Appendices document in Markdown

Name Surname

Day/Month/Year

Appendix A

This appendix includes tables of sample data sets.

Year	Country list	Population trend	ID	Mean max. T (°C)	Mean min. T (°C)
1979	Norway	1.00	8122	8.23	3.95
1979	Norway	1.00	2556	8.23	3.95
1980	Norway	0.00	2555	9.09	4.83
1980	Norway	0.00	8126	9.09	4.83
1980	Norway	0.80	8122	9.09	4.83
1980	Norway	0.00	2553	9.09	4.83
1980	Norway	0.83	2556	9.09	4.83
1981	Norway	0.20	2555	8.73	4.22
1981	Norway	0.29	8126	8.73	4.22
1981	Norway	0.88	8122	8.73	4.22

Year	Country list	**Population trend**	ID	**Mean max. T (°C)**	**Mean min. T (°C)**
1979	Norway	**1.00**	8122	**8.23**	**3.95**
1979	Norway	**1.00**	2556	**8.23**	**3.95**
1980	Norway	**0.00**	2555	**9.09**	**4.83**
1980	Norway	**0.00**	8126	**9.09**	**4.83**
1980	Norway	**0.80**	8122	**9.09**	**4.83**
1980	Norway	**0.00**	2553	**9.09**	**4.83**
1980	Norway	**0.83**	2556	**9.09**	**4.83**
1981	Norway	**0.20**	2555	**8.73**	**4.22**
1981	Norway	**0.29**	8126	**8.73**	**4.22**
1981	Norway	**0.88**	8122	**8.73**	**4.22**

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1981	Norway	0.88	8122	8.73	4.22

	EU puffins			Mean Temperatue (°C)	
Year	Country list	Population trend	ID	Mean max. T (°C)	Mean min. T (°C)
1970s					
1979	Norway	1.00	8122	8.23	3.95
1979	Norway	1.00	2556	8.23	3.95
1980s					
1980	Norway	0.00	2555	9.09	4.83
1980	Norway	0.00	8126	9.09	4.83
1980	Norway	0.80	8122	9.09	4.83
1980	Norway	0.00	2553	9.09	4.83
1980	Norway	0.83	2556	9.09	4.83
1981	Norway	0.20	2555	8.73	4.22
1981	Norway	0.29	8126	8.73	4.22
1981	Norway	0.88	8122	8.73	4.22

Appendix B

This appendix includes additional figures.

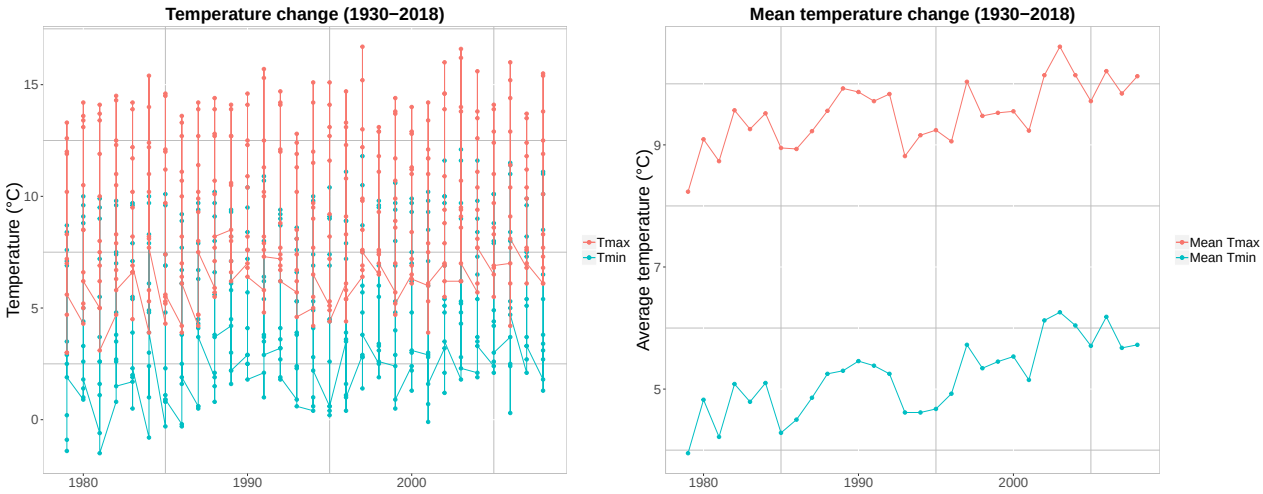

Figure 1: The figures are created directly in this .Rmd file.

Figure 2: This is an attempt to set the size of externally located figures. The settings don't work as well as in the example above. The labels are very small and illegible.

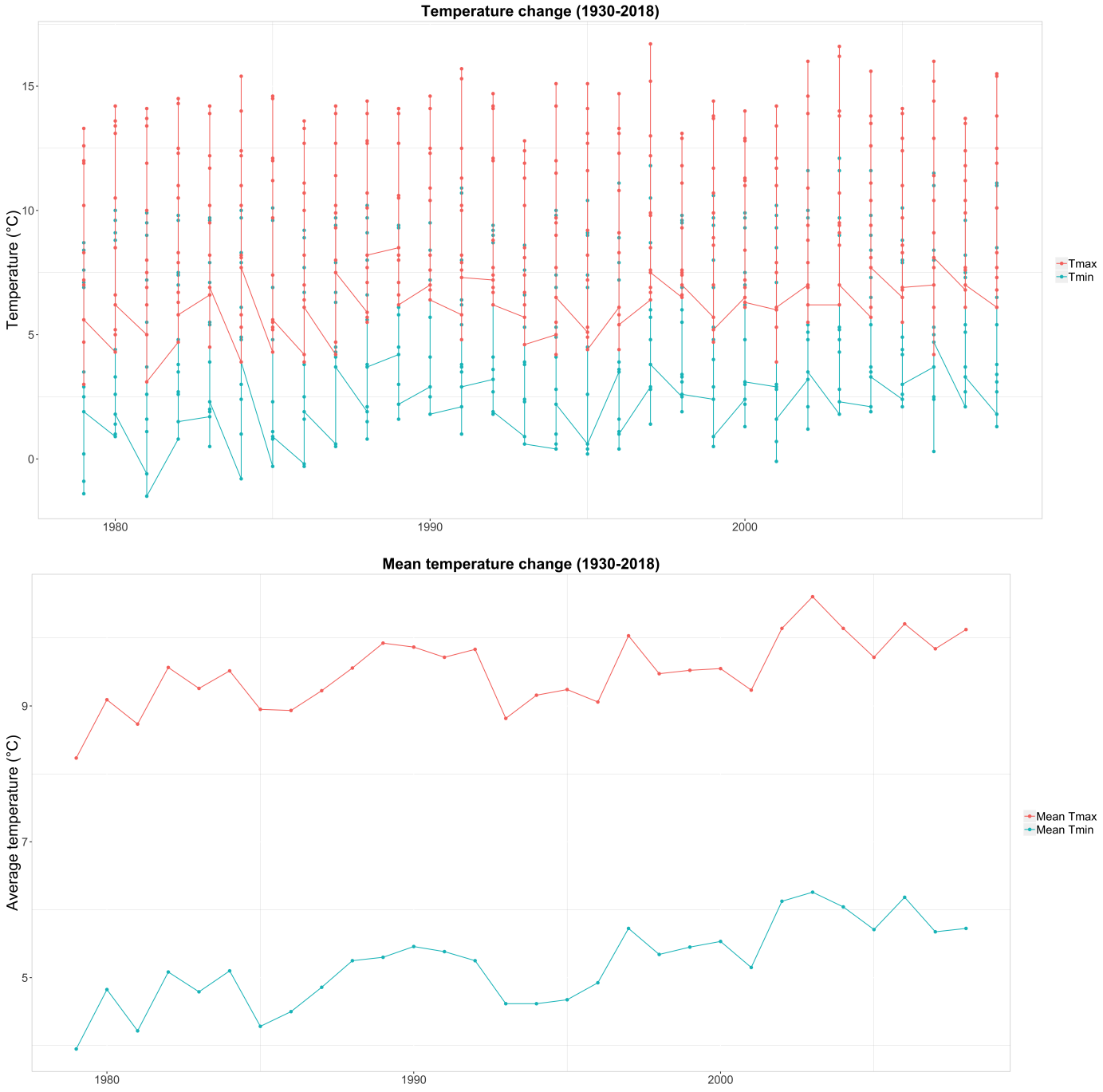

Figure 3: Additional images in Appendix B

Appendix C

This appendix includes the code used.

```
# Loading necessary packages
library(tidyverse)  # data transformation
library(reshape2) # restructure and aggregate data
library(ggplot2) # create beautiful graphs

# Load Living planet data
LPI <- read_csv("./data/LPIdata_Feb2016.csv")

# Load climate data
climate_data <- read_csv("./data/Lerwick_temp_data.csv")

# Puffins data transformation
LPI <- LPI %>%
  gather(key = "year", value = "population", select = 26:70) %>%
  mutate(binomial_id = paste(Genus, Species, id, sep = "_")) %>%
  filter(population >= 0) %>%
  group_by(binomial_id) %>%
  mutate(max_year = max(year), min_year = min(year),
         lengthyear = as.integer(max_year) - as.integer(min_year),
         pop_trend = (population - min(population))/(max(population) - min(population))) %>%
  ungroup()

# European puffins only

eu_puffins <- filter(LPI, Genus == "Fratercula", Species == "arctica",
         `Country list` !="Russian Federation") %>%
  select(`Country list`, year, pop_trend, id)  %>%
  group_by(id) %>%
  filter(length(year)>10)  # studies longer than 10 years, it results they have
                           # been carried out exclusively in Norway.

write_csv(eu_puffins, file.path("puffin_toplot.csv"))


# Mean T

mean_t_data <- climate_data %>%
  group_by(year) %>%
  summarise(mean_tmax = mean(tmax),
            mean_tmin = mean(tmin))

# Merging EU puffins and mean T

puffin_temp <- merge(eu_puffins, mean_t_data)

# Select values to correlate
corpuffin_temp <- puffin_temp %>%
  select(id, year, mean_tmax, mean_tmin, pop_trend) %>%
  spread(key = "id", value = "pop_trend") %>%
  drop_na()
```

```r
# Correlation

cormat <- round(cor(corpuffin_temp[, c(2:9)]),2) %>%
  melt()

# Compare Puffin populations with temperature

  # Max temps
ggplot(puffin_temp) +
  ggtitle("Comparison between puffin abundance and max. temperature changes (1930-2018)\n") +
  theme(plot.title = element_text(hjust = 0.5, vjust = 0.5, size = 11, face = "bold"),
        panel.background = element_rect(fill = "white"),
        panel.grid.minor = element_line(colour = "grey", size = 0.1 ),
        panel.border = element_rect(colour = "grey", fill = NA)) +
  scale_colour_discrete(name = "Puffins i.d.") +
  xlab("\nMean max. temperature (°C)") + ylab("Population trend\n") +
  geom_point(aes(x = mean_tmax, y = pop_trend,
                 colour = as.factor(id))) +
  geom_smooth(aes(x = mean_tmax, y = pop_trend,
                  colour = as.factor(id)),
              method = 'lm')

# Compare Puffin populations with temperature

  # Min temps
ggplot(puffin_temp) +
  ggtitle("Comparison between puffin abundance and min. temperature changes (1930-2018)\n") +
  theme(plot.title = element_text(hjust = 0.5, vjust = 0.5, size = 11, face = "bold"),
        panel.background = element_rect(fill = "white"),
        panel.grid.minor = element_line(colour = "grey", size = 0.1 ),
        panel.border = element_rect(colour = "grey", fill = NA)) +
  scale_colour_discrete(name = "Puffins i.d.") +
  xlab("\nMean min. temperature (°C)") + ylab("Population trend\n") +
  geom_point(aes(x = mean_tmin, y = pop_trend,
                 colour = as.factor(id))) +
  geom_smooth(aes(x = mean_tmin, y = pop_trend,
                  colour = as.factor(id)),
              method = 'lm')

# Correlation mat

ggplot(cormat,
       aes(x = Var1, y = Var2, fill = value)) +
  ggtitle("Correlation mat of population trends\n") +
  theme(plot.title = element_text(hjust = 0.5, vjust = 0.5,
                                  size = 11, face = "bold")) +
  geom_tile() +
  xlab(" ") + ylab(" ")
```