INSTREAM reductions
Delta F.A.R.M.

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Contents

TURBIDITY

Harris Bayou

Historical Harris Bayou sites

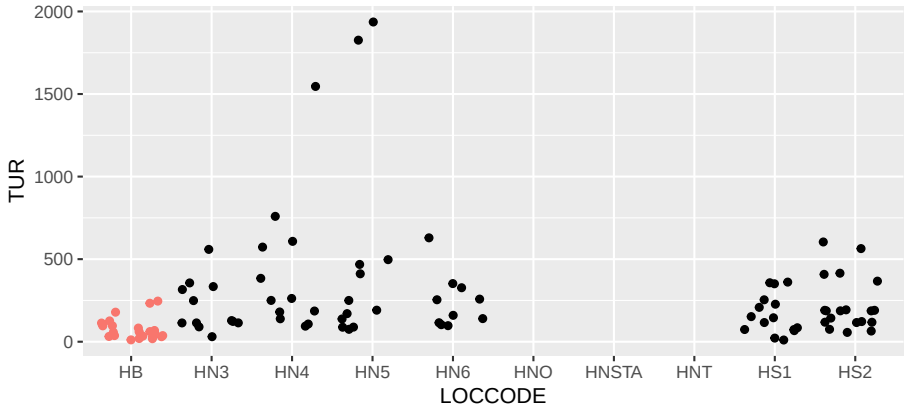
```
##    n    Mean Median
## 1 80 287.475    187
```

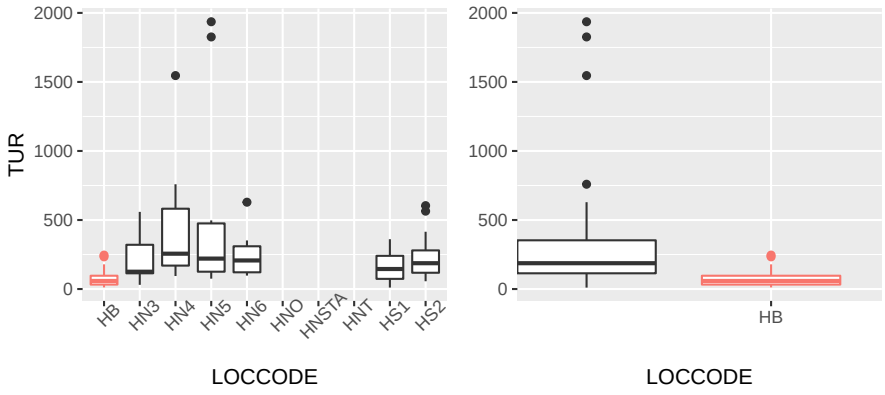
Data from Harris Bayou site associated with the original Delta FARM project

```
##    n     Mean Median
## 1 22 78.37273  58.55
```

Plot the data points.

Red is our recent data.





Test for a difference in means

```
wilcox.test(y= oldharris$TUR, x= instreamdata[instreamdata$LOCCODE == "HB", "TUR"],
            alternative = "less")
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  instreamdata[instreamdata$LOCCODE == "HB", "TUR"] and oldharris$TUR
## W = 260, p-value = 2.322e-07
## alternative hypothesis: true location shift is less than 0
```

Small P-value here indicates that we can reject the null hypothesis that the difference is not less than zero and conclude, at a %95 confidence level, that the values of our recent data is in fact lower than the historical data.

Percent reduction in the median value

```
x <- median(oldharris$TUR, na.rm= TRUE)
y <- median(instreamdata[instreamdata$LOCCODE == "HB", "TUR"])
(y-x)/x * 100
```

```
## [1] -68.68984
```

Here we would use median values because there are outliers and apparent skewness from the boxplot. The mean reduction is even greater (%72). Negative value represents a dcrease relative to the historical data.

Porter Bayou

Historical Porter Bayou sites

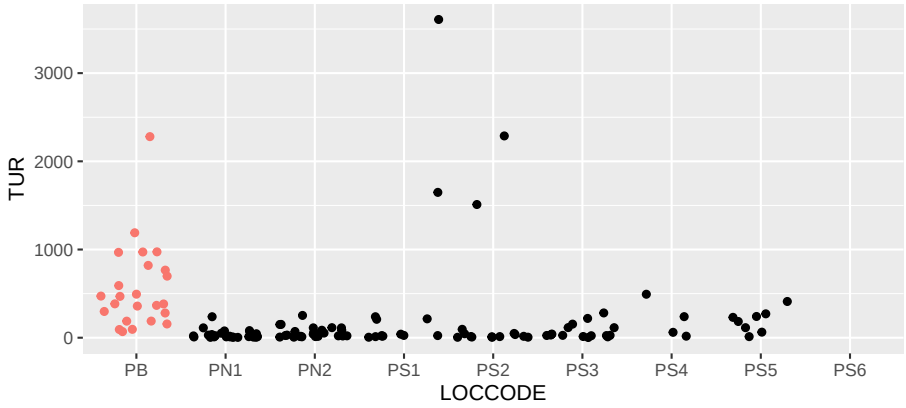
```
##     n     Mean Median
## 1 107 150.7751   27.2
```

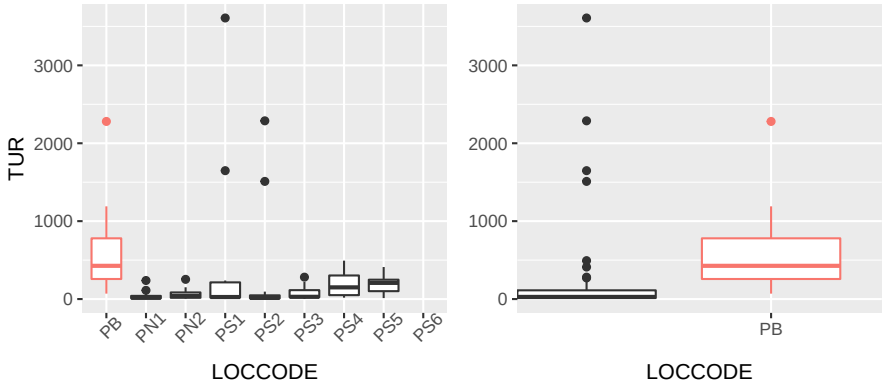
Data from Porter Bayou site associated with the original Delta FARM project

```
##    n     Mean Median
## 1 24 564.8042  426.5
```

Plot the data points.

Red is our recent data.





Test for a difference in means

```
wilcox.test(y= oldporter$TUR, x= instreamdata[instreamdata$LOCCODE == "PB", "TUR"],
            alternative = "greater")
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  instreamdata[instreamdata$LOCCODE == "PB", "TUR"] and oldporter$TUR
## W = 2339, p-value = 1.757e-10
## alternative hypothesis: true location shift is greater than 0
```

Small P-value here indicates that we can reject the null hypothesis that the difference is not greater than zero and conclude, at a %95 confidence level, that the values of our recent data is in fact higher than the historical data.
H_0 : old data $\geq$ new data
H_a : old data $<$ new data

Percent reduction in the median value

```
x <- median(oldporter$TUR, na.rm= TRUE)
y <- median(instreamdata[instreamdata$LOCCODE == "PB", "TUR"])
(y-x)/x * 100
```

```
## [1] 1468.015
```

Here we would use median values because there are outliers and apparent skewness from the boxplot. Postive values represents a relative increase. This relative change can range from (-) 100% decrease to (+) infinite increase.

TOTAL SUSPENDED SOLIDS

Harris Bayou

Historical Harris Bayou sites

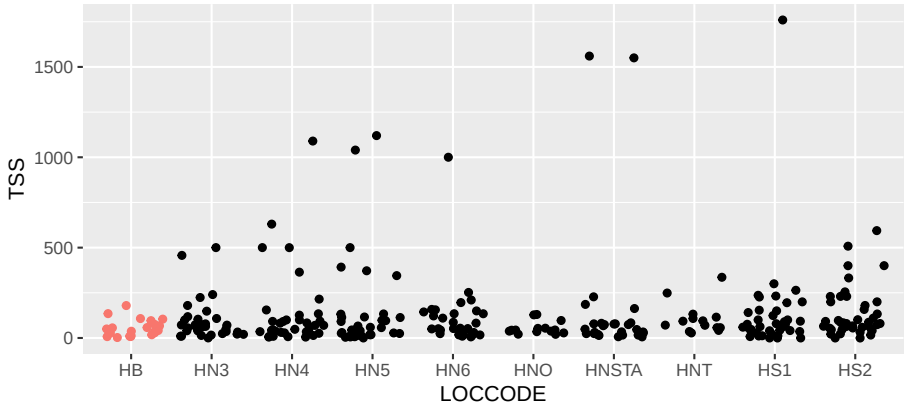
```
##     n     Mean Median
## 1 267 129.5443     67
```

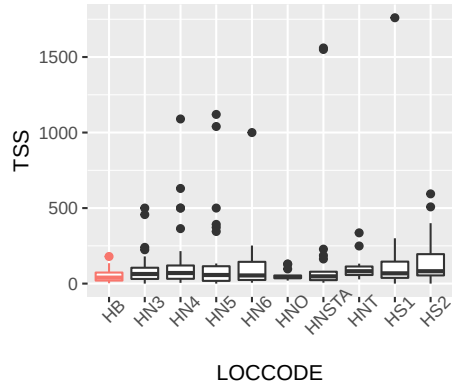
Data from Harris Bayou site associated with the original Delta FARM project

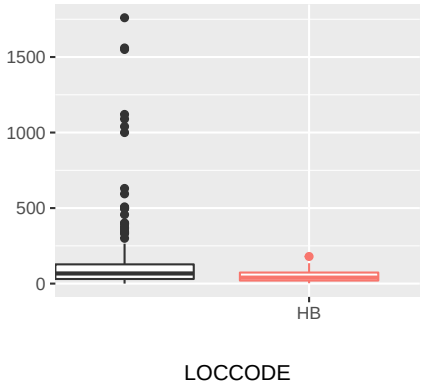
```
##    n     Mean Median
## 1 22 53.77727   39.4
```

Plot the data points.

Red is our recent data.







Test for a difference in means

```
wilcox.test(y= oldharris$TSS, x= instreamdata[instreamdata$LOCCODE == "HB", "TSS"],
            alternative = "less")
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  instreamdata[instreamdata$LOCCODE == "HB", "TSS"] and oldharris$TSS
## W = 2169.5, p-value = 0.02088
## alternative hypothesis: true location shift is less than 0
```

P-value of less than alpha = 0.05 means we can conclude the alternative hypothesis. H_a : our recent samples had less total suspended solids than our historical observations

Percent reduction in the median value

```
x <- median(oldharris$TSS, na.rm= TRUE)
y <- median(instreamdata[instreamdata$LOCCODE == "HB", "TSS"])
(y-x)/x * 100
```

```
## [1] -41.19403
```

Porter Bayou

Historical Porter Bayou sites

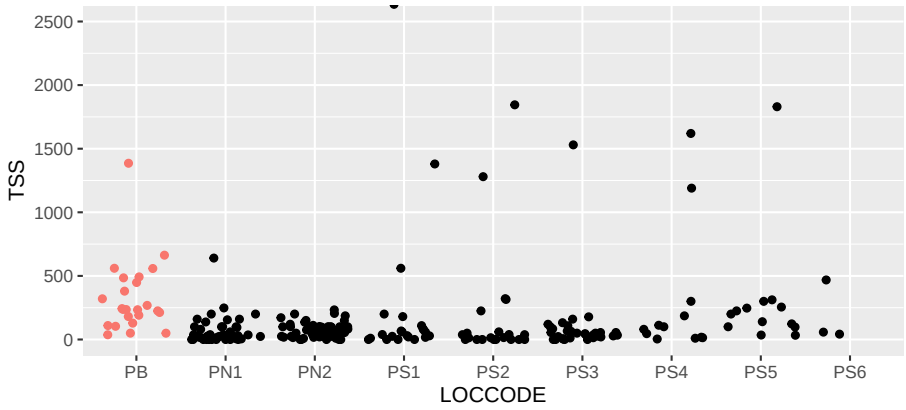
```
##     n     Mean Median
## 1 214 293.7352     42
```

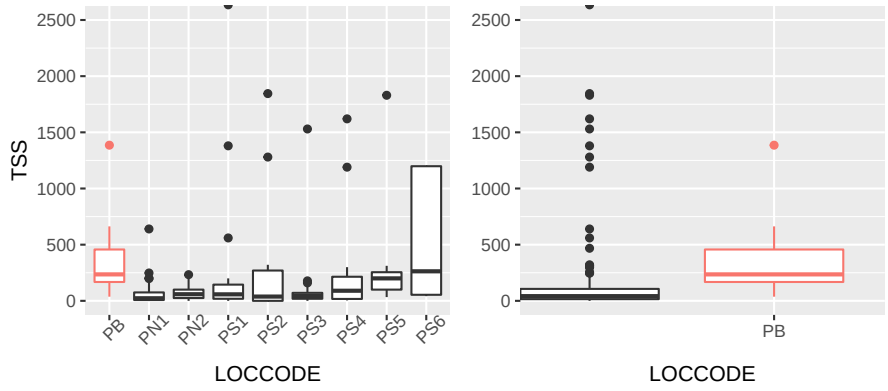
Data from Porter Bayou site associated with the original Delta FARM project

```
##    n     Mean Median
## 1 24 324.8958 235.65
```

Plot the data points.

Red is our recent data.





* some outliers clipped from visualization

Test for a difference in means

```
wilcox.test(y= oldporter$TSS, x= instreamdata[instreamdata$LOCCODE == "PB", "TSS"],
            alternative = "greater")
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  instreamdata[instreamdata$LOCCODE == "PB", "TSS"] and oldporter$TSS
## W = 4312.5, p-value = 2.387e-08
## alternative hypothesis: true location shift is greater than 0
```

H_a : new data is greater than the old data The test lends statistical significance to old porter bayou data values being less than what we recently collected.

Percent reduction in the median value

```
x <- median(oldporter$TSS, na.rm= TRUE)
y <- median(instreamdata[instreamdata$LOCCODE == "PB", "TSS"])
(y-x)/x * 100
```

```
## [1] 461.0714
```

This positive number represents a four fold increase from values formerly observed in porter bayou.

TOTAL NITROGEN

Harris Bayou

Historical Harris Bayou sites

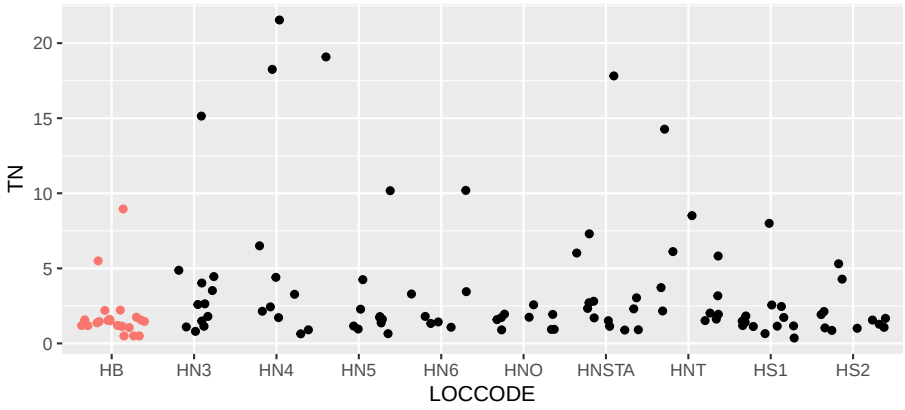
```
##    n     Mean Median
## 1 97 3.462268   1.83
```

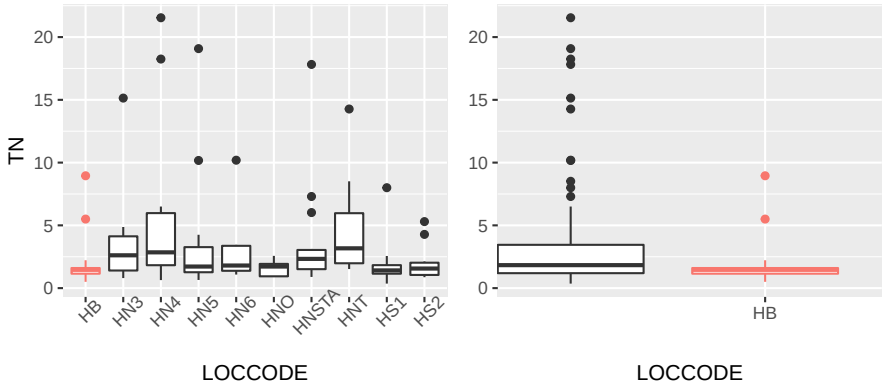
Data from Harris Bayou site associated with the original Delta FARM project

```
##    n     Mean Median
## 1 22 1.867727  1.455
```

Plot the data points.

Red is our recent data.





Test for a difference in means

```
wilcox.test(y= oldharris$TN, x= instreamdata[instreamdata$LOCCODE == "HB", "TN"],
            alternative = "less")
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  instreamdata[instreamdata$LOCCODE == "HB", "TN"] and oldharris$TN
## W = 721.5, p-value = 0.009093
## alternative hypothesis: true location shift is less than 0
```

P-value $< \alpha = 0.05$: reject null that old values are $\leq$ new observations.
Ha: new observations $<$ old observations.

Percent reduction in the median value

```
x <- median(oldharris$TN, na.rm= TRUE)
y <- median(instreamdata[instreamdata$LOCCODE == "HB", "TN"])
(y-x)/x * 100
```

```
## [1] -20.4918
```

Negative value here represents a twenty percent reduction over the historical observations.

Porter Bayou

Historical Porter Bayou sites

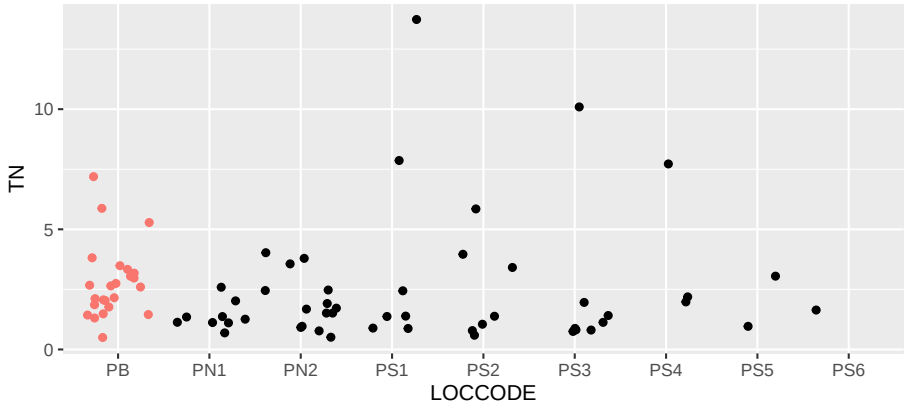
```
##    n     Mean Median
## 1 51 2.380196   1.41
```

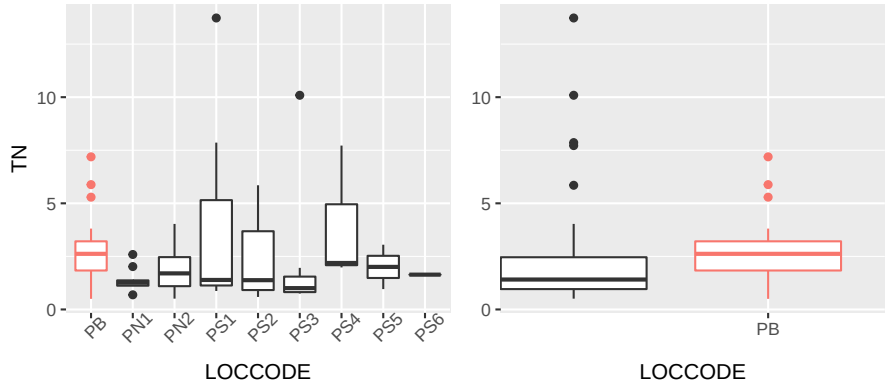
Data from Porter Bayou site associated with the original Delta FARM project

```
##    n     Mean Median
## 1 24 2.791667   2.62
```

Plot the data points.

Red is our recent data.





Test for a difference in means

```
wilcox.test(y= oldporter$TN, x= instreamdata[instreamdata$LOCCODE == "PB", "TN"],
            alternative = "greater")
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  instreamdata[instreamdata$LOCCODE == "PB", "TN"] and oldporter$TN
## W = 848.5, p-value = 0.003675
## alternative hypothesis: true location shift is greater than 0
```

Reject null hypothesis that porter bayou TN concentrations are $\leq$ old observations. H_a : new observations are greater than old ones.

Percent reduction in the median value

```
x <- median(oldporter$TN, na.rm= TRUE)
y <- median(instreamdata[instreamdata$LOCCODE == "PB", "TN"])
(y-x)/x * 100
```

```
## [1] 85.8156
```

This postive value represents an ncrease from the historical observations.