## A simple workflow for using R with Microsoft products

#### Marcus W. Beck

USEPA NHEERL Gulf Ecology Division, Gulf Breeze, FL Email: beck.marcus@epa.gov, Phone: 850 934 2480

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### The problem...

- R is great and has an increasing user base
- RStudio is integrated with multiple document preparation systems
- Output documents are not in a format that facilitates collaboration with non R users, e.g., pdf, html
- Data coming to you may be in a proprietary format, e.g., xls spreadsheet

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- Solution two Use gdata package to import excel data
- Solution three Get pandoc to convert document formats http://johnmacfarlane.net/pandoc/

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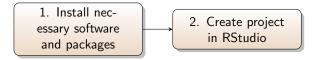
Not recommended for simple tasks unless you really, really love R

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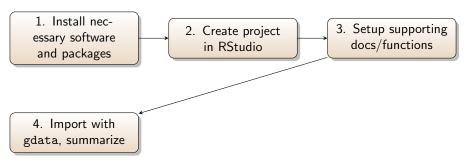
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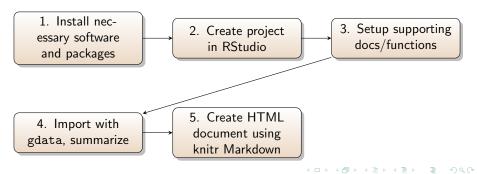
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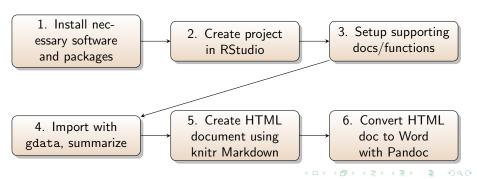
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#### The example

You are sent an Excel file of data to summarize and report but you love R and want to do everything in RStudio...

SiteName	Year	Restoration	Reference	Observer.Names	Precipitation	Temperature
IGH	2005	3	3	Tyler_Amanda	0	48
Kelly	2005	4	2	Patrick_Chelsea	0	48
Carlton	2005	2	3	David_Megan	0	48
IGH	2006	9	6	Tyler_Amanda	0	52
Kelly	2006	9	1	David_Megan	0	52
Carlton	2006	7	3	Patrick_Chelsea	0	52
IGH	2007	12	7	David_Megan	12	41
Kelly	2007	2	18	Jeremy_Lucy	12	41
Carlton	2007	11	2	Patrick_Chelsea	12	41
IGH	2008	9	4	Tyler_Amanda	0	54
Kelly	2008	14	5	David_Megan	0	54
Carlton	2008	13	3	Patrick_Chelsea	0	54
IGH	2009	18	7	Patrick_Chelsea	0	55
Kelly	2009	16	5	David_Megan	0	55
Carlton	2009	20	1	Tyler_Amanda	0	55
IGH	2010	12	2	David_Megan	0	61
Kelly	2010	15	3	Patrick_Chelsea	0	61
Carlton	2010	24	4	$Tyler\_Amanda$	0	61

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- Packages: gdata, knitr, utils, xtable, others as needed...

#### Create a project in RStudio

- Create a folder or use existing on local machine
- Add .Rprofile file to the folder for custom startup
- Move all data you are working with to the folder
- Literally create project in RStudio
- Set options within RStudio

```
.Rprofile
# library path
.libPaths("C:\\Users\\mbeck\\R\\library")
# startup message
cat("My project...\n")
# packages to use
library(utils) # for system commands
library(knitr) # for markdown
library(gdata) # for import xls
library(reshape2) # data format conversion
library(xtable) # easy tables
library(ggplot2) # plotting
# perl path for gdata
prl_pth <- "C:/strawberry/perl/bin/perl.exe"</pre>
# functions to use
source("my_funcs.r")
```

```
my_funcs.r
###### functions for creating report, created May 2014, M. Beck
###### processes data for creating output in report, 'dat_in' is input data as
###### data frame, output is data frame with converted variables
proc_fun <- function(dat_in) {</pre>
    # convert temp to C
    dat_in$Temperature <- round((dat_in$Temperature - 32) * 5/9)
    # convert data to long format
    dat_in <- melt(dat_in, measure.vars = c("Restoration", "Reference"))</pre>
    return(dat_in)
###### creates linear model for data, 'proc_dat' is processed data returned from
###### 'proc_fun', output is linear model object
mod_fun <- function(proc_in) lm(value ~ variable + Year, dat = proc_in)</pre>
```

```
report.Rmd
Here's a report I made for `r gsub('/|.xlsx','',name)`
```{r echo=F, include=F}
# import data
url <- paste0('http://beckmw.files.wordpress.com/2014/05', name)
dat <- read.xls(xls = url, sheet = 'Sheet1', perl = prl pth)
# process data for tables/figs
dat <- proc_fun(dat)
# model of data
mod <- mod_fun(dat)</pre>
### Model summary
```{r results='asis'. echo=F}
print.xtable(xtable(mod, digits = 2), type = 'html')
### Figure of restoration and reference by year
```{r reg_fig, echo = F, fig.width = 5, fig.height = 3, dpi=200}
ggplot(dat, aes(x = Year, y = value, colour = variable)) +
  geom_point() +
  stat_smooth(method = 'lm')
```

```
master.r

# file to process
name <- "/my_data.xlsx"

# rmd to html
knit2html("report.Rmd")

# pandoc conversion of html to word doc
system(paste0("pandoc -o report.docx report.html"))</pre>
```

# Steps 4 - 6

After creating supporting documents in Project directory, final steps are completed by running 'master.r'

- Step 4 xls file imported using gdata package, implemented in 'report.Rmd'
- Step 5 HTML document created by converting 'report.Rmd' with knit2html in 'master.r'
- Step 6 HTML document converted to Word with Pandoc by invoking system command

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