

How to run an EFDM example for non-even aged forests (NEAF)?

To use EFDM you need to have R, RStudio and a package “abind” installed. For more information see the document “How to prepare your R environment for EFDM?”.

When you have R, RStudio and a package “abind” installed, you can continue with this tutorial EFDM_for_NEAF based on a zip file with the same name (EFDM_for_NEAF.zip).

This tutorial includes instructions for the following major tasks:

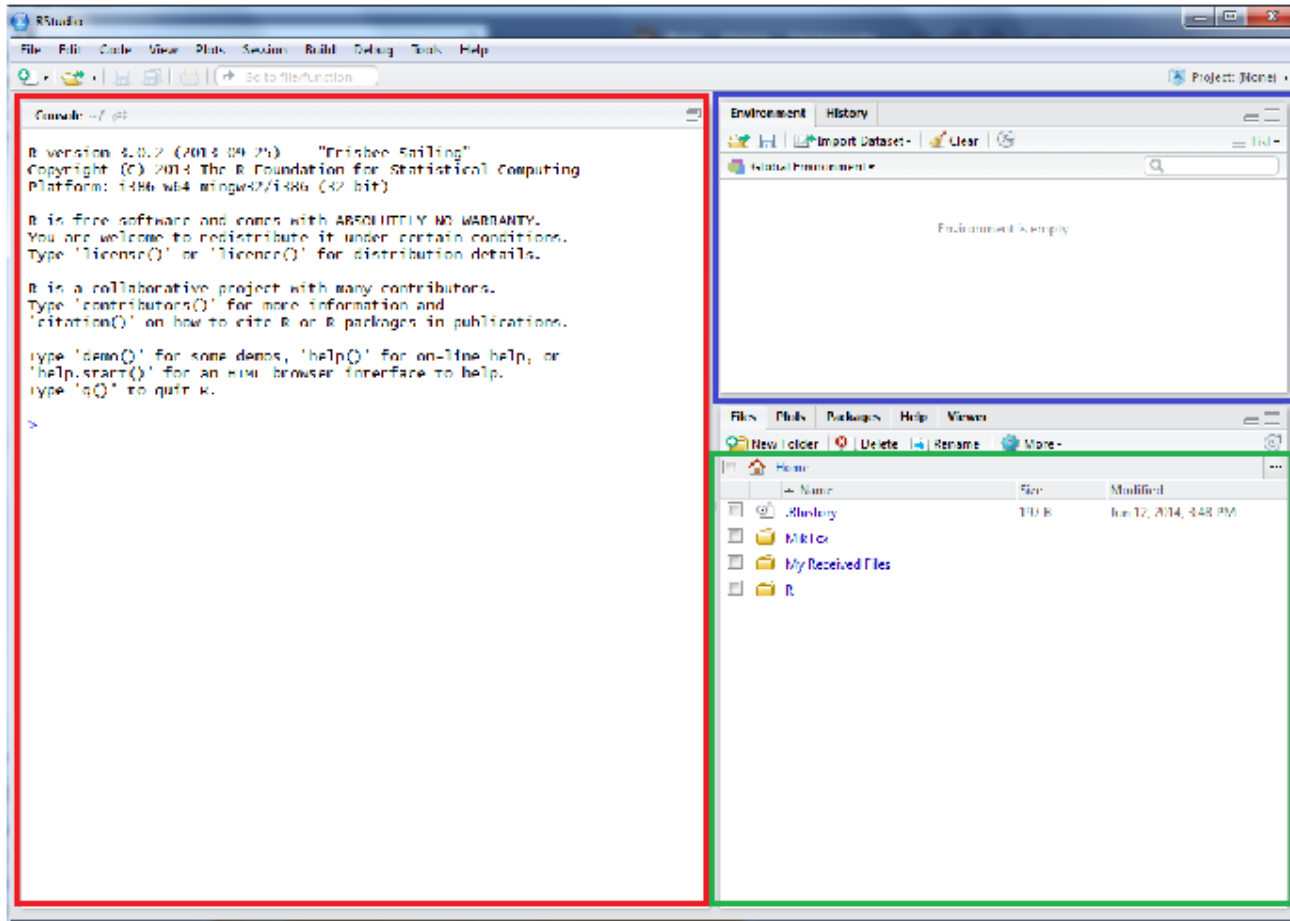
1. Setting up EFDM_for_NEAF into your R environment
2. Running a pre-set example for NEAF
3. Using “efmdsetuptools.r” to generate transition probability matrices (for more information on transition probabilities see Trubins 2015)

1. Setting up EFDM in your R environment

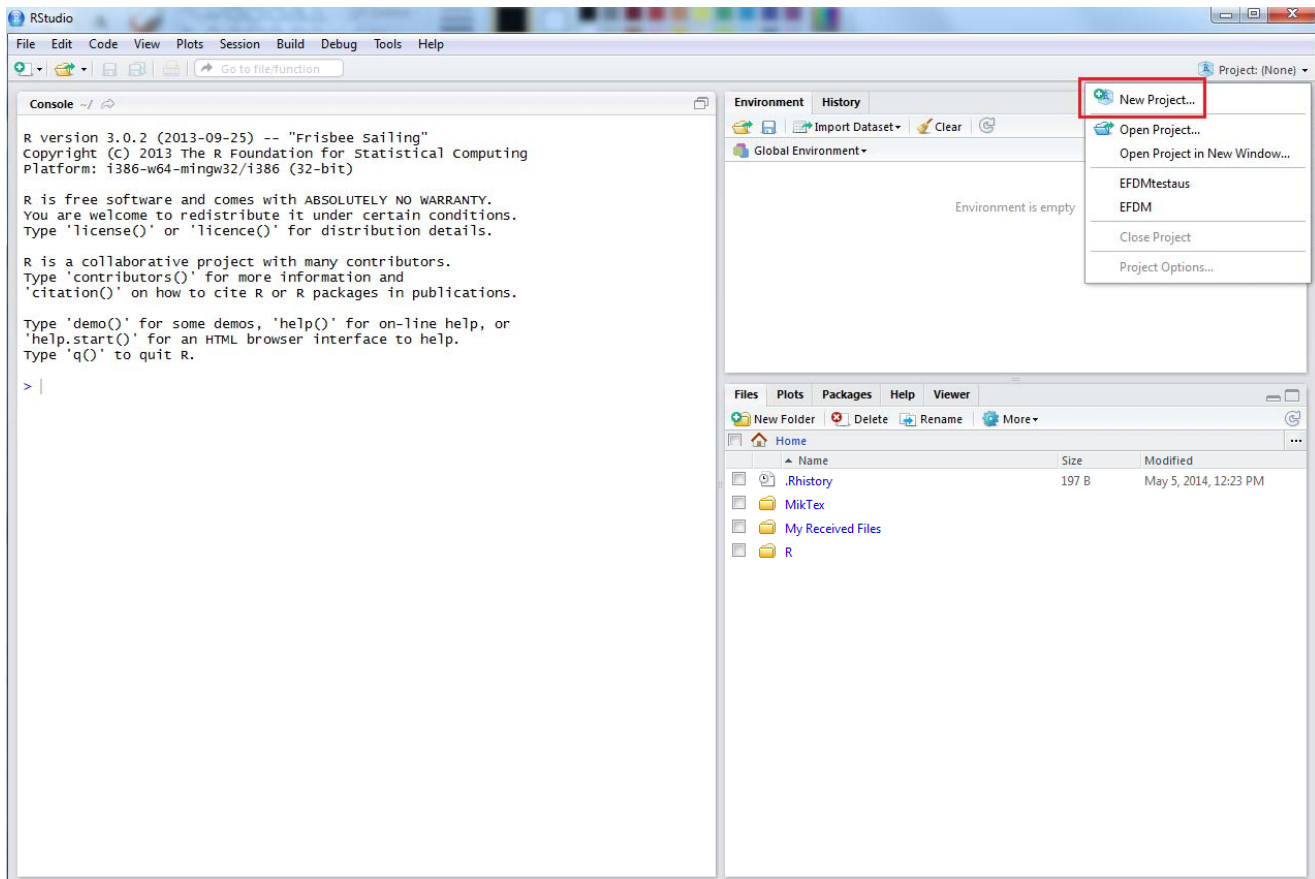
1.1 Open R-studio

You should have something like below (except color coding). Red is console, where you can write commands to run. Blue is environment, where will be all functions, variables etc. that you have. Green is basically the project folder.

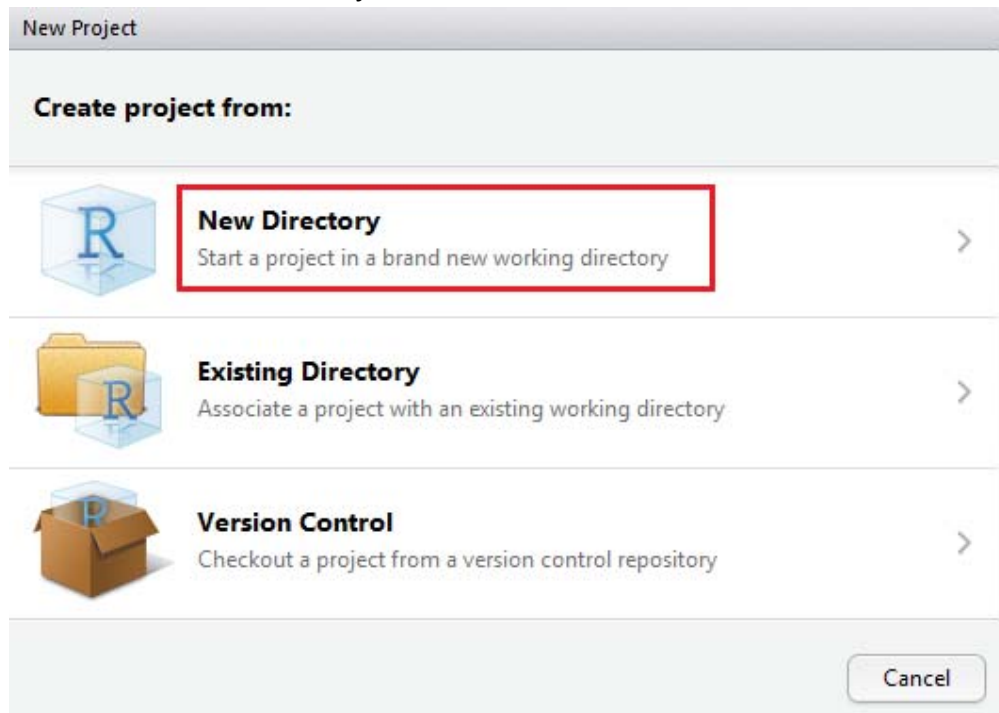
After you have finished the project setup (steps 1.2 and 1.3 below), you should have there the list of files needed for this tutorial. Note that output files related to the example will be there too.



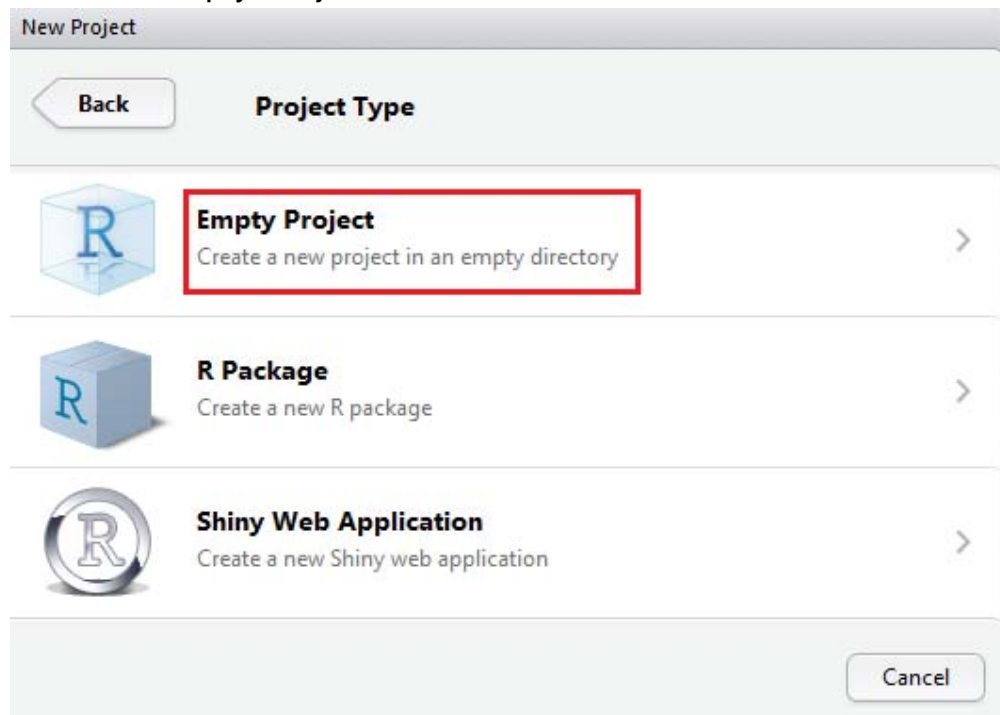
1.2 Make a new project



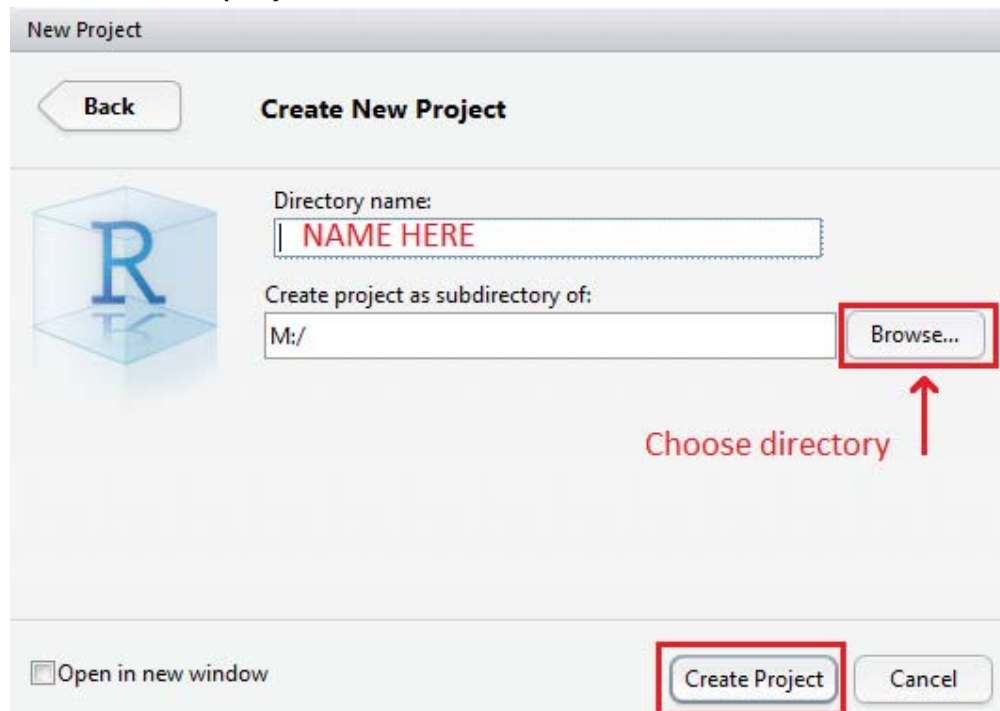
- Choose "New Directory"



- Choose “Empty Project”



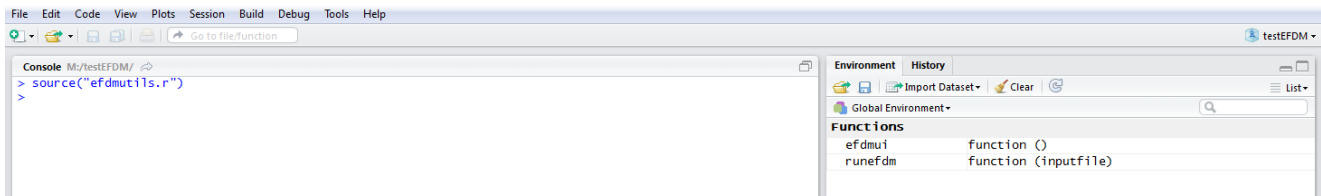
- Give a name to your project. Please do not use special character or space in the name of project.
- Choose where you want to save your project
- Click “Create project”



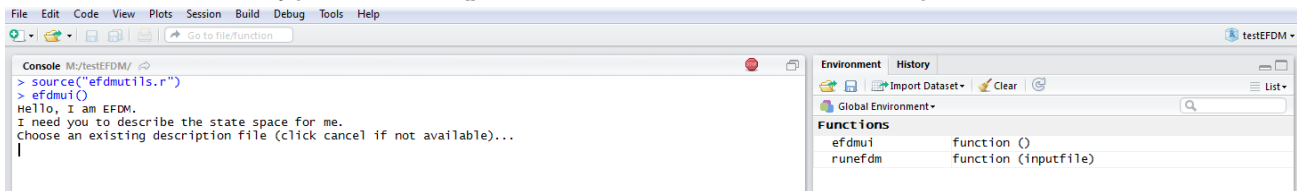
1.3 Unzip files from EFDM_for_NEAF to your R-project's directory

2. Running a pre-set example for NEAF

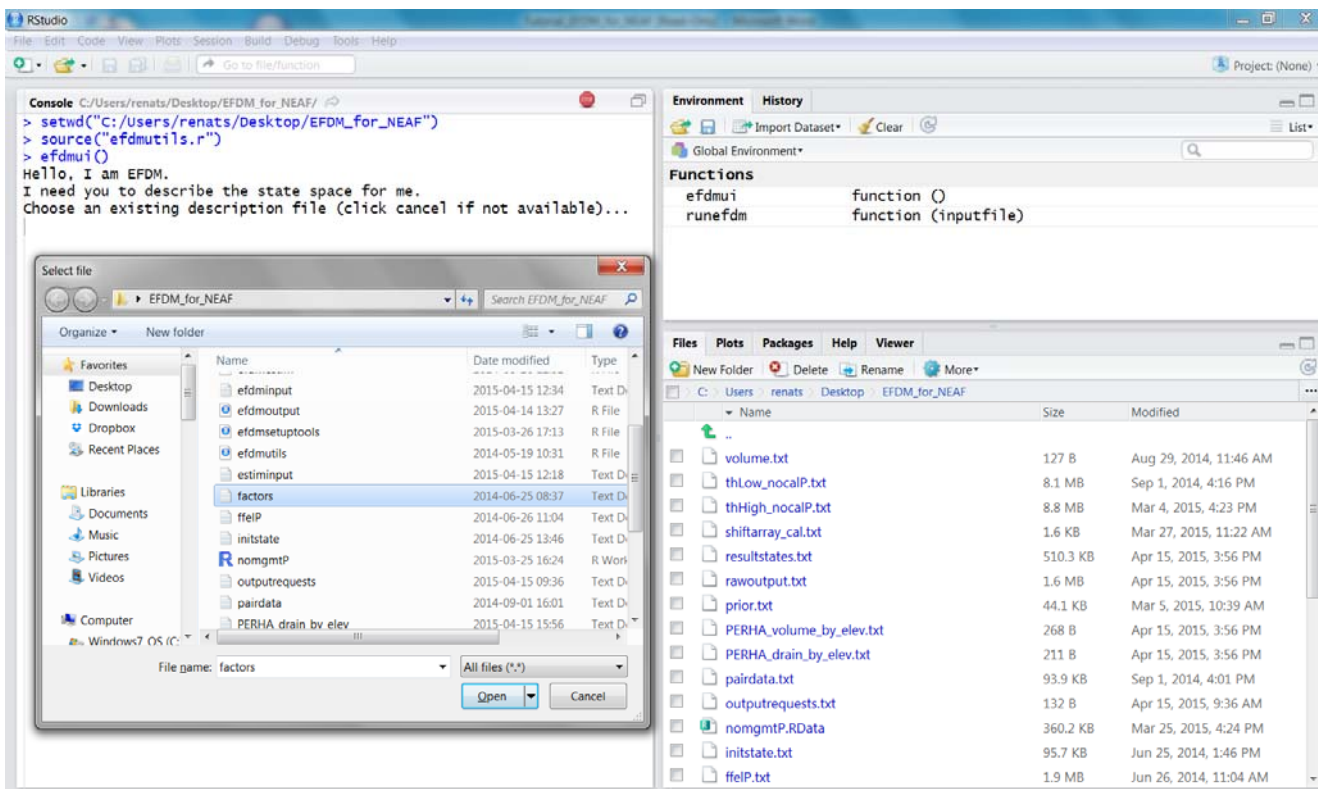
2.1 Type `source("efdmutils.r")`



2.2 Type `efdmui()` and the user interface will open.



2.3 Choose file factors.tx



2.4 Choose file initstate.txt

The screenshot shows the RStudio interface with the console, environment, and file explorer panes. The console displays the following code and output:

```
> setwd("C:/Users/renats/Desktop/EFDM_for_NEAF")
> source("efdmutils.r")
> efdm()
Hello, I am EFDM.
I need you to describe the state space for me.
Choose an existing description file (click cancel if not available)...
Choose the file for initial state...
```

A "Select file" dialog box is open, showing the contents of the "EFDM_for_NEAF" folder. The file "initstate" is selected. The file name field at the bottom is set to "initstate".

The "Environment" pane shows the following functions:

Function	Definition
efdmui	function ()
runefdm	function (inputfile)

The "Files" pane shows the following files:

Name	Size	Modified
volume.txt	127 B	Aug 29, 2014, 11:46 AM
thLow_nocalP.txt	8.1 MB	Sep 1, 2014, 4:16 PM
thHigh_nocalP.txt	8.8 MB	Mar 4, 2015, 4:23 PM
shiftarray_cal.txt	1.6 KB	Mar 27, 2015, 11:22 AM
resultstates.txt	510.3 KB	Apr 15, 2015, 3:56 PM
rawoutput.txt	1.6 MB	Apr 15, 2015, 3:56 PM
prior.txt	44.1 KB	Mar 5, 2015, 10:39 AM
PERHA_volume_by_elev.txt	268 B	Apr 15, 2015, 3:56 PM
PERHA_drain_by_elev.txt	211 B	Apr 15, 2015, 3:56 PM
pairedata.txt	93.9 KB	Sep 1, 2014, 4:01 PM
outputrequests.txt	132 B	Apr 15, 2015, 9:36 AM
nomgmtP.RData	360.2 KB	Mar 25, 2015, 4:24 PM
initstate.txt	95.7 KB	Jun 25, 2014, 1:46 PM
fflp.txt	1.9 MB	Jun 26, 2014, 11:04 AM

2.5 Choose file activities.txt

The screenshot shows the RStudio interface with the console, environment, and file explorer panes. The console displays the following code and output:

```
> setwd("C:/Users/renats/Desktop/EFDM_for_NEAF")
> source("efdmutils.r")
> efdm()
Hello, I am EFDM.
I need you to describe the state space for me.
Choose an existing description file (click cancel if not available)...
Choose the file for initial state...
I need you to describe the activities for me.
Choose an existing description file (click cancel if not available)...
```

A "Select file" dialog box is open, showing the contents of the "EFDM_for_NEAF" folder. The file "activities" is selected. The file name field at the bottom is set to "activities".

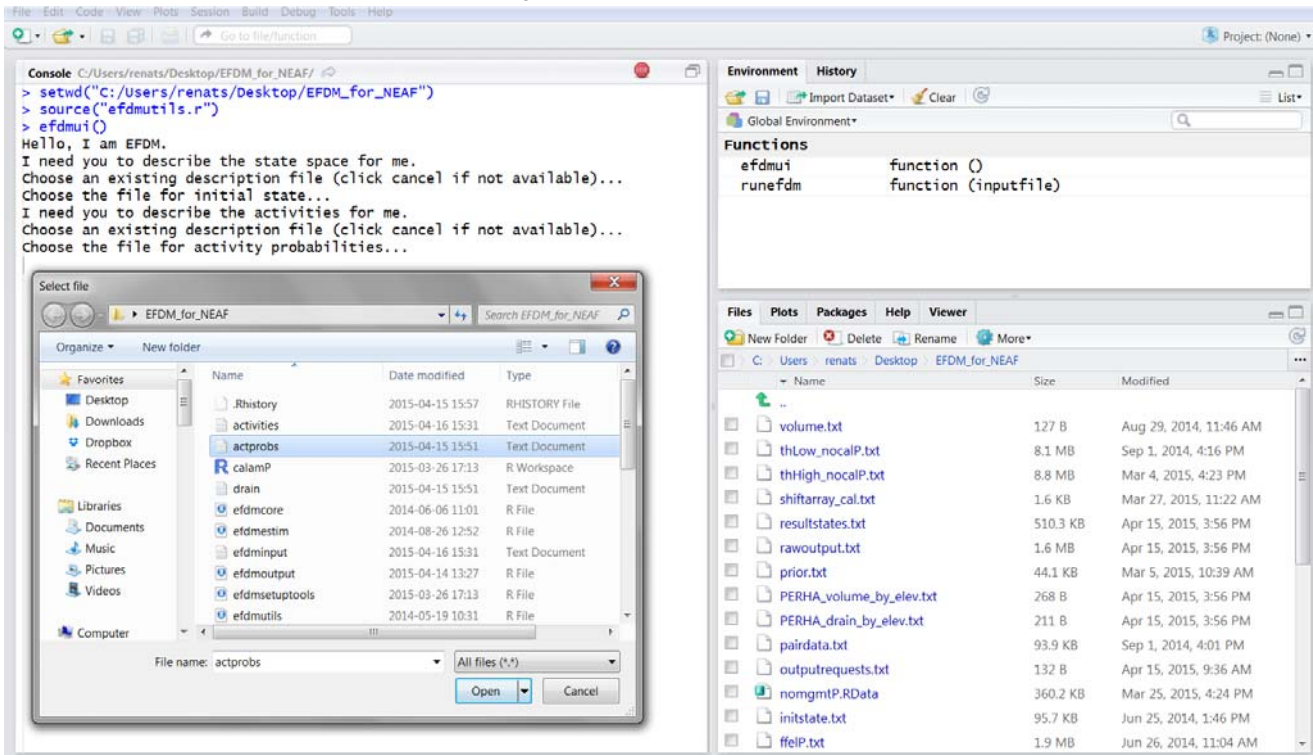
The "Environment" pane shows the following functions:

Function	Definition
efdmui	function ()
runefdm	function (inputfile)

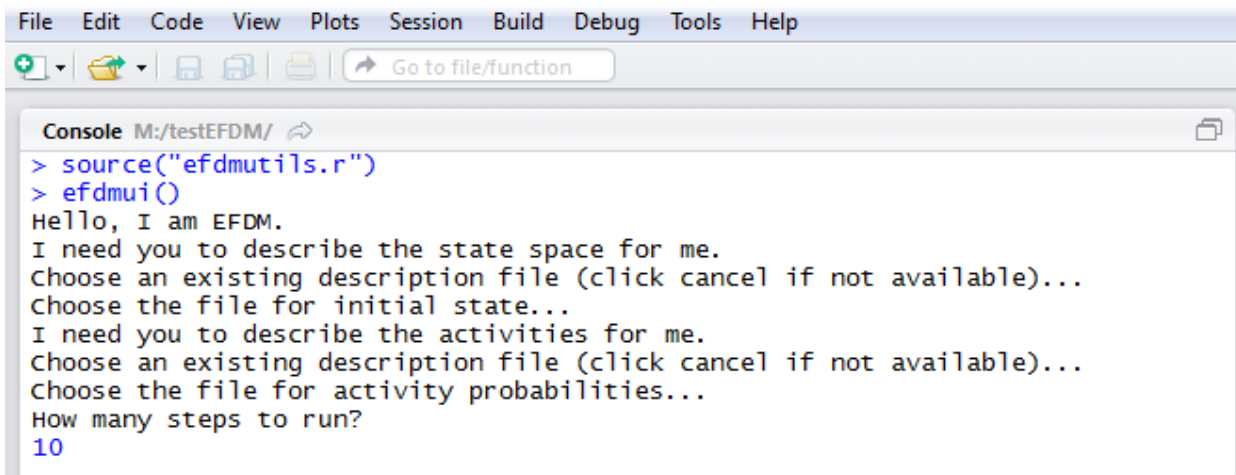
The "Files" pane shows the following files:

Name	Size	Modified
volume.txt	127 B	Aug 29, 2014, 11:46 AM
thLow_nocalP.txt	8.1 MB	Sep 1, 2014, 4:16 PM
thHigh_nocalP.txt	8.8 MB	Mar 4, 2015, 4:23 PM
shiftarray_cal.txt	1.6 KB	Mar 27, 2015, 11:22 AM
resultstates.txt	510.3 KB	Apr 15, 2015, 3:56 PM
rawoutput.txt	1.6 MB	Apr 15, 2015, 3:56 PM
prior.txt	44.1 KB	Mar 5, 2015, 10:39 AM
PERHA_volume_by_elev.txt	268 B	Apr 15, 2015, 3:56 PM
PERHA_drain_by_elev.txt	211 B	Apr 15, 2015, 3:56 PM
pairedata.txt	93.9 KB	Sep 1, 2014, 4:01 PM
outputrequests.txt	132 B	Apr 15, 2015, 9:36 AM
nomgmtP.RData	360.2 KB	Mar 25, 2015, 4:24 PM
initstate.txt	95.7 KB	Jun 25, 2014, 1:46 PM
fflp.txt	1.9 MB	Jun 26, 2014, 11:04 AM

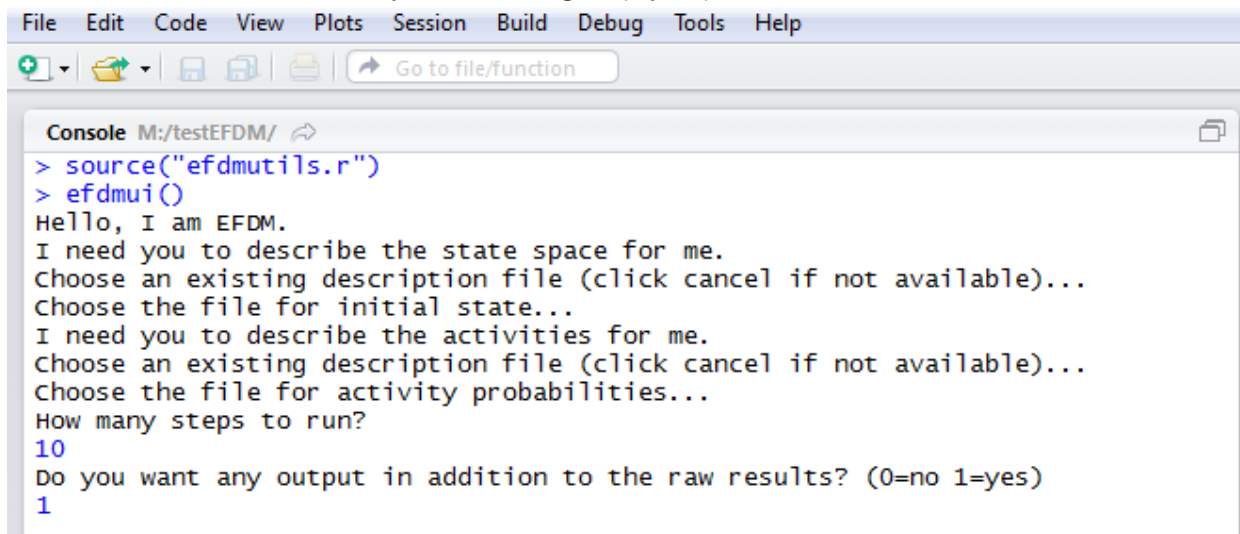
2.6 Choose file actprobs.txt



2.7 Give an integer, how many steps you want to run



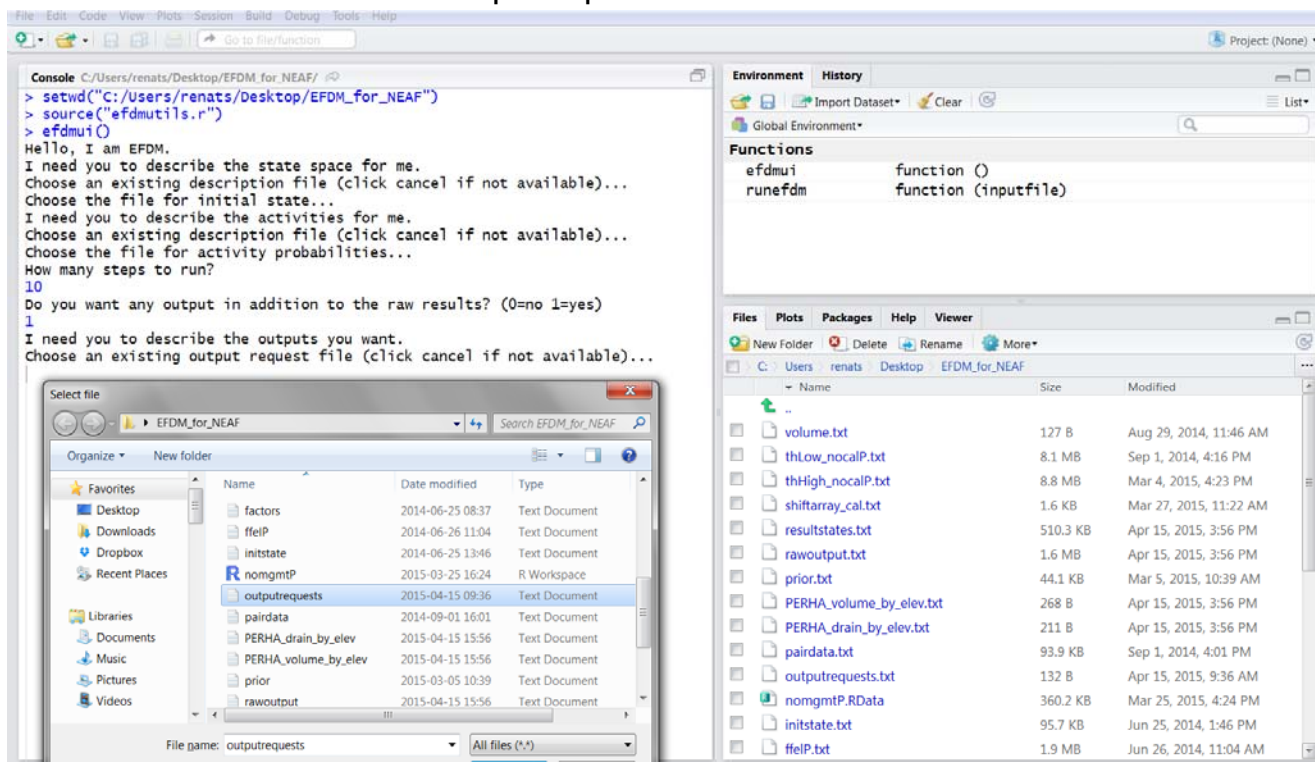
2.8 You can tell if you want some additional information about the results by answering 1 (=yes).



```
File Edit Code View Plots Session Build Debug Tools Help
Go to file/function

Console M:/testEFDm/
> source("efdmutils.r")
> efdmui()
Hello, I am EFDm.
I need you to describe the state space for me.
Choose an existing description file (click cancel if not available)...
Choose the file for initial state...
I need you to describe the activities for me.
Choose an existing description file (click cancel if not available)...
Choose the file for activity probabilities...
How many steps to run?
10
Do you want any output in addition to the raw results? (0=no 1=yes)
1
```

2.9 Choose file outputrequests.txt



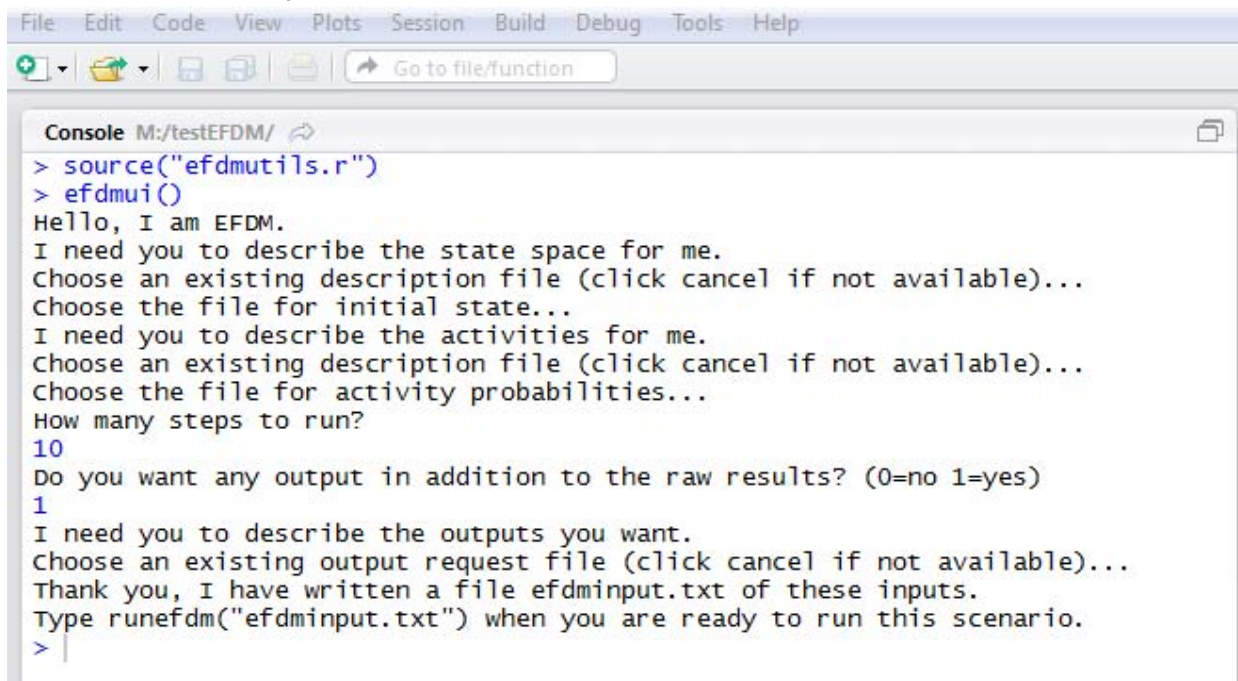
```
File Edit Code View Plots Session Build Debug Tools Help
Go to file/function

Console C:/Users/renats/Desktop/EFDm_for_NEAF/
> setwd("C:/Users/renats/Desktop/EFDm_for_NEAF")
> source("efdmutils.r")
> efdmui()
Hello, I am EFDm.
I need you to describe the state space for me.
Choose an existing description file (click cancel if not available)...
Choose the file for initial state...
I need you to describe the activities for me.
Choose an existing description file (click cancel if not available)...
Choose the file for activity probabilities...
How many steps to run?
10
Do you want any output in addition to the raw results? (0=no 1=yes)
1
I need you to describe the outputs you want.
Choose an existing output request file (click cancel if not available)...
```

The file selection dialog shows the following files in the EFDm_for_NEAF directory:

Name	Size	Modified
volume.txt	127 B	Aug 29, 2014, 11:46 AM
thLow_nocalP.txt	8.1 MB	Sep 1, 2014, 4:16 PM
thHigh_nocalP.txt	8.8 MB	Mar 4, 2015, 4:23 PM
shiftarray_cal.txt	1.6 KB	Mar 27, 2015, 11:22 AM
resultstates.txt	510.3 KB	Apr 15, 2015, 3:56 PM
rawoutput.txt	1.6 MB	Apr 15, 2015, 3:56 PM
prior.txt	44.1 KB	Mar 5, 2015, 10:39 AM
PERHA_volume_by_elev.txt	268 B	Apr 15, 2015, 3:56 PM
PERHA_drain_by_elev.txt	211 B	Apr 15, 2015, 3:56 PM
pairedata.txt	93.9 KB	Sep 1, 2014, 4:01 PM
outputrequests.txt	132 B	Apr 15, 2015, 9:36 AM
nomgmtP.RData	360.2 KB	Mar 25, 2015, 4:24 PM
initstate.txt	95.7 KB	Jun 25, 2014, 1:46 PM
ffelp.txt	1.9 MB	Jun 26, 2014, 11:04 AM

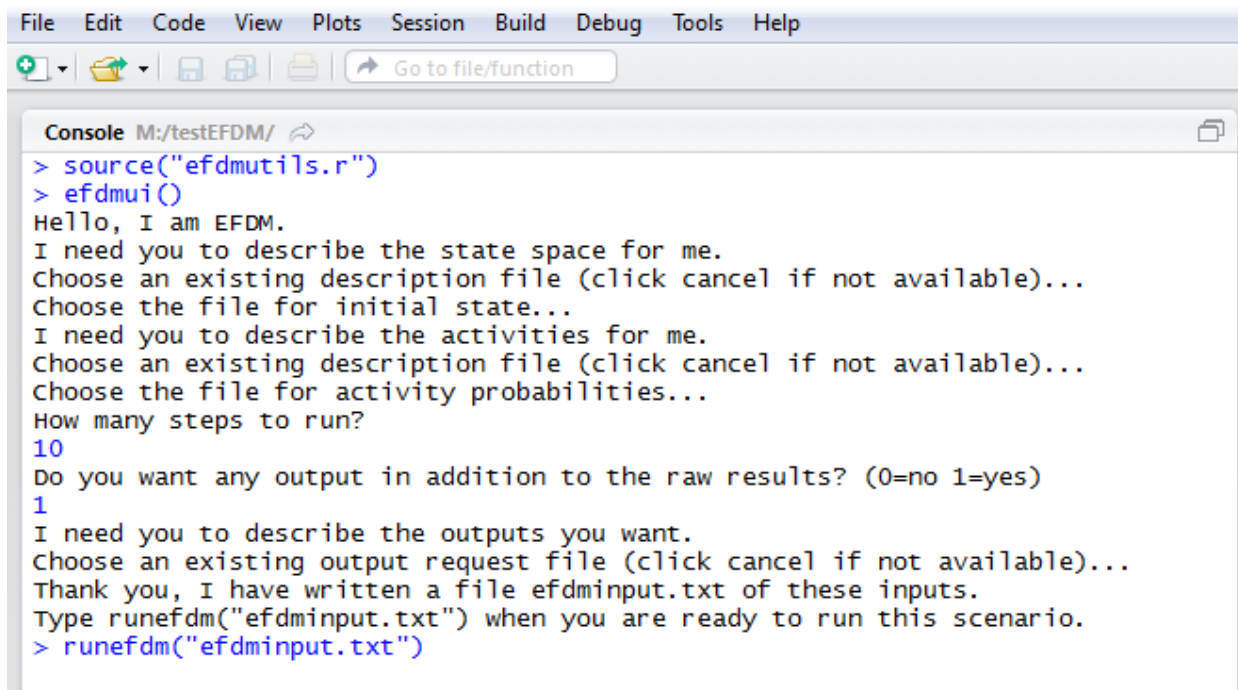
2.10 Now the program has written a file called efdminput.txt following the inputs.



```
File Edit Code View Plots Session Build Debug Tools Help
Go to file/function

Console M:/testEFDM/
> source("efdmutils.r")
> efdmui()
Hello, I am EFDM.
I need you to describe the state space for me.
Choose an existing description file (click cancel if not available)...
Choose the file for initial state...
I need you to describe the activities for me.
Choose an existing description file (click cancel if not available)...
Choose the file for activity probabilities...
How many steps to run?
10
Do you want any output in addition to the raw results? (0=no 1=yes)
1
I need you to describe the outputs you want.
Choose an existing output request file (click cancel if not available)...
Thank you, I have written a file efdminput.txt of these inputs.
Type runefdm("efdminput.txt") when you are ready to run this scenario.
>
```

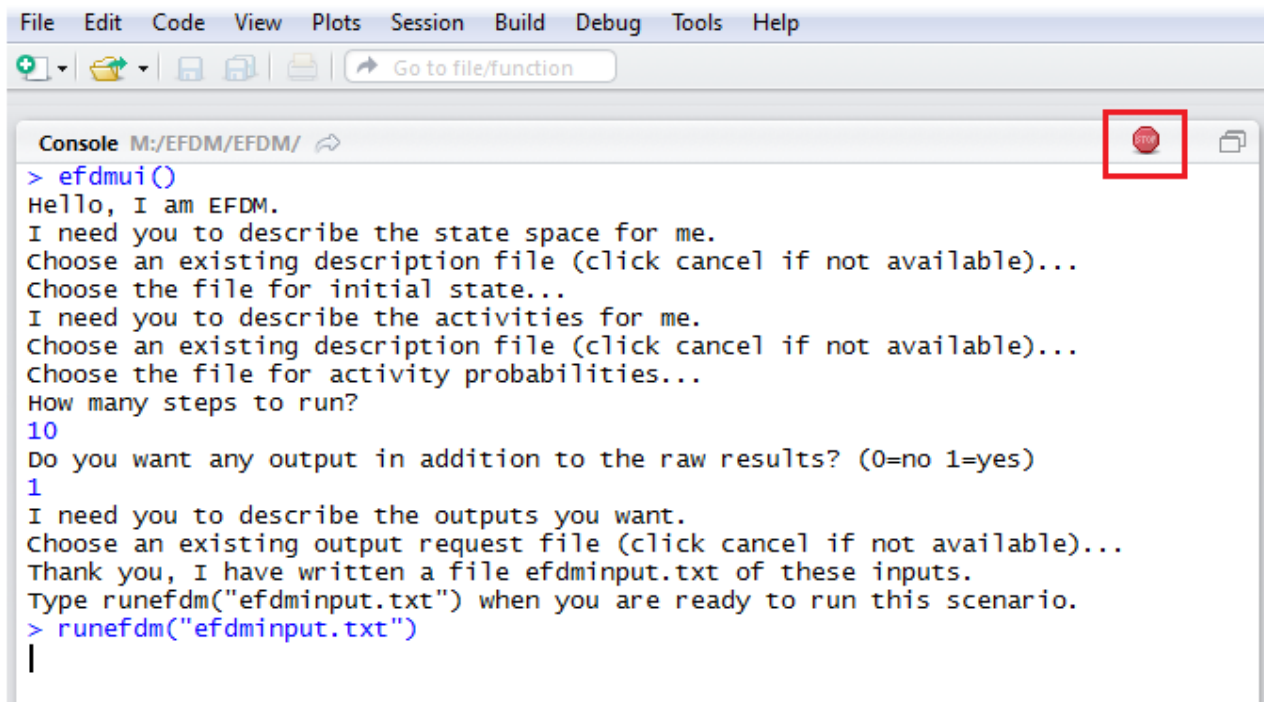
2.11 Type **runefdm("efdminput.txt")** for running the program through



```
File Edit Code View Plots Session Build Debug Tools Help
Go to file/function

Console M:/testEFDM/
> source("efdmutils.r")
> efdmui()
Hello, I am EFDM.
I need you to describe the state space for me.
Choose an existing description file (click cancel if not available)...
Choose the file for initial state...
I need you to describe the activities for me.
Choose an existing description file (click cancel if not available)...
Choose the file for activity probabilities...
How many steps to run?
10
Do you want any output in addition to the raw results? (0=no 1=yes)
1
I need you to describe the outputs you want.
Choose an existing output request file (click cancel if not available)...
Thank you, I have written a file efdminput.txt of these inputs.
Type runefdm("efdminput.txt") when you are ready to run this scenario.
> runefdm("efdminput.txt")
```

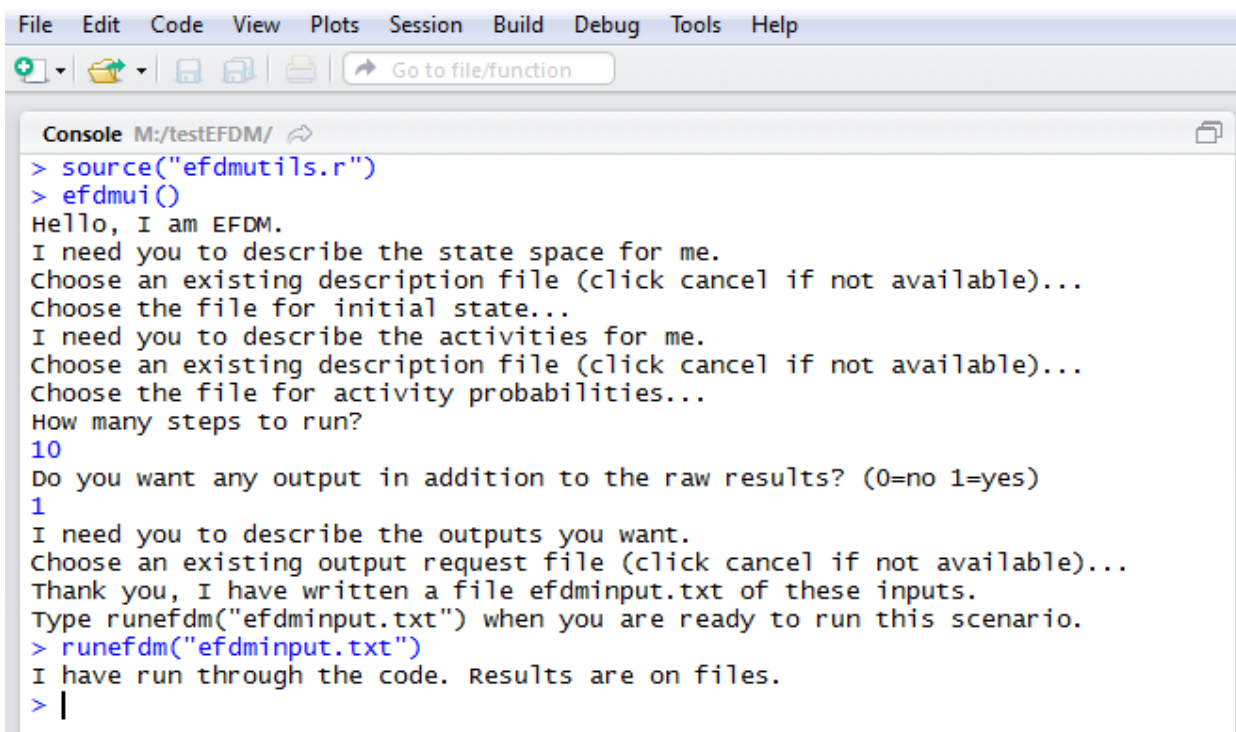
2.12 While the little “stop” sign is on the upper right corner, it means that the program is doing something, wait until the sign disappears.



```
File Edit Code View Plots Session Build Debug Tools Help
Go to file/function

Console M:/EFDM/EFDM/
> efdmui()
Hello, I am EFDM.
I need you to describe the state space for me.
Choose an existing description file (click cancel if not available)...
Choose the file for initial state...
I need you to describe the activities for me.
Choose an existing description file (click cancel if not available)...
Choose the file for activity probabilities...
How many steps to run?
10
Do you want any output in addition to the raw results? (0=no 1=yes)
1
I need you to describe the outputs you want.
Choose an existing output request file (click cancel if not available)...
Thank you, I have written a file efdminput.txt of these inputs.
Type runefdm("efdminput.txt") when you are ready to run this scenario.
> runefdm("efdminput.txt")
|
```

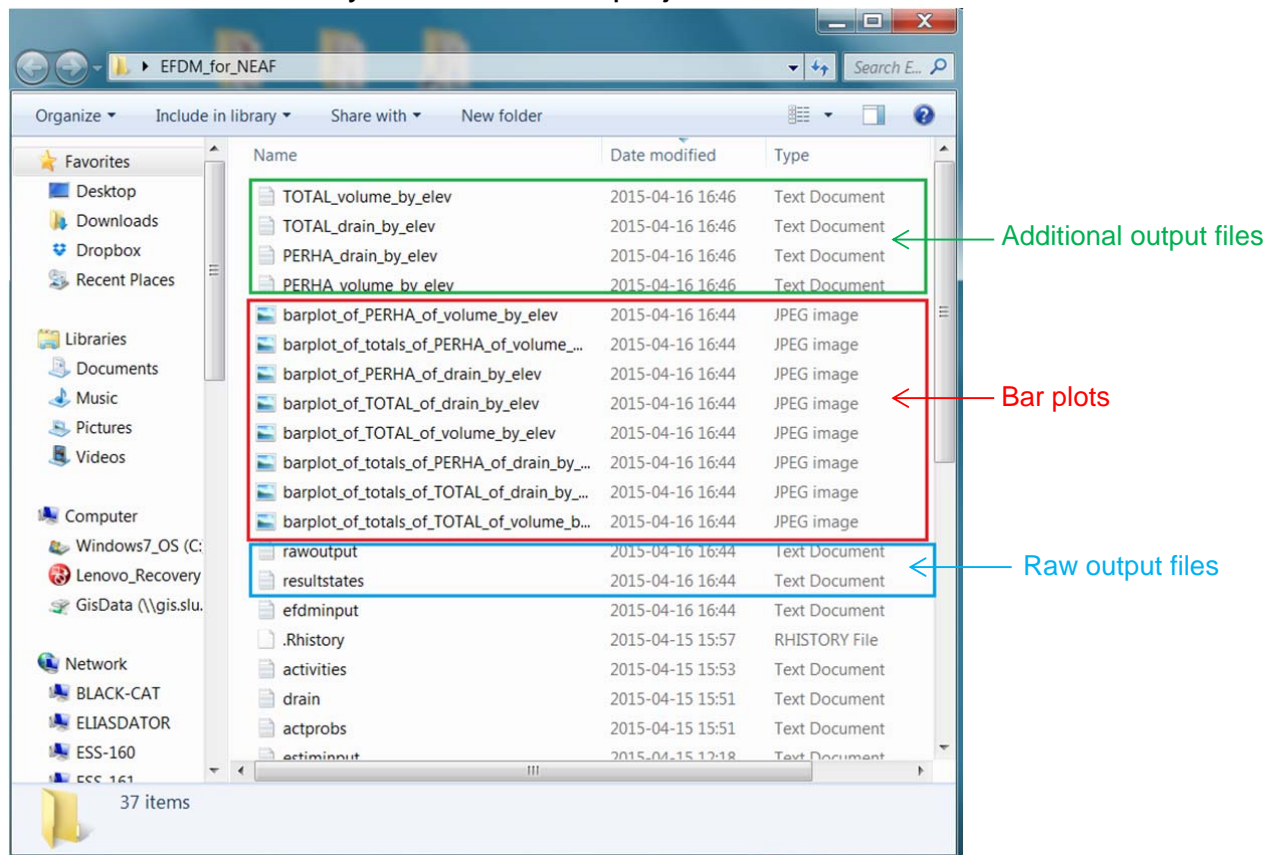
2.13 Now you can close the R-studio. You can save the workspace if you want, but it is not obligatory. The results have been saved to their own files.



```
File Edit Code View Plots Session Build Debug Tools Help
Go to file/function

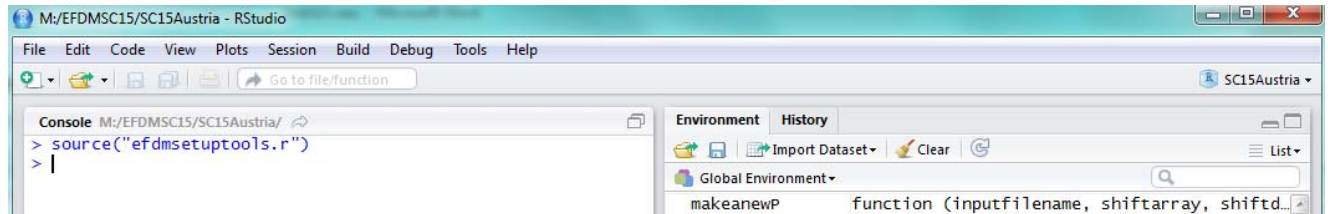
Console M:/testEFDM/
> source("efdmutils.r")
> efdmui()
Hello, I am EFDM.
I need you to describe the state space for me.
Choose an existing description file (click cancel if not available)...
Choose the file for initial state...
I need you to describe the activities for me.
Choose an existing description file (click cancel if not available)...
Choose the file for activity probabilities...
How many steps to run?
10
Do you want any output in addition to the raw results? (0=no 1=yes)
1
I need you to describe the outputs you want.
Choose an existing output request file (click cancel if not available)...
Thank you, I have written a file efdminput.txt of these inputs.
Type runefdm("efdminput.txt") when you are ready to run this scenario.
> runefdm("efdminput.txt")
I have run through the code. Results are on files.
> |
```

2.14 If you want to see the result files, you will have to go to the directory where you saved the R-project.

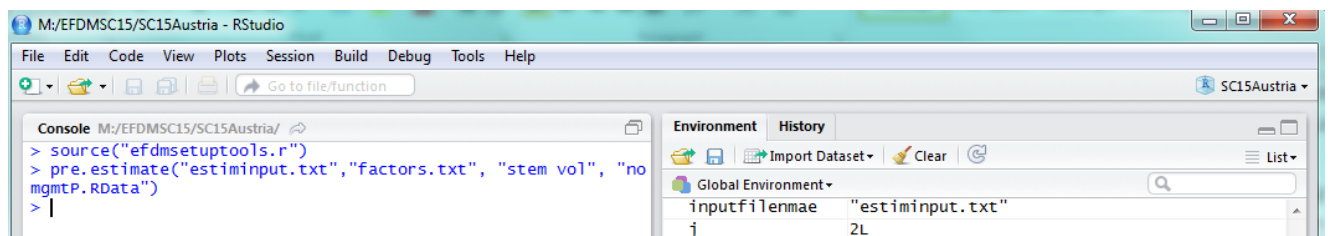


3. Using “efmdsetuptools.r” to generate transition probability matrices (for more information on transition probabilities see Trubins 2015)

3.1. Type **source(“efmdsetuptools.r”)**



3.2 Type **pre.estimate(“estiminput.txt”, “factors.txt”, “stem vol”, “nomgmtP.RData”)** estiminput.txt is an input file, factors.txt includes factors, “stem vol” (as text string!) are the names of the “dynamic factors” of the state space and nomgmtP.RData is the name of the result file.



3.3 Type **makeanewP(“nomgmtP.RData”, shiftarray, c(nstem,nvol),“thinP.RData”)**

“**shiftarray**” describes the direct effect of an activity, such as thinning or calamity, by specifying a new state for each old state. The table has two columns and the number of rows is `nvol*nstem`. (For example, the first row first column gives the new “vol” class for class `vol=1`, `stem=1`. The first row second column gives the new “stem” class for class `vol=1`, `stem=1`.)

For a quick test of the function, “**shiftarray**” can be produced by using the following command:
“`cbind(rep(1:nstem,times=nvol),rep(1:nvol, each=nstem))`”. In this case, there is no direct effect – the new state is the same as the old.

“**c(nstemnr, nvol)**” is a vector, which gives the number of levels of each of the dynamic factors.

(In the picture nstem=10, nvol=15)

