Planbureau voor de Leefomgeving

154

User documentation MOVE4 v 1.0

G.W.W. Wamelink
R.M. Winkler
F.G. Wortelboer

werkdocumenten

WOt
Wettelijke Onderzoekstaken Natuur & Milieu

WAGENINGEN UR
For quality of life

User documentation MOVE4 v 1.0

The 'Working Documents' series presents interim results of research commissioned by the Statutory Research Tasks Unit for Nature & the Environment (WOT Natuur & Milieu) from various external agencies. The series is intended as an internal channel of communication and is not being distributed outside the WOT Unit. The content of this document is mainly intended as a reference for other researchers engaged in projects commissioned by the Unit. As soon as final research results become available, these are published through other channels. The present series includes documents reporting research findings as well as documents relating to research management issues.

This document was produced in accordance with the Quality Manual of the Statutory Research Tasks Unit for Nature & the Environment (WOT Natuur & Milieu) and has been accepted by Paul Hinssen programme coordinator of WOT Natuur & Milieu.

WOt Working Document **154** presents the findings of a research project commissioned by the Netherlands Environmental Assessment Agency (PBL) and funded by the Dutch Ministry of Agriculture, Nature and Food Quality (LNV). This document contributes to the body of knowledge which will be incorporated in more policy-oriented publications such as the Nature Balance and Environmental Balance reports, and Thematic Assessments.

User documentation MOVE4 v 1.0

G.W.W. Wamelink

R.M. Winkler

F.G. Wortelboer

Werkdocument 154

Wettelijke Onderzoekstaken Natuur & Milieu

Wageningen, December 2009

Abstract
Wamelink, G.W.W., R.M. Winkler & F.G. Wortelboer (2009). *User documenttation MOVE4 v. 1.0.* Wageningen, Statutory Research Tasks Unit for Nature & the Environment, WOt-werkdocument 154. 69 p. 19 fig.; 4 tab.; 13 ref.; 4 annex.

The model MOVE4 calculates the chance of occurrence of over 900 Dutch plant species for abiotic soil conditions and physical geographical region. In this report we describe how the model can be run (technical documentation). This includes metainformation of the model, borders applications of the model in projects etc. This document is produced within the framework of the quality status (i.e. quality assurance) of the model MOVE4

Key words: model quality, MOVE, plant species, sensitivity, uncertainty

Postbus 47, 6700 AA Wageningen
Tel: (0317) 48 07 00; fax: (0317) 41 90 00; e-mail: info.alterra@wur.nl

Netherlands Environmental Assessment Agency (PBL)
Postbus 303, 3720 AH Bilthoven
Tel: (030) 274 274 5; fax: (030) 274 44 79; e-mail: info@pbl.nl

---

The Working Documents series is published by the Statutory Research Tasks Unit for Nature & the Environment (WOT Natuur & Milieu), part of Wageningen UR. This document is available from the secretary's office, and can be downloaded from 0Hwww.wotnatuurenmilieu.wur.nl.

Statutory Research Tasks Unit for Nature & the Environment, P.O. Box 47, NL-6700 AA Wageningen, The Netherlands
Phone: +31 317 48 54 71; Fax: +31 317 41 90 00; e-mail: 1Hinfo.wnm@wur.nl;
Internet: 2Hwww.wotnatuurenmilieu.wur.nl

Contents

Summary

The model MOVE4 has been developed to calculate the chance of occurrence of plant species as a result of Ellenberg indicator values, the physical geographical region in the Netherlands and the vegetation type for over 900 Dutch plant species. The model was developed by F.G. Wortelboer of the PBL (Netherlands Environmental Assessment Agency). The gain the so called A-quality status, an internal Alterra quality assurance, several tests and descriptions have to be made. In this report we describe some of the aspects that are necessary to fulfil the quality status.

The report contains metainformation about MOVE4, including:
1. The boundaries of the model, application area and needed prior knowledge of the user,
2. A user documentation part with instructions how to use the model,
3. A short description of the sensitivity and uncertainty analyses carried out
4. A short description of the projects the model has been used for.

Other documents will be produced or are produced (scientific report, development wishes etc.) to fulfil to quality status demands.

1 Meta information of MOVE4

Name	:	MOVE
Version	:	4
Release date	:	2004
Executable	:	In the Natureplanner called from Arisflow As standalone called by starting the ACCESS file (Move 4 Bereken Responsies XP.mdb) or by a bat-file
Platform	:	Dos, Windows XP or later
Costs	:	free of charge
Contact	:	Wieger Wamelink (wieger.wamelink@wur.nl)
Support	:	None, unless agreed otherwise
Output	:	MS ACCESS database version 2003
Time step	:	-
Resolution	:	Free (depending on the input)
Model type	:	Statistical model
Doc. Date	:	30-6-2009
Disclaimer	:	PBL nor Alterra nor the model makers are responsible for any (financial) damage that the model may cause in any way.

MOVE4

The model MOVE4, like his predecessors, calculates the chance of occurrence of plant species for given soil circumstances (Ellenberg F, R and N), vegetation type, the region in The Netherlands (FGR) and salt indicator value. The model is calibrated using a database containing over 100,000 vegetation relevés made in The Netherlands. This resulted in a response function for over 900 species for the above mentioned input parameters. MOVE4 is in principal a statistical model. The model itself consists of two ACCESS files; one containing parameter values and the selected plant species and one with the program itself, written in a combination of Visual basic for ACCESS including SQL statements and SPlus.

Input

MOVE4 needs a number of input files. There are two different types of files, the ascii-grids that contain the data used for the calculation and two steering files. The two steering files are MOVE.ini and BIODIV.ini. They contain info on the settings for the model and the paths and names for the input files. The ascii-grids contain besides header info on the Ellenberg indicator values for F, R and N, the vegetation type, region and salt. All files are described in the user documentation.

Alternatively, MOVE4 can also use the input data directly given in an ACCESS database. The info needed is similar to the input described above. Then the BIODIV.ini file is not needed and the content of the MOVE.ini file differs from the one mentioned above.

Output

The output of MOVE4 is stored in an ACCESS -database. It contains a Table with the chance of occurrence of the selected species and also the 95% confidence interval of the calculated chance on the basis of the model uncertainty. The output also contains tables with info on the used input.

SMART2-SUMO2-P2E
The input for MOVE4 is normally modelled by the model chain SMART2-SUMO2-P2E. However, input like the Ellenberg indicator value files may also be generated in a different way.

DIMO
The newly developed model DIMO is designed to correct the output from MOVE2 for present day occurrence of plant species, seedbank occurrence and dispersal capacity. The maps provided by MOVE4 per species can be used for input in DIMO.

Application area
MOVE4 is designed for The Netherlands. It is also calibrated for the Netherlands, so application outside the Netherlands is not recommended without further tests and new calibration. The calibration set used exists of relevés made in natural areas. Strictly speaking this also limits the model to natural areas only.

Prior knowledge
To be able to run MOVE4 as a standalone model basic knowledge of windows or DOS and ACCESS is necessary. To be able to run MOVE4 as an integrated part of the Natureplanner knowledge of the Natureplanner as well as some knowledge of ArisFlow is necessary.
To be able to understand the results a basic ecological education is necessary. However, that may not be sufficient in some cases.

2 Introduction

The model MOVE4 was developed as a follow up of the model MOVE 3.2 (Bakkenes *et al.* 2002) and as a follow up to the audit of the previous MOVE model (Reijnen & Van Oostenbrugge 2001). The model was especially criticized for the non-realistic response functions of at least some of the species. For this reason the Model MOVE4 was developed, that was newly set, in a new environment (ACCESS) and with new response functions that were internally validated (cross validation, see van Adrichem *et al.* in prep).

This document describes how the model can be installed and used as a standalone model or applied in the Arisflow environment of the Natureplanner. Some parts are similar to the description made by Van der Hoek & Bakkenes (2007). A more detailed description of the model and it principles can be found in van Adrichem *et al.* (in prep). Moreover, this document also includes documents that were made for the A quality status of MOVE4. Some of the information is digitally available only; all documents are also included on the accompanying CD.

2.1 Goal

MOVE4 predicts the chance of occurrence of over 900 species of the Dutch flora based on the Ellenberg indicator values for moisture (F), acidity (R) and nutrient availability (N), physical geographical region and vegetation type. Predictions are given per species or accumulated per vegetation type and are accompanied by the 95% confidence intervals based on the model uncertainty.

The aim of this report is to guide a user of MOVE4, as part of the a-quality status of the model, as defined by

Alterra(www2.alterra.wur.nl/webdocs/Internet/Geoinformatie/Softwarekwaliteit/kwamodbest/index.htm).

2.2 Boundaries

MOVE4 is, as all other MOVE versions, calibrated for the Netherlands. That limits the model to The Netherlands. However, application in countries with similar plant species and abiotic circumstances may be possible after careful testing. The model is calibrated using relevés made in natural areas. Therefore application outside natural areas is not recommended, e.g. road verges, parks, dikes or ditches. MOVE4 gives the chance of occurrence for plant species; it does not provide any information on the actual presence of a species at a certain site. The boundaries for the input are given in Appendix 3.

Boundaries for single parameters, but combinations may lead to combined input and output that never has been tested and may even lead to situation that do not occur in The Netherlands.

2.3 Model concepts

The model concepts and tests are extensively described by van Adrichem *et al.* (2009). Here we only give a brief summary.

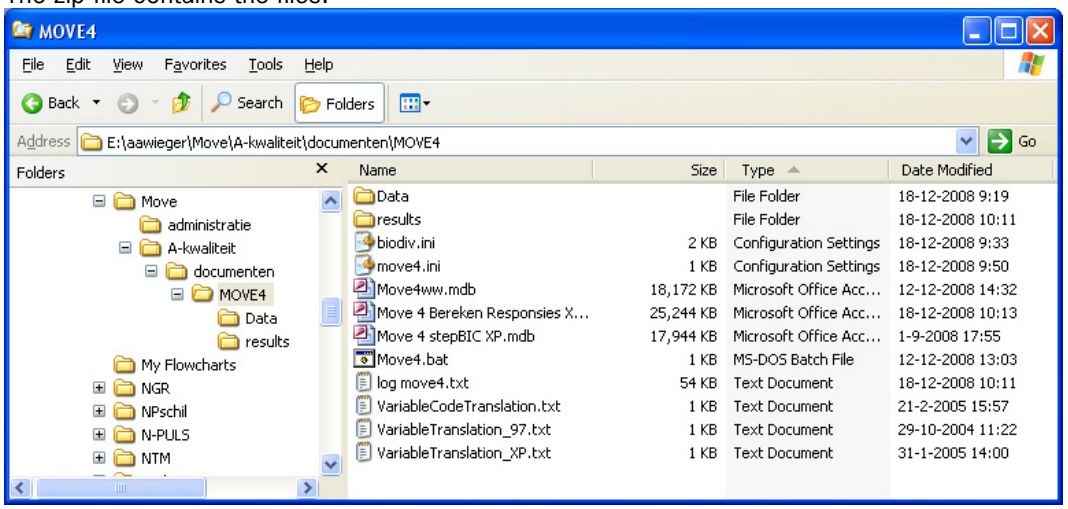
MOVE4 is a typical regression model where in this case the chance of occurrence of plant species is regressed on abiotic variables; The Ellenberg (Ellenberg *et al.* 1991) indicator values for salinity, acidity, moisture and nutrient availability, a geophysical reference map and the vegetation type. For The Netherlands for over 900 species all the Ellenberg indicator values are available and these species are used for calibration. In MOVE4 all the possible interactions between the variables is accounted for. However terms are only added to the species specific regression equation when it is significant, thus leading to regression equations that may contain different numbers of terms. The model is calibrated on a data set with vegetation relevés made in all natural areas in The Netherlands. This data set contains over 100.000 relevés and is assumed to represent the Dutch flora. Model input may be delivered by other models (e.g. SMART2-SUMO2), but can be in principle any description of a field situation as long as it is given in Ellenberg indicator values and accompanied by the physical geographical reference and the vegetation type. In a standard setting, in the model chain The Natureplanner, these variables are delivered by SMART2-SUMO2 in the form of maps. MOVE4 returns the chance of occurrence of the selected plant species accompanied by the uncertainty and a kappa value indicating whether or not a species may actually be expected in the field. MOVE can also be run as a standalone model, needing the same input and providing the same output.

3 Stand alone version of MOVE4

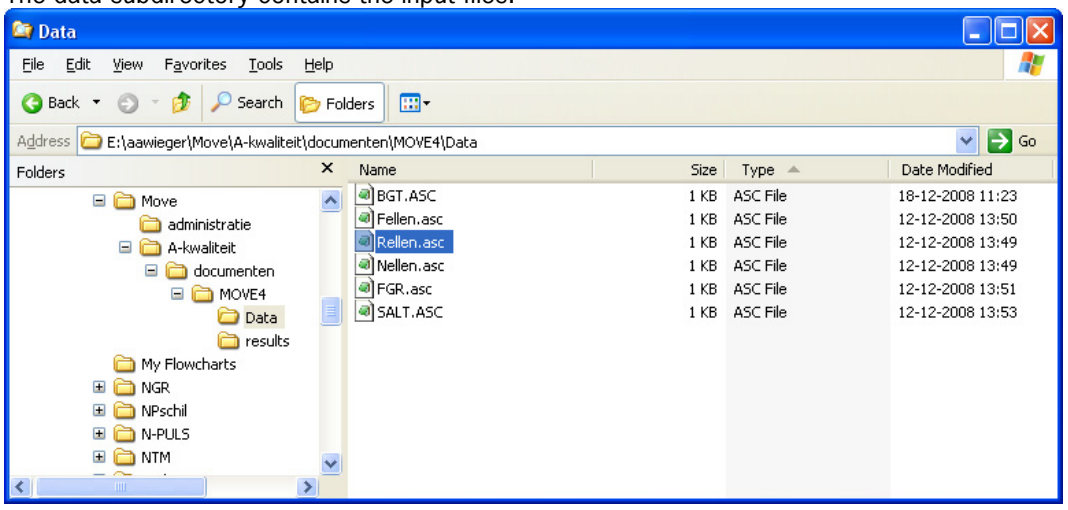
3.1 Installation

The MOVE4 model as a stand alone version can be placed in any directory, all paths are relative. MOVE4 works under ACCESS 2003 and Windows XP or later versions. The zip file MOVE.zip contains all necessary files, by unzipping the file all files are placed in the correct sub-directories (the file is placed on the CD). All paths are initially adjusted to this installation. The zip files includes a test run and by clicking the MOVE4.bat file the model runs.

The zip file contains the files:



The data subdirectory contains the input files:



The files are described in Chapter 2.2 and 2.3. The result sub directory contains an ACCESS database with the output of MOVE4.

3.2 Running the standalone model

The model can be run by double clicking the MOVE4.bat file (see Appendix 2). It then starts a standard test run. The ACCESS database 'Move 4 Bereken Responsies XP.mdb' is called from the bat file and the program then starts running. Depending on the ACCESS settings it is possible that ACCESS will ask whether or not to open the mdb. file, the answer should be 'open' (Figure 1). This message is a result of the security settings on the pc; the security level is hampering automatic and standalone calculations of MOVE4. After that the real program will start. Results will be written to the results directory in the file 'results multirun WOConf.mdb'.

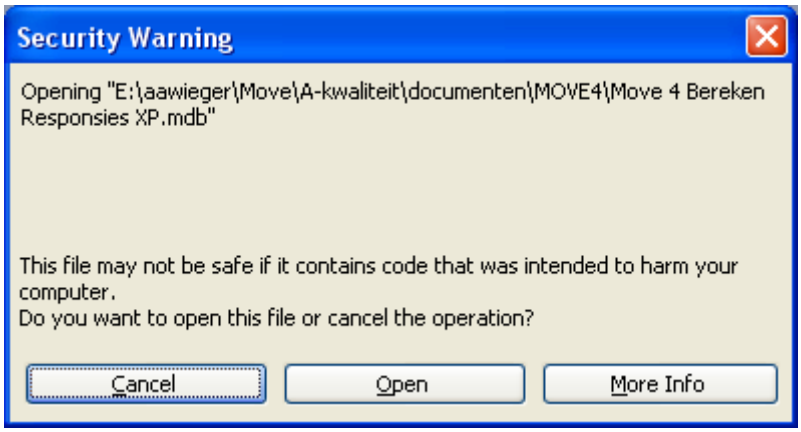


Figure. 1 Pop up message from ACCESS asking whether or not to open the file. The answer should be 'open'.

MOVE4 can be run with different input files and with some options. The files and the options are described in the Chapters below for each file.

3.3 The input maps

All the input maps are in ascii-grid format and should all have the same standard layout. An ascii input file contains a header of six lines and then the actual data.

- The first line gives the number of columns with data (in principal unlimited)
- The second line gives the number of rows with data (in principal unlimited)
- The third line gives the x coordinate of the bottom left cell in the file
- The fourth line gives the y coordinate of the bottom left cell in the file
- The fifth line gives the cell size
- The sixth line gives the indicator for missing data (normally -9999)
- Then the columns and rows with data, in this case R, follow.

! The grid files are not read from left to right or from top to bottom of the ascii file. The first value read from the ascii grids is the value at the bottom of the first row. The second value read is the one above the left bottom value, till the top of the first row is reached. Then the bottom value of the second row is read and so on. The first value in the output (per species) is the chance of occurrence based on the bottom value of the first row!

3.3.1 Rellen.asc

This file contains the Ellenberg indicator value for acidity (R; Ellenberg *et al*. 1991). The value must be between 1.0 and 9.0. The map can be provided by SMART2-SUMO2, but then still the values have to be translated from pH into the R –value. For this a regression equation is available (Wamelink *et al*. 2002). An example of the file is given in Figure 2.

```
ncols                    2
nrows                    2
xllcorner           240250
yllcorner           566000
cellsize               250
NODATA_value         -9999
  6.5680E+00  6.5680E+00
  7.4240E+00  6.5790E+00
```

Figure 2 Content of the test file Rellen.asc.

3.3.2 Fellen.asc

This file contains the Ellenberg indicator value for Moisture (F; Ellenberg *et al*. 1991). Normally the values are derived from the groundwater Table map and based on the spring groundwater Table. The value must be between 1.0 and 12.0. An example of the file is given in Figure 3

```
Ncols                    2
nrows                    2
xllcorner           240250
yllcorner           566000
cellsize               250
NODATA_value         -9999
  2.3462E+00  2.3462E+00
  5.6749E+00  10.345E+00
```

Figure 3 Content of the test file Fellen.asc.

3.3.3 Nellen.asc

This file contains the Ellenberg indicator value for nutrient availability, sometimes also referred to as nitrogen availability (N; Ellenberg *et al*. 1991). The value must be between 1.0 and 9.0. The map can be provided by SMART2-SUMO2, but then still the values have to be translated from total yearly nitrogen availability into the N –value. For this a regression equation is available, though the translation is highly uncertain (Ertsen et al. 1998, Wamelink *et al*. 2008). An example of the file is given in Figure 4.

```
ncols                    2
nrows                    2
xllcorner           240250
yllcorner           566000
cellsize               250
NODATA_value         -9999
  3.5600E+00  3.5600E+00
  7.9800E+00  1.4555E+00
```

Figure 4 Content of the test file Fellen.asc, input file for Ellenberg indicator value for moisture

3.3.4 Salt.asc

This file contains about the salinity of the grid. The value is given as the Ellenberg indicator value for Salinity (S; Ellenberg *et al.* 1991) and must be between 0 and 9. The value may be calculated based on the chloride content. Figure 5 gives an example.

```
ncols                    2
nrows                    2
xllcorner           240250
yllcorner           566000
cellsize               250
NODATA_value          -9999
  2.0000E-01  2.0000E-01
  2.0000E-01  2.0000E-01
```

Figure 5 Content of test file salt.asc, input file for Ellenberg S

3.3.5 FGR.asc

This file provides MOVE4 with the physical geographic region each grid cell is situated in. The input for MOVE4 is given in Table 1 The variable code column in Table 1 gives the possible regions, with: the hilly area in the South (Hl), the higher sandy soils, mainly situated in the east (Hz), the clay area around the rivers (Rv), the organic soil area (Lv, fenland in Figure 7), the see clay area (Zk), the sandy dune area (Du), the old see areas (Az, part of the see clay area in Figure 7), the tidal zones (Gg) and the North See (Nz). The test input file is given in Figure 6. In this case the code in the input file is 5, indicating the see clay physical geographical region, as can be read from the CodeInInput column from Table 1.

Table 1.Codes for the translation of the physical geographical region types

RelationId	VariableName	VariableCode	ResponseModelCode	CodeInInput
6	Fgr	Hl	1	1
7	Fgr	Hz	2	2
8	Fgr	Rv	3	3
9	Fgr	Lv	4	4
10	Fgr	Zk	5	5
11	Fgr	Du	6	6
12	Fgr	Az	7	7
13	Fgr	Gg	8	8
14	Fgr	Nz	9	9

```
ncols                    2
nrows                    2
xllcorner           240250
yllcorner           566000
cellsize               250
NODATA_value          -9999
  5.0000E+00  5.0000E+00
  5.0000E+00  5.0000E+00
```

Figure 6 Content of test file FGR.asc, containing the physical geographical region as a number. The regions are given in Figure 7.

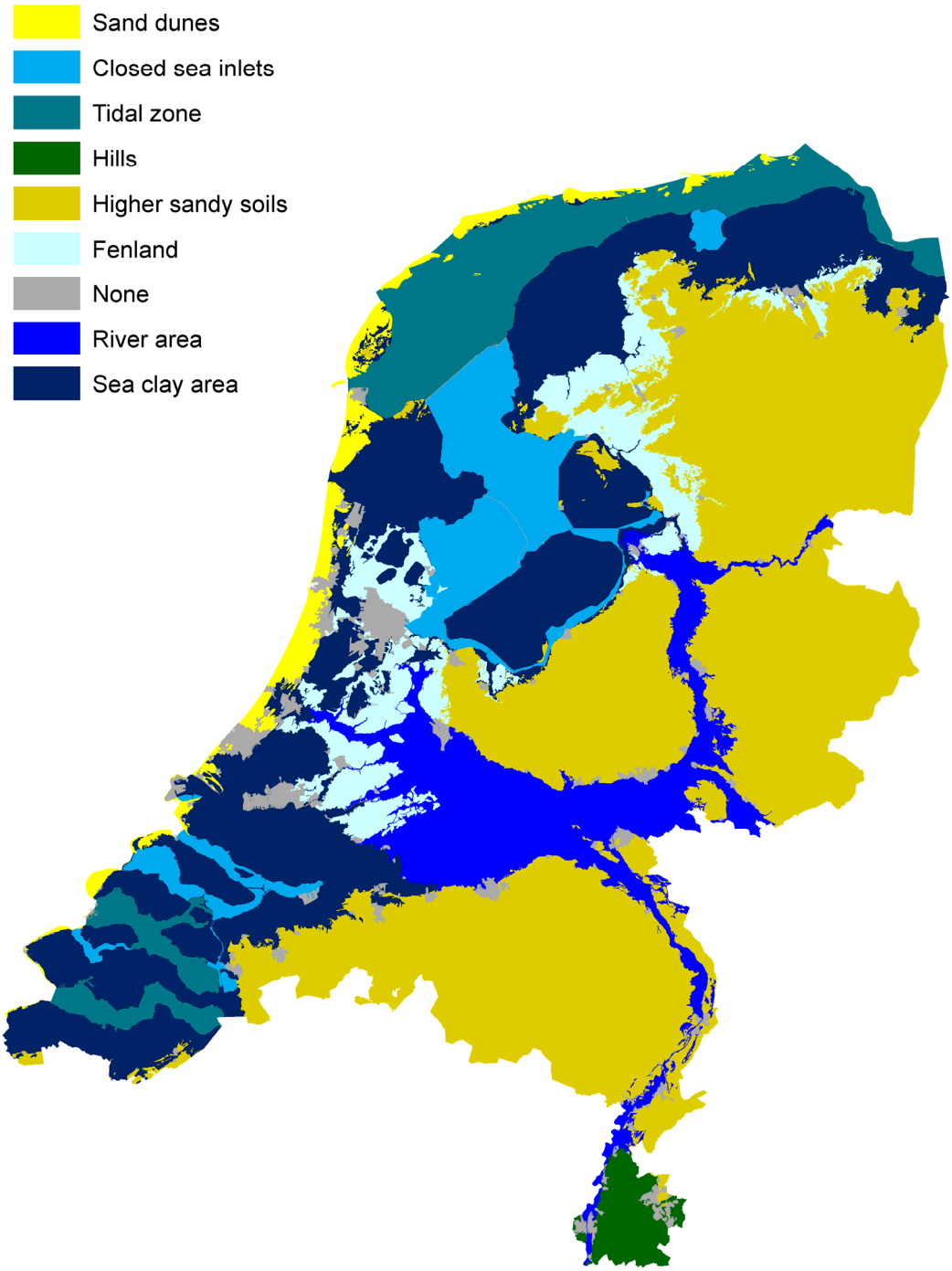


Figure. 7. Physical geographical regions in The Netherlands.

3.3.6 BGT.asc

This file provides MOVE4 with the vegetation type of the grid. The vegetation types are given in Table 2 The variable code has five options: deciduous forest (Dec), nutrient poor grassland (Grp), heather (Hea), pine trees (Pin) and spruce trees (Spr). The pine tree settings can be

used for relative light needle forest (e.g. pine, larch), the spruce tree settings can be used for relative dark needle forests (e.g. spruce, Douglas). The test input file is given in Figure 8 In this case the code in the input file is 5, indicating a grassland vegetation type, as can be read from the CodeInInput column from Table 2.

Table 2 Vegetation types, used in MOVE4.

RelationId	VariableName	VariableCode	ResponseModelCode	CodeInInput
1	Vegetatie	Dec	1	1
2	Vegetatie	Grp	2	5
3	Vegetatie	Hea	3	4
4	Vegetatie	Pin	4	2
5	Vegetatie	Spr	5	3

```
ncols                    2
nrows                    2
xllcorner           240250
yllcorner           566000
cellsize               250
NODATA_value          -9999
  5.0000E+00  5.0000E+00
  5.0000E+00  5.0000E+00
```

Figure 8 Content of test file BGT.asc, input file for vegetation type.

3.4 The initialization files

3.4.1 MOVE4.bat

The file MOVE4.bat starts a model run by double clicking it. It is also possible to start it from Windows (Start, Run, browse to the bat file, open, ok) or in a dos-Box. It is also possible to give the command in a Dos box on the command line (Figure 9). The first part states where the MS ACCESS executable can be found. If the executable is located somewhere else, than this part of the command must be adjusted. The second part gives the name of the ACCESS file that contains the MOVE4 program. The last part gives the name of the MOVE4 initialization file (move4.ini). A technical description of how MOVE4 was applied in the uncertainty analyses of the Natureplanner is given in Appendix 1.

```
"C:\Program Files\Microsoft Office\OFFICE11\MSACCESS.EXE" "%CD%\Move 4 Bereken Responsies.mdb" /cmd "%CD%\move4.ini"
```

Figure 9 Command line to start a MOVE4 run.

3.4.2 MOVE.ini

The MOVE.ini file is the steering file for MOVE4 called from the command line that starts the model (see above). An example of the file is given in Figure 10. Text between square brackets indicate sections, looked for by the model.

Each statement is explained here below, starting with the line number it is referring to.

2. The name of the model used containing the information on the response models (ResponseModelsDatabaseName=Move 4 stepBIC.mdb).
3. The file name that contains the translation of variables delivered by SMART2, for an explanation see 2.4.4
   (VariableTranslationFileName=VariableTranslation.txt).
4. The file name that contains the translation of variable codes delivered by SMART2, for an explanation see 2.4.4 (VariableCodeTranslationFileName = VariableCodeTranslation.txt).
5. File name that steers the multirun of MOVE4 (BiodivFileName=biodiv alleen voor Move 4.ini).
6. File name where the log of the run is kept (LogFileName=log move4.txt). Error messages are written to this file!
7. The name of the ACCESS file where the results are written to (ResultsDatabaseName=results multirun WOConf_20.mdb).
9. Whether or not the confidence intervals should be calculated and written to the result file, True for yes and False for not
   (CalculateConfidenceIntervals=FALSE).
10. Whether calculations should be done per species (or per grid, see below), True for yes and False for not (CalculatePerSpecies=False). The time consumption of the model may differ between both options and can thus be optimised in combination with line 11.
11. Whether calculations should be done per grid, True for yes and False for not (CalculatePerGridCell=True).
12. Name that contains the unique abiotic column name
    (AbioticUniqueColumnName=Id).

```
[Files]
ResponseModelsDatabaseName=Move 4 stepBIC.mdb
VariableTranslationFileName=VariableTranslation.txt
VariableCodeTranslationFileName=VariableCodeTranslation.txt
BiodivFileName=biodiv alleen voor Move 4.ini
LogFileName=log move4.txt
ResultsDatabaseName=results multirun WOConf_20.mdb
[Options]
CalculateConfidenceIntervals=FALSE
CalculatePerSpecies=False
CalculatePerGridCell=True
AbioticUniqueColumnName=Id
BioDivUseRelationSpeciesGridFile=False
BioDivUseExternalUniqueGridIdFile=False
```

Figure 10 MOVE.ini file. An explanation is given in the text above.

3.4.3 BIODIV.ini

The biodiv.ini file is used to provide the names of the input files and information on the number of runs (Figure 11). Some or all of the file names may be run specific and then should be given for the specific run. In the example only three runs are shown, in principle an infinite number of runs can be given.

```
[Algemeen]
MultiRun=1
Description=MOVE4

[commentaar]
text=Algemene inputs; worden 1 maal bij start van berekeningen ingelezen
[Files]
ResponseModelsDatabaseName=
Zuurgraad=
Nutrienten=
Grondwater=
Vegetatie= Data \BGT.asc
Zoutgehalte= Data \zout.asc
Fgr=

[runs]
aantal=20
start=20


[commentaar]
text=Specifieke inputs; Eerder ingelezen data worden overschreven; niet gespecificeerd voor een bepaalde run: gebruikt al aanwezige data (uit vorige run of algemene invoer)
[run1]
ScenarioYear=2000
Zuurgraad=Data\rellen1.asc
Nutrienten= Data \nellen1.asc
Grondwater= Data \fellen1.asc
Fgr= Data \fgr1.asc
[run2]
ScenarioYear=2000
Zuurgraad= Data \rellen2.asc
Nutrienten= Data \nellen2.asc
Grondwater= Data \fellen2.asc
Fgr= Data \fgr2.asc
[run3]
ScenarioYear=2000
Zuurgraad= Data \rellen3.asc
Nutrienten= Data \nellen3.asc
Grondwater= Data \fellen3.asc
Fgr= Data \fgr3.asc
```

Figure 11 BIODIV.ini file. An explanation is given above.

Most of the statements are explained here below, starting with the line number it is referring to. Statements between brackets give comments on what follows and are not red by the program.

2. Whether or not to run the model with more than one set of input files (MultiRun=1); 0 no, 1 yes
9. Name of the acidity grid file (Zuurgraad=); only given here when in the case of a multi run the content is the same for all multi runs.
10. Name of the nutrient grid file (Nutrienten=); only given here when in the case of a multi run the content is the same for all multi runs.

11. Name of the moisture grid file (Grondwater=); only given here when in the case of a multi run the content is the same for all multi runs.
12. Name of the vegetation type grid file (Vegetatie= Data\BGT.asc); only given here when in the case of a multi run the content is the same for all multi runs, which is the case for this example.
13. Name of the salt content grid file (Zoutgehalte= Data\zout.asc); only given here when in the case of a multi run the content is the same for all multi runs, which is the case for this example.
14. Name of the physical geographical region grid file (FGR=); only given here when in the case of a multi run the content is the same for all multi runs.
17. Number of runs the model has to do (aantal=20); in this example twenty.
18. Starting point of the run (start=20); In this case the multi run starts at run number 20, which is not given in Figure 11. There only the input for the first three runs is given.

From line 25 on the run specific input files are given, only three examples are given here and only one is described here below.

25. The number of the run ([Run1]).
26. The year of the output from SMART2 (ScenarioYear=2000); in this case input for MOVE4 is provided for the year 2000.
27. Name of the acidity grid file (Zuurgraad= Data \rellen1.asc); run specific input, the statement includes a reference to directory (Data) where the file is located.
28. Name of the nutrient grid file (Nutrienten= Data \nellen1.asc); run specific input, the statement includes a reference to directory (Data) where the file is located.
29. Name of the moisture grid file (grondwater= Data \fellen1.asc); run specific input, the statement includes a reference to directory (Data) where the file is located.
30. Name of the physical geographical region grid file (Fgr= Data \fgr1.asc); run specific input, the statement includes a reference to directory (Data) where the file is located.

3.4.4 Variable translation file and code translation

The variable translation file is used for the transformation of codes in MOVE4 (Figure 12). Normally the content of this file is not changed. Each line is shortly explained here below, starting with the line number it is referring to.

1. Header, giving the name of the 'column' of the information in the following lines.
   For the following lines, first a number is given for the variable, then variable name, then the variable type, the response variable name used in MOVE4 and then when appropriate a transformation (not used, since the input is in Ellenberg indicator values).
2. Statement for Ellenberg indicator value for acidity (R).
3. Statement for Ellenberg indicator value for nutrients (N).
4. Statement for Ellenberg indicator value for moisture (F).
5. Statement for vegetation type (veg).
6. Statement for Ellenberg indicator value for salinity (S).
7. Statement for physical geographical region (fgr).

```
RelationVariablesId,VariableName,VariableType,ResponseVariableName,Transformation
1,r,Double,elbr,
2,n,Double,elbn,
3,f,Double,elbf,
4,veg,FactorNum,veg[,
5,s,Double,elbs,
6,fgr,FactorNum,fgr[,
```

Fig. 12 Variabletranslation.txt file. An explanation is given above.

The variable code translation file is used for the transformation of vegetation and physical geographical region codes in MOVE4 (Figure 13). Normally the content of this file is not changed. Each line is shortly explained here below, starting with the line number it is referring to.

1. Header, giving the name of the 'column' of the information in the following lines.
   For the following lines, first a number is given for the relation, then a variable name (for vegetation; vegetatie, or physical geographical region; Fgr) , then a code giving the subdivision of the variable, the response variable name used in MOVE4 and then the code in the model SMART2.
2. Vegetation type deciduous forest (Dec).
3. Vegetation type grassland (Grp).
4. Vegetation type heathland (Hea).
5. Vegetation type pine forest (Pin).
6. Vegetation type spruce forest (Spr).

The next lines give the nine physical geographical regions, the explanation of the codes can be found in Chapter 2.3.5, Table 1.

```
RelationId,VariableName,VariableCode,ResponseModelCode,CodeInInput
1,    Vegetatie,Dec,1,1
2,    Vegetatie,Grp,2,5
3,    Vegetatie,Hea,3,4
4,    Vegetatie,Pin,4,2
5,    Vegetatie,Spr,5,3
6,    Fgr,Hl,1,1
7,    Fgr,Hz,2,2
8,    Fgr,Rv,3,3
9,    Fgr,Lv,4,4
10,  Fgr,Zk,5,5
11,  Fgr,Du,6,6
12,  Fgr,Az,7,7
13,  Fgr,Gg,8,8
14,  Fgr,Nz,9,9
```

Figure 13 VariableCodeTranslation.txt. An explanation is given above.

3.5 The selection of taxons

The taxons (species) to be run can be selected in the ACCESS file 'MOVE4 stepBIC XP. Mdb'. After opening the Taxa Table all the species present in MOVE4 will appear (Figure 14). The first column gives the taxon code in MOVE4 (Taxonnr), the second column the taxon code in

the Dutch botanical database preceded by p_ (TaxonCode, CBS 1990) and the third column contains the Latin name of the species (after van der Meijden *et al.* 1991).

A selection can be made by removing the unwanted species. It is advisory to store either the complete Table in a separate Table or to keep an unchanged backup version of the whole ACCESS file, for later use. A complete species list in MOVE4 can be found in Appendix 4.

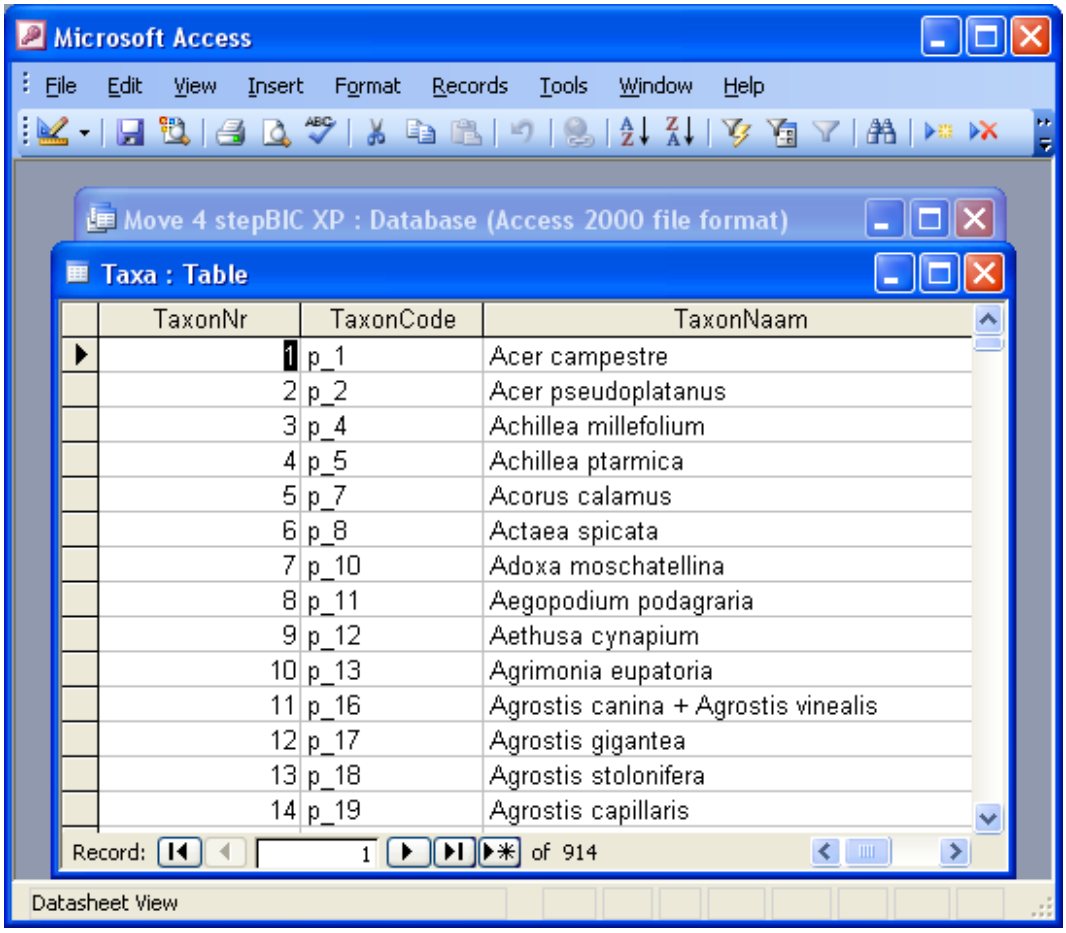


Figure 14. Species list of MOVE4.

4 Running the Natureplanner version of MOVE4

MOVE4 is an integrated part of the decision support system (DSS) The Natureplanner (version 3.0). To run MOVE4 in this DSS it is necessary to install this DSS, please refer to van der Hoek & Bakkenes (2007). The Natureplanner is preferably run from ArisFlow. Basic knowledge how to work with this package is necessary. For this we also refer to Van der Hoek & Bakkenes (2007).

To be able to run MOVE4, the necessary input has to be generated. This input is delivered by the models SMART2-SUMO2 and the conversion module 'uitvoer Ellenberg'. Input files for MOVE4 are automatically generated. When a standardised run is carried out with the Natureplanner no adjustments have to be made and all the processes run without action from the user, other than starting the processes by activating the red points in Figure 15. This is extensively described in Van der Hoek & Bakkenes (2007). Most of the models need some kind of input before they can be run. These are partly parameter values which are a part of the Natureplanner and do not have to be changed. Some site specific input has to be given, e.g. groundwater Table, management regime, initial biomass, soil type, etc. For this we also refer to Van der Hoek & Bakkenes (2007).

As for the stand alone version a selection of species has to be made. This can be done in the same way as for the stand alone version by opening the 'MOVE stepBIC XP.mdb' file and selecting the target species

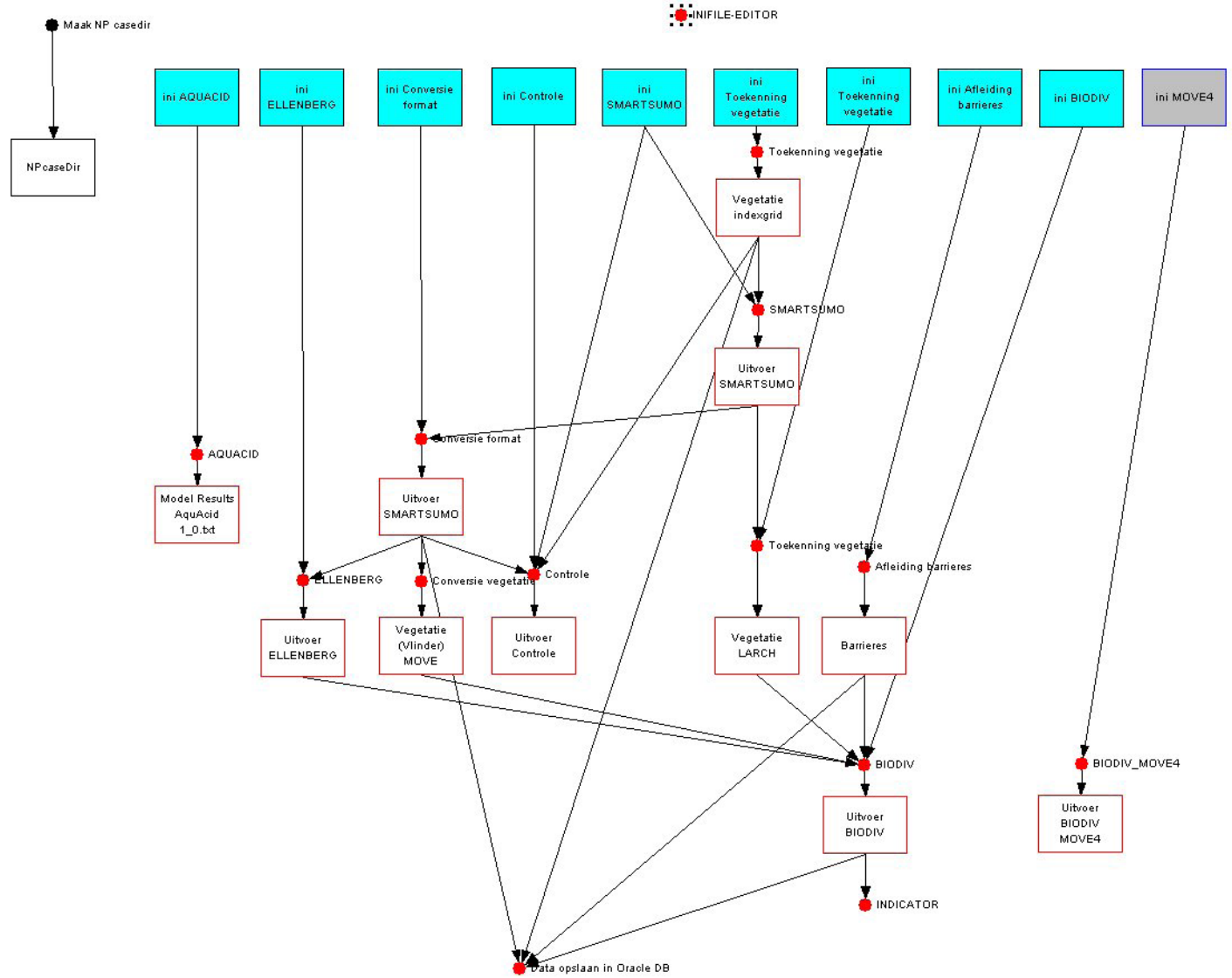


Figure. 15 ArisFlow schedule of the models in the Natureplanner (Figure taken from Van der Hoek and Bakkenes 2007).

5 Output of MOVE4

5.1 Standalone version of MOVE4

The output of MOVE4 in the standalone version is given in an ACCESS file. The name of the file can be defined in the MOVE4.ini file after 'ResultsDatabaseName' (see Chapter 2.4.2). The results file will be placed in the same directory as the program file is placed (unless stated otherwise).

When the ACCESS file is opened the results can be found in the Table 'ResponseModel Results' (Figure 16).

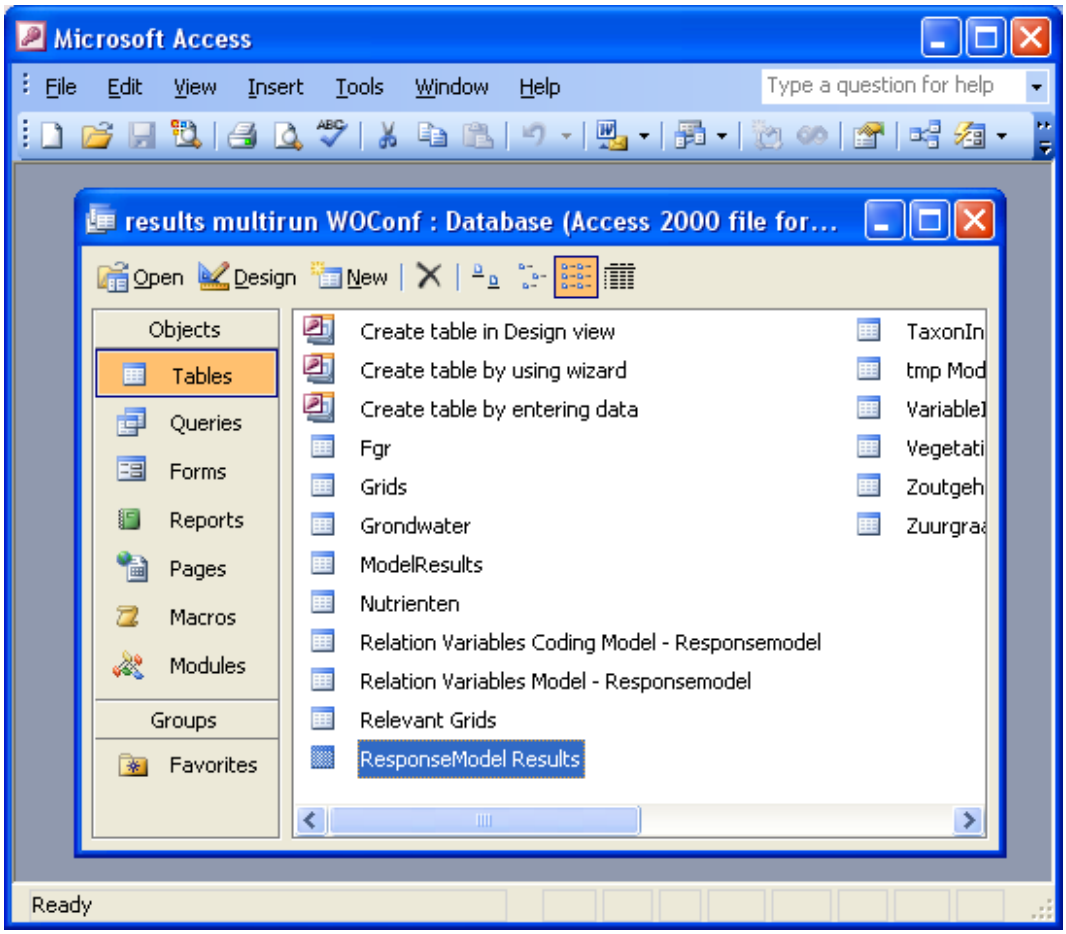
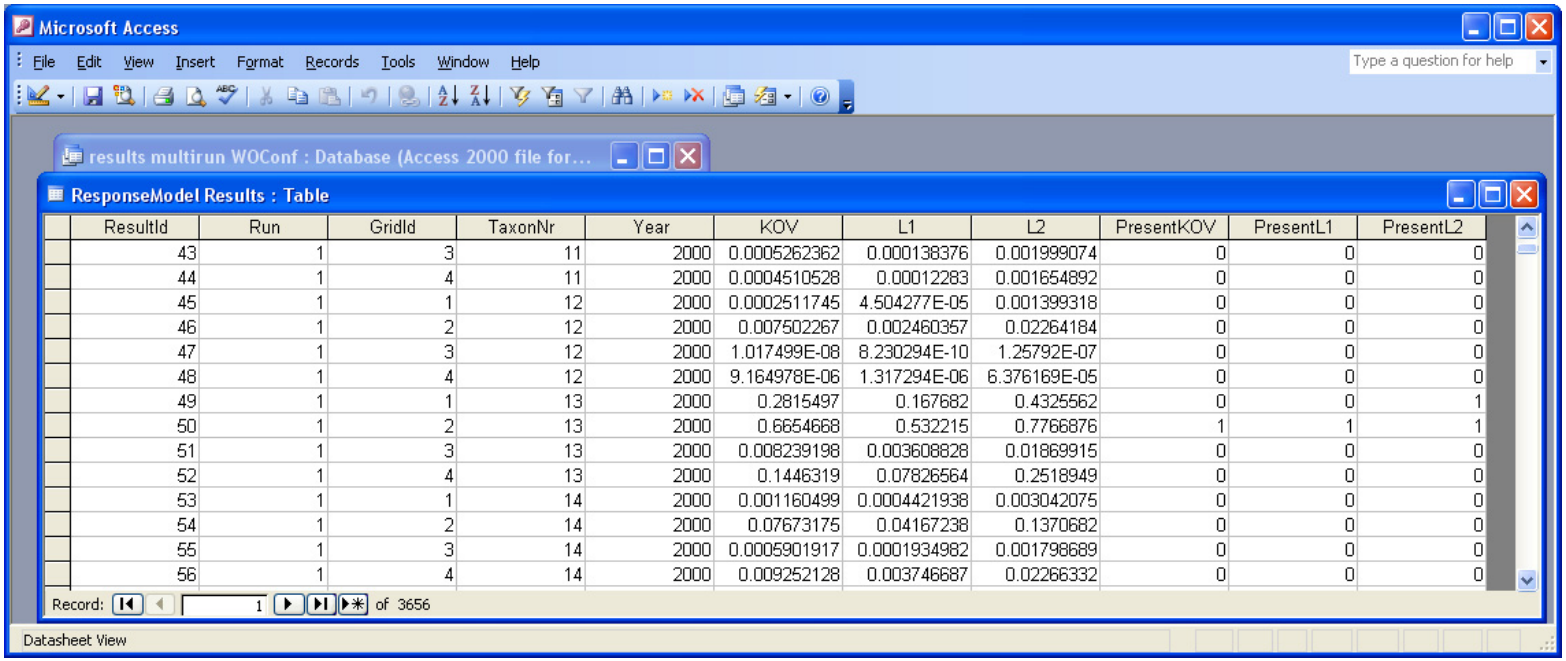


Figure 16 ACCESS file 'results multirun WOConf.mdb', containing the results of the model run (the in blue background shown Table).

When opening the Table the results become visible (by clicking the Table name; see Figure 17).



ResultId	Run	GridId	TaxonNr	Year	KOV	L1	L2	PresentKOV	PresentL1	PresentL2
43	1	3	11	2000	0.0005262362	0.000138376	0.001999074	0	0	0
44	1	4	11	2000	0.0004510528	0.00012283	0.001654892	0	0	0
45	1	1	12	2000	0.0002511745	4.504277E-05	0.001399318	0	0	0
46	1	2	12	2000	0.007502267	0.002460357	0.02264184	0	0	0
47	1	3	12	2000	1.017499E-08	8.230294E-10	1.25792E-07	0	0	0
48	1	4	12	2000	9.164978E-06	1.317294E-06	6.376169E-05	0	0	0
49	1	1	13	2000	0.2815497	0.167682	0.4325562	0	0	1
50	1	2	13	2000	0.6654668	0.532215	0.7766876	1	1	1
51	1	3	13	2000	0.008239198	0.003608828	0.01869915	0	0	0
52	1	4	13	2000	0.1446319	0.07826564	0.2518949	0	0	0
53	1	1	14	2000	0.001160499	0.0004421938	0.003042075	0	0	0
54	1	2	14	2000	0.07673175	0.04167238	0.1370682	0	0	0
55	1	3	14	2000	0.0005901917	0.0001934982	0.001798689	0	0	0
56	1	4	14	2000	0.009252128	0.003746687	0.02266332	0	0	0

Figure 17 Output Table (ResponseModel Results) of MOVE4

The first column give the result id (Resultid), the second column the run number (Run), the third number the grid id (gridid), the fourth column the taxon number (TaxonNr), the fifth column the year (Year), the sixth column the chance of occurrence of the species in the grid examined (KOV), the seventh column the lower value of the 95% confidence interval (L1), the eight column the higher value for the 95% confidence interval (L2), the ninth column shows whether (1) or not (0) a species is expected be present based on the chance of occurrence. The tenth and the eleventh column give the same for the confidence intervals. How the chance of occurrence and the confidence interval is calculated can be found in van Adrichem *et al.* (in prep) as well as the criteria the decision whether or not a species is expected to be present is based on. The relation between the taxon numbers and taxon names is described in Chapter 2.5.

MOVE4 also supplies other tables in the output. Most of the tables contain the input used for the calculations, including the species list and the abiotic variables, so the input can be controlled. The content of the translation files is also given in the results file. The names of the tables refer to the (Dutch) names of the biodiv.ini file for grid input.

Unfortunately, MOVE4 does not produce the results in a straightforward sequence. MOVE4 starts reading at the bottom left grid cell and the goes up that column. Then the second column is read from the bottom to the top. However, this is not the sequence that the output is given. An example sequence for an ascii grid map with 10 rows and one column is given in Table 3 The output is related to the input as [9 7 5 3 1 10 8 6 4 2] , where the numbers give the sorting sequence, So the First value in the output file is the result of the ninth combination of values in the input ascii grid. Basically, first the uneven linenumbers in a backwards sequence and then the even line numbers in a backwards sequence are given in the output file.

Table 3. Example of a MOVE4 output file for 10 cells, only the chance of occurrence is given. KOV gives the chance of occurrence, V the relation with the input file, Sort(V) the sorted V and KOV (sort) the chance of occurrence after sorting which makes the sequence the same as the input sequence.

		After sorting	
KOV	**V**	**Sort(V)**	**KOV (sort)**
0.0801	9	1	0.000974
0.00102	7	2	0.005841
0.00938	5	3	0.007365
0.007365	3	4	0.000646
0.000974	1	5	0.00938
0.000657	10	6	0.002575
0.009913	8	7	0.00102
0.002575	6	8	0.009913
0.000646	4	9	0.0801
0.005841	2	10	0.000657

5.2 Natureplanner version of MOVE4

Results can be found in the ACCESS results file, as described in Chapter 4.1. In the MOVE4 initialisation file it is stated where the results are physically placed on the computer. The output file is exactly the same as for the standalone version of the model as explained in Chapter 4.1. In a standard installation of the Natureplanner the initialisation file for MOVE4 is placed in the directory 'C:\cases\np5test_1\ini', as is the initialisation file for the multirun (see also Chapters 2.4.2 and 2.4.3).

6 Uncertainty and sensitivity analysis and validation

6.1 Uncertainty and sensitivity analysis

MOVE4 is able to calculate besides the chance of occurrence of a species also the uncertainty in that chance. This uncertainty only reflects the uncertainty caused by the model itself and not the propagated uncertainty of the input and applied other models uncertainty.

The uncertainty per regression variable per species is calculated using a bootstrap method. This leads to a covariance matrix which can be used to calculate the uncertainty in the prediction. Given is the 95% uncertainty interval.

A sensitivity analyses of the Natureplanner including MOVE4 was carried out by van der Hoek & Heuberger (2006, see also Chapter 6).

An uncertainty analyses was carried out by Wamelink *et al.* (in prep) for a model chain with MOVE4 as final model (see also Chapter 6). Although the predictions of MOVE4 were used to quantify the uncertainty, the uncertainty in MOVE4 was not taken into account.

6.2 Validation

MOVE4 is not yet validated on independent data. However, the model was extensively tested by several means of cross validation by F.G. Wortelboer (see Van Adrichem *et al.* 2009). The cross validation was carried out by comparing the chance of occurrence of the species in the calibration vegetation data set with predictions of MOVE4 for the species. Performance was tested by:

1. Percentage deviance explained based on the difference between calculated and observed presence
2. Pearson correlation between total observed presence and total calculated presence
3. Regression analysis.

Performance scores for the three test methods were simplified to a 0, 1 or 2 score and summed. Overall performances per individual regression equation per species were then assed. In general the performance of the species models is acceptable, although for a substantial set of species the performance was judged as poor. A minor subset of species scored good or very good.

An extensive validation on independent data is strongly desirable, preferably in combination with the plant dispersal model DIMO. The latter model should make the chances of occurrence in the field more comparable with the model outcomes of MOVE4, because DIMO corrects for seedbank characteristics and seed dispersal capacity.

7 Application of MOVE4 in projects

MOVE has been applied in many projects, many of them being overviews for the Dutch government (e.g.). MOVE is then always used as an integrated part of the DSS the Natureplanner. In most cases however, MOVE2 or MOVE3.2 was used. MOVE4 has not been applied that much yet. An overview is given here below. Normaly, MOVE is applied for groups of species; application for an individual species is scarce. In a typical application more than one scenario is run after which the results are compared.

A sensitivity analysis of the Nature Planner: from complex to simple

Van der Hoek & Heuberger (2006) describe the methodologies and results of an extended sensitivity analysis of the terrestrial component of the Nature Planner. The Netherlands Environmental Assessment Agency's 'Nature Planner' comprises a sequence of models (model train) used to calculate, evaluate and predict the quality of nature on the national scale. This is based on a number of driving forces and is applied to a wide range of common ecosystems (soil type/vegetation combinations).

For this study, Variance Analysis proved to be a well-suited method for the purpose of a sensitivity analysis. Use of other methodologies, such as Trend Analysis, and Regression and Scatter Plot Analysis is also recommended here for the purpose of verification and explanation. The analysis and results are elaborately described for heathland ecosystems. This type of analysis can also be incorporated into the initial phase of the process of developing so-called meta-models, approximations of the underlying model train. These model approximations are rapid, and yet reliable; they can also be used successfully in policy-decision processes. An initial result in this direction is a so-called 'knowledge Table', containing all the results from the large number of model runs used in this study, and organised in a condensed and easily accessible format (text taken and slightly adjusted from the summary of van der Hoek & Heuberger, 2006).

Meta Nature Planner

Goal of this research is to test The Nature Planner for a limited set of species and to develop based on the test a 'meta Nature Planner' as a regression of the output on the input of the Nature Planner (Van Dobben, in prep).

This has to lead to a regression of the Natura Planner that is quick and easy to handle and to describe the Nature Planner as a simple tool that is easy to evaluate by experts. The regression equations are based on earlier model runs (by Van der Hoek & Heuberger 2006, see also above) for a sensitivity analyses.

Quality guarantee Meta Nature Planner

This project is closely linked to the above motioned project of the Meta Nature Planner. In this project a relation is made between environmental conditions (abiotic as well as spatial) and target plant species (Van der Greft *et al.* in prep). The outcome is translated to the national scale, indicating whether or not the presence of a species is sustainable in The Netherlands.

Effect of acid and nitrogen deposition on plant species occurrence

For an overview report (Van Hinsberg in prep), MOVE4 was applied together with the model SMART2 to asses the effect of nitrogen deposition on species occurrence. Model runs were performed for the years 1880-2100 by SMART2, simulating the effect of nitrogen and sulphur

deposition on the soil. MOVE4 predicted the chance of occurrence for typical species for the vegetation type's coniferous forest on sandy soil, grassland on clay, deciduous forest on sand and deciduous forest on clay for the year 2100. Results showed that the chance of occurrence for some more nitrophilous species increase and decreased for some red list and rare species.

Uncertainty analysis

An important project involving MOVE is currently being finished (2009), where MOVE4 is used in an uncertainty analysis of the model chain, soil map, groundwater Table map, SMART2-SUMO2-P2E-MOVE4. In this project the uncertainty propagation through the model chain is assessed. The model uncertainty will be expressed as the uncertainty in the lumped chance of occurrence of typical species for the vegetation type's grassland, forest and heathland. The results will also give insights in the most uncertain processes in the model chain. The tested model chain forms the hart of the DSS the Natureplanner.

References

Bakkenes, M., Zwart, D. de & Alkemade, J.R.M., 2002. Achtergronden en analyse van modelvarianten. RIVM rapport 408657006/2002. RIVM, Bilthoven

Bakkenes, M., Hoek, D.C.J. van der Hoek & Alkemade, J.R.M., 2003. Documentatie testrapport modelketen Natuurplanner. RIVM report 500002001/2003. RIVM, Bilthoven.

Centraal Bureau voor de Statistiek 1991. Botanisch basisregister. CBS, Voorburg.

Ertsen, A.C.D., Alkemade, J.R.M. & Wassen, M.J., 1998. Calibrating Ellenberg indicator values for moisture, acidity, nutrient availability and salinity in the Netherlands. Plant Ecology 135: 113–124.

Reijnen, M.J.S.M. & Van Oostenbrugge, R., 2001. Wetenschappelijke review van SMART-MOVE. Onderdeel van het kern- instrumentarium van het Natuurplanbureau. Werkdocument 2001/05. Natuurplanbureau vestiging Wageningen.

Van Adrichem, M.H.C., Wortelboer, F.G. & Wamelink, G.W.W., in prep. MOVE. MOdel for terrestrial Vegetation version 4.0. WOt-werkdocument 153. WOT Natuur & Milieu, Wageningen

Van Dobben, H.F. (in prep.). Meta Natuurplanner. Alterra rapport.

Van der Greft *et al.* (in prep.). Kwaliteitsborging Meta Natuurplanner.

Van Hinsberg (in prep.). Verzuring NL. PBL rapport.

Van der Hoek, D.C.J., Heuberger, P.S.C. 2006. Gevoeligheidsanalyse Natuurplanner Van complex tot simpel. MNP Rapport 500067001/2006. MNP, Bilthoven.

Van der Meijden, R., Weeda, E.J., Holverda, W.J. & Hovenkamp P.H., 1990. Heukels' Flora van Nederland. 21th ed. Wolters-Noordhof, Groningen.

Wamelink, G.W.W., Joosten, V., Dobben, H.F. van & Berendse, F., 2002. Validity of Ellenberg indicator values judged from physico-chemical field measurements. Journal of vegetation science 13: 269-278.

Wamelink, G.W.W., G. Reinds, J.P. Mol-Dijkstra, J. Kros & R. Wiegers, 2008. Verbeteringen voor de Natuurplanner. Werkdocument 2008/35. WOT Natuur & Mllieu, Wageningen.

Wamelink *et al.* (in prep.). Uncertainty analyses of the Natureplanner. Alterra report.

Appendix 1 Technical description of MOVE4 standalone version as applied in de uncertainty analysis of the Natureplanner

Executable: Move4.bat

Runs MS ACCESS **Move 4 Bereken Responsies XP.mdb** (through AutoExec Macro) initialized by **move4.ini** file. MDB and INI files should be located in the same folder as **Move4.bat** file.

Initialization file **move4.ini**

[Files]
ResponseModelsDatabaseName=Move4ww.mdb – database file with input data from tables (note: modules are ignored)
VariableTranslationFileName=VariableTranslation_XP.txt -
VariableCodeTranslationFileName=VariableCodeTranslation.txt -
BiodivFileName=biodiv.ini – initialization file
LogFileName=log move4.txt – log file
ResultsDatabaseName=results multirun WOConf.mdb – database oputput file name
[Options]
CalculateConfidenceIntervals=True
CalculatePerSpecies=True
CalculatePerGridCell=False
BioDivUseRelationSpeciesGridFile=False
BioDivUseExternalUniqueGridIdFile=False

Output: as specified in **move4.ini::[Files]::ResultsDatabaseName**

Executable: **iniCreator.bat**

Batch used to create multiple entries for **biodiv.ini** file. Namely for specifying run parameters. Outputs part of initialization text in **iniCopy.txt**.

Appendix 2 The Move.bat file for running MOVE4 standalone (on CD)

The bat file contains just one command line, given below. The file is also available on the CD.

"C:\Program Files\Microsoft Office\OFFICE11\MSACCESS .EXE" "%CD%\Move 4 Bereken Responsies XP.mdb" /cmd "%CD%\move4.ini"

Appendix 3 Boundaries of MOVE4

The model MOVE4 is calibrated with a dataset of vegetation relevés. This dataset contains over 100,000 relevés. Since for each species a model is fitted using a different number of model terms, boundaries can only be given per species. Since this is impossible tot do in a report, we give the physical boundaries of the model terms, without the effect of interaction or without differences per species (Table A1). The model terms FGR and BGT are all present in the total dataset. For more information see Van Adrichem *et al* (2009). The best indication of the reliability of the prediction of MOVE4 is the uncertainty given together with the chance of occurrence. When it is very large, it may be an indication that the prediction is out of the boundaries of the model.

Table A1. Statistical measures for the continuous variables in the dataset.

	n	**f**	**r**	**s**
minimum	1.00	2.00	1.00	0.00
First quartile	4.93	5.42	4.93	0.12
average	5.68	6.90	5.68	0.50
Median	6.11	6.50	6.11	0.28
Third quartile	6.75	8.25	6.75	0.50
maximum	8.67	12.00	8.67	8.67
Total n	108826	108826	108826	108826
variance	2.07	4.38	2.07	1.07
Standard deviation	1.44	2.09	1.44	1.03

Appendix 4 Species list of MOVE4

The first column gives the rank number in MOVE4, the second column the code that is used in the botanical reference guide, preceded by p_.

TaxonNr	TaxonCode	TaxonNaam
1	p_1	Acer campestre
2	p_2	Acer pseudoplatanus
3	p_4	Achillea millefolium
4	p_5	Achillea ptarmica
5	p_7	Acorus calamus
6	p_8	Actaea spicata
7	p_10	Adoxa moschatellina
8	p_11	Aegopodium podagraria
9	p_12	Aethusa cynapium
10	p_13	Agrimonia eupatoria
11	p_16	Agrostis canina + Agrostis vinealis
12	p_17	Agrostis gigantea
13	p_18	Agrostis stolonifera
14	p_19	Agrostis capillaris
15	p_20	Aira caryophyllea
16	p_21	Aira praecox
17	p_24	Ajuga reptans
18	p_26	Alisma gramineum
19	p_27	Alisma lanceolatum
20	p_28	Alisma plantago-aquatica
21	p_29	Alliaria petiolata
22	p_31	Allium oleraceum
23	p_34	Allium ursinum
24	p_35	Allium vineale
25	p_36	Alnus glutinosa
26	p_37	Alnus incana
27	p_38	Alopecurus aequalis
28	p_39	Alopecurus bulbosus
29	p_40	Alopecurus geniculatus
30	p_41	Alopecurus myosuroides
31	p_42	Alopecurus pratensis
32	p_43	Althaea officinalis
33	p_49	Calammophila baltica (x-)
34	p_50	Ammophila arenaria

TaxonNr	TaxonCode	TaxonNaam
35	p_52	Anagallis arvensis subsp. arvensis
36	p_53	Anagallis tenella
37	p_54	Anchusa officinalis
38	p_55	Andromeda polifolia
39	p_56	Anemone nemorosa
40	p_59	Angelica archangelica
41	p_60	Angelica sylvestris
42	p_61	Antennaria dioica
43	p_62	Anthemis arvensis
44	p_66	Anthoxanthum odoratum
45	p_67	Anthoxanthum aristatum
46	p_68	Anthriscus caucalis
47	p_70	Anthriscus sylvestris
48	p_71	Anthyllis vulneraria
49	p_73	Apera spica-venti
50	p_74	Aphanes arvensis
51	p_75	Aphanes inexpectata
52	p_76	Apium graveolens
53	p_77	Apium inundatum
54	p_78	Apium nodiflorum
55	p_81	Arabidopsis thaliana
56	p_83	Arctium lappa
57	p_84	
58	p_91	Armeria maritima
59	p_94	Arnoseris minima
60	p_96	Arrhenatherum elatius
61	p_99	Artemisia campestris subsp. maritima
62	p_100	Artemisia maritima
63	p_101	Artemisia vulgaris
64	p_103	Arum maculatum
65	p_104	Asparagus officinalis subsp. officinalis
66	p_105	Asparagus officinalis subsp. prostratus
67	p_110	Galium odoratum
68	p_112	Asplenium ruta-muraria
69	p_117	Aster tripolium
70	p_119	Athyrium filix-femina
71	p_121	Atriplex prostrata
72	p_122	Atriplex littoralis
73	p_123	Atriplex patula
74	p_128	Azolla filiculoides
75	p_129	Ballota nigra subsp. foetida

TaxonNr	TaxonCode	TaxonNaam
76	p_133	Barbarea vulgaris
77	p_135	Bellis perennis
78	p_136	Berberis vulgaris
79	p_137	Berteroa incana
80	p_139	Betula pubescens
81	p_140	Betula pendula
82	p_141	Bidens cernua
83	p_142	Bidens connata
84	p_143	Bidens frondosa
85	p_144	Bidens tripartita
86	p_146	Blechnum spicant
87	p_148	Botrychium lunaria
88	p_150	Brachypodium pinnatum
89	p_151	Brachypodium sylvaticum
90	p_152	Brassica nigra
91	p_153	Briza media
92	p_159	Bromopsis inermis (subsp. inermis)
93	p_165	Bromus sterilis
94	p_166	Bromus tectorum
95	p_167	Bryonia cretica (subsp. dioica)
96	p_170	Bupleurum tenuissimum
97	p_171	Butomus umbellatus
98	p_172	Cakile maritima
99	p_173	Calamagrostis canescens
100	p_174	Calamagrostis epigejos
101	p_175	Calamagrostis stricta
102	p_178	Calla palustris
103	p_180	Callitriche hamulata
104	p_182	Callitriche obtusangula
105	p_184	Callitriche platycarpa
106	p_185	Callitriche stagnalis
107	p_186	Calluna vulgaris
108	p_187	Caltha palustris subsp. palustris
109	p_188	Calystegia sepium
110	p_196	Campanula rapunculus
111	p_198	Campanula rotundifolia
112	p_199	Campanula trachelium
113	p_200	Capsella bursa-pastoris
114	p_201	Cardamine amara
115	p_202	Cardamine flexuosa
116	p_203	Cardamine hirsuta

TaxonNr	TaxonCode	TaxonNaam
117	p_205	Cardamine pratensis
118	p_208	Carduus crispus
119	p_209	Carduus nutans
120	p_211	Carex acuta
121	p_212	Carex acutiformis
122	p_213	Carex appropinquata
123	p_214	Carex aquatilis
124	p_215	Carex arenaria
125	p_218	Carex caryophyllea
126	p_219	Carex curta
127	p_220	Carex oederi subsp. oedocarpa
128	p_221	Carex diandra
129	p_224	Carex distans
130	p_225	Carex disticha
131	p_228	Carex echinata
132	p_229	Carex elongata
133	p_231	Carex extensa
134	p_232	Carex flacca
135	p_235	Carex hirta
136	p_236	Carex hostiana
137	p_237	Carex elata
138	p_239	Carex lasiocarpa
139	p_244	Carex nigra
140	p_245	Carex cuprina
141	p_246	Carex ovalis
142	p_247	Carex pallescens
143	p_248	Carex panicea
144	p_249	Carex paniculata
145	p_251	Carex pilulifera
146	p_254	Carex pseudocyperus
147	p_255	Carex pulicaris
148	p_258	Carex remota
149	p_259	Carex riparia
150	p_260	Carex rostrata
151	p_261	Carex oederi subsp. oederi
152	p_262	Carex spicata
153	p_264	Carex sylvatica
154	p_266	Carex trinervis
155	p_267	Carex vesicaria
156	p_269	Carlina vulgaris
157	p_270	Carpinus betulus

TaxonNr	TaxonCode	TaxonNaam
158	p_271	Carum carvi
159	p_273	Castanea sativa
160	p_274	Catabrosa aquatica
161	p_279	Centaurea cyanus
162	p_284	Centaurea scabiosa
163	p_285	Centaurium littorale
164	p_286	Centaurium erythraea
165	p_287	Centaurium pulchellum
166	p_288	Anagallis minima
167	p_292	Cerastium arvense
168	p_293	Cerastium diffusum
169	p_295	Cerastium glomeratum
170	p_296	Cerastium fontanum subsp. vulgare
171	p_298	Cerastium semidecandrum
172	p_299	Ceratophyllum demersum
173	p_300	Ceratophyllum submersum
174	p_303	Chaerophyllum temulum
175	p_305	Chelidonium majus
176	p_306	Chenopodium album
177	p_310	Chenopodium ficifolium
178	p_312	Chenopodium glaucum
179	p_315	Chenopodium polyspermum
180	p_316	Chenopodium rubrum
181	p_319	Leucanthemum vulgare
182	p_321	Chrysanthemum segetum
183	p_323	Chrysosplenium oppositifolium
184	p_324	Cicendia filiformis
185	p_325	Cichorium intybus
186	p_326	Cicuta virosa
187	p_329	Circaea lutetiana
188	p_330	Cirsium acaule
189	p_331	Cirsium arvense
190	p_332	Cirsium dissectum
191	p_335	Cirsium palustre
192	p_336	Cirsium vulgare
193	p_337	Cladium mariscus
194	p_338	Claytonia perfoliata
195	p_339	Clematis vitalba
196	p_342	Cochlearia danica
197	p_343	Cochlearia officinalis subsp. Officinalis
198	p_346	Potentilla palustris

TaxonNr	TaxonCode	TaxonNaam
199	p_349	Convallaria majalis
200	p_350	Convolvulus arvensis
201	p_355	Cornus sanguinea
202	p_359	Coronopus squamatus
203	p_362	Ceratocapnos claviculata
204	p_365	Corydalis solida
205	p_366	Corylus avellana
206	p_367	Corynephorus canescens
207	p_369	Crataegus monogyna
208	p_370	Crataegus laevigata
209	p_371	Crepis biennis
210	p_372	Crepis capillaris
211	p_373	Crepis paludosa
212	p_375	Crepis vesicaria
213	p_379	Cuscuta epithymum
214	p_380	Cuscate europaea
215	p_384	Cynodon dactylon
216	p_385	Cynoglossum officinale
217	p_386	Cynosurus cristatus
218	p_390	Dactylis glomerata
219	p_394	Daucus carota
220	p_397	Deschampsia cespitosa
221	p_398	Deschampsia flexuosa
222	p_399	Deschampsia setacea
223	p_404	Dianthus deltoides
224	p_406	Digitalis purpurea
225	p_407	Digitaria ischaemum
226	p_410	Diplotaxis tenuifolia
227	p_412	Dipsacus fullonum
228	p_417	Drosera intermedia
229	p_418	Drosera rotundifolia
230	p_419	Dryopteris dilatata
231	p_420	Dryopteris cristata
232	p_421	Dryopteris filix-mas
233	p_426	Dryopteris carthusiana
234	p_427	Thelypteris palustris
235	p_428	Echinochloa crus-galli
236	p_429	Echinodorus ranunculoides
237	p_431	Echium vulgare
238	p_435	Eleocharis acicularis
239	p_436	Eleocharis multicaulis

TaxonNr	TaxonCode	TaxonNaam
240	p_437	Eleocharis palustris subsp. palustris
241	p_438	Eleocharis quinqueflora
242	p_440	Eleocharis palustris subsp. uniglumis
243	p_441	Elodea canadensis
244	p_442	Elodea nuttallii
245	p_443	Leymus arenarius
246	p_444	Elymus farctus
247	p_445	Elymus athericus
248	p_446	Elymus repens
249	p_447	Empetrum nigrum
250	p_448	Epilobium ciliatum
251	p_450	Chamerion angustifolium
252	p_451	Epilobium hirsutum
253	p_454	Epilobium montanum
254	p_455	Epilobium obscurum
255	p_456	Epilobium palustre
256	p_457	Epilobium parviflorum
257	p_460	Epipactis helleborine
258	p_461	Epipactis palustris
259	p_462	Equisetum arvense
260	p_463	Equisetum fluviatile
261	p_464	
262	p_465	Equisetum x litorale
263	p_466	Equisetum palustre
264	p_471	Equisetum variegatum
265	p_473	Erica tetralix
266	p_474	Erigeron acris
267	p_475	Erigeron canadensis
268	p_476	Eriophorum angustifolium
269	p_479	Eriophorum vaginatum
270	p_480	Erodium cicutarium subsp. cicutarium
271	p_481	Erodium glutinosum
272	p_482	Erodium cicutarium subsp. dunense
273	p_483	Erophila verna
274	p_485	Eryngium campestre
275	p_486	Eryngium maritimum
276	p_487	Erysimum cheiranthoides
277	p_489	Evonymus europaeus
278	p_490	Eupatorium cannabinum
279	p_492	Euphorbia cyparissias
280	p_495	Euphorbia helioscopia

TaxonNr	TaxonCode	TaxonNaam
281	p_496	Euphorbia palustris
282	p_498	Euphorbia peplus
283	p_509	Odontites vernus subsp. serotinus
284	p_513	Fagus sylvatica
285	p_514	Festuca arundinacea
286	p_515	Festuca gigantea
287	p_517	Festuca rubra subsp. arenaria
288	p_519	Festuca pratensis
289	p_521	Festulolium loliacea (x-)
290	p_524	Filago minima
291	p_526	Filipendula ulmaria
292	p_529	Fragaria vesca
293	p_530	Rhamnus frangula
294	p_531	Fraxinus excelsior
295	p_532	Fritillaria meleagris
296	p_533	Fumaria officinalis
297	p_538	Galanthus nivalis
298	p_540	Galeopsis bifida
299	p_542	Galeopsis speciosa
300	p_543	Galeopsis tetrahit
301	p_544	Galinsoga quadriradiata
302	p_545	Galinsoga parviflora
303	p_546	Galium aparine
304	p_548	Cruciata laevipes
305	p_549	Galium saxatile
306	p_550	Galium mollugo
307	p_553	Galium pumilum
308	p_556	Galium uliginosum
309	p_557	Galium verum
310	p_558	Genista anglica
311	p_560	Genista pilosa
312	p_561	Genista tinctoria
313	p_562	Gentianella amarella
314	p_567	Gentianella germanica
315	p_568	Gentiana pneumonanthe
316	p_570	Geranium dissectum
317	p_571	Geranium molle
318	p_574	Geranium pusillum
319	p_576	Geranium robertianum
320	p_579	Geum urbanum
321	p_581	Glaux maritima

TaxonNr	TaxonCode	TaxonNaam
322	p_582	Glechoma hederacea
323	p_583	Glyceria notata subsp. declinata
324	p_584	Glyceria fluitans
325	p_585	Glyceria maxima
326	p_586	Glyceria notata subsp. notata
327	p_587	Gnaphalium luteo-album
328	p_588	Gnaphalium sylvaticum
329	p_589	Gnaphalium uliginosum
330	p_593	Gymnadenia conopsea
331	p_595	Atriplex pedunculata
332	p_596	Atriplex portulacoides
333	p_597	Hammarbya paludosa
334	p_598	Hedera helix
335	p_604	Avenula pubescens
336	p_607	Heracleum sphondylium
337	p_609	Herniaria glabra
338	p_617	Hieracium vulgatum
339	p_618	Hieracium laevigatum
340	p_621	Hieracium pilosella
341	p_624	Hieracium sabaudum
342	p_625	Hieracium umbellatum
343	p_626	Hierochloe odorata
344	p_629	Hippophae rhamnoides
345	p_630	Hippuris vulgaris
346	p_631	Holcus lanatus
347	p_632	Holcus mollis
348	p_634	Honckenya peploides
349	p_635	Hordeum marinum
350	p_636	Hordeum murinum
351	p_637	Hordeum secalinum
352	p_638	Hottonia palustris
353	p_639	Humulus lupulus
354	p_640	Hydrocharis morsus-ranae
355	p_641	Hydrocotyle vulgaris
356	p_644	Hypericum elodes
357	p_646	Hypericum humifusum
358	p_647	Hypericum dubium
359	p_649	Hypericum perforatum
360	p_650	Hypericum pulchrum
361	p_651	Hypericum quadrangulum
362	p_654	Hypochaeris radicata

TaxonNr	TaxonCode	TaxonNaam
363	p_658	Ilex aquifolium
364	p_659	Illecebrum verticillatum
365	p_660	Impatiens noli-tangere
366	p_661	Impatiens parviflora
367	p_662	Inula britannica
368	p_663	Inula conyzae
369	p_665	Iris pseudacorus
370	p_669	Jasione montana
371	p_670	Juncus acutiflorus
372	p_671	Juncus ambiguus
373	p_672	Juncus alpinoarticulatus subsp. atricapillus
374	p_673	Juncus articulatus
375	p_674	Juncus arcticus (subsp. balticus)
376	p_675	Juncus bufonius
377	p_678	Juncus compressus
378	p_679	Juncus conglomeratus
379	p_680	Juncus effusus
380	p_681	Juncus filiformis
381	p_682	Juncus alpinoarticulatus subsp. Alpinoarticulatus
382	p_683	Juncus gerardi
383	p_684	Juncus inflexus
384	p_685	Juncus maritimus
385	p_687	Juncus squarrosus
386	p_688	Juncus subnodulosus
387	p_689	Juncus tenageia
388	p_690	Juncus tenuis
389	p_691	Juniperus communis
390	p_692	Knautia arvensis
391	p_693	Koeleria macrantha
392	p_699	Lactuca serriola
393	p_700	Lamium album
394	p_701	Lamium amplexicaule
395	p_702	Galeobdolon luteum
396	p_704	Lamium maculatum
397	p_706	Lamium purpureum
398	p_708	Lapsana communis
399	p_714	Lathyrus palustris
400	p_715	Lathyrus pratensis
401	p_717	Lathyrus tuberosus
402	p_722	Lemna gibba
403	p_723	Lemna minor

TaxonNr	TaxonCode	TaxonNaam
404	p_724	Lemna trisulca
405	p_725	Leontodon autumnalis
406	p_726	Leontodon hispidus
407	p_727	Leontodon saxatilis
408	p_734	Leucojum aestivum
409	p_736	Ligustrum vulgare
410	p_738	Limonium vulgare
411	p_739	Limosella aquatica
412	p_741	Cymbalaria muralis
413	p_743	Chaenorrhinum minus
414	p_745	Linaria vulgaris
415	p_747	Linum catharticum
416	p_748	Liparis loeselii
417	p_750	Listera ovata
418	p_752	Lithospermum officinale
419	p_753	Littorella uniflora
420	p_754	Lobelia dortmanna
421	p_755	Lolium multiflorum
422	p_756	Lolium perenne
423	p_759	Lonicera periclymenum
424	p_761	Lotus corniculatus subsp. corniculatus
425	p_762	Lotus corniculatus subsp. tenuifolius
426	p_763	Lotus uliginosus
427	p_765	Luronium natans
428	p_766	Luzula campestris
429	p_770	Luzula pilosa
430	p_771	Luzula sylvatica
431	p_772	Lychnis flos-cuculi
432	p_777	Lycopodium inundatum
433	p_779	Anchusa arvensis
434	p_780	Lycopus europaeus
435	p_781	Lysimachia nemorum
436	p_782	Lysimachia nummularia
437	p_783	Lysimachia thyrsiflora
438	p_784	Lysimachia vulgaris
439	p_785	Lythrum salicaria
440	p_786	Maianthemum bifolium
441	p_790	Malva neglecta
442	p_792	Malva sylvestris
443	p_794	Matricaria recutita
444	p_795	Matricaria maritima

TaxonNr	TaxonCode	TaxonNaam
445	p_796	Matricaria discoidea
446	p_797	Medicago arabica
447	p_798	Medicago falcata
448	p_799	Medicago lupulina
449	p_801	Medicago sativa
450	p_804	Melampyrum pratense
451	p_805	Silene latifolia (subsp. alba)
452	p_807	Silene dioica
453	p_808	Melica uniflora
454	p_809	Melilotus albus
455	p_810	Melilotus altissima
456	p_813	Mentha aquatica
457	p_814	Mentha arvensis
458	p_820	Mentha x verticillata
459	p_821	Menyanthes trifoliata
460	p_823	Mercurialis perennis
461	p_824	Mespilus germanica
462	p_826	Milium effusum
463	p_830	Moehringia trinervia
464	p_832	Molinia caerulea
465	p_839	Mycelis muralis
466	p_840	Myosotis arvensis
467	p_841	Myosotis laxa (subsp. cespitosa)
468	p_842	Myosotis discolor
469	p_843	Myosotis ramosissima
470	p_844	Myosotis palustris
471	p_846	Myosotis sylvatica
472	p_847	Stellaria aquatica
473	p_848	Myosurus minimus
474	p_849	Myrica gale
475	p_850	Myriophyllum alterniflorum
476	p_851	Myriophyllum spicatum
477	p_852	Myriophyllum verticillatum
478	p_854	Najas marina
479	p_857	Nardus stricta
480	p_858	Narthecium ossifragum
481	p_859	Rorippa microphylla
482	p_860	Rorippa nasturtium-aquaticum
483	p_865	Nuphar lutea
484	p_866	Nymphaea alba
485	p_867	Nymphoides peltata

TaxonNr	TaxonCode	TaxonNaam
486	p_868	Oenanthe aquatica
487	p_869	Oenanthe fistulosa
488	p_870	Oenanthe lachenalii
489	p_872	Oenothera biennis
490	p_876	Ononis repens subsp. repens
491	p_877	Ononis repens subsp. spinosa
492	p_879	Ophioglossum vulgatum
493	p_884	Dactylorhiza incarnata
494	p_886	Dactylorhiza majalis subsp. majalis
495	p_888	Orchis militaris
496	p_889	Orchis morio
497	p_890	Dactylorhiza majalis subsp. praetermissa
498	p_894	Origanum vulgare
499	p_896	Ornithogalum umbellatum
500	p_897	Ornithopus perpusillus
501	p_907	Orobanche caryophyllacea
502	p_908	Osmunda regalis
503	p_909	Oxalis acetosella
504	p_911	Oxalis fontana
505	p_912	Oxycoccus macrocarpos
506	p_913	Oxycoccus palustris
507	p_914	Papaver argemone
508	p_915	Papaver dubium
509	p_916	Papaver rhoeas
510	p_917	Parapholis strigosa
511	p_920	Paris quadrifolia
512	p_921	Parnassia palustris
513	p_922	Pastinaca sativa
514	p_923	Pedicularis palustris
515	p_924	Pedicularis sylvatica
516	p_925	Lythrum portula
517	p_926	Petasites hybridus
518	p_928	Peucedanum carvifolia
519	p_929	Peucedanum palustre
520	p_930	Phalaris arundinacea
521	p_931	Phleum arenarium
522	p_932	Phleum pratense subsp. pratense
523	p_933	Phragmites australis
524	p_935	Phyteuma spicatum subsp. nigrum
525	p_938	Picris hieracioides
526	p_939	Pilularia globulifera

TaxonNr	TaxonCode	TaxonNaam
527	p_940	Pimpinella major
528	p_941	Pimpinella saxifraga
529	p_943	Pinus sylvestris
530	p_944	Plantago coronopus
531	p_945	Plantago major subsp. pleiosperma
532	p_946	Plantago lanceolata
533	p_947	Plantago major subsp. major
534	p_948	Plantago maritima
535	p_949	Plantago media
536	p_950	Platanthera bifolia
537	p_952	Poa annua
538	p_955	Poa compressa
539	p_956	Poa nemoralis
540	p_957	Poa palustris
541	p_959	Poa trivialis
542	p_961	Polygala comosa
543	p_962	Polygala serpyllifolia
544	p_963	Polygala vulgaris
545	p_964	Polygonatum multiflorum
546	p_965	Polygonatum odoratum
547	p_967	Polygonum amphibium
548	p_968	Polygonum aviculare
549	p_969	Persicaria bistorta
550	p_970	Polygonum convolvulus
551	p_971	Polygonum dumetorum
552	p_972	Polygonum hydropiper
553	p_973	Polygonum lapathifolium
554	p_975	Persicaria minor
555	p_976	Polygonum mite
556	p_977	Polygonum persicaria
557	p_980	Populus alba
558	p_981	Populus x canescens
559	p_982	Populus nigra
560	p_983	Populus tremula
561	p_985	Potamogeton acutifolius
562	p_986	Potamogeton alpinus
563	p_987	Potamogeton berchtoldii
564	p_989	Potamogeton compressus
565	p_990	Potamogeton crispus
566	p_991	Groenlandia densa
567	p_992	Potamogeton mucronatus

TaxonNr	TaxonCode	TaxonNaam
568	p_993	Potamogeton gramineus
569	p_994	Potamogeton lucens
570	p_995	Potamogeton natans
571	p_997	Potamogeton obtusifolius
572	p_998	Potamogeton pectinatus
573	p_999	Potamogeton perfoliatus
574	p_1000	Potamogeton polygonifolius
575	p_1002	Potamogeton pusillus
576	p_1003	Potamogeton trichoides
577	p_1005	Potentilla anglica
578	p_1006	Potentilla anserina
579	p_1007	Potentilla argentea
580	p_1008	Potentilla erecta
581	p_1010	Potentilla reptans
582	p_1011	Potentilla sterilis
583	p_1012	Potentilla supina
584	p_1013	Potentilla verna
585	p_1014	Primula elatior
586	p_1015	Primula veris
587	p_1017	Prunella vulgaris
588	p_1018	Prunus avium
589	p_1019	Prunus padus
590	p_1020	Prunus serotina
591	p_1021	Prunus spinosa
592	p_1022	Pteridium aquilinum
593	p_1023	Puccinellia distans subsp. distans
594	p_1024	Puccinellia fasciculata
595	p_1025	Puccinellia maritima
596	p_1029	Pulicaria dysenterica
597	p_1034	Pyrola rotundifolia
598	p_1036	Quercus petraea
599	p_1037	Quercus robur
600	p_1038	Radiola linoides
601	p_1040	Ranunculus acris
602	p_1041	Ranunculus aquatilis
603	p_1043	Ranunculus auricomus
604	p_1044	Ranunculus baudotii
605	p_1045	Ranunculus bulbosus
606	p_1046	Ranunculus circinatus
607	p_1047	Ranunculus ficaria subsp. bulbilifer
608	p_1048	Ranunculus flammula

TaxonNr	TaxonCode	TaxonNaam
609	p_1050	Ranunculus hederaceus
610	p_1051	Ranunculus lingua
611	p_1055	Ranunculus peltatus
612	p_1056	Ranunculus repens
613	p_1057	Ranunculus sardous
614	p_1058	Ranunculus sceleratus
615	p_1061	Raphanus raphanistrum
616	p_1062	Reseda lutea
617	p_1064	Rhamnus catharticus
618	p_1066	Rhinanthus angustifolius
619	p_1067	Rhinanthus minor
620	p_1068	Rhynchospora alba
621	p_1069	Rhynchospora fusca
622	p_1070	Ribes nigrum
623	p_1071	Ribes rubrum
624	p_1072	Ribes uva-crispa
625	p_1074	Rorippa amphibia
626	p_1076	Rorippa palustris
627	p_1078	Rorippa sylvestris
628	p_1083	Rosa pimpinellifolia
629	p_1085	Rosa rugosa
630	p_1089	Rubus caesius
631	p_1091	Rubus idaeus
632	p_1093	Rumex acetosa
633	p_1094	Rumex acetosella
634	p_1095	Rumex x pratensis
635	p_1097	Rumex conglomeratus
636	p_1098	Rumex crispus
637	p_1099	Rumex hydrolapathum
638	p_1100	Rumex maritimus
639	p_1101	Rumex obtusifolius
640	p_1102	Rumex palustris
641	p_1103	Rumex sanguineus
642	p_1106	Rumex thyrsiflorus
643	p_1109	Sagina apetala
644	p_1110	Sagina maritima
645	p_1111	Sagina nodosa
646	p_1112	Sagina procumbens
647	p_1114	Sagittaria sagittifolia
648	p_1115	Salicornia europaea + Salicornia procumbens
649	p_1116	Salix alba

TaxonNr	TaxonCode	TaxonNaam
650	p_1117	Salix aurita
651	p_1118	Salix caprea
652	p_1119	Salix cinerea
653	p_1120	Salix dasyclados
654	p_1121	Salix fragilis
655	p_1122	Salix pentandra
656	p_1123	Salix purpurea
657	p_1124	Salix repens
658	p_1125	Salix triandra
659	p_1126	Salix viminalis
660	p_1127	Salsola kali subsp. kali
661	p_1128	Salvia pratensis
662	p_1133	Sambucus nigra
663	p_1134	Sambucus racemosa
664	p_1135	Samolus valerandi
665	p_1136	Sanguisorba minor
666	p_1137	Sanguisorba officinalis
667	p_1138	Sanicula europaea
668	p_1139	Saponaria officinalis
669	p_1140	Cytisus scoparius
670	p_1141	Satureja acinos
671	p_1143	Satureja vulgaris
672	p_1146	Saxifraga tridactylites
673	p_1147	Scabiosa columbaria
674	p_1150	Schoenus nigricans
675	p_1151	Scilla non-scripta
676	p_1154	Scirpus fluitans
677	p_1155	Scirpus lacustris subsp. lacustris
678	p_1156	Scirpus maritimus
679	p_1157	Scirpus cariciformis
680	p_1158	Scirpus rufus
681	p_1159	Scirpus setaceus
682	p_1160	Scirpus sylvaticus
683	p_1161	Scirpus lacustris subsp. tabernaemontani
684	p_1163	Scleranthus annuus
685	p_1164	Scleranthus perennis
686	p_1167	Scrophularia auriculata
687	p_1170	Scrophularia nodosa
688	p_1173	Scutellaria galericulata
689	p_1175	Sedum acre
690	p_1176	Sedum album

TaxonNr	TaxonCode	TaxonNaam
691	p_1180	Sedum reflexum
692	p_1181	Sedum sexangulare
693	p_1183	Senecio aquaticus
694	p_1184	Senecio congestus
695	p_1185	Senecio erucifolius
696	p_1186	Senecio fluviatilis
697	p_1187	Senecio nemorensis (subsp. fuchsii)
698	p_1189	Senecio paludosus
699	p_1190	Senecio sylvaticus
700	p_1191	Senecio viscosus
701	p_1192	Senecio vulgaris
702	p_1197	Setaria viridis
703	p_1199	Danthonia decumbens
704	p_1202	Silene conica
705	p_1204	Silene nutans
706	p_1205	Silene otites
707	p_1206	Silene vulgaris
708	p_1207	Sinapis arvensis
709	p_1208	Sisymbrium altissimum
710	p_1211	Sisymbrium officinale
711	p_1215	Berula erecta
712	p_1216	Sium latifolium
713	p_1218	Solanum dulcamara
714	p_1221	Solidago gigantea
715	p_1222	Solidago virgaurea
716	p_1224	Sonchus asper
717	p_1225	Sonchus oleraceus
718	p_1226	Sonchus palustris
719	p_1227	Sorbus aucuparia
720	p_1229	Sparganium erectum
721	p_1230	Sparganium natans
722	p_1231	Sparganium emersum
723	p_1233	Spartina townsendii
724	p_1234	Spergula arvensis
725	p_1235	Spergula morisonii
726	p_1236	Spergularia maritima
727	p_1237	Spergularia rubra
728	p_1238	Spergularia salina
729	p_1241	Spirodela polyrhiza
730	p_1243	Stachys arvensis
731	p_1245	Stachys palustris

TaxonNr	TaxonCode	TaxonNaam
732	p_1246	Stachys sylvatica
733	p_1247	Stellaria uliginosa
734	p_1248	Stellaria graminea
735	p_1249	Stellaria holostea
736	p_1250	Stellaria media
737	p_1252	Stellaria pallida
738	p_1254	Stellaria palustris
739	p_1255	Stratiotes aloides
740	p_1256	Suaeda maritima
741	p_1258	Succisa pratensis
742	p_1259	Symphytum officinale
743	p_1260	Tanacetum vulgare
744	p_1261	Taraxacum laevigatum
745	p_1262	Taraxacum celticum
746	p_1263	Taraxacum obliquum
747	p_1264	Taraxacum officinale
748	p_1265	Taraxacum palustre
749	p_1267	Taxus baccata
750	p_1268	Teesdalia nudicaulis
751	p_1273	Teucrium scorodonia
752	p_1275	Thalictrum flavum
753	p_1281	Thlaspi arvense
754	p_1283	Thymus pulegioides
755	p_1284	Thymus serpyllum
756	p_1285	Tilia cordata
757	p_1286	Tilia platyphyllos
758	p_1289	Torilis japonica
759	p_1296	Trifolium arvense
760	p_1298	Trifolium campestre
761	p_1299	Trifolium dubium
762	p_1300	Trifolium fragiferum
763	p_1301	Trifolium hybridum
764	p_1305	Trifolium pratense
765	p_1306	Trifolium repens
766	p_1310	Triglochin maritima
767	p_1311	Triglochin palustris
768	p_1312	Trisetum flavescens
769	p_1316	Tussilago farfara
770	p_1317	Typha angustifolia
771	p_1318	Typha latifolia
772	p_1320	Ulmus minor

TaxonNr	TaxonCode	TaxonNaam
773	p_1321	Urtica dioica
774	p_1322	Urtica urens
775	p_1323	Utricularia intermedia
776	p_1324	Utricularia minor
777	p_1327	Utricularia vulgaris
778	p_1329	Vaccinium myrtillus
779	p_1331	Vaccinium vitis-idaea
780	p_1332	Valeriana dioica
781	p_1333	Valeriana officinalis
782	p_1336	Valerianella locusta
783	p_1340	Verbascum nigrum
784	p_1343	Verbascum thapsus
785	p_1344	Verbena officinalis
786	p_1345	Veronica agrestis
787	p_1346	Veronica anagallis-aquatica
788	p_1347	Veronica arvensis
789	p_1349	Veronica beccabunga
790	p_1350	Veronica catenata
791	p_1351	Veronica chamaedrys
792	p_1352	Veronica hederifolia
793	p_1353	Veronica longifolia
794	p_1354	Veronica montana
795	p_1355	Veronica officinalis
796	p_1358	Veronica persica
797	p_1362	Veronica scutellata
798	p_1363	Veronica serpyllifolia
799	p_1364	Veronica austriaca subsp. teucrium
800	p_1367	Viburnum opulus
801	p_1368	Vicia sativa subsp. nigra
802	p_1369	Vicia cracca
803	p_1370	Vicia hirsuta
804	p_1371	Vicia lathyroides
805	p_1372	Vicia sativa subsp. sativa
806	p_1373	Vicia sepium
807	p_1375	Vicia tetrasperma subsp. tetrasperma
808	p_1377	Vinca minor
809	p_1378	Viola arvensis
810	p_1380	Viola canina
811	p_1381	Viola curtisii
812	p_1382	Viola hirta
813	p_1384	Viola odorata

TaxonNr	TaxonCode	TaxonNaam
814	p_1385	Viola palustris
815	p_1386	Viola reichenbachiana
816	p_1387	Viola riviniana
817	p_1388	Viola rupestris
818	p_1389	Viola persicifolia
819	p_1390	Viola tricolor
820	p_1393	Vulpia myuros
821	p_1395	Wolffia arrhiza
822	p_1396	Zannichellia palustris subsp. palustris
823	p_1397	Zannichellia palustris subsp. pedicellata
824	p_1411	Phleum pratense subsp. bertolonii
825	p_1460	Caltha palustris subsp. araneosa
826	p_1465	Cerastium fontanum subsp. glabrescens
827	p_1472	Festuca ovina subsp. cinerea
828	p_1474	Festuca ovina subsp. tenuifolia
829	p_1500	Poa angustifolia
830	p_1544	Agrostis canina
831	p_1545	Agrostis vinealis
832	p_1561	Carex x timmiana
833	p_1593	Salix x multinervis
834	p_1610	Bromus racemosus
835	p_1616	Dactylorhiza maculata
836	p_1634	Rubus fruticosus
837	p_1635	Salicornia europaea
838	p_1636	Salicornia procumbens
839	p_1637	Dactylorhiza majalis
840	p_1642	Epilobium tetragonum
841	p_1643	Rosa canina
842	p_1645	Rosa rubiginosa
843	p_1733	Senecio inaequidens
844	p_1766	Centaurea jacea
845	p_1800	Avena sativa
846	p_1802	Brassica napus
847	p_1811	Hordeum vulgare
848	p_1830	Secale cereale
849	p_1839	Triticum aestivum
850	p_1850	Acer platanoides
851	p_1851	Aesculus hippocastanum
852	p_1852	Amelanchier lamarckii
853	p_1876	Quercus rubra
854	p_1877	Robinia pseudoacacia

TaxonNr	TaxonCode	TaxonNaam
855	p_1884	Sambucus nigra cv. 'Laciniata'
856	p_1895	Ulmus glabra
857	p_1914	Eleocharis palustris
858	p_1917	Erodium cicutarium
859	p_1921	Festuca rubra
860	p_1922	Myosotis laxa + Myosotis scorpioides
861	p_1930	Juncus bufonius + Juncus ambiguus
862	p_1933	Luzula multiflora
863	p_1934	Malus sylvestris
864	p_1949	Scirpus lacustris
865	p_1953	Thalictrum minus
866	p_1960	Vicia sativa
867	p_1964	Zannichellia palustris
868	p_1965	Aronia x prunifolia
869	p_1966	Viola reichenbachiana + Viola riviniana
870	p_2009	Rubus corylifolius
871	p_2105	Rhododendron ponticum
872	p_2107	Symphoricarpos albus
873	p_2131	
874	p_2132	Enteromorpha species
875	p_2134	Hydrodictyon reticulatum
876	p_2135	Vaucheria species
877	p_2145	Chara globularis
878	p_2146	Chara major
879	p_2147	Chara vulgaris
880	p_2153	Chara species
881	p_2155	Nitella flexilis
882	p_2156	Nitella mucronata
883	p_2160	Nitellopsis obtusa
884	p_2164	Characeae
885	p_2213	Carex oederi
886	p_2222	Galeopsis bifida + Galeopsis tetrahit
887	p_2229	Larix decidua
888	p_2230	Larix kaempferi
889	p_2238	Picea abies
890	p_2242	Picea sitchensis
891	p_2245	Pinus nigra
892	p_2254	Populus x canadensis
893	p_2259	Pseudotsuga menziesii
894	p_2268	Solanum tuberosum
895	p_2290	Senecio jacobaea

TaxonNr	TaxonCode	TaxonNaam
896	p_2313	Zea mays
897	p_2316	Euphrasia stricta
898	p_2319	Odontites vernus
899	p_2320	Plantago major
900	p_2321	Poa pratensis + Poa angustifolia
901	p_2323	Solanum nigrum
902	p_2324	Sonchus arvensis
903	p_2333	Arabis hirsuta
904	p_2334	Arenaria serpyllifolia
905	p_2336	Blackstonia perfoliata
906	p_2337	Bromus hordeaceus
907	p_2343	Juncus bulbosus
908	p_2357	Scirpus cespitosus
909	p_2358	Sedum telephium
910	p_2374	Lemna gibba + Lemna minor
911	p_2376	Galium palustre
912	p_2388	Euphorbia esula
913	p_2406	Scrophularia umbrosa
914	p_2418	Tragopogon pratensis subsp. pratensis

Verschenen documenten in de reeks Werkdocumenten van de Wettelijke Onderzoekstaken Natuur & Milieu vanaf 2007

Werkdocumenten zijn verkrijgbaar bij het secretariaat van Unit Wettelijke Onderzoekstaken Natuur & Milieu, te Wageningen. T 0317 – 48 54 71; F 0317 – 41 90 00; E info.wnm@wur.nl
De werkdocumenten zijn ook te downloaden via de WOt-website www.wotnatuurenmilieu.wur.nl

2007

47 *Ten Berge, H.F.M., A.M. van Dam, B.H. Janssen & G.L. Velthof.* Mestbeleid en bodemvruchtbaarheid in de Duin- en Bollenstreek; Advies van de CDM-werkgroep Mestbeleid en Bodemvruchtbaarheid in de Duin- en Bollenstreek

48 *Kruit, J. & I.E. Salverda*. Spiegeltje, spiegeltje aan de muur, valt er iets te leren van een andere planningscultuur?

49 *Rijk, P.J., E.J. Bos & E.S. van Leeuwen.* Nieuwe activiteiten in het landelijk gebied. Een verkennende studie naar natuur en landschap als vestigingsfactor

50 *Ligthart, S.S.H.* Natuurbeleid met kwaliteit. Het Milieu- en Natuurplanbureau en natuurbeleidsevaluatie in de periode 1998-2006

51 *Kennismarkt 22 maart 2007; van onderbouwend onderzoek Wageningen UR naar producten MNP in 27 posters*

52 *Kuindersma, W., R.I. van Dam & J. Vreke.* Sturen op niveau. Perversies tussen nationaal natuurbeleid en besluitvorming op gebiedsniveau.

53.1 *Reijnen, M.J.S.M.* Indicators for the 'Convention on Biodiversity 2010'. National Capital Index version 2.0

53.3 *Windig, J.J., M.G.P. van Veller & S.J. Hiemstra.* Indicatoren voor 'Convention on Biodiversity 2010'. Biodiversiteit Nederlandse landbouwhuisdieren en gewassen

53.4 *Melman, Th.C.P. & J.P.M. Willemen.* Indicators for the 'Convention on Biodiversity 2010'. Coverage protected areas.

53.6 *Weijden, W.J. van der, R. Leewis & P. Bol.* Indicatoren voor 'Convention on Biodiversity 2010'. Indicatoren voor het invasieproces van exotische organismen in Nederland

53.7a *Nijhof, B.S.J., C.C. Vos & A.J. van Strien.* Indicators for the 'Convention on Biodiversity 2010'. Influence of climate change on biodiversity.

53.7b *Moraal, L.G.* Indicatoren voor 'Convention on Biodiversity 2010'. Effecten van klimaatverandering op insectenplagen bij bomen.

53.8 *Fey-Hofstede, F.E. & H.W.G. Meesters.* Indicators for the 'Convention on Biodiversity 2010'. Exploration of the usefulness of the Marine Trophic Index (MTI) as an indicator for sustainability of marine fisheries in the Dutch part of the North Sea.

53.9 *Reijnen, M.J.S.M.* Indicators for the 'Convention on Biodiversity 2010'. Connectivity/fragmentation of ecosystems: spatial conditions for sustainable biodiversity

53.11 *Gaaff, A. & R.W. Verburg.* Indicators for the 'Convention on Biodiversity 2010' Government expenditure on land acquisition and nature development for the National Ecological Network (EHS) and expenditure for international biodiversity projects

53.12 *Elands, B.H.M. & C.S.A. van Koppen.* Indicators for the 'Convention on Biodiversity 2010'. Public awareness and participation

54 *Broekmeyer, M.E.A. & E.P.A.G. Schouwenberg & M.E. Sanders & R. Pouwels.* Synergie Ecologische Hoofdstructuur en Natura 2000-gebieden. Wat stuurt het beheer?

55 *Bosch, F.J.P. van den.* Draagvlak voor het Natura 2000-gebiedenbeleid. Onder relevante betrokkenen op regionaal niveau

56 *Jong, J.J. & M.N. van Wijk, I.M. Bouwma.* Beheerskosten van Natura 2000-gebieden

57 *Pouwels, R. & M.J.S.M. Reijnen & M. van Adrichem & H. Kuipers.* Ruimtelijke condities voor VHR-soorten

58 *Bouwma, I.M.* Quickscan Natura 2000 en Programma Beheer.

59 *Schouwenberg, E.P.A.G.* Huidige en toekomstige stikstofbelasting op Natura 2000-gebieden

60 Niet verschenen/ vervallen

61 *Jaarrapportage 2006.* WOT-04-001 – ME-AVP

62 *Jaarrapportage 2006.* WOT-04-002 – Onderbouwend Onderzoek

63 *Jaarrapportage 2006.* WOT-04-003 – Advisering Natuur & Milieu

64 *Jaarrapportage 2006.* WOT-04-385 – Milieuplanbureaufunctie

65 *Jaarrapportage 2006.* WOT-04-394 – Natuurplanbureaufunctie

66 *Brasser E.A., M.F. van de Kerkhof, A.M.E. Groot, L. Bos-Gorter, M.H. Borgstein, H. Leneman* Verslag van de Dialogen over Duurzame Landbouw in 2006

67 *Hinssen, P.J.W.* Wettelijke Onderzoekstaken Natuur & Milieu. Werkplan 2007

68 *Nieuwenhuizen, W. & J. Roos Klein Lankhorst.* Landschap in Natuurbalans 2006; Landschap in verandering tussen 1990 en 2005; Achtergronddocument bij Natuurbalans 2006.

69 *Geelen, J. & H. Leneman.* Belangstelling, motieven en knelpunten van natuuraanleg door grondeigenaren. Uitkomsten van een marktonderzoek.

70 *Didderen, K., P.F.M. Verdonschot, M. Bleeker.* Basiskaart Natuur aquatisch. Deel 1: Beleidskaarten en prototype

71 *Boesten, J.J.T.I, A. Tiktak & R.C. van Leerdam.* Manual of PEARLNEQ v4

72 *Grashof-Bokdam, C.J., J. Frissel, H.A.M. Meeuwsen & M.J.S.M. Reijnen.* Aanpassing graadmeter natuurwaarde voor het agrarisch gebied

73 *Bosch, F.J.P. van den.* Functionele agrobiodiversiteit. Inventarisatie van nut, noodzaak en haalbaarheid van het ontwikkelen van een indicator voor het MNP

74 *Kistenkas, F.H. en M.E.A. Broekmeyer.* Natuur, landschap en de Wet algemene bepalingen omgevingsrecht

75 *Luttik, J., F.R. Veeneklaas, J. Vreke, T.A. de Boer,*

L.M. van den Berg & P. Luttik. Investeren in landschapskwaliteit; De toekomstige vraag naar landschappen om in te wonen, te werken en te ontspannen

76 *Vreke, J.* Evaluatie van natuurbeleidsprocessen

77 *Apeldoorn, R.C. van,* Working with biodiversity goals in European directives. A comparison of the implementation of the Birds and Habitats Directives and the Water Framework Directive in the Netherlands, Belgium, France and Germany

78 *Hinssen, P.J.W.* Werkprogramma 2008; Unit Wettelijke Onderzoekstaken Natuur & Milieu (WOT-04). Onderdeel Planbureaufuncties Natuur en Milieu.

79 *Custers, M.H.G.* Betekenissen van Landschap in onderzoek voor het Milieu- en Natuurplanbureau; een bibliografisch overzicht

80 *Vreke,J., J.L.M. Donders, B.H.M. Elands, C.M. Goossen, F. Langers, R. de Niet & S. de Vries.* Natuur en landschap voor mensen Achtergronddocument bij Natuurbalans 2007

81 *Bakel, P.J.T. van, T. Kroon, J.G. Kroes, J. Hoogewoud, R. Pastoors, H.Th.L. Massop, D.J.J. Walvoort*. Reparatie Hydrologie voor STONE 2.1. Beschrijving reparatie-acties, analyse resultaten en beoordeling plausibiliteit.

2008

82 *Kistenkas, F.H. & W. Kuindersma..* Jurisprudentie-monitor natuur 2005-2007; Rechtsontwikkelingen Natura 2000 en Ecologische Hoofdstructuur

83 *Berg, F. van den, P.I. Adriaanse, J. A. te Roller, V.C. Vulto & J.G. Groenwold..* SWASH Manual 2.1; User's Guide version 2

84 *Smits, M.J., M.J. Bogaardt, D. Eaton, P. Roza & T. Selnes..* Tussen de bomen het geld zien. Programma Beheer en vergelijkbare regelingen in het buitenland (een quick-scan)

85 *Dijk, T.A. van, J.J.M. Driessen, P.A.I. Ehlert, P.H. Hotsma, M.H.M.M. Montforts, S.F. Plessius & O. Oenema..* Protocol beoordeling stoffen Meststoffenwet; versie 1.0

86 *Goossen, C.M., H.A.M. Meeuwsen, G.J. Franke & M.C. Kuyper. V*erkenning Europese versie van de website www.daarmoetikzijn.nl.

87 *Helming, J.F.M. & R.A.M. Schrijver.* Economische effecten van inzet van landbouwsubsidies voor milieu, natuur en landschap in Nederland; Achtergrond bij het MNP-rapport 'Opties voor Europese landbouw-subsidies

88 *Hinssen, P.J.W.* Werkprogramma 2008; Unit Wettelijke Onderzoekstaken Natuur & Milieu (WOT-04). Programma 001/003/005

90 *Kramer, H.* Geografisch Informatiesysteem Bestaande Natuur; Beschrijving IBN1990t en pilot ontwikkeling BN2004

92 *Jaarrapportage 2007.* WOT-04-001 – Koepel

93 *Jaarrapportage 2007.* WOT-04-002 – Onderbouwend Onderzoek

94 *Jaarrapportage 2007.* WOT-04-003 – Advisering Natuur & Milieu

95 *Jaarrapportage 2007.* WOT-04-005 – M-AVP

96 *Jaarrapportage 2007.* WOT-04-006 – Natuurplanbureaufunctie

97 *Jaarrapportage 2007.* WOT-04-007 – Milieuplanbureaufunctie

98 *Wamelink, G.W.W.* Gevoeligheids- en onzekerheids-analyse van SUMO

99 *Hoogeveen, M.W., H.H. Luesink, L.J. Mokveld & J.H. Wisman.* Ammoniakemissies uit de landbouw in Milieubalans 2006: uitgangspunten en berekeningen

100 *Kennismarkt 3 april 2008; Van onderbouwend onderzoek Wageningen UR naar producten MNP*

101 *Mansfeld, M.J.M. van & J.A. Klijn.* "Balansen op de weegschaal". Terugblik op acht jaar Natuurbalansen (1996-2005)

102 *Sollart, K.M. & J. Vreke.* Het faciliteren van natuur- en milieueducatie in het basisonderwijs; NME-ondersteuning in de provincies

103 *Berg, F. van den, A. Tiktak, J.G. Groenwold, D.W.G. van Kraalingen, A.M.A. van der Linden & J.J.T.I. Boesten*, Documentation update for GeoPEARL 3.3.3

104 *Wijk, M.N., van (redactie).* Aansturing en kosten van het natuurbeheer. Ecologische effectiviteit regelingen natuurbeheer

105 *Selnes, T. & P. van der Wielen.* Tot elkaar veroordeeld? Het belang van gebiedsprocessen voor de natuur

106 *Annual reports for 2007; Programme WOT-04*

107 *Pouwels, R. J.G.M. van der Greft, M.H.C. van Adrichem, H. Kuiper, R. Jochem & M.J.S.M. Reijnen.* LARCH Status A

108 *Wamelink, G.W.W.* Technical Documentation for SUMO2 v. 3.2.1,

109 *Wamelink, G.W.W., J.P. Mol-Dijkstra & G.J. Reinds.* Herprogrammeren van SUMO2. Verbetering in het kader van de modelkwaliteitsslag

110 *Salm, C. van der, T. Hoogland & D.J.J. Walvoort.* Verkenning van de mogelijkheden voor de ontwikkeling van een metamodel voor de uitspoeling van stikstof uit landbouwgronden

111 *Dobben H.F. van & R.M.A. Wegman.* Relatie tussen bodem, atmosfeer en vegetatie in het Landelijk Meetnet Flora (LMF)

112 *Smits, M.J.W. & M.J. Bogaardt.* Kennis over de effecten van EU-beleid op natuur en landschap

113 *Maas,G.J. & H. van Reuler.* Boomkwekerij en aardkunde in Nederland,

114 *Lindeboom, H.J., R. Witbaard, O.G. Bos & H.W.G. Meesters.* Gebiedsbescherming Noordzee, habitattypen, instandhoudingdoelen en beheermaatregelen

115 *Leneman, H., J. Vader, L.H.G. Slangen, K.H.M. Bommel, N.B.P. Polman, M.W.M. van der Elst & C. Mijnders.* Groene diensten in Nationale Landschappen- Potenties bij een veranderende landbouw,

116 *Groeneveld, R.A. & D.P. Rudrum.* Habitat Allocation to Maximize BiOdiversity, A technical description of the HAMBO model

117 *Kruit, J., M. Brinkhuijzen & H. van Blerck.* Ontwikkelen met kwaliteit. Indicatoren voor culturele vernieuwing en architectonische vormgeving

118 *Roos-Klein Lankhorst, J.* Beheers- en Ontwikkelingsplan 2007: Kennismodel Effecten Landschap Kwaliteit; Monitoring Schaal; BelevingsGIS

119 *Henkens, R.J.H.G.* Kwalitatieve analyse van knelpunten tussen Natura 2000-gebieden en waterrecreatie

120 *Verburg, R.W., I.M. Jorritsma & G.H.P. Dirkx.* Quick scan naar de processen bij het opstellen van beheerplannen van Natura 2000-gebieden. Een eerste verkenning bij provincies, Rijkswaterstaat en Dienst Landelijk Gebied

121 *Daamen, W.P.* Kaart van de oudste bossen in Nederland; Kansen op hot spots voor biodiversiteit

122 *Lange de, H.J., G.H.P. Arts & W.C.E.P. Verberk.* Verkenning CBD 2010-indicatoren zoetwater. Inventarisatie en uitwerking relevante indicatoren voor Nederland

123 *Vreke, J., N.Y. van der Wulp, J.L.M. Donders, C.M. Goossen, T.A. de Boer & R. Henkens.* Recreatief

gebruik van water. Achtergronddocument Natuurbalans 2008

124 *Oenema, O. & J.W.H. van der Kolk*. Moet het eenvoudiger? Een essay over de complexiteit van het milieubeleid

125 *Oenema, O. & A. Tiktak.* Niets is zonder grond; Een essay over de manier waarop samenlevingen met hun grond omgaan

2009

126 *Kamphorst, D.A.* Keuzes in het internationale biodiversiteitsbeleid; Verkenning van de beleidstheorie achter de internationale aspecten van het Beleidsprogramma Biodiversiteit (2008-2011)

127 *Dirkx, G.H.P. & F.J.P. van den Bosch.* Quick scan gebruik Catalogus groenblauwe diensten

128 *Loeb, R. & P.F.M. Verdonschot.* Complexiteit van nutriëntenlimitaties in oppervlaktewateren

129 *Kruit, J. & P.M. Veer.* Herfotografie van landschappen; Landschapsfoto's van de 'Collectie de Boer' als uitgangspunt voor het in beeld brengen van ontwikkelingen in het landschap in de periode 1976-2008

130 *Oenema, O., A. Smit & J.W.H. van der Kolk.* Indicatoren Landelijk Gebied; werkwijze en eerste resultaten

131 *Agricola, H.J.A.J. van Strien, J.A. Boone, M.A. Dolman, C.M. Goossen, S. de Vries, N.Y. van der Wulp, L.M.G. Groenemeijer, W.F. Lukey, R.J. van Til.* Achtergrond-document Nulmeting Effectindicatoren Monitor Agenda Vitaal Platteland

132 *Jaarrapportage 2008.* WOT-04-001 – Koepel

133 *Jaarrapportage 2008.* WOT-04-002 – Onderbouwend Onderzoek

134 *Jaarrapportage 2008.* WOT-04-003 – Advisering Natuur & Milieu

135 *Jaarrapportage 2008.* WOT-04-005 – M-AVP

136 *Jaarrapportage 2008.* WOT-04-006 – Natuurplanbureaufunctie

137 *Jaarrapportage 2008.* WOT-04-007 – Milieuplanbureaufunctie

138 *Jong de, J.J., J. van Os & R.A. Smidt.* Inventarisatie en beheerskosten van landschapselementen

139 *Dirkx, G.H.P., R.W. Verburg & P. van der Wielen.* Tegenkrachten Natuur. Korte verkenning van de weerstand tegen aankopen van landbouwgrond voor natuur

140 *Annual reports for 2008; Programme WOT-04*

141 *Vullings, L.A.E., C. Blok, G. Vonk, M. van Heusden, A. Huisman, J.M. van Linge, S. Keijzer, J. Oldengarm & J.D. Bulens.* Omgaan met digitale nationale beleidskaarten

142 *Vreke, J.,A.L. Gerritsen, R.P. Kranendonk, M. Pleijte, P.H. Kersten, F.J.P. van den Bosch.* Maatlat Government - Governance

143 *Gerritsen, A.L., R.P. Kranendonk, J. Vreke, F.J.P. van den Bosch & M. Pleijte.* Verdrogingsbestrijding in het tijdperk van het Investeringsbudget Landelijk Gebied. Een verslag van casusonderzoek in de provincies Drenthe, Noord-Brabant en Noord-Holland.

144 *Luesink, H.H., P.W. Blokland, M.W. Hoogeveen & J.H. Wisman.* Ammoniakemissie uit de landbouw in 2006 en 2007

145 *Bakker de, H.C.M., C.S.A. van Koppen.* Draagvlakonderzoek in de steigers. Een voorstudie naar indicatoren om maatschappelijk draagvlak voor natuur en landschap te meten

146 *Goossen, C.M.,* Monitoring recreatiegedrag van Nederlanders in landelijke gebieden. Jaar 2006/2007

147 *Hoefs, R.M.A., J. van Os, T.J.A. Gies.* Kavelruil en Landschap. Een korte verkenning naar ruimtelijke effecten van kavelruil.

148 *Klok, T.L., R. Hille Ris Lambers, P. de Vries, J.E. Tamis, J.W.M. Wijsman.* Quick scan model instruments for marine biodiversity policy.

149 *Spruijt, J., P. Spoorenberg, R. Schreuder.* Milieueffectiviteit en kosten van maatregelen gewasbescherming.

150 *Ehlert, P.A.I. (rapporteur).* Advies Bemonstering bodem voor differentiatie van fosfaatgebruiksnormen.

151 *Wulp van der, N..* Storende elementen in het landschap: Welke, waar en voor wie

152 *Oltmer, K., K.H.M. van Bommel, J. Clement, J.J. de Jong, D.P. Rudrum, E.P.A.G. Schouwenberg.* Kosten ter realisatie van de habitattypen in de Natura 2000-gebieden. Toepassing van de methode kosteneffectiviteit natuurbeleid.

153 *Adrichem van, M.H.C., F.G. Wortelboer, G.W.W. Wamelink.* MOVE. Model for terrestrial VEgetation. Version 4.0

154 *Wamelink, G.W.W., R.M. Winkler, F.G. Wortelboer.* User documenttation MOVE4 v 1.0

155 *Gies de, T.J.A., L.J.J. Jeurissen, I. Staritsky, A. Bleeker.* Leefomgevingsindicatoren Landelijk gebied. Inventarisatie naar stand van zaken omtrent geurhinder, lichthinder en fijnstof.

156 *Tamminga, S., A.W. Jongbloed, P. Bikker, L. Sebek, C. van Bruggen, O, Oenema.* Actualisatie excretiecijfers landbouwhuisdieren voor forfaits regeling Meststoffenwet