Institute of Freshwater Ecology

Practical Sessions on RIVPACS III

England and Wales Version

A series of step-by-step exercises to demonstrate some of the major options available in RIVPACS III.

by J F Wright, M T Furse & K L Symes

CONTENTS

RIVPACS III - INTRODUCTORY NOTES

Loading the software

The RIVPACS software should be loaded in a directory of its own. This does not prevent input and output files being stored elsewhere if necessary (see later exercises).

To load the software, the PC should be switched on and set at the C: drive. To create the required directory for carrying RIVPACS III, at the C:> prompt type
>   MD RIVPACS3 <<enter>>

The symbols << and >> are used throughout this document to signify a single key which must be pressed.

The PC should now be set to the new directory before loading the software. Therefore, at the C:> prompt type
>   CD RIVPACS3 <<enter>>

The RIVPACS software is provided on a single disk. To load it, insert the disk in drive A: and type
>   A:\INSTALLR <<enter>>

The software, which is compressed, will be expanded and loaded and the state of progress will be shown on the screen.

Getting going

Your PC should now be set at the C:\RIVPACS3> prompt and the software loaded and ready for action.

To get going type
>   RIVPACS <<enter>>

The first screen is the title page and this is followed by two pages of background text. Each is exited by pressing <<enter>> or any other key.

The first menu page (main panel) offers the basic choice of type of run and the four main options are described in this collection of exercises.

For each of the exercises that follow you need to select one of the main panel options. The exercises successively cover PREDICTION, CLASSIFICATION, DEFAULTS SETUP and BATCH SETUP. HELP boxes with informative text are a menu option at each key stage. EXIT is used to leave RIVPACS and return to the C:\RIVPACS3> prompt. At each exercise select the appropriate menu option.

General considerations

Throughout the following exercises the selected response to each on-screen prompt box or menu is determined by highlighting your chosen option, using the up/down, left/right arrows, and pressing <<enter>> or by typing the option number or initial letter of your selection.

Sometimes <<Esc>> can be used to terminate a run and return to the initial menu. Many prompt boxes/menus offer the option to return to previous screens.

Most prompt boxes allow only a single choice to be made but more than one taxonomic level or season can be selected for each run.

RIVPACS III - INTERACTIVE PREDICTIONS (1)

Introductory note

Many keyboard operations are common to all RIVPACS III runs and are tedious to repeat throughout this primer. They are given in italics in this first example only and are assumed for subsequent exercises.

Pressing <<enter>> is not necessary if the initial letter of your chosen option or its menu number is used to select it.

BMWP family level - manual data input (Example a)

As a simple, introductory example, make the following choices:

Country : Great Britain <<enter>>
Taxonomic level(s) : BMWP families & BMWP indices (1) <<enter>>
The C: SELECTION COMPLETED bar is now highlighted. Press <<C>> or <<enter>>
Season (s) : Spring, summer & autumn combined (7) <<enter>>
The C: SELECTION COMPLETED bar is now highlighted. Press <<C>> or <<enter>>
Biological data on file? : NO <<enter>>
Environmental variables : Option 1 <<enter>>
Continue/Previous screen : Continue <<enter>>
Environmental data on file? : NO <<enter>>
Proceed automatically? : NO <<enter>>
[the environmental data to be manually entered]
Predicted taxa on screen? : YES <<enter>>
Outputs to disk file? : NO to each option <<enter>> *after each response*
[in this run see taxa and scores on screen]
Stop listing taxa? : Keep it as 0.1% for BMWP level <<enter>>
Continue/Previous screen : Continue <<enter>>

Now enter the following data (1 site only).

Site reference	:	**Frome at East Stoke**	<<enter>>
Grid reference	:	**SY 866 867**	<<enter>>
Altitude (m)	:	**13**	<<enter>>
Distance from source (km)	:	**43**	<<enter>>
Water width (m)	:	**18**	<<enter>>
Water depth (cm)	:	**64**	<<enter>>
Discharge category	:	**6**	<<enter>>
Boulders (% cover)	:	**13**	<<enter>>
Gravel (% cover)	:	**61**	<<enter>>
Sand (% cover)	:	**22**	<<enter>>
Silt (% cover)	:	**4**	<<enter>>
Alkalinity (mg l^{-1} CaCO$_3$)	:	**172**	<<enter>>
Slope (m km^{-1})	:	**10**	<<enter>>

Are environmental data correct? : Y (YES) <<enter>>
Enter data for another site? : N (NO) <<enter>>

Environmental data are then displayed <<enter>>
Probabilities of group membership are given <<enter>>
Predicted BMWP families are listed *Press <<enter>> to scroll through the list*
BMWP index values are presented *Press <<enter>> to return to the main panel*

RIVPACS III - INTERACTIVE PREDICTIONS (2)

BMWP family level - data input from files (Example b)

Initially, we offer another straightforward example to familiarise you with the basic procedures. This can be followed by examples of your own using different responses at each asterisk (*).

The responses for this exercise are as follows:

*	Country	:	Great Britain
	Taxonomic level(s)	:	BMWP family & BMWP indices (1)
*	Season(s)	:	Spring, summer & autumn combined (7)
	Biological data on file?	:	YES
	Biological file name	:	TSTFAMGB.ASC
*	Environmental variables	:	Option 1
	Environmental data on file?	:	YES
*	Type of file	:	ASCII
	Environmental filename	:	TSTENVGB.ASC
	Proceed automatically?	:	YES
	Output to disk file?	:	YES
	Output biological filename	:	WKSPBMWP.BIO
*	Include predicted taxa?	:	YES

* Do not create additional output files on this run

* Stop listing taxa?   :   0.1%

The three Great Britain test file sites are flagged as the prediction proceeds, before the main panel reappears.

Examine your output file WKSPBMWP.BIO as follows:

Exit from main panel
At the prompt C:\RIVPACS3> type
    EDIT WKSPBMWP.BIO <<enter>>

To close the DOS editor press the following three keys in sequence
    <<Alt>> <<F>> <<X>>

Then re-enter RIVPACS from the C:\RIVPACS3> prompt, type
    RIVPACS <<enter>>

Now do another run and make your own choice at each asterisk.

When making your own choices, refer to the list of example input files in Appendix 3 of the RIVPACS III manual to be sure of entering the correct file names.

RIVPACS III   INTERACTIVE PREDICTIONS (3)

Abundance for all families and the abundance index (Example c)

This example involves making predictions of mean expected abundances (arithmetic means of log categories) and of the experimental abundance index Q14.

The required responses for this exercise are:

Country	:	Great Britain
Taxonomic level(s)	:	Abundance for all families and abundance index (2)
Season(s)	:	Spring (1)
Biological data on file?	:	YES
Biological filename	:	TSTSPRGB.ASC
Environmental variables	:	Option 1
Environmental data on file?	:	YES
Type of file?	:	ASCII
Environmental filename	:	TSTENVGB.ASC
* Proceed automatically?	:	YES
Output to disk file?	:	YES
Output biological filename	:	WKSPABUN.BIO
Include predicted taxa?	:	YES

Do not create additional output files on this run

Stop listing taxa?	:	Retain 0.0 log abundance.

As in the previous example (b), the three test sites are flagged as the prediction proceeds, before the main panel reappears.

Use the procedure detailed under example (b) to view contents of WKSPABUN.BIO

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*   Alternatively the full prediction may be viewed at leisure on screen if you answer NO at this point and then request that predicted taxa are to be listed on screen. You still retain the option of creating output files if required.

RIVPACS III - INTERACTIVE PREDICTIONS (4)

Multiple taxonomic levels (and/or seasons) on a single run (Example d)

In theory it is possible to request predictions at 5 taxonomic levels (1-5) and for 7 seasons/seasonal combinations (1-7).

In practice, we recommend that you exclude taxonomic level 5 (Existing customisation) until you have become familiar with this option (see next section on setting up a customisation).

Merely excluding taxonomic level 5 could still generate 24 predictions for each site if you request all of taxonomic levels 1-4 and seasons 1-7 (NB taxonomic level 2, abundance for all families only operates on seasons 1-3).

Hence, we suggest that you are selective in your initial choice. Bear in mind that there are 3 sites in the environmental data example files and that if you request output files they will be substantial if you ask for the inclusion of predicted taxa.

As one example, try the following:

Country	:	Great Britain
Taxonomic level(s)	:	Choose 3 & 4
Season(s)	:	Choose 1 & 7
Biological data on file?	:	NO - on this initial run. [On a later run, reply YES, but bear in mind the need to input the appropriate example files when requested]
Environmental variables	:	Option 1
Environmental data on file?	:	YES
Type of file	:	ASCII
Environmental filename	:	TSTENVGB.ASC
Proceed automatically?	:	YES
Output to disk file?	:	YES
Output biological filename	:	WKSPMULT.BIO
Include predicted taxa?	:	YES

Do not create additional output files

Stop listing taxa?	:	Retain as 0.1 for all families Change to 50.0 for species

Follow the previous instructions for example (b) to examine the output file.

For each of the 3 example sites, the output sequence is,

Site name/code
Environmental data
Probabilities of group membership

Predicted families	Spring	To 0.1%.
	Spring, summer and autumn combined	To 0.1%.
Predicted species.	Spring	To 50.0%.
	Spring, summer and autumn combined	To 50.0%.

RIVPACS III - INTERACTIVE PREDICTIONS (5)

Setting up and using a customisation.

At the outset, go through the sequence of operations to familiarise yourself with the procedure. Do not attempt to set up a useful customisation. This can be done later.

In the simple (and unlikely!) example below, we want a prediction in which all members of the Tricladida (flatworms) are identified at generic level. The remaining invertebrates are predicted at major taxonomic group only.

Country	:	Great Britain
Taxonomic level(s)	:	Chose new customisation (6)
Name?	:	CUSTOM1
Description?	:	Triclads to genus
Country	:	Great Britain (G)
Current taxon	:	Tricladida	Select? N
		Planariidae	Select? N
		Planaria sp.	Select? Y
		Polycelis sp.	Select? Y
		Phagocata sp.	Select? Y
		Crenobia sp.	Select? Y
		Dugesia sp.	Select? Y
		Dendrocoelidae	Select? N
		Bdellocephala sp.	Select? Y
		Dendrocoelum sp.	Select? Y
Current taxon	:	Gastropoda	Select? Y
		Answer Y to all subsequent questions.	

At the end, the screen indicates that this customisation generates 31 taxa. The necessary files are then created before the taxonomic level panel reappears. The customisation is thus saved to file and can be accessed in subsequent runs as follows:

Taxonomic level(s)	:	Existing customisation (5)

After highlighting the required customisation, choose SELECT. Choose SELECT again on the subsequent screen to re-enforce your choice. [This screen also offers the option of deleting unwanted customisations. Use it on a subsequent occasion to delete CUSTOM1]

Season(s)	:	Spring
Biological data on file?	:	NO
Environmental variables	:	Option 1
Environmental data on file?	:	YES
Type of file?	:	ASCII
Environmental filename	:	TSTENVGB.ASC
Proceed automatically?	:	YES
Output to disk file?	:	YES
Output biological filename	:	WKSPCUST.BIO
Include predicted taxa?	:	YES

Do not create additional output files

Stop listing taxa?	:	Retain 0.1%

Follow previous instructions in example (b) to examine output file.

RIVPACS III - INTERACTIVE CLASSIFICATION

Species level classification

The classification procedures are simple to operate and depend upon the biological data being held on file. Only one practical example is given here.

A new site may only be classified using species level data (three seasons combined) or BMWP family data (three seasons combined).

Bear in mind that when the reference sites were used to develop the 35 group Great Britain and seven group Northern Ireland classifications, information on both species composition and family abundances was utilized. Use of this same procedure for classification of new sites would have been very cumbersome and is unlikely to have been used in practice. The simplified options of species or BMWP family classification have, thus, been retained from RIVPACS II.

We recommend that classification results are used, with caution, to allocate sites to a restricted area of the classification. It is unwise to place great importance on the individual classification group with which the site has most in common.

As an example, use the following procedure:

Country	:	Great Britain
Taxonomic level	:	Species
Type of file?	:	ASCII
Biological filename	:	TSTSPPGB.ASC
Output to disk file?	:	NO
Proceed automatically?	:	NO

Then view the results on screen.

RIVPACS III - DEFAULTS FILES (1)

Using defaults files

Defaults files contain the paths for the user's input and output files.

At installation, the RIVPACS program is instructed to find the input files (eg the example environmental and biological files) in the RIVPACS software directory. RIVPACS III is supplied with a main "defaults" file entitled DEFAULTS.DAT which contains this instruction.

The user may make alternative defaults files, if required, instructing the program to input and output files to alternative directories or sub-directories. This example shows how defaults files are created and used.

In this exercise you will:

i)   create a new directory and suitable sub-directories for holding input and output files

ii)   place example environmental and biological files in the input sub-directories

iii)   use the input files in a prediction

iv)   examine the results in the new output sub-directory

Creating directories and sub-directories

Exit RIVPACS at the main panel
Return to the main C:> prompt by typing CD.. <<enter>>
Create a directory called RUBBISH by typing MD RUBBISH <<enter>>
Move to your new directory by typing CD RUBBISH <<enter>>
Create three new sub-directories (BIO, ENV and OUT) by typing
        MD BIO <<enter>>
        MD ENV <<enter>>
        MD OUT <<enter>>

Locating input files in the new sub-directories

Whilst at the existing prompt of C:\RUBBISH>, type
        COPY C:\RIVPACS3\TSTENVGB.ASC C:\RUBBISH\ENV

This copies a test file of environmental data to sub-directory C:\RUBBISH\ENV

Whilst at the existing prompt of C:\RUBBISH>, type
        COPY C:\RIVPACS3\TSTFAMGB.ASC C:\RUBBISH\BIO

This copies a test file of family level biological data to sub-directory C:\RUBBISH\BIO

Returning to RIVPACS III

At the prompt C:\RUBBISH> type CD C:\RIVPACS3 <<enter>>
At the prompt C:\RIVPACS3> type RIVPACS <<enter>>

RIVPACS III - DEFAULTS FILES (2)

Creating a new defaults file

In RIVPACS III select Defaults setup from the main panel

The screen shows a series of questions which must be answered successively by typing the necessary information in screen boxes. In this example the following actions are required:

The first screen box appears with the file name DEFAULTS.DAT already entered. Enter the new defaults file name by over-typing
        DEF3.DAT <<enter>>

The next screen box highlights the instruction E: Edit this file. Select this option by pressing either <<enter>> or <<E>>.

A new screen is now displayed

The next two screen boxes allow the input paths to be entered for the biological and environmental data respectively. Type the following
        C:\RUBBISH\BIO <<enter>> (The input path for the biological data)
        C:\RUBBISH\ENV <<enter>> (The input path for the environmental data)

The next box allows the output path to be defined. Type the following
        C:\RUBBISH\OUT <<enter>>

Press <<enter>> again to move on to the next screen

At the next box type Y <<enter>> to initiate the saving of the file.
The next box displays your chosen defaults file name, DEF3.DAT
Type <<enter>> to confirm this.

You will be asked if you want to overwrite the existing file. In this exercise respond YES. This prompt is a useful reminder to ensure you don't lose an existing file which you want to keep.

Now press <<F3>> in order to save the file.

Selecting a defaults file

In order to use your new defaults file in interactive mode you first need to select it as follows:

Select Defaults setup at the main panel
Delete DEFAULTS.DAT from the first screen box and type DEF3.DAT

At the next screen box either
        Select U: Use as defaults file by pressing <<enter>>, or
        Press <<U>>
Either option automatically returns you to the main panel.

Your new defaults file is set and you can proceed with whatever prediction or classification run you require.

RIVPACS III - DEFAULTS FILES (3)

Using your defaults file

Having created and selected your new defaults file, DEF3.DAT, try the following exercise.

Make a simple family level prediction for Great Britain by choosing option 1 from the taxonomic selection menu and option 7, spring, summer and autumn, from the season menu.

Select the options that state that you hold environmental data on file in ASCII format.

When requested, give the appropriate biological and environmental file names.

Biological filename	:	TSTFAMGB.ASC
Environmental filename	:	TSTENVGB.ASC

Your defaults file, DEF3.DAT, will find these files for you using the paths you have stipulated.

When prompted, request that the prediction proceeds automatically without user intervention.

When requested send the results, including the probabilities of taxon occurrences, to output file WKSPDFIL.BIO

Your defaults file will automatically send this to the required sub-directory.

To see the contents of the output file exit RIVPACS III at the main panel and type
EDIT C:\RUBBISH\OUT\WKSPDFIL.BIO

Press the following keys to return to the C:\RIVPACS3> prompt:
<<Alt>> <<F>> <<X>>

Further information

After exiting RIVPACS III, the next use of the system will automatically revert to using DEFAULTS.DAT as the defaults file.

If you wish to use DEF3.DAT again it needs to be re-selected using the procedure above.

For a fuller explanation of the defaults file procedures it is important to study section 2.5 of the RIVPACS III Manual (P9 onwards).

RIVPACS III - BATCH MODE (1)

Using the batch setup menu option

At the main panel choose Batch setup. Type in the following responses:

Batch file name	:	NEWAUTO.DAT
Defaults file name	:	DEFAULTS.DAT
		[This means that the input and output files will be in the same directory as the RIVPACS III software]
Procedure	:	Prediction (1)
Country	:	Great Britain (1)
Taxonomic level(s)	:	BMWP families (1)
Season(s)	:	All three seasons combined (7)
Environmental variables	:	Option 1
Biological data files?	:	YES (Y)
Biological filename	:	TSTFAMGB.ASC
Environmental file format	:	ASCII (1)
Environmental filename	:	TSTENVGB.ASC
Output listing filename	:	BATCHTST.LST
Include predicted taxa?	:	YES (Y)
Stop listing taxa?	:	0.1%
Additional output files		
Environmental data	:	BATCHTST.ENV
BMWP scores - obs and exp	:	BATCHTST.BIO
BMWP statistics	:	BATCHTST.STA
Family abundance index	:	[Leave this blank and press <<enter>>]
Overwrite existing files?	:	YES (Y)
Save changes?	:	YES (Y), to file NEWAUTO.DAT

Press <<F3>> to save the batch file and to return to the main panel.

Running a simple batch mode prediction

The batch file NEWAUTO.DAT created in the previous section includes the batch mode instruction line and a list of the files named above.

To run RIVPACS III in batch mode, exit the main panel and at the C:\RIVPACS3> prompt type

    RIVPACS AUTO NEWAUTO.DAT <<enter>>

On completion of the batch run, examine the various output files as follows:

The output files will be of the form BATCHTST.***

For example, exit RIVPACS III from the main panel and, at the prompt C:\RIVPACS3>, type
    EDIT BATCHTST.LST <<enter>>

Exit from the DOS Editor by pressing <<Alt>> <<F>> <<X>> and return to RIVPACS by, at the C:\RIVPACS3> prompt, typing
    RIVPACS <<enter>>

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RIVPACS III - BATCH MODE (2)

More complex batch mode predictions - Multiple predictions in batch mode

More than one prediction can be run from a single batch file as the following example shows

Batch file name	:	MULTAUTO.DAT
Defaults file name	:	DEFAULTS.DAT
Procedure	:	Prediction (1)
Country	:	Great Britain (1)
Taxonomic level(s)	:	BMWP families (1) & species (4)
		[To do this type 14 <<enter>>]
Season(s)	:	Spring (1) & 3 seasons combined (7)
		[To do this type 17 <<enter>>]
Environmental variables	:	Option 1
Biological data files?	:	YES (Y)
Biological filenames		
BMWP families	:	TSTFAMGB.ASC
		[for both spring & spring, summer and autumn combined]
Species	:	TSTSPPGB.ASC
		[for both spring & spring, summer and autumn combined]
Environmental file format	:	ASCII (1)
Environmental filename	:	TSTENVGB.ASC
Output listing filename	:	BATCHMUL.LST
Include predicted taxa?	:	YES (Y)
Stop listing taxa?	:	Retain as 0.1 for all families
		Change to 50.0 for species
Additional output files		
Environmental data	:	BATCHMUL.ENV
BMWP scores - obs and exp	:	BATCHMUL.BIO
BMWP statistics	:	BATCHMUL.STA
Family abundance index	:	[Leave this blank and press <<enter>>]
Overwrite existing files?	:	YES (Y)
Save changes?	:	YES (Y), to file MULTAUTO.DAT

Press <<F3>> to save the batch file and return to the main panel.

Now run MULTAUTO.DAT from the C:\RIVPACS3> prompt by typing
    RIVPACS AUTO MULTAUTO.DAT <<enter>>

After the batch run, examine the output files as directed previously.

Other complex batch mode runs

Batch files can also be used to run classifications or a mixed package of both predictions and classifications.

Defaults files other than the standard DEFAULTS.DAT can be used to input and output files from and to other directories. You could try to use the files you hold in other sub-directories to set up a mixed prediction and classification run using the information held in your own defaults file, DEF3.DAT.

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