

Chapter 5: Enhancing Your Output with ODS

- ODS (Output Delivery System) can simply be a way to save high-quality output to different files:
 - RTF files
 - PS (Postscript) files
 - PDF files
 - HTML files (be sure to look at the text's example)
- ODS uses style templates to enhance default formats (for those who want to do EVERYTHING in SAS).
- It is also an effective means to control output printed to the usual OUTPUT window (LISTING files) or written to SAS data sets.

Why ODS?

- We have seen a couple of menu-driven applications of ODS.
 - Selecting `Create HTML...` to save output in HTML format under `Tools -> Options -> Preferences`.
 - Right-clicking on a graphics window and saving it as a PDF file.
- The second example is analogous to saving graphics in R.

Why ODS?

- While menu-driven options are convenient, they do have shortcomings when:
 - Generating many graphics in a large program.
 - Generating graphics in a DO loop
 - Generating graphics in a macro.
- We need in-line commands to save output files as well.

Creating an output file

- The basic structure of an ODS command can be quite simple:

```
ODS PDF FILE="z:\stat540\filename.pdf";
```

(SAS graphics commands)

```
ODS PDF CLOSE;
```

- This basic syntax is commonly used for postscript, html, and rtf files as well.
- Note the similarity to the use of the `pdf` and `postscript` functions in R.
- In addition to saving `filename.pdf`, an attractive PDF window will open in SAS.

Creating an output file

- We can include multiple PROC steps inside the ODS commands and generate multiple graphs.

- An additional precaution: Turn off the default output device (and resume it when finished):

```
ODS LISTING CLOSE;
```

```
ODS PDF FILE="z:\stat540\filename.pdf";
```

(SAS graphics commands)

```
ODS PDF CLOSE;
```

```
ODS LISTING;
```

- Example: Broad River stage data

Selecting Output

- SAS procedures can produce a lot of separate pieces of output, some more useful than others.
- We can use `ODS SELECT` to choose a few selected pieces of the output.
- `ODS TRACE` identifies output names for `ODS SELECT`
- The “trace” is printed in the Log window – and it is quite cryptic.
- Once you get used to the naming conventions though, it isn't so bad.

```
ODS TRACE ON;  
(SAS PROC statements)  
RUN;  
ODS TRACE OFF;
```

Saving Output

- ODS OUTPUT can save multiple output files
- Remember that these output data sets can look odd . . .
- . . . but judicious use of IF statements can take care of that.
- ODS OUTPUT can save name, label and path output pieces:

(SAS PROC statements)

```
ODS OUTPUT output_object = your_new_dataset_name;  
RUN;
```

Customizing Titles, Footnotes, and Output

- Can change the color, background color, height, font, etc. of titles and footnotes with options in the `TITLE` and `FOOTNOTE` statements.
- Can make text justified or italic, as well.
- The `STYLE` option in `PROC PRINT` can change the background color, text color, font style, etc., of data table cells, column headers, and other `PROC PRINT` output.
- Similar customization can be done to `PROC REPORT` or `PROC TABULATE` output.
- By defining style formats with `PROC FORMAT`, you can even alter the appearance of the output depending on the data value being printed (traffic-lighting).