Untitled

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```
library(tidyverse)
```

```
## -- Attaching packages ---------------------------------------------------------------------------
```

```
## v ggplot2 3.3.1     v purrr   0.3.4
## v tibble  3.0.1     v dplyr   1.0.0
## v tidyr   1.1.0     v stringr 1.4.0
## v readr   1.3.1     v forcats 0.5.0
```

```
## -- Conflicts ------------------------------------------------------------------------------------ 
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

```
library(xtable)
wd.data <- "~/Dropbox (FFRC)/NWOS/PRODUCTS/TOOLS/TABLING/INPUTS/ESTIMATES"
wd.ref <- "~/Dropbox (FFRC)/NWOS/PRODUCTS/TOOLS/TABLING/INPUTS/REF"

forest.area <- readRDS(file.path(wd.data, "NWOS_FOREST_AREA_2018_20190909.RDS"))
nwos <- readRDS(file.path(wd.data, "NWOS_2018_FFO_TENPLUS_20200401.RDS"))

ref.label <- read_csv(file.path(wd.ref, "REF_LABEL.csv"))
```

```
## Parsed with column specification:
## cols(
##   VARIABLE = col_character(),
##   LEVEL = col_double(),
##   LABEL = col_character(),
##   ORDER = col_double()
## )
```

```
ref.variable <- read_csv(file.path(wd.ref, "REF_VARIABLE.csv"))
```

```
## Parsed with column specification:
## cols(
##   TABLE = col_character(),
##   SUBTABLE = col_character(),
##   VARIABLE = col_character()
## )
```

```
ref.table <- read_csv(file.path(wd.ref, "REF_TABLE.csv"))
```

```
## Parsed with column specification:
## cols(
##   TABLE_NUMBER = col_double(),
##   TABLE = col_character(),
##   TABLE_NAME = col_character(),
```

```
##   SUBTABLE_NUMBER = col_double(),
##   SUBTABLE = col_character(),
##   HEADER = col_character(),
##   DESCRIPTION = col_character(),
##   FOOTNOTE = col_character()
## )
```

```
forest.area.geo <- forest.area %>% filter(STATECD == 25)
nwos.geo <- nwos %>% filter(GEO_ABB == "MA")
```

```
forest.area.geo.table <- forest.area.geo %>%
  group_by(OWNGRP) %>%
  summarize(ACRES = sum(ACRES),
            ACRES_VARIANCE = sum(ACRES_VARIANCE),
            .groups = "drop") %>%
  mutate(ACRES = ACRES / 1e3,
         SE = sqrt(ACRES_VARIANCE) / 1e3) %>%
  select(OWNGRP, ACRES, SE)
print(xtable(forest.area.geo.table), include.rownames = F)
```

% latex table generated in R 4.0.3 by xtable 1.8-4 package % Fri Dec 11 17:58:25 2020

OWNGRP	ACRES	SE
Family	1320.98	59.99
Corporate	343.60	43.37
Other private	225.10	37.39
Federal	73.86	19.82
State	607.92	41.03
Local	438.67	45.74

```
nwos.geo.total <- nwos.geo %>%
  filter((VARIABLE == "TOTAL" & STATISTIC == "TOTAL" & UNITS %in% c("ACRES", "OWNERSHIPS") |
            (VARIABLE == "OWNERS_NUMBER" & STATISTIC == "TOTAL"))) %>%
  mutate(SE = sqrt(VARIANCE),
         STUB = if_else(VARIABLE == "OWNERS_NUMBER", "Owners", NULL),
         STUB = if_else(VARIABLE == "TOTAL" & UNITS == "ACRES", "Acres", STUB),
         STUB = if_else(VARIABLE == "TOTAL" & UNITS == "OWNERSHIPS", "Ownerships", STUB),
         STUB = factor(STUB, levels = c("Acres", "Ownerships", "Owners")),
         VALUE = round(VALUE, -3),
         SE = round(SE, -3)) %>%
  select(Units = STUB, Total = VALUE, SE) %>%
  arrange(Units)
print(xtable(nwos.geo.total, digits = 0), format.args = list(big.mark = ","), include.rownames = F)
```

% latex table generated in R 4.0.3 by xtable 1.8-4 package % Fri Dec 11 17:58:25 2020

Units	Total	SE
Acres	884,000	44,000
Ownerships	21,000	1,000
Owners	39,000	3,000

```
ref.size <- ref.label %>%
  filter(VARIABLE == "AC_WOOD_CAT") %>%
  mutate(LEVEL = as.character(LEVEL)) %>%
  select(LEVEL, LABEL, ORDER)
```

```r
nwos.geo.size <- nwos.geo %>%
  filter(VARIABLE == "AC_WOOD_CAT", STATISTIC == "PROPORTION", UNITS %in% c("ACRES", "OWNERSHIPS"), !LE
  mutate(VALUE = VALUE * 100,
         SE = sqrt(VARIANCE) * 100) %>%
  select(-VARIANCE) %>%
  pivot_wider(names_from = c("UNITS"), values_from = c("VALUE", "SE")) %>%
  left_join(ref.size, by = "LEVEL") %>%
  arrange(ORDER) %>%
  select("Size of Holdings (Acres)"= LABEL,
         Acres = VALUE_ACRES, SE = SE_ACRES,
         Ownerships = VALUE_OWNERSHIPS, "SE " = SE_OWNERSHIPS)

addtorow <- list()
addtorow$pos <- list(0)
addtorow$command <- c("& \\multicolumn{4}{c}{Percentage} \\\\\n")
print(xtable(nwos.geo.size, digits = 1), add.to.row = addtorow, include.rownames = F)
```

% latex table generated in R 4.0.3 by xtable 1.8-4 package % Fri Dec 11 17:58:25 2020

Size of Holdings (Acres)	Acres	SE	Ownerships	SE
			Percentage	
10-19	14.2	2.4	43.7	5.5
20-49	22.4	3.2	31.4	4.8
50-99	29.4	3.4	17.7	2.7
100-199	18.4	2.9	6.1	1.2
200-499	7.0	1.8	0.9	0.3
500-999	3.3	1.3	0.2	0.1
1,000-4,999	2.1	0.8	0.0	0.0
5,000+	3.1	0.2	0.0	0.0

```r
ref.obj <- ref.label %>%
  left_join(ref.variable) %>%
  left_join(ref.table) %>%
  filter(grepl("OBJ_", VARIABLE)) %>%
  select(VARIABLE, HEADER) %>%
  distinct()
```

```
## Joining, by = "VARIABLE"
```

```
## Joining, by = c("TABLE", "SUBTABLE")
```

```r
nwos.geo.obj <- nwos.geo %>%
  filter(grepl("OBJ_", VARIABLE), !VARIABLE == "OBJ_OTH", LEVEL %in% 4:5, STATISTIC == "PROPORTION",
         UNITS %in% c("ACRES", "OWNERSHIPS")) %>%
  group_by(VARIABLE, UNITS) %>%
  summarize(VALUE = sum(VALUE) * 100,
            SE = sqrt(sum(VARIANCE)) * 100,
            .groups = "drop") %>%
  pivot_wider(names_from = c("UNITS"), values_from = c("VALUE", "SE")) %>%
  left_join(ref.obj) %>%
  select("Objective" = HEADER,
         Acres = VALUE_ACRES, SE = SE_ACRES,
         Ownerships = VALUE_OWNERSHIPS, "SE " = SE_OWNERSHIPS)
```

```
## Joining, by = "VARIABLE"
```

```
addtorow <- list()
addtorow$pos <- list(0)
addtorow$command <- c("& \\multicolumn{4}{c}{Percentage} \\\\\n")
print(xtable(nwos.geo.obj, digits = 1), add.to.row = addtorow, include.rownames = F)
```

% latex table generated in R 4.0.3 by xtable 1.8-4 package % Fri Dec 11 17:58:25 2020

Objective	Acres	SE	Ownerships	SE
			Percentage	
Beauty or scenery	82.1	4.7	85.6	6.7
Family legacy	57.0	4.6	51.1	6.5
Raise family	43.8	4.4	44.9	5.9
Firewood	33.5	3.9	28.8	4.7
Hunting	25.8	3.2	14.6	3.0
Land investment	35.5	3.8	25.0	4.5
Nature protection	74.9	4.9	70.8	6.8
Nontimber forest products	11.7	2.1	6.2	1.9
Privacy	73.0	4.9	74.4	6.8
Recreation	53.8	4.5	52.1	6.5
Timber products	33.5	3.6	14.7	2.7
Water protection	64.7	4.9	54.8	6.4
Wildlife habitat	75.9	4.9	71.9	6.7

```
ref.cnc <- ref.label %>%
  left_join(ref.variable) %>%
  left_join(ref.table) %>%
  filter(grepl("CNC_", VARIABLE)) %>%
  select(VARIABLE, HEADER) %>%
  distinct()
```

```
## Joining, by = "VARIABLE"
```

```
## Joining, by = c("TABLE", "SUBTABLE")
```

```
nwos.geo.cnc <- nwos.geo %>%
  filter(grepl("CNC_", VARIABLE), !VARIABLE == "CNC_OTH", LEVEL %in% 4:5, STATISTIC == "PROPORTION",
         UNITS %in% c("ACRES", "OWNERSHIPS")) %>%
  group_by(VARIABLE, UNITS) %>%
  summarize(VALUE = sum(VALUE) * 100,
            SE = sqrt(sum(VARIANCE)) * 100,
            .groups = "drop") %>%
  pivot_wider(names_from = c("UNITS"), values_from = c("VALUE", "SE")) %>%
  left_join(ref.cnc) %>%
  select("Concern" = HEADER,
         Acres = VALUE_ACRES, SE = SE_ACRES,
         Ownerships = VALUE_OWNERSHIPS, "SE " = SE_OWNERSHIPS)
```

```
## Joining, by = "VARIABLE"
```

```
addtorow <- list()
addtorow$pos <- list(0)
addtorow$command <- c("& \\multicolumn{4}{c}{Percentage} \\\\\n")
print(xtable(nwos.geo.cnc, digits = 1), add.to.row = addtorow, include.rownames = F)
```

% latex table generated in R 4.0.3 by xtable 1.8-4 package % Fri Dec 11 17:58:26 2020

Concern	Acres	SE	Ownerships	SE
			Percentage	
Air pollution	46.9	4.4	44.1	5.9
Animal damage	12.6	2.5	7.1	2.1
Climate change	55.8	4.7	56.0	6.2
Development	38.2	4.0	38.8	5.9
Dumping or vandalism	64.4	4.6	53.5	6.2
Wildfire	40.0	4.1	38.0	5.8
Government regulation	55.7	4.5	45.6	5.9
Keeping land intact	76.7	5.0	76.5	7.0
Insects or diseases	68.7	4.7	64.4	6.7
Invasive plants	51.1	4.4	57.8	6.1
Off-road vehicles	41.8	4.0	40.6	5.8
Wind or ice storms	38.4	3.7	39.9	5.7
Property taxes	73.5	4.7	65.2	6.4
Trespassing or poaching	53.7	4.4	46.6	6.2
Drought	33.1	3.9	41.5	5.9
Water pollution	46.7	4.2	54.7	6.5

```
ref.act <- ref.label %>%
  filter(str_detect(VARIABLE, "^ACT_")) %>%
  select(VARIABLE, LABEL)

nwos.geo.act <- nwos.geo %>%
  filter(str_detect(VARIABLE, "^ACT_"), !VARIABLE == "ACT_OTH", LEVEL == 1, STATISTIC == "PROPORTION",
         UNITS %in% c("ACRES", "OWNERSHIPS")) %>%
  group_by(VARIABLE, UNITS) %>%
  summarize(VALUE = sum(VALUE) * 100,
            SE = sqrt(sum(VARIANCE)) * 100,
            .groups = "drop") %>%
  pivot_wider(names_from = c("UNITS"), values_from = c("VALUE", "SE")) %>%
  left_join(ref.act) %>%
  select("Activity" = LABEL,
         Acres = VALUE_ACRES, SE = SE_ACRES,
         Ownerships = VALUE_OWNERSHIPS, "SE " = SE_OWNERSHIPS)
```

```
## Joining, by = "VARIABLE"
```

```
addtorow <- list()
addtorow$pos <- list(0)
addtorow$command <- c("& \\multicolumn{4}{c}{Percentage} \\\\\n")
print(xtable(nwos.geo.act, digits = 1), add.to.row = addtorow, include.rownames = F)
```

% latex table generated in R 4.0.3 by xtable 1.8-4 package % Fri Dec 11 17:58:26 2020

```
ref.prog <- ref.label %>%
  filter(VARIABLE %in% c("MAN_PLAN", "ADVICE", "TAX", "COST_5YR", "EASE",  "CERT", "CARBON")) %>%
  left_join(ref.variable) %>%
  left_join(ref.table) %>%
  select(VARIABLE, TABLE_NAME) %>%
  distinct()
```

```
## Joining, by = "VARIABLE"
```

```
## Joining, by = c("TABLE", "SUBTABLE")
```

Activity	Acres	SE	Ownerships	SE
			Percentage	
Controlled burn/prescribed fire	8.3	2.0	11.6	3.0
Cut and/or removed trees for own use	56.0	3.7	51.6	5.2
Cut and/or removed trees for sale	34.8	3.3	17.6	3.0
Livestock grazing	15.6	2.6	7.8	1.6
Eliminated or reduced unwanted insects or diseases	13.7	2.2	6.8	1.9
Eliminated or reduced invasive plants	35.2	3.4	35.2	4.8
None	14.4	2.5	27.3	5.2
Collected nontimber forest products	26.8	3.2	30.8	4.8
Reduced fire hazard	10.0	2.2	6.4	2.0
Road construction or maintenance	21.3	2.8	10.0	2.4
Trail construction or maintenance	38.9	3.6	29.7	4.3
Improved wildlife habitat	31.0	3.3	23.7	4.0

```
nwos.geo.prog <- nwos.geo %>%
  filter(VARIABLE %in% c("MAN_PLAN", "ADVICE", "TAX", "COST_5YR", "EASE",  "CERT", "CARBON"),
         LEVEL == 1, STATISTIC == "PROPORTION", UNITS %in% c("ACRES", "OWNERSHIPS")) %>%
  group_by(VARIABLE, UNITS) %>%
  summarize(VALUE = sum(VALUE) * 100,
            SE = sqrt(sum(VARIANCE)) * 100,
            .groups = "drop") %>%
  pivot_wider(names_from = c("UNITS"), values_from = c("VALUE", "SE")) %>%
  left_join(ref.prog) %>%
  select("Program" = TABLE_NAME,
         Acres = VALUE_ACRES, SE = SE_ACRES,
         Ownerships = VALUE_OWNERSHIPS, "SE " = SE_OWNERSHIPS)
```

```
## Joining, by = "VARIABLE"
```

```
addtorow <- list()
addtorow$pos <- list(0)
addtorow$command <- c("& \\multicolumn{4}{c}{Percentage} \\\\\n")
print(xtable(nwos.geo.prog, digits = 1), add.to.row = addtorow, include.rownames = F)
```

% latex table generated in R 4.0.3 by xtable 1.8-4 package % Fri Dec 11 17:58:26 2020

Program	Acres	SE	Ownerships	SE
			Percentage	
Advice	47.6	3.7	35.7	4.7
Carbon sequestration programs	0.0	0.0	0.0	0.0
Green certification	8.2	1.5	1.6	0.9
Cost-share programs	9.7	2.0	3.8	1.2
Conservation easements	24.1	3.0	14.4	3.3
Management plan	56.0	3.4	38.1	5.0
Property tax programs	67.1	3.3	45.4	5.3

```
nwos.geo.dem <- nwos.geo %>%
  filter(((VARIABLE == "OWN1_AGE_CAT" & LEVEL %in% c(65, 75)) |
            (VARIABLE == "OWN1_EDU" & LEVEL %in% 5:6) |
            (VARIABLE == "OWN1_GENDER" & LEVEL %in% 1) |
            (VARIABLE == "OWN1_RACE_WHITE" & LEVEL %in% 1)) &
           STATISTIC == "PROPORTION" & UNITS %in% c("ACRES", "OWNERSHIPS")) %>%
  group_by(VARIABLE, UNITS) %>%
```

```
  summarize(VALUE = sum(VALUE) * 100,
            SE = sqrt(sum(VARIANCE)) * 100,
            .groups = "drop") %>%
  pivot_wider(names_from = c("UNITS"), values_from = c("VALUE", "SE")) %>%
  mutate(VARIABLE = recode(VARIABLE,
                           "OWN1_AGE_CAT" = "Age (65+)",
                           "OWN1_EDU" = "Education (College)",
                           "OWN1_GENDER" = "Gender (Male)",
                           "OWN1_RACE_WHITE" = "Race (White)")) %>%
  select("Demographic" = VARIABLE,
         Acres = VALUE_ACRES, SE = SE_ACRES,
         Ownerships = VALUE_OWNERSHIPS, "SE " = SE_OWNERSHIPS)

addtorow <- list()
addtorow$pos <- list(0)
addtorow$command <- c("& \\multicolumn{4}{c}{Percentage} \\\\\n")
print(xtable(nwos.geo.dem, digits = 1), add.to.row = addtorow, include.rownames = F)
```

% latex table generated in R 4.0.3 by xtable 1.8-4 package % Fri Dec 11 17:58:26 2020

Demographic	Acres	SE	Ownerships	SE
			Percentage	
Age (65+)	59.1	4.8	63.4	7.1
Education (College)	64.9	5.0	59.9	7.0
Gender (Male)	81.3	2.8	78.7	4.4
Race (White)	100.0	0.0	100.0	0.0