Citizen\_Science\_Efficacy\_Analysis

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library(readxl)  
library(dplyr)

##   
## Attaching package: 'dplyr'

## The following objects are masked from 'package:stats':  
##   
## filter, lag

## The following objects are masked from 'package:base':  
##   
## intersect, setdiff, setequal, union

library(tidyverse)

## -- Attaching packages ------------------------------------------------- tidyverse 1.2.1 --

## v ggplot2 3.2.1 v readr 1.3.1  
## v tibble 2.1.3 v purrr 0.3.3  
## v tidyr 1.0.0 v stringr 1.4.0  
## v ggplot2 3.2.1 v forcats 0.4.0

## -- Conflicts ---------------------------------------------------- tidyverse\_conflicts() --  
## x dplyr::filter() masks stats::filter()  
## x dplyr::lag() masks stats::lag()

library(forcats)  
library(ggthemes)  
library(plotly)

##   
## Attaching package: 'plotly'

## The following object is masked from 'package:ggplot2':  
##   
## last\_plot

## The following object is masked from 'package:stats':  
##   
## filter

## The following object is masked from 'package:graphics':  
##   
## layout

library(knitr)  
library(naniar)  
library(broom)  
library(gridExtra)

##   
## Attaching package: 'gridExtra'

## The following object is masked from 'package:dplyr':  
##   
## combine

library(zoo)

##   
## Attaching package: 'zoo'

## The following objects are masked from 'package:base':  
##   
## as.Date, as.Date.numeric

library(ggpubr)

## Loading required package: magrittr

##   
## Attaching package: 'magrittr'

## The following object is masked from 'package:purrr':  
##   
## set\_names

## The following object is masked from 'package:tidyr':  
##   
## extract

WQ\_clean\_data <- readRDS("../../data/processed\_data/processeddata.rds")  
  
glimpse(WQ\_clean\_data)

## Observations: 522  
## Variables: 15  
## $ Month <chr> "01", "02", "02", "02", "02", "02", "02", "02...  
## $ Day <chr> "08", "08", "08", "08", "09", "09", "09", "12...  
## $ Year <chr> "16", "16", "16", "16", "16", "16", "16", "16...  
## $ military\_time <dbl> 1415, 1515, 1550, 1555, 1001, 1015, 1022, 103...  
## $ location <chr> "Boat Ramp", "Grecian Dry Rocks", "Grecian Dr...  
## $ instructor\_name <chr> "Katy, Sarah, Driver", "Chelsea", "Katy, Tomm...  
## $ group\_name <chr> "NA", "McLean High School", "McLean High Scho...  
## $ ph <dbl> 8.0, 8.4, 8.2, 8.4, 8.0, 8.0, 8.0, 8.0, 8.4, ...  
## $ ammonia <dbl> 0.00, 0.00, 0.00, 0.00, 0.25, 0.00, 0.00, 0.0...  
## $ dissolved\_oxygen <dbl> 5.0, 4.0, 4.0, 6.0, 8.0, 4.0, 5.0, 6.0, 6.0, ...  
## $ water\_temp <dbl> NA, 23.5, 21.0, 36.0, 18.0, 18.0, 18.0, 18.3,...  
## $ salinity <dbl> 36, 40, 44, 35, 33, 30, 33, 35, 40, 30, 35, 2...  
## $ equipment <chr> "kit", "kit", "kit", "kit", "kit", "kit", "ki...  
## $ island\_side <chr> "ocean", "ocean", "ocean", "ocean", NA, "bay"...  
## $ site\_type <chr> "Seagrass/Mangrove", "Coral Reef", "Coral Ree...

fknms\_data\_raw <- readxl::read\_excel("../../data/raw\_data/FKNMS\_WQ\_raw.xlsx")

## New names:  
## \* YEAR -> YEAR...8  
## \* YEAR -> YEAR...19  
## \* `` -> ...65  
## \* `` -> ...66  
## \* `` -> ...67  
## \* ... and 32 more problems

glimpse(fknms\_data\_raw)

## Observations: 13,427  
## Variables: 99  
## $ `Survey No.` <dbl> 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15...  
## $ DATE <chr> "34787", "34905", "35038", "35137", "35285", "354...  
## $ TIME <chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, "...  
## $ STA <dbl> 200, 200, 200, 200, 200, 200, 200, 200, 200, 200,...  
## $ SITE <chr> "Fowey Rocks", "Fowey Rocks", "Fowey Rocks", "Fow...  
## $ LATDEC <dbl> 25.59, 25.59, 25.59, 25.59, 25.59, 25.59, 25.59, ...  
## $ LONDEC <dbl> -80.1, -80.1, -80.1, -80.1, -80.1, -80.1, -80.1, ...  
## $ YEAR...8 <dbl> 1995.237, 1995.560, 1995.924, 1996.195, 1996.600,...  
## $ DEPTH <dbl> 5.5, 5.5, 5.5, 5.5, 5.5, 5.5, 5.5, 5.5, 5.5, 5.5,...  
## $ ZONE <chr> "KR", "KR", "KR", "KR", "KR", "KR", "KR", "KR", "...  
## $ SEG <dbl> 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9...  
## $ CLUST <dbl> 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3...  
## $ ZONE5 <chr> "REEF", "REEF", "REEF", "REEF", "REEF", "REEF", "...  
## $ ZONE6 <chr> "REEF", "REEF", "REEF", "REEF", "REEF", "REEF", "...  
## $ ZSEG <chr> "9-Reef", "9-Reef", "9-Reef", "9-Reef", "9-Reef",...  
## $ TRAN <chr> "BISC", "BISC", "BISC", "BISC", "BISC", "BISC", "...  
## $ NMILE <dbl> 3.5, 3.5, 3.5, 3.5, 3.5, 3.5, 3.5, 3.5, 3.5, 3.5,...  
## $ QUART <dbl> 2, 3, 4, 2, 3, 4, 1, 2, 3, 4, 1, 2, 3, 4, 1, 2, 3...  
## $ YEAR...19 <dbl> 1995, 1995, 1995, 1996, 1996, 1996, 1997, 1997, 1...  
## $ `YR-QT` <chr> "1995-02", "1995-03", "1995-04", "1996-02", "1996...  
## $ `NOX-S` <dbl> 0.07750000, 0.04500000, 0.12250000, 0.01750000, 0...  
## $ `NOX-B` <dbl> NA, NA, NA, NA, 0.0200000, 0.0400000, 0.0675000, ...  
## $ `NO3-S` <dbl> 0.0200000000, NA, 0.0975000000, NA, NA, NA, 0.045...  
## $ `NO3-B` <dbl> NA, NA, NA, NA, NA, NA, NA, NA, 0.3600000, 0.0725...  
## $ `NO2-S` <dbl> 0.060000000, 0.045000000, 0.025000000, 0.01750000...  
## $ `NO2-B` <dbl> NA, NA, NA, NA, 0.0200000, 0.0400000, 0.0675000, ...  
## $ `NH4-S` <dbl> 0.2750000, 0.2750000, 0.2025000, 0.1350000, 0.122...  
## $ `NH4-B` <dbl> NA, NA, NA, NA, 0.0875000, 0.1825000, 0.2475000, ...  
## $ `TN-S` <dbl> 15.376079, 13.629270, 9.591759, 8.267623, 7.73550...  
## $ `TN-B` <dbl> NA, NA, NA, NA, 7.047500, 13.374286, 9.620859, 8....  
## $ `DIN-S` <dbl> 0.3525000, 0.3200000, 0.3250000, 0.1525000, 0.132...  
## $ `DIN-B` <dbl> NA, NA, NA, NA, 0.1075000, 0.2225000, 0.3150000, ...  
## $ `TON-S` <dbl> 15.023579, 13.309270, 9.266759, 8.115123, 7.60300...  
## $ `TON-B` <dbl> NA, NA, NA, NA, 6.940000, 13.151786, 9.305859, 8....  
## $ `TP-S` <dbl> 0.16250400, 0.17500431, 0.12250301, 0.10500258, 0...  
## $ `TP-B` <dbl> NA, NA, NA, NA, 0.13250326, 0.14500357, 0.1375033...  
## $ `SRP-S` <dbl> 0.012500308, 0.005000123, 0.002500062, NA, 0.0250...  
## $ `SRP-B` <dbl> NA, NA, NA, NA, 0.030000738, 0.017500431, NA, 0.0...  
## $ `APA-S` <dbl> 0.05512535, 0.07380222, 0.01104704, 0.03809723, 0...  
## $ `APA-B` <dbl> NA, NA, NA, NA, 0.04030000, 0.02220000, 0.0300000...  
## $ `CHLA-S` <dbl> 0.47805942, 0.06348215, 0.28286095, 0.24701600, 0...  
## $ `CHLA-B` <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N...  
## $ `TOC-S` <dbl> 313.3125, 227.0000, 135.4583, 129.5625, 158.6042,...  
## $ `TOC-B` <dbl> NA, NA, NA, NA, 165.2083, 189.7083, 234.9167, 267...  
## $ `SiO2-S` <dbl> NA, NA, NA, NA, 0.4572, 0.1498, 0.0675, 0.6825, 0...  
## $ `SiO2-B` <dbl> NA, NA, NA, NA, 0.457200000, 0.224700000, 0.06750...  
## $ `TURB-S` <dbl> 1.400, 0.600, 0.600, 0.300, 0.265, 0.150, 0.470, ...  
## $ `TURB-B` <dbl> NA, NA, NA, NA, 0.175, 0.310, 0.300, 0.100, 0.450...  
## $ `SAL-S` <dbl> 35.5000, 35.4000, 36.2000, 36.1000, 36.0000, 36.2...  
## $ `SAL-B` <dbl> 35.5000, 35.4000, 36.2000, 36.1000, NA, 36.2000, ...  
## $ `TEMP-S` <dbl> 23.6000, 30.3000, 25.6000, 23.3000, 31.0000, 24.8...  
## $ `TEMP-B` <dbl> 23.6000, 30.3000, 25.6000, 23.3000, NA, 24.3000, ...  
## $ `DO-S` <dbl> 7.00000, 6.40000, 6.70000, 6.80000, 6.25000, 5.90...  
## $ `DO-B` <dbl> 7.00000, 6.40000, 6.70000, 6.80000, NA, 6.10000, ...  
## $ Kd <chr> NA, NA, NA, NA, NA, "2.087E-2", NA, "0.245", "0.3...  
## $ pH <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N...  
## $ `TN:TP` <dbl> 94.622024, 77.881544, 78.300073, 78.739269, 73.67...  
## $ `N:P` <dbl> 28.200000, 64.000000, 130.000000, NA, 5.300000, 4...  
## $ `DIN:TP` <dbl> 2.1692310, 1.8285714, 2.6530612, 1.4523810, 1.261...  
## $ `%SAT-S` <dbl> 71.32471, 97.92023, 98.99452, 97.89006, 96.42675,...  
## $ `%SAT-B` <dbl> 71.37029, 97.92023, 98.99452, 97.89006, NA, 88.88...  
## $ `%Io` <dbl> NA, NA, NA, NA, NA, 86.40799325, NA, 15.92149664,...  
## $ DSIGT <dbl> NA, NA, NA, NA, NA, 0.17044700, 0.07463620, 0.308...  
## $ `Si:DIN` <dbl> NA, NA, NA, 0.000000000, 3.450566038, 0.495206612...  
## $ ...65 <lgl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N...  
## $ ...66 <lgl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N...  
## $ ...67 <lgl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N...  
## $ ...68 <lgl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N...  
## $ ...69 <lgl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N...  
## $ ...70 <lgl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N...  
## $ ...71 <lgl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N...  
## $ ...72 <lgl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N...  
## $ ...73 <lgl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N...  
## $ ...74 <lgl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N...  
## $ ...75 <lgl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N...  
## $ ...76 <lgl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N...  
## $ ...77 <lgl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N...  
## $ ...78 <lgl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N...  
## $ ...79 <lgl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N...  
## $ ...80 <lgl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N...  
## $ ...81 <lgl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N...  
## $ ...82 <lgl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N...  
## $ ...83 <lgl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N...  
## $ ...84 <lgl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N...  
## $ ...85 <lgl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N...  
## $ ...86 <lgl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N...  
## $ ...87 <lgl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N...  
## $ ...88 <lgl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N...  
## $ ...89 <lgl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N...  
## $ ...90 <lgl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N...  
## $ ...91 <lgl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N...  
## $ ...92 <lgl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N...  
## $ ...93 <lgl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N...  
## $ ...94 <lgl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N...  
## $ ...95 <lgl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N...  
## $ ...96 <lgl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N...  
## $ ...97 <lgl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N...  
## $ ...98 <lgl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N...  
## $ ...99 <lgl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N...

This data set is in need to some serious cleaning, luckily to compare to our citizen science data we only need a small porition of these variables. We will remove variables then take a closer look at cleaning criteria.

fknms\_reduce\_vars <- fknms\_data\_raw %>% dplyr::select(SITE, `NH4-S`, `TEMP-S`, `DO-S`, `SAL-S`)  
  
#We will rename these to match our predictors in the citizen science dataset.  
fknms\_rename <- fknms\_reduce\_vars %>% rename(location = SITE,   
 water\_temp = `TEMP-S`,  
 ammonia = `NH4-S`,  
 dissolved\_oxygen = `DO-S`,  
 salinity = `SAL-S`)  
  
unique(fknms\_rename$location)

## [1] "Fowey Rocks"   
## [2] "Sands Key"   
## [3] "Bowles Bank"   
## [4] "Triumph Reef"   
## [5] "Elliott Key"   
## [6] "Margo Fish Shoal"   
## [7] "Ajax Reef"   
## [8] "Old Rhodes Key"   
## [9] "Old Rhodes Key Channel"   
## [10] "Channel Key"   
## [11] "Old Rhodes Key Reef"   
## [12] "Pennikamp G27"   
## [13] "Turtle Harbor"   
## [14] "Turtle Reef"   
## [15] "Port Elizabeth"   
## [16] "Carysfort Channel"   
## [17] "Carysfort Reef"   
## [18] "Rattlesnake Key"   
## [19] "White Bank"   
## [20] "The Elbow"   
## [21] "Radabob Key"   
## [22] "Radabob Key Channel"   
## [23] "Dixie Shoal"   
## [24] "Mosquito Bank"   
## [25] "Molasses Reef Channel"   
## [26] "Molasses Reef"   
## [27] "Tavernier Harbor"   
## [28] "Triangles"   
## [29] "Conch Reef"   
## [30] "Plantation Point"   
## [31] "The Rocks"   
## [32] "Davis Reef"   
## [33] "Upper Matecumbe Key"   
## [34] "Upper MateCumbe Chnl"   
## [35] "Fish Haven"   
## [36] "Lower Matecumbe Key"   
## [37] "Alligator Shoal"   
## [38] "Alligator Reef"   
## [39] "Matecumbe Harbor"   
## [40] "Lower Matecumbe Chnl"   
## [41] "Matecumbe Offshore"   
## [42] "Long Key"   
## [43] "Long Key Channel"   
## [44] "Tennessee Reef"   
## [45] "Long Key Pass Inshore"   
## [46] "Long Key Pass Channel"   
## [47] "Long Key Pass Offshore"   
## [48] "Key Colony Beach"   
## [49] "Coffins Patch Channel"   
## [50] "Coffins Patch Offshore"   
## [51] "Seven Mile Bridge"   
## [52] "Seven Mile Br. Channel"   
## [53] "Sombrero Key"   
## [54] "Spanish Harbor Keys"   
## [55] "Bahia Honda Key"   
## [56] "Bahia Honda Channel"   
## [57] "Bahia Honda Offshore"   
## [58] "Long Beach"   
## [59] "Big Pine Channel"   
## [60] "Big Pine Shoal"   
## [61] "Newfound Harbor Keys"   
## [62] "American Shoal Channel"   
## [63] "Looe Key Channel"   
## [64] "Looe Key"   
## [65] "Aquarius"   
## [66] NA   
## [67] "Tarpon Creek"   
## [68] "American Shoal"   
## [69] "Saddlebunch Keys"   
## [70] "West Washerwoman"   
## [71] "Maryland Shoal"   
## [72] "Boca Chica Key"   
## [73] "Eastern Sambo"   
## [74] "Eastern Sambo Offshore"   
## [75] "Boca Chica Channel"   
## [76] "Boca Chica Mid"   
## [77] "Western Sambo"   
## [78] "Key West Cut A"   
## [79] "Western Head"   
## [80] "Main Ship Channel"   
## [81] "Eastern Dry Rocks"   
## [82] "Middle Ground"   
## [83] "Arsenic Bank"   
## [84] "Tripod Bank"   
## [85] "Channel Key Pass"   
## [86] "Toms Harbor Cut"   
## [87] "Bamboo Banks"   
## [88] "Bamboo Key"   
## [89] "Bluefish Bank"   
## [90] "Bullard Bank"   
## [91] "John Sawyer Bank"   
## [92] "Bethel Bank"   
## [93] "Red Bay Bank"   
## [94] "Bullfrog Banks"   
## [95] "W. Bahia Honda Key"   
## [96] "Coconut Key"   
## [97] "Harbor Key Bank"   
## [98] "Bogie Channel"   
## [99] "Little Pine Key"   
## [100] "Cutoe Key"   
## [101] "Content Passage"   
## [102] "Pine Channel"   
## [103] "Toptree Hammock Chan."   
## [104] "Cudjoe Key"   
## [105] "Johnson Key Channel"   
## [106] "Tarpon Belly Keys"   
## [107] "Kemp Channel"   
## [108] "Marvin Key Channel"   
## [109] "Snipe Keys"   
## [110] "Shark Key"   
## [111] "E. Harbor Key Channel"   
## [112] "Lower Harbor Keys"   
## [113] "Bluefish Channel"   
## [114] "Calda Channel"   
## [115] "Man of War Harbor"   
## [116] "Garrison Bight"   
## [117] "KW Northwest Channel"   
## [118] "N Boca Grande Channel"   
## [119] "Loggerhead Marker"   
## [120] "Loggerhead Channel"   
## [121] "Satan Shoal"   
## [122] "Ellis Rock"   
## [123] "SE Marquesas"   
## [124] "N Quicksands"   
## [125] "Marquesas Rock"   
## [126] "New Ground"   
## [127] "S Quicksands"   
## [128] "Half Moon Shoal"   
## [129] "Rebecca Shoal"   
## [130] "Garden Key"   
## [131] "Northwest Channel"   
## [132] "NE DTNP"   
## [133] "N DTNP"   
## [134] "Southeast Channel"   
## [135] "W DTNP"   
## [136] "Loggerhead Offshore"   
## [137] "Hospital Key"   
## [138] "Logerhead Inshore"   
## [139] "Grecian Rocks"   
## [140] "White Shoal"   
## [141] "Lake Largo Canal, Key Largo"   
## [142] "Calusa Park Marina, Key Largo"   
## [143] "Priv. Docks, Upper Matacumbe"   
## [144] "Blackwood Dr. boat ramp, Islamorada"   
## [145] "100th St. Canal, Marathon"   
## [146] "Hidden Harbor Beach, Marathon"   
## [147] "Newfound Harbor Channel, Little Torch"  
## [148] "Doctor's Arm, Big Pine Key"   
## [149] "Marriot Beachside, Key West"   
## [150] "Key West International Airport"

Unfortunately it looks like the data did not collect pH regularly so to avoid 1000+ NA values we will have to exclude pH from our comparison.

Now we can clean some of these. We are only interested in samples from sites that overlab with our citizen science data so we will select for thos samples.

fknms\_1 <- fknms\_rename[fknms\_rename$location == "Pennikamp G27", ]  
fknms\_2 <- fknms\_rename[fknms\_rename$location == "Rattlesnake Key", ]  
fknms\_3 <- fknms\_rename[fknms\_rename$location == "Radabob Key", ]  
fknms\_4 <- fknms\_rename[fknms\_rename$location == "Mosquito Bank", ]  
fknms\_5 <- fknms\_rename[fknms\_rename$location == "Molasses Reef", ]  
fknms\_6 <- fknms\_rename[fknms\_rename$location == "Tarpon Creek", ]  
fknms\_7 <- fknms\_rename[fknms\_rename$location == "Bogie Channel", ]  
fknms\_8 <- fknms\_rename[fknms\_rename$location == "Grecian Rocks", ]  
  
fknms\_total <- rbind(fknms\_1, fknms\_2, fknms\_3, fknms\_4, fknms\_5, fknms\_6, fknms\_7, fknms\_8)  
  
fknms\_na\_drop <- na.omit(fknms\_total)

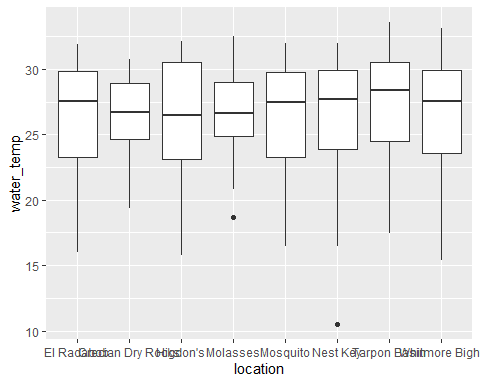
Now we are looking more compareable. The next step is to recode the FKNMS sites with the correcponding site names from the citizen science data (there are many synonyms).

fknms\_fix\_names <- fknms\_na\_drop %>% mutate(location = recode(location,   
 "Pennikamp G27" = "Higdon's",  
 "Rattlesnake Key" = "Whitmore Bight",  
 "Mosquito Bank" = "Mosquito",  
 "Molasses Reef" = "Molasses",  
 "Tarpon Creek" = "Tarpon Basin",  
 "Bogie Channel" = "Nest Key",  
 "Grecian Rocks" = "Grecian Dry Rocks",  
 "Radabob Key" = "El Radabob"))

cs\_1 <- WQ\_clean\_data[WQ\_clean\_data$location == "Grecian Dry Rocks", ]  
cs\_2 <- WQ\_clean\_data[WQ\_clean\_data$location == "Higdon's", ]  
cs\_3 <- WQ\_clean\_data[WQ\_clean\_data$location == "Mosquito", ]  
cs\_4 <- WQ\_clean\_data[WQ\_clean\_data$location == "Molasses", ]  
cs\_5 <- WQ\_clean\_data[WQ\_clean\_data$location == "Tarpon Basin", ]  
cs\_6 <- WQ\_clean\_data[WQ\_clean\_data$location == "Nest Key", ]  
cs\_7 <- WQ\_clean\_data[WQ\_clean\_data$location == "Whitmore Bight", ]  
cs\_8 <- WQ\_clean\_data[WQ\_clean\_data$location == "El Radabob", ]  
  
cs\_total <- rbind(cs\_1, cs\_2, cs\_3, cs\_4, cs\_5, cs\_6, cs\_7, cs\_8)

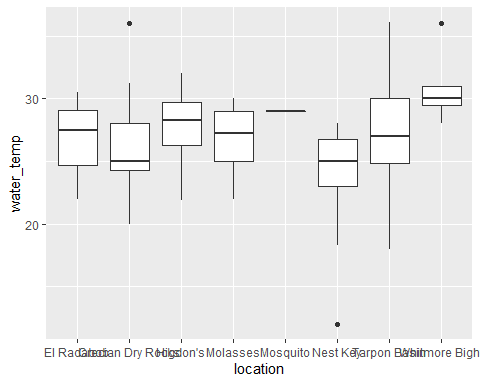
Lets take a look at some plots now.

water\_temp\_fknms <- ggplot(fknms\_fix\_names, aes(x = location, y = water\_temp)) + geom\_boxplot()   
  
water\_temp\_fknms

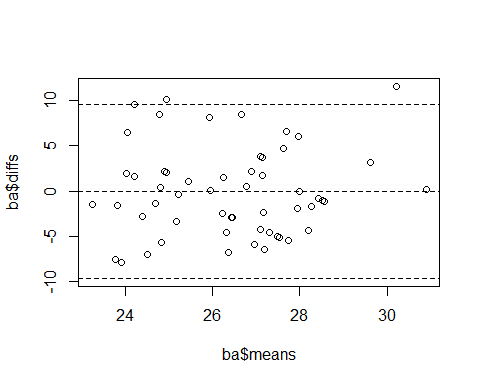


water\_temp\_cs <- ggplot(cs\_total, aes(x = location, y = water\_temp)) + geom\_boxplot()   
  
water\_temp\_cs

## Warning: Removed 2 rows containing non-finite values (stat\_boxplot).

 TO DO Make Better Comparison Plots

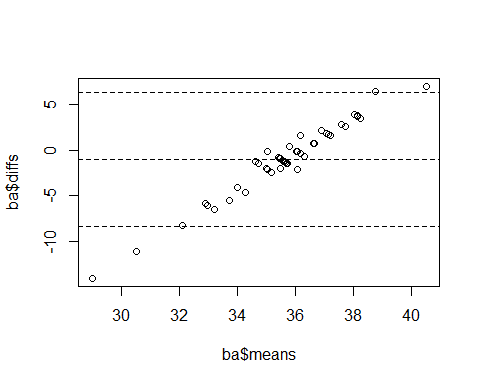
set.seed(4444)  
x <- subset(cs\_total, location == "Grecian Dry Rocks")  
  
x <- x[sample(nrow(x), 56), ] # Bland-Altman requires the same number of inputs to compare so we will randomly sample the larger data set (in this case citizen science) to match the max samples from the smaller data set.  
  
xx <- x$water\_temp  
  
  
  
y <- subset(fknms\_fix\_names, location == "Grecian Dry Rocks")  
yy <- y$water\_temp  
  
library(BlandAltmanLeh)  
  
bland.altman.plot(xx, yy, two = 1.96)



## NULL

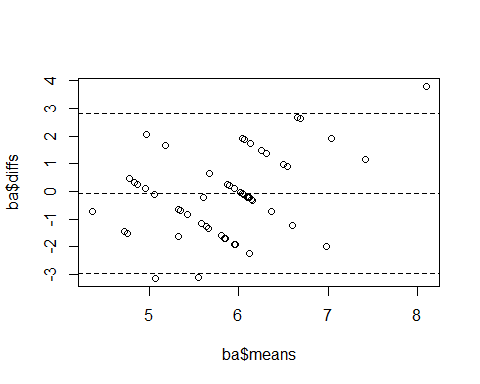
It looks like our citizen science and sanctuary data agree with on water temperature at Grecian Dry Rocks.

set.seed(4444)  
x <- x[sample(nrow(x), 56), ]   
xx <- x$salinity  
yy <- y$salinity  
bland.altman.plot(xx, yy, two = 1.96)



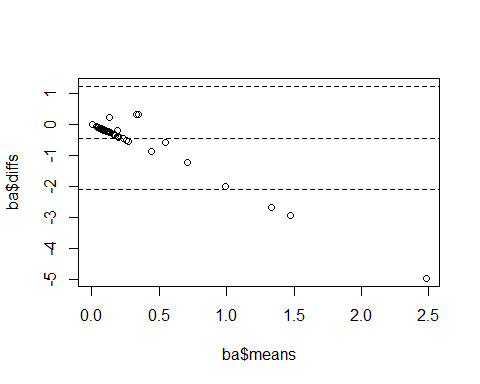
## NULL

set.seed(4444)  
x <- x[sample(nrow(x), 56), ]   
xx <- x$dissolved\_oxygen  
yy <- y$dissolved\_oxygen  
bland.altman.plot(xx, yy, two = 1.96)



## NULL

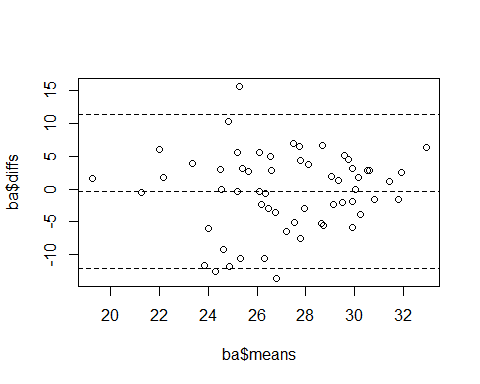
set.seed(4444)  
x <- x[sample(nrow(x), 56), ]   
xx <- x$ammonia  
yy <- y$ammonia  
bland.altman.plot(xx, yy, two = 1.96)



## NULL

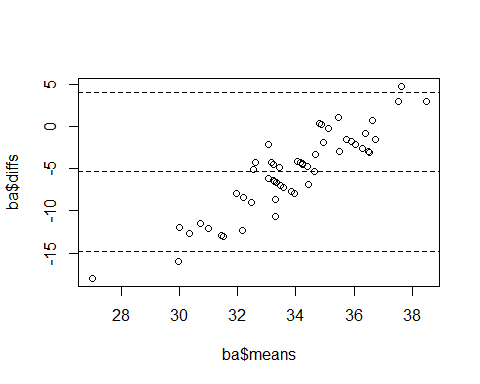
Lets take a look at Tarpon Basin Also

set.seed(4444)  
x <- subset(cs\_total, location == "Tarpon Basin")  
  
x <- x[sample(nrow(x), 59), ]   
  
xx <- x$water\_temp  
  
  
  
y <- subset(fknms\_fix\_names, location == "Tarpon Basin")  
yy <- y$water\_temp  
  
  
bland.altman.plot(xx, yy, two = 1.96)



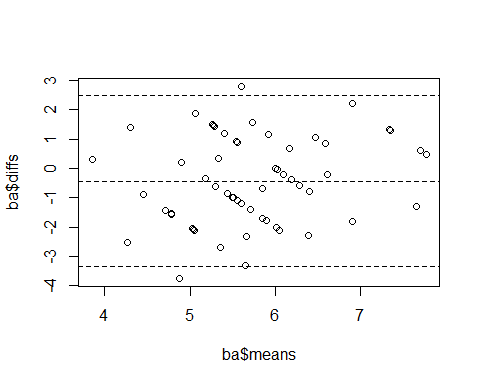
## NULL

set.seed(4444)  
x <- x[sample(nrow(x), 59), ]   
  
xx <- x$salinity  
  
yy <- y$salinity  
  
  
bland.altman.plot(xx, yy, two = 1.96)



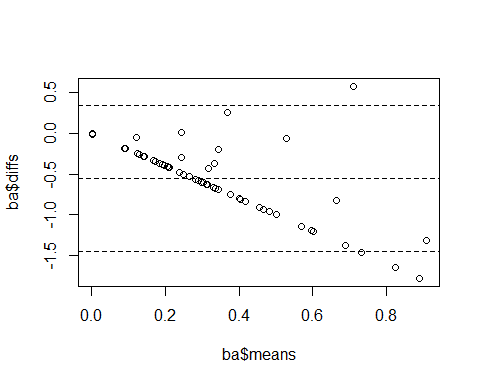
## NULL

set.seed(4444)  
x <- x[sample(nrow(x), 59), ]   
xx <- x$dissolved\_oxygen  
yy <- y$dissolved\_oxygen  
  
bland.altman.plot(xx, yy, two = 1.96)



## NULL

set.seed(4444)  
x <- x[sample(nrow(x), 59), ]   
xx <- x$ammonia  
yy <- y$ammonia  
  
bland.altman.plot(xx, yy, two = 1.96)



## NULL