soil solution [meq/m ³] |
| ANC | Acid Neutralizing Capacity [meq/m ³] |
| Qle | Percolating water [mm/a] |
| Cpool | Carbon pool [g/m ²] |
| CNrat | Carbon-Nitrogen ratio [g/g] |
| Bsat | Base saturation [-] |
| Method | 1: Calibrated and GP, 2: Calibrated and BKG, 3: measured, 9: other |

Table 3. Fields of the *Composition* table.

| | |
|--------------|--|
| DRpointID | Reference to DRpoint (see Table 2) |
| SpeciesLName | Latin name of the (plant) species |
| strength | Species strength in relation to others or relative abundance |

The structure of the table “*RefComposition*” is identical that of the table “*Composition*”.

For questions or remarks, please contact us at jaap.slootweg@rivm.nl or max.posch@rivm.nl