

# pH\_HOBO\_plots

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## Table of contents

0.1	Set up workspace . . . . .	1
0.1.1	Dennis . . . . .	1
0.1.2	Ptown . . . . .	11
0.1.3	Eel Pond . . . . .	42
0.2	Combine . . . . .	70
0.2.1	Plot tides . . . . .	72

## 0.1 Set up workspace

### 0.1.1 Dennis

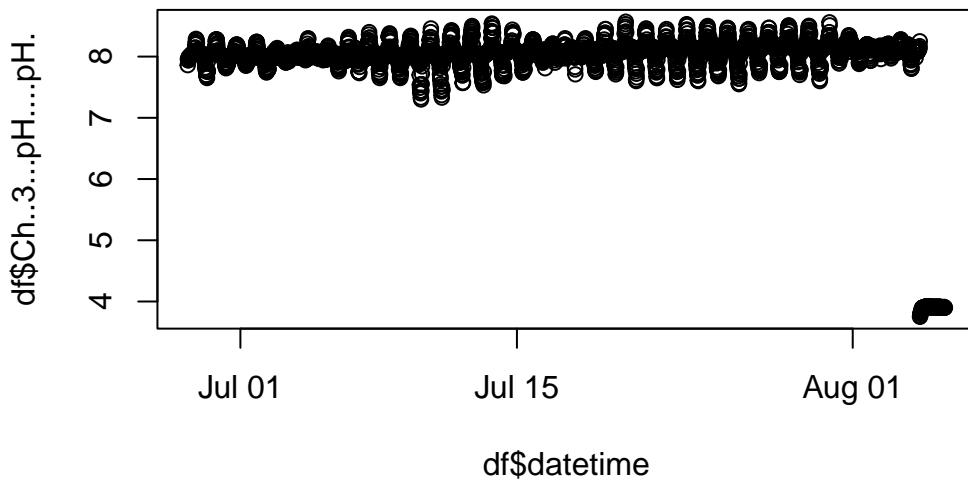
```
setwd(wdDen)
filenames <- dir()
filenames

[1] "1230_East_Dennis 2022-08-05 16_12_44 EDT (Data EDT).csv"
[2] "1230_East_Dennis 2022-08-05 16_12_44 EDT (Data EDT).csv.orig"
[3] "1230_East_Dennis 2022-09-21 09_29_48 EDT (Data EDT).csv"
[4] "1230_East_Dennis 2022-09-21 09_29_48 EDT (Data EDT).csv.orig"
[5] "Den_077 2022-09-14 14_08_26 EDT (Data EDT).csv"
[6] "Den_077 2022-09-14 14_08_26 EDT (Data EDT).csv.orig"
[7] "Den_077 2022-09-21 09_28_37 EDT (Data EDT)(1).csv"
[8] "Den_077 2022-09-21 09_28_37 EDT (Data EDT)(1).csv.orig"
[9] "E Dennis 2022-06-13 08_04_00 EDT (Data EDT).csv"
[10] "E Dennis 2022-06-13 08_04_00 EDT (Data EDT).csv.orig"
[11] "Untitled.ipynb"
[12] "Untitled.ipynb.orig"
```

```

setwd(wdDen)
# Late June to early Aug
#(open_file <- filenames[1]) # "1230_East_Dennis 2022-08-05 16_12_44 EDT (Data EDT).csv"
open_file <- "1230_East_Dennis 2022-08-05 16_12_44 EDT (Data EDT).csv"
#Also works: (open_file <- filenames[2]) # "1230_East_Dennis 2022-09-21 09_29_48 EDT (Data
df <- read.csv(open_file, stringsAsFactors = F)
df$datetime <- as.POSIXct(strptime(df$date.Time..EDT., format = "%m/%d/%Y %H:%M:%S"))
plot(df$datetime, df$Ch..3...pH....pH.)

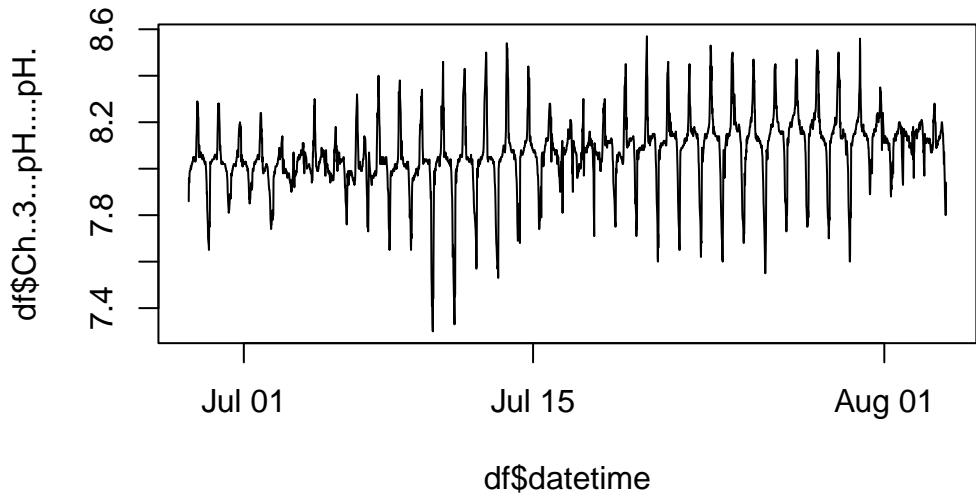
```



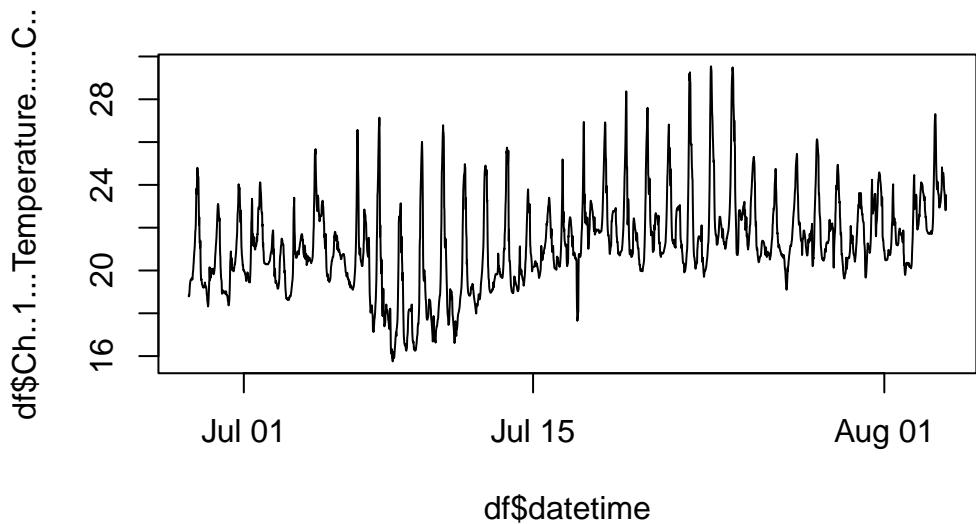
```

df <- df[df$datetime<"2022-08-04 00:00:00 EDT",]
plot(df$datetime, df$Ch..3...pH....pH., type = "l")

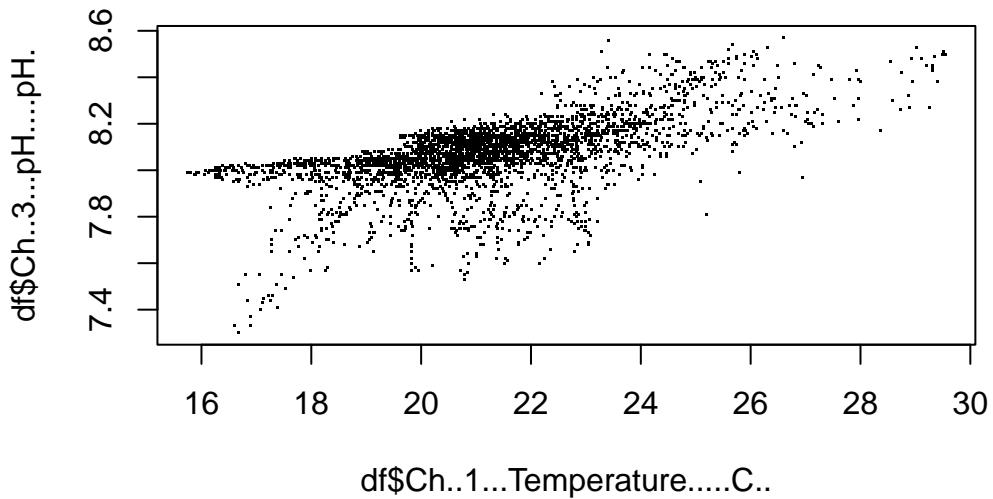
```



```
plot(df$datetime, df$Ch..1...Temperature.....C., type = "l")
```



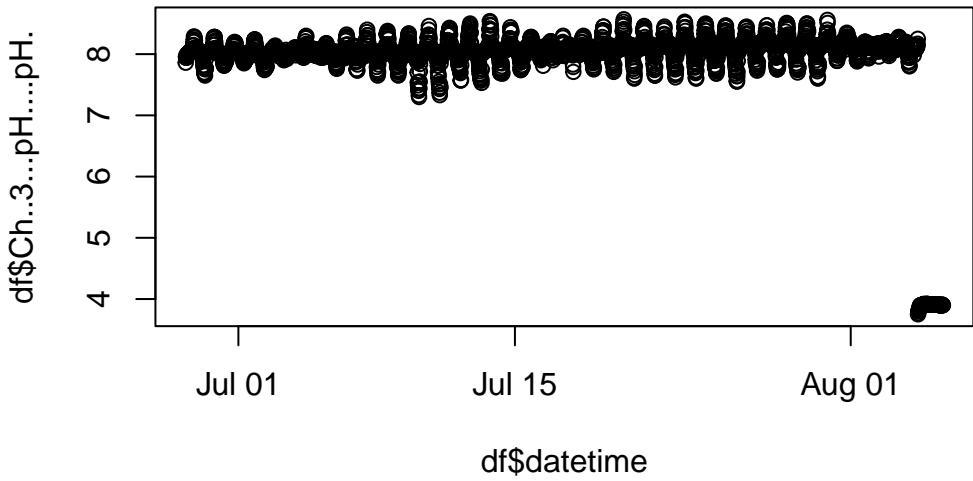
```
plot(df$Ch..1...Temperature.....C., df$Ch..3...pH....pH., pch = '.')
```



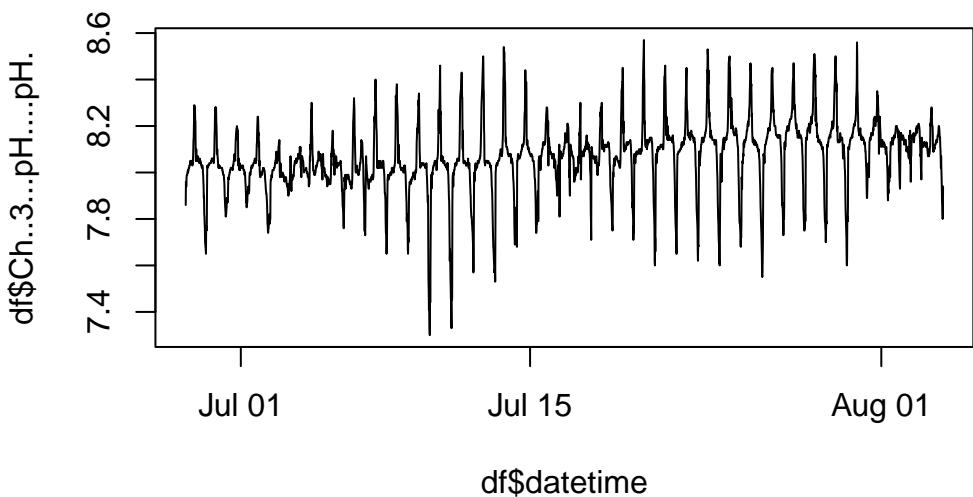
```
data_combined_new <- data.frame(
  Site = rep("Den", times = nrow(df)),
  Date = df$datetime,
  Temp = df$Ch..1...Temperature.....C.,
  pH = df$Ch..3...pH....pH.
)

data_combined <- rbind(data_combined_new)

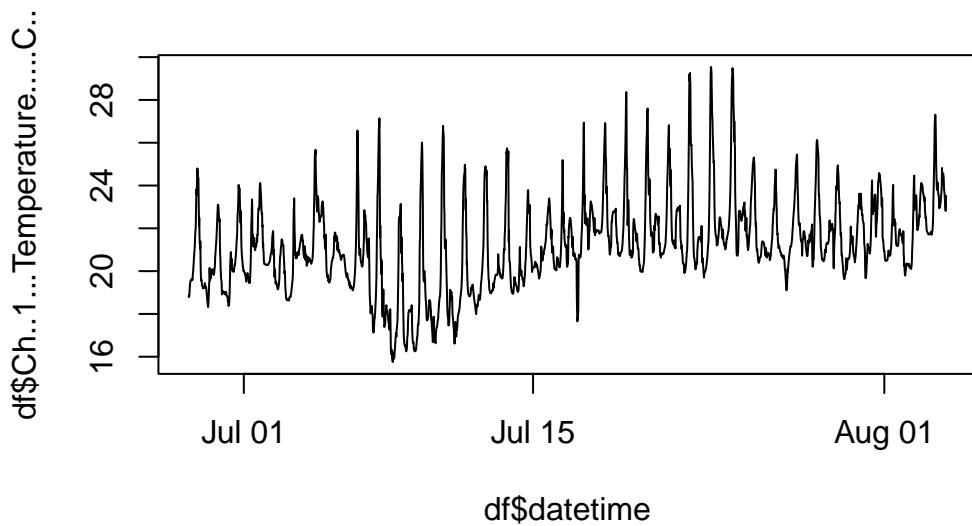
setwd(wdDen)
# Late June to early Aug
#(open_file <- filenames[1]) # "1230_East_Dennis 2022-08-05 16_12_44 EDT (Data EDT).csv"
open_file <- "1230_East_Dennis 2022-08-05 16_12_44 EDT (Data EDT).csv"
#Also works: (open_file <- filenames[2]) # "1230_East_Dennis 2022-09-21 09_29_48 EDT (Data
df <- read.csv(open_file, stringsAsFactors = F)
df$datetime <- as.POSIXct(strptime(df>Date.Time..EDT., format = "%m/%d/%Y %H:%M:%S"))
plot(df$datetime, df$Ch..3...pH....pH.)
```



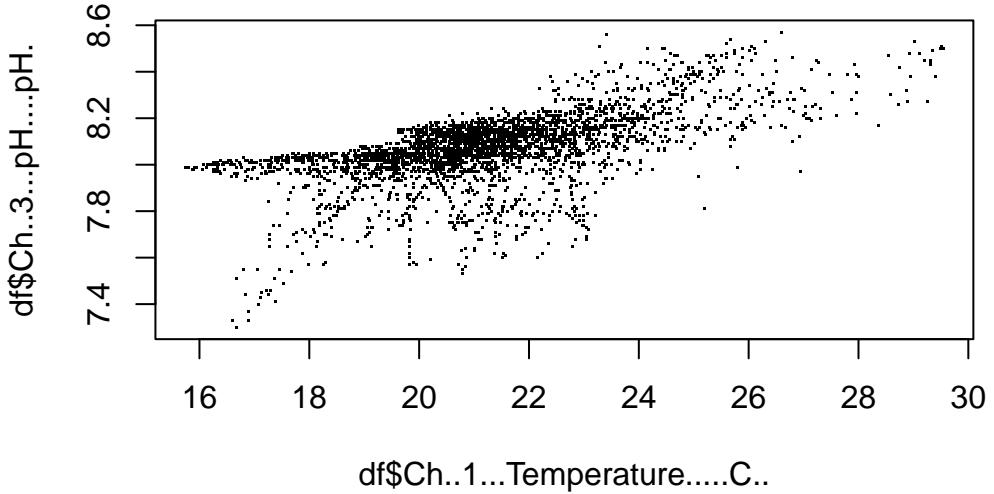
```
df <- df[df$datetime<"2022-08-04 00:00:00 EDT",]  
plot(df$datetime, df$Ch..3...pH....pH., type = "l")
```



```
plot(df$datetime, df$Ch..1...Temperature.....C., type = "l")
```



```
plot(df$Ch..1...Temperature.....C., df$Ch..3...pH....pH., pch = '.')
```



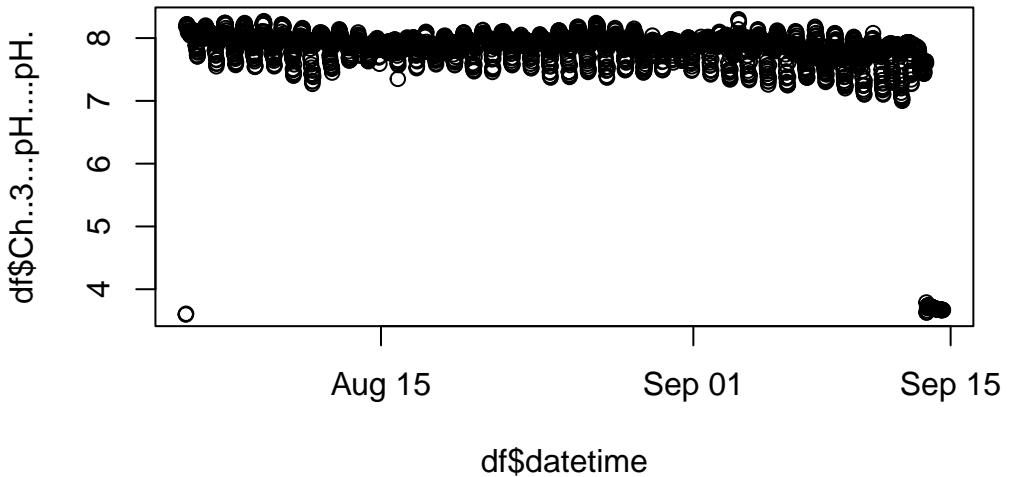
```

data_combined_new <- data.frame(
  Site = rep("Den", times = nrow(df)),
  Date = df$datetime,
  Temp = df$Ch..1...Temperature.....C.,
  pH = df$Ch..3...pH....pH.
)

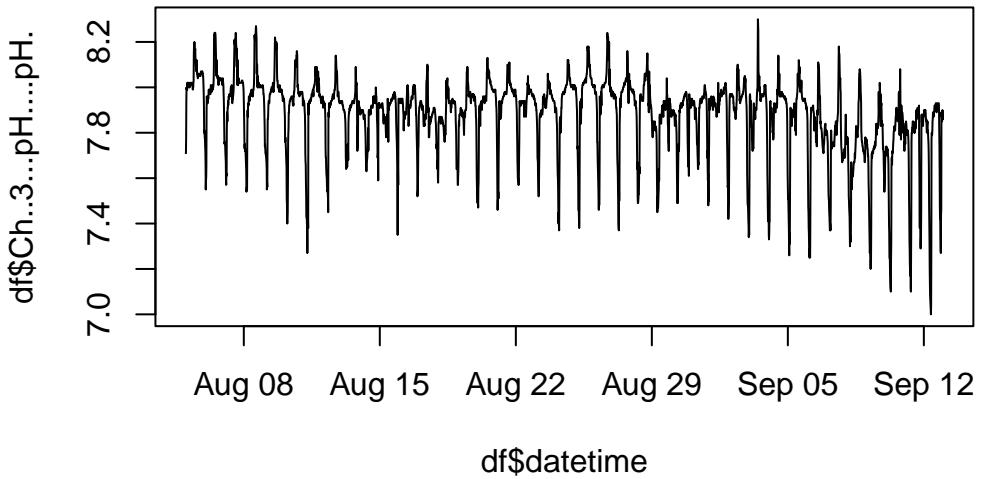
data_combined <- rbind(data_combined_new)

setwd(wdDen)
# Aug to mid September
#"Den_077 2022-09-14 14_08_26 EDT (Data EDT).csv"
#"Den_077 2022-09-21 09_28_37 EDT (Data EDT)(1).csv" is the same file read out later on
#(open_file <- filenames[3])
open_file <- "Den_077 2022-09-14 14_08_26 EDT (Data EDT).csv"
df <- read.csv(open_file, stringsAsFactors = F)
df$datetime <- as.POSIXct(strptime(df$Date.Time..EDT., format = "%m/%d/%Y %H:%M:%S"))
plot(df$datetime, df$Ch..3...pH....pH.)

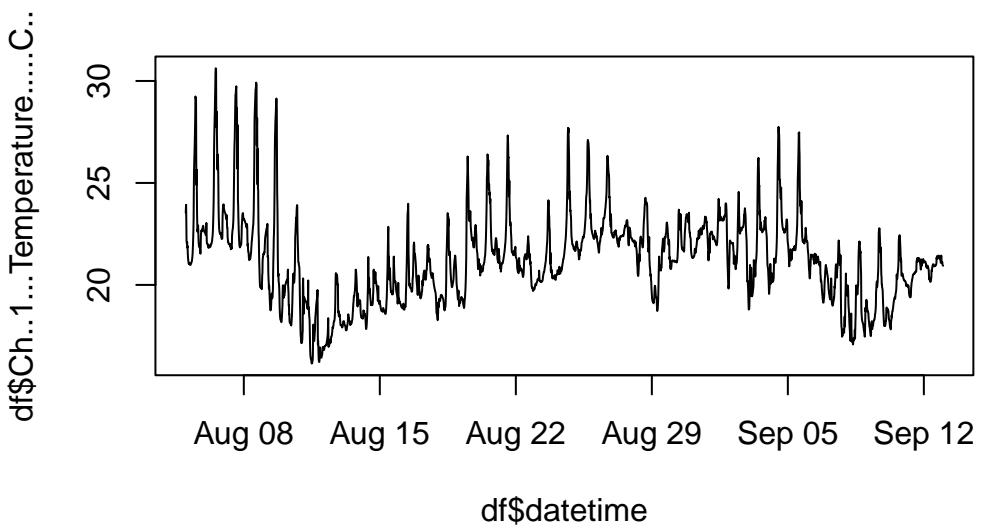
```



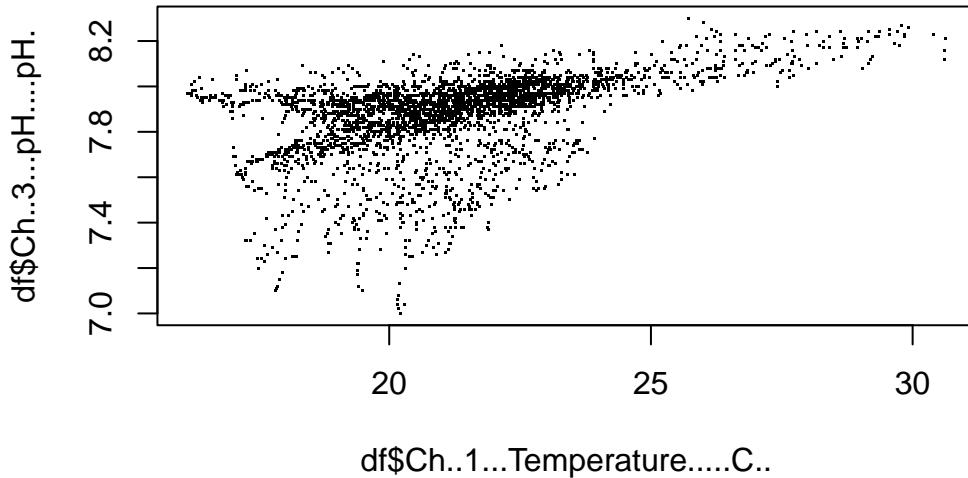
```
df <- df[df$datetime>"2022-08-05 00:00:00 EDT",]  
df <- df[df$datetime<"2022-09-13 00:00:00 EDT",]  
plot(df$datetime, df$Ch..3...pH....pH., type = "l")
```



```
plot(df$datetime, df$Ch..1...Temperature.....C., type = "l")
```



```
plot(df$Ch..1...Temperature.....C., df$Ch..3...pH....pH., pch = '.')
```



```
data_combined_new <- data.frame(  
  Site = rep("Den", times = nrow(df)),  
  Date = df$datetime,  
  Temp = df$Ch..1...Temperature.....C.,  
  pH = df$Ch..3...pH....pH.  
)  
  
data_combined <- rbind(data_combined, data_combined_new)  
  
head(data_combined_new)
```

	Site	Date	Temp	pH
1	Den	2022-08-05 00:15:00	23.54	7.71
2	Den	2022-08-05 00:30:00	23.79	7.71
3	Den	2022-08-05 00:45:00	23.93	7.77
4	Den	2022-08-05 01:00:00	23.04	7.94
5	Den	2022-08-05 01:15:00	22.15	8.00
6	Den	2022-08-05 01:30:00	22.06	7.99

```
tail(data_combined_new)
```

	Site	Date	Temp	pH
3738	Den	2022-09-12 22:30:00	21.10	7.85
3739	Den	2022-09-12 22:45:00	21.13	7.87
3740	Den	2022-09-12 23:00:00	21.01	7.90
3741	Den	2022-09-12 23:15:00	20.98	7.89
3742	Den	2022-09-12 23:30:00	20.96	7.87
3743	Den	2022-09-12 23:45:00	20.94	7.86

### 0.1.2 Ptown

```
setwd(wdPtown)
filenames <- dir()
filenames
```

```
[1] "20573560_Ptown 2022-06-15 18_08_38 EDT (Data EDT).csv"
[2] "20573560_Ptown 2022-06-15 18_08_38 EDT (Data EDT).csv.orig"
[3] "20573560_Ptown 2022-08-05 17_08_58 EDT (Data EDT).csv"
[4] "20573560_Ptown 2022-08-05 17_08_58 EDT (Data EDT).csv.orig"
[5] "20573560_Ptown 2022-09-29 17_27_52 EDT (Data EDT).csv"
[6] "20573560_Ptown 2022-09-29 17_27_52 EDT (Data EDT).csv.orig"
[7] "20573560_Ptown 2023-05-10 14_13_07 EDT (Data EDT).csv"
[8] "20573560_Ptown 2023-05-10 14_13_07 EDT (Data EDT).csv.orig"
[9] "21333340_Eel_Pond 2022-11-07 15_11_16 EST (Data EST)_actuallyPtown.csv"
[10] "21333340_Eel_Pond 2022-11-07 15_11_16 EST (Data EST)_actuallyPtown.csv.orig"
[11] "Ptown 2022-05-17 14_31_47 EDT (Data EDT) 2.csv"
[12] "Ptown 2022-05-17 14_31_47 EDT (Data EDT) 2.csv.orig"
[13] "Ptown 2022-05-17 14_31_47 EDT (Data EDT).csv"
[14] "Ptown 2022-05-17 14_31_47 EDT (Data EDT).csv.orig"
[15] "Ptown 2022-06-27 15_06_47 EDT (Data EDT).csv"
[16] "Ptown 2022-06-27 15_06_47 EDT (Data EDT).csv.orig"
[17] "Ptown_075 2022-08-29 21_52_54 EDT (Data EDT).csv"
[18] "Ptown_075 2022-08-29 21_52_54 EDT (Data EDT).csv.orig"
[19] "Ptown_076 2022-12-05 21_20_00 EST (Data EST).csv"
[20] "Ptown_076 2022-12-05 21_20_00 EST (Data EST).csv.orig"
[21] "Ptown_20573560_Ptown 2022-09-29 17_27_52 EDT (Data EDT).csv"
[22] "Ptown_20573560_Ptown 2022-09-29 17_27_52 EDT (Data EDT).csv.orig"
```

```

setwd(wdPtown)
# mid June to August
(open_file <- filenames[2])

[1] "20573560_Ptown 2022-06-15 18_08_38 EDT (Data EDT).csv.orig"

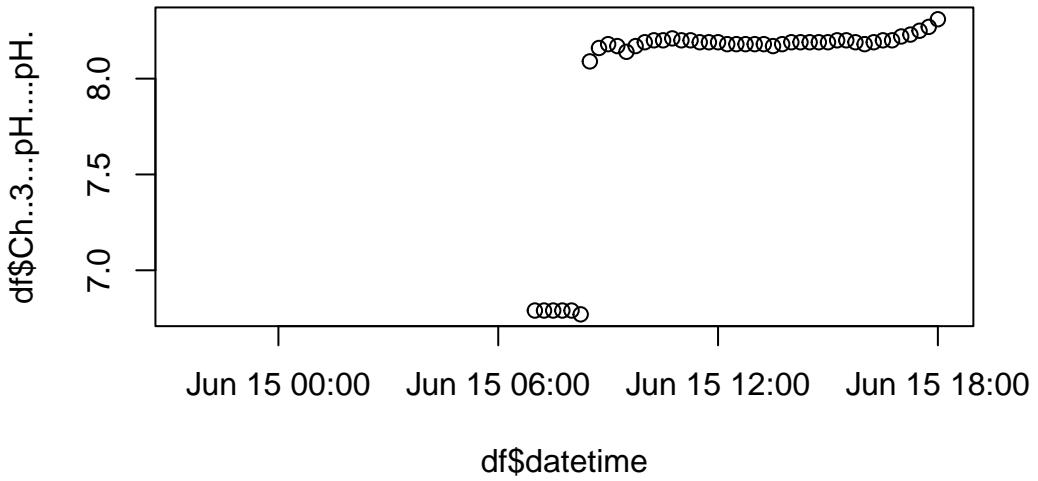
df <- read.csv(open_file, stringsAsFactors = F)
head(df)

X.      Date.Time..EDT. Ch..1...Temperature.....C.. Ch..2...Millivolts....mv.
1  1 06/14/2022 21:28:13                      NA                      NA
2  2 06/14/2022 21:28:36                      NA                      NA
3  3 06/14/2022 21:31:47                      NA                      NA
4  4 06/15/2022 07:00:00                     20.98                   3.63
5  5 06/15/2022 07:15:00                     20.91                   3.64
6  6 06/15/2022 07:30:00                     20.86                   3.66

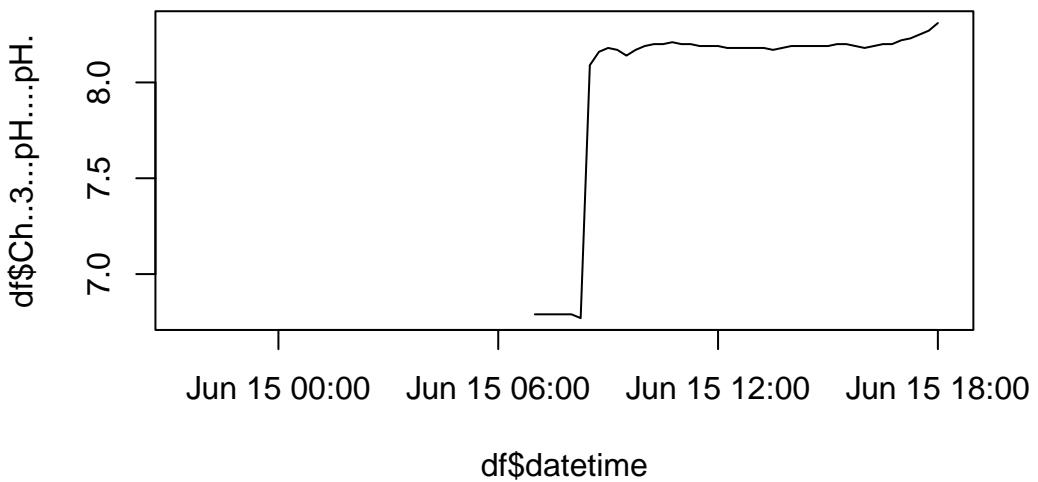
Ch..3...pH....pH. Button.Down Button.Up Host.Connected End.of.File
1                 NA     Logged     Logged
2                 NA           Logged
3                 NA           Logged
4                 6.79
5                 6.79
6                 6.79

df$datetime <- as.POSIXct(strptime(df$date.Time..EDT., format = "%m/%d/%Y %H:%M:%S"))
plot(df$datetime, df$Ch..3...pH....pH.)

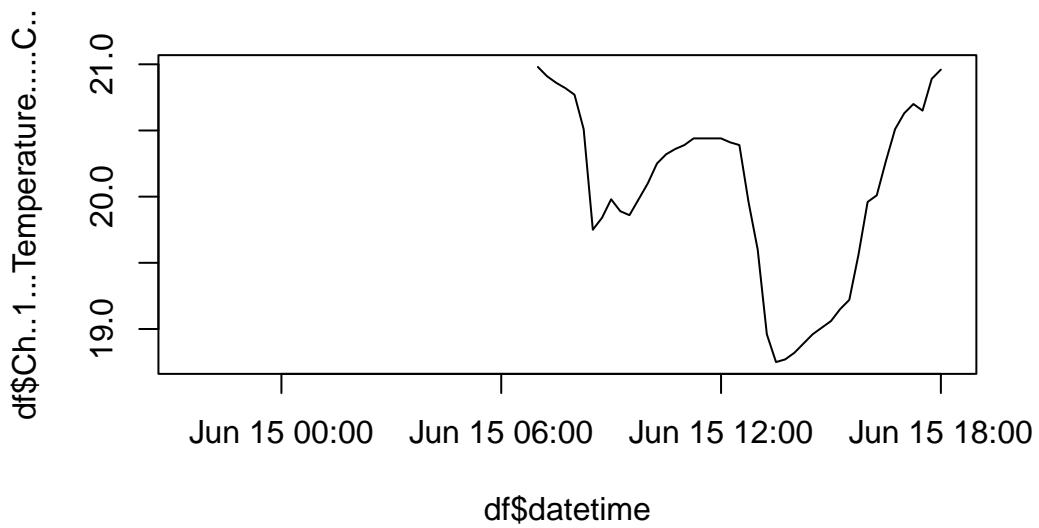
```



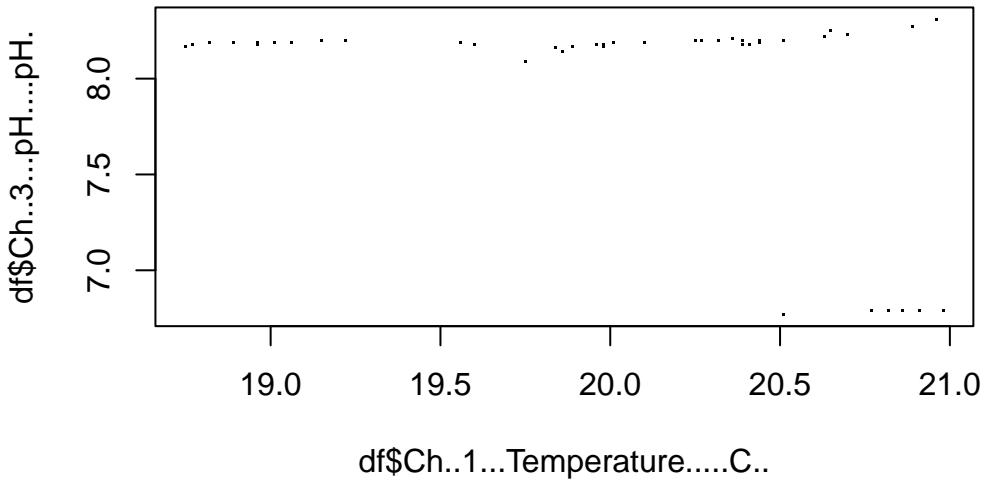
```
df <- df[df$datetime<"2022-08-03 00:00:00 EDT",]  
plot(df$datetime, df$Ch..3...pH....pH., type = "l")
```



```
plot(df$datetime, df$Ch..1...Temperature.....C., type = "l")
```



```
plot(df$Ch..1...Temperature.....C., df$Ch..3...pH....pH., pch = '.')
```



```

data_combined_new <- data.frame(
  Site = rep("Ptown", times = nrow(df)),
  Date = df$datetime,
  Temp = df$Ch..1...Temperature.....C.,
  pH = df$Ch..3...pH....pH.
)

data_combined <- rbind(data_combined, data_combined_new)

setwd(wdPtown)
# August
(open_file <- filenames[6])

```

[1] "20573560\_Ptown 2022-09-29 17\_27\_52 EDT (Data EDT).csv.orig"

```

open_file <- "Ptown_075 2022-08-29 21_52_54 EDT (Data EDT).csv"
df <- read.csv(open_file, stringsAsFactors = F)
head(df)

```

X. Date.Time..EDT. Ch..1...Temperature.....C.. Ch..2...Millivolts....mv.

```

1 1 08/02/2022 21:25:37 NA NA
2 2 08/03/2022 08:00:00 23.04 175.90
3 3 08/03/2022 08:15:00 23.59 175.96
4 4 08/03/2022 08:30:00 23.98 176.02
5 5 08/03/2022 08:45:00 25.91 176.32
6 6 08/03/2022 09:00:00 25.48 -91.85

```

Ch..3...pH....pH. Host.Connected Button.Down Button.Up End.of.File

```

1 NA Logged
2 3.56
3 3.56
4 3.57
5 3.58
6 8.28

```

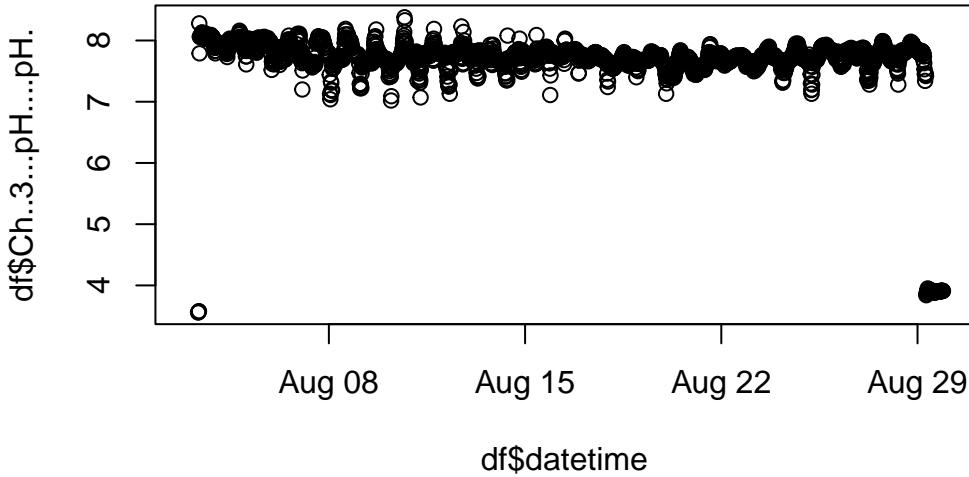
`tail(df)`

	X.	Date.Time..EDT.	Ch..1...Temperature.....C..	
2552	2552	08/29/2022 21:30:00		24.22
2553	2553	08/29/2022 21:45:00		24.29
2554	2554	08/29/2022 21:46:15		NA
2555	2555	08/29/2022 21:46:17		NA
2556	2556	08/29/2022 21:51:50		NA
2557	2557	08/29/2022 21:51:51		NA
		Ch..2...Millivolts....mv.	Ch..3...pH....pH.	Host.Connected Button.Down
2552		156.68	3.91	
2553		156.66	3.91	
2554		NA	NA	Logged
2555		NA	NA	Logged
2556		NA	NA	Logged
2557		NA	NA	Logged
		Button.Up	End.of.File	
2552				
2553				
2554		Logged		
2555				
2556		Logged		
2557		Logged		

```

df$datetime <- as.POSIXct(strptime(df$date..Time..EDT., format = "%m/%d/%Y %H:%M:%S"))
plot(df$datetime, df$Ch..3...pH....pH.)

```



```

df <- df[df$datetime>"2022-08-04 00:00:00 EDT",]
df <- df[df$datetime<"2022-08-29 00:00:00 EDT",]
#plot(df$datetime, df$Ch..3...pH....pH., type = "l")
#plot(df$datetime, df$Ch..1...Temperature.....C..., type = "l")
#plot(df$Ch..1...Temperature.....C..., df$Ch..3...pH....pH., pch = '.')
#plot(df$Ch..3...pH....pH., df$Ch..1...Temperature.....C..., type = "l")

data_combined_new <- data.frame(
  Site = rep("Ptown",times = nrow(df)),
  Date = df$datetime,
  Temp = df$Ch..1...Temperature.....C.,
  pH = df$Ch..3...pH....pH.
)
data_combined <- rbind(data_combined,data_combined_new)

setwd(wdPtown)
# September
open_file <- "Ptown_20573560_Ptown 2022-09-29 17_27_52 EDT (Data EDT).csv"
df <- read.csv(open_file, stringsAsFactors = F)
head(df)

X.      Date.Time..EDT. Ch..1...Temperature.....C.. Ch..2...Millivolts....mv.

```

```

1 1 08/28/2022 13:50:27           24.65          -181.07
2 2 08/28/2022 14:04:17           NA             NA
3 3 08/28/2022 14:04:18           NA             NA
4 4 08/28/2022 14:05:27           24.68          -82.24
5 5 08/28/2022 14:11:28           NA             NA
6 6 08/28/2022 14:11:29           NA             NA
Ch..3...pH....pH. Button.Down Host.Connected Button.Up End.of.File
1               9.93
2                 NA      Logged        Logged
3                 NA
4               8.20
5                 NA      Logged
6                 NA

```

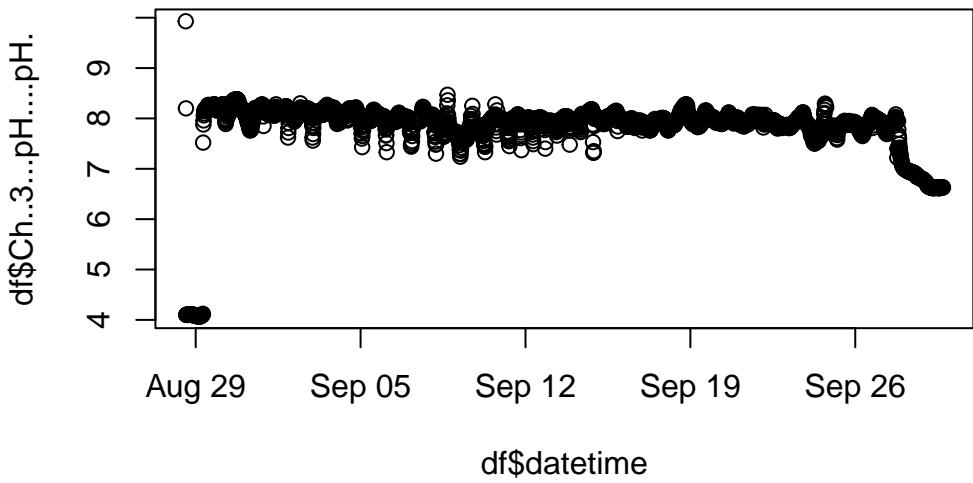
```
tail(df)
```

```

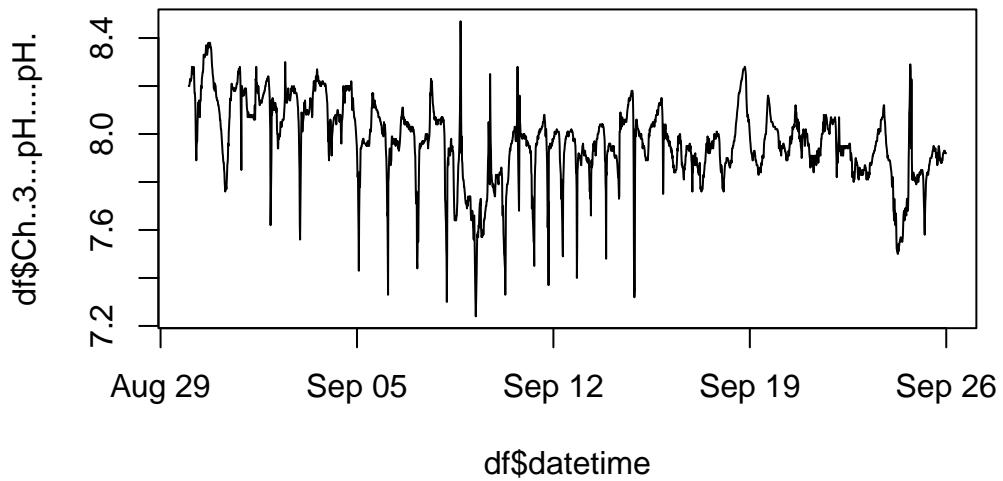
X.      Date.Time..EDT. Ch..1...Temperature.....C..
3092 3092 09/29/2022 16:50:27           24.94
3093 3093 09/29/2022 17:05:27           24.87
3094 3094 09/29/2022 17:20:27           24.63
3095 3095 09/29/2022 17:27:26           NA
3096 3096 09/29/2022 17:27:27           NA
3097 3097 09/29/2022 17:27:28           NA
Ch..2...Millivolts....mv. Ch..3...pH....pH. Button.Down Host.Connected
3092            7.03       6.63
3093            7.09       6.63
3094            7.13       6.63
3095            NA         NA      Logged
3096            NA         NA
3097            NA         NA
                           Button.Up End.of.File
3092
3093
3094
3095
3096      Logged
3097      Logged

```

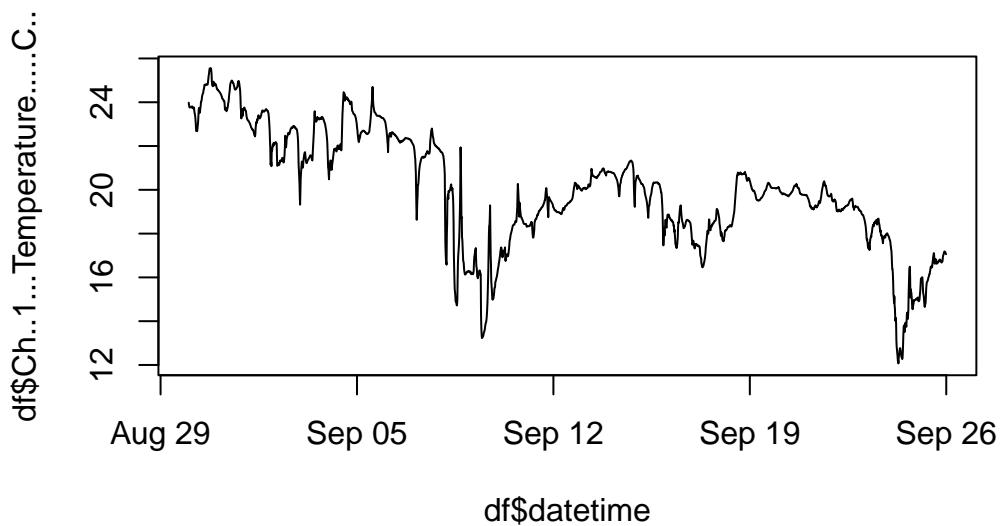
```
df$datetime <- as.POSIXct(strptime(df>Date.Time..EDT., format = "%m/%d/%Y %H:%M:%S"))
plot(df$datetime, df$Ch..3...pH....pH.)
```



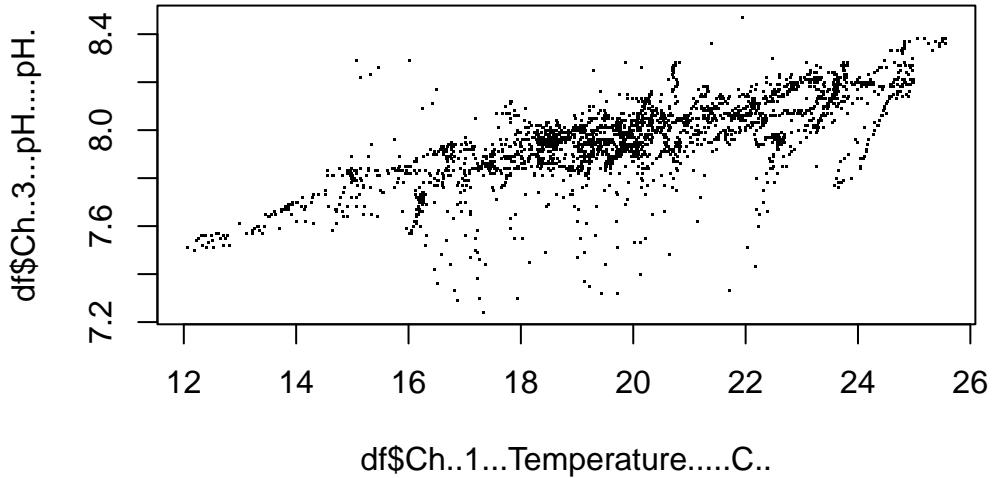
```
df <- df[df$datetime>"2022-08-30 00:00:00 EDT",]  
df <- df[df$datetime<"2022-09-26 00:00:00 EDT",]  
plot(df$datetime, df$Ch..3...pH....pH., type = "l")
```



```
plot(df$datetime, df$Ch..1...Temperature.....C., type = "l")
```



```
plot(df$Ch..1...Temperature.....C., df$Ch..3...pH....pH., pch = '.')
```



```
data_combined_new <- data.frame(  
  Site = rep("Ptown", times = nrow(df)),  
  Date = df$datetime,  
  Temp = df$Ch..1...Temperature.....C.,  
  pH = df$Ch..3...pH....pH.  
)
```

```
data_combined <- rbind(data_combined, data_combined_new)
```

```
setwd(wdPtown)  
# October  
# This sensor seems to be deployed at Eel pond originally, recalibrated without a change in  
# and then moved to Ptown. The segment at Ptown starts late in the day on 9/27/22  
filenames
```

```
[1] "20573560_Ptown 2022-06-15 18_08_38 EDT (Data EDT).csv"  
[2] "20573560_Ptown 2022-06-15 18_08_38 EDT (Data EDT).csv.orig"  
[3] "20573560_Ptown 2022-08-05 17_08_58 EDT (Data EDT).csv"  
[4] "20573560_Ptown 2022-08-05 17_08_58 EDT (Data EDT).csv.orig"
```

```

[5] "20573560_Ptown 2022-09-29 17_27_52 EDT (Data EDT).csv"
[6] "20573560_Ptown 2022-09-29 17_27_52 EDT (Data EDT).csv.orig"
[7] "20573560_Ptown 2023-05-10 14_13_07 EDT (Data EDT).csv"
[8] "20573560_Ptown 2023-05-10 14_13_07 EDT (Data EDT).csv.orig"
[9] "21333340_Eel_Pond 2022-11-07 15_11_16 EST (Data EST)_actuallyPtown.csv"
[10] "21333340_Eel_Pond 2022-11-07 15_11_16 EST (Data EST)_actuallyPtown.csv.orig"
[11] "Ptown 2022-05-17 14_31_47 EDT (Data EDT) 2.csv"
[12] "Ptown 2022-05-17 14_31_47 EDT (Data EDT) 2.csv.orig"
[13] "Ptown 2022-05-17 14_31_47 EDT (Data EDT).csv"
[14] "Ptown 2022-05-17 14_31_47 EDT (Data EDT).csv.orig"
[15] "Ptown 2022-06-27 15_06_47 EDT (Data EDT).csv"
[16] "Ptown 2022-06-27 15_06_47 EDT (Data EDT).csv.orig"
[17] "Ptown_075 2022-08-29 21_52_54 EDT (Data EDT).csv"
[18] "Ptown_075 2022-08-29 21_52_54 EDT (Data EDT).csv.orig"
[19] "Ptown_076 2022-12-05 21_20_00 EST (Data EST).csv"
[20] "Ptown_076 2022-12-05 21_20_00 EST (Data EST).csv.orig"
[21] "Ptown_20573560_Ptown 2022-09-29 17_27_52 EDT (Data EDT).csv"
[22] "Ptown_20573560_Ptown 2022-09-29 17_27_52 EDT (Data EDT).csv.orig"

```

```

open_file <- "21333340_Eel_Pond 2022-11-07 15_11_16 EST (Data EST)_actuallyPtown.csv"
df <- read.csv(open_file, stringsAsFactors = F)
head(df)

```

	X. Date.Time..EST.EDT. Ch..1...Temperature.....C.. Ch..2...Millivolts....mv.
1	1 08/28/2022 14:03:02 24.65 -178.86
2	2 08/28/2022 14:12:50 NA NA
3	3 08/28/2022 14:12:51 NA NA
4	4 08/28/2022 14:12:53 NA NA
5	5 08/28/2022 14:18:02 24.63 152.60
6	6 08/28/2022 14:33:02 25.09 156.57
	Ch..3...pH....pH. Button.Down Button.Up Host.Connected Start.pH.Calibration
1	9.93
2	NA Logged
3	NA Logged
4	NA Logged
5	4.12
6	4.06
	pH.Calibration.Values pH.Calibration.Buffers End.pH.Calibration Stopped
1	
2	
3	

```

4
5
6
End.of.File
1
2
3
4
5
6

tail(df,80)

X. Date.Time..EST.EDT. Ch..1...Temperature.....C..
6768 6768 11/06/2022 20:18:02           16.08
6769 6769 11/06/2022 20:33:02           16.06
6770 6770 11/06/2022 20:48:02           16.08
6771 6771 11/06/2022 21:03:02           16.08
6772 6772 11/06/2022 21:18:02           16.06
6773 6773 11/06/2022 21:33:02           16.03
6774 6774 11/06/2022 21:48:02           16.01
6775 6775 11/06/2022 22:03:02           15.99
6776 6776 11/06/2022 22:18:02           15.99
6777 6777 11/06/2022 22:33:02           15.99
6778 6778 11/06/2022 22:48:02           16.01
6779 6779 11/06/2022 23:03:02           16.01
6780 6780 11/06/2022 23:18:02           16.01
6781 6781 11/06/2022 23:33:02           16.01
6782 6782 11/06/2022 23:48:02           16.03
6783 6783 11/07/2022 00:03:02           16.06
6784 6784 11/07/2022 00:18:02           16.06
6785 6785 11/07/2022 00:33:02           16.06
6786 6786 11/07/2022 00:48:02           16.06
6787 6787 11/07/2022 01:03:02           16.06
6788 6788 11/07/2022 01:18:02           16.03
6789 6789 11/07/2022 01:33:02           16.01
6790 6790 11/07/2022 01:48:02           15.99
6791 6791 11/07/2022 02:03:02           15.99
6792 6792 11/07/2022 02:18:02           15.96
6793 6793 11/07/2022 02:33:02           15.94
6794 6794 11/07/2022 02:48:02           15.91
6795 6795 11/07/2022 03:03:02           15.87

```

6796	6796	11/07/2022	03:18:02	15.84
6797	6797	11/07/2022	03:33:02	15.82
6798	6798	11/07/2022	03:48:02	15.80
6799	6799	11/07/2022	04:03:02	15.75
6800	6800	11/07/2022	04:18:02	15.72
6801	6801	11/07/2022	04:33:02	15.75
6802	6802	11/07/2022	04:48:02	15.77
6803	6803	11/07/2022	05:03:02	15.75
6804	6804	11/07/2022	05:18:02	15.80
6805	6805	11/07/2022	05:33:02	15.84
6806	6806	11/07/2022	05:48:02	15.87
6807	6807	11/07/2022	06:03:02	15.89
6808	6808	11/07/2022	06:18:02	15.89
6809	6809	11/07/2022	06:33:02	15.91
6810	6810	11/07/2022	06:48:02	15.91
6811	6811	11/07/2022	07:03:02	15.94
6812	6812	11/07/2022	07:18:02	15.94
6813	6813	11/07/2022	07:33:02	15.96
6814	6814	11/07/2022	07:48:02	15.96
6815	6815	11/07/2022	08:03:02	15.99
6816	6816	11/07/2022	08:18:02	16.01
6817	6817	11/07/2022	08:33:02	16.03
6818	6818	11/07/2022	08:48:02	16.06
6819	6819	11/07/2022	09:03:02	16.06
6820	6820	11/07/2022	09:18:02	16.06
6821	6821	11/07/2022	09:33:02	16.08
6822	6822	11/07/2022	09:48:02	16.11
6823	6823	11/07/2022	10:03:02	16.11
6824	6824	11/07/2022	10:18:02	16.11
6825	6825	11/07/2022	10:33:02	16.13
6826	6826	11/07/2022	10:48:02	16.15
6827	6827	11/07/2022	11:03:02	16.18
6828	6828	11/07/2022	11:18:02	16.22
6829	6829	11/07/2022	11:33:02	16.25
6830	6830	11/07/2022	11:48:02	16.25
6831	6831	11/07/2022	12:03:02	16.22
6832	6832	11/07/2022	12:18:02	16.22
6833	6833	11/07/2022	12:33:02	16.22
6834	6834	11/07/2022	12:48:02	16.27
6835	6835	11/07/2022	13:03:02	16.30
6836	6836	11/07/2022	13:18:02	16.32
6837	6837	11/07/2022	13:33:02	16.32
6838	6838	11/07/2022	13:48:02	16.34

6839	6839	11/07/2022	14:03:02	16.42
6840	6840	11/07/2022	14:18:02	16.53
6841	6841	11/07/2022	14:33:02	16.82
6842	6842	11/07/2022	14:48:02	17.08
6843	6843	11/07/2022	15:03:02	17.08
6844	6844	11/07/2022	15:10:04	NA
6845	6845	11/07/2022	15:10:05	NA
6846	6846	11/07/2022	15:10:09	NA
6847	6847	11/07/2022	15:10:40	NA
Ch..2....Millivolts....mv. Ch..3....pH....pH. Button.Down Button.Up				
6768		-64.69	7.97	
6769		-64.55	7.97	
6770		-64.52	7.97	
6771		-64.36	7.96	
6772		-64.25	7.96	
6773		-64.21	7.96	
6774		-64.00	7.96	
6775		-63.85	7.96	
6776		-64.30	7.96	
6777		-63.78	7.95	
6778		-63.22	7.94	
6779		-62.71	7.94	
6780		-62.49	7.93	
6781		-62.24	7.93	
6782		-61.89	7.92	
6783		-61.66	7.92	
6784		-61.64	7.92	
6785		-61.46	7.91	
6786		-61.74	7.92	
6787		-61.97	7.92	
6788		-62.08	7.92	
6789		-62.28	7.93	
6790		-62.03	7.92	
6791		-61.81	7.92	
6792		-60.53	7.90	
6793		-59.64	7.88	
6794		-58.67	7.86	
6795		-58.45	7.86	
6796		-58.30	7.86	
6797		-57.08	7.83	
6798		-55.08	7.80	
6799		-52.36	7.75	
6800		-49.95	7.71	

6801	-51.99	7.74
6802	-53.28	7.77
6803	-53.67	7.77
6804	-54.91	7.80
6805	-55.33	7.80
6806	-55.11	7.80
6807	-55.20	7.80
6808	-55.42	7.80
6809	-55.92	7.81
6810	-55.91	7.81
6811	-55.97	7.81
6812	-55.74	7.81
6813	-55.56	7.81
6814	-55.61	7.81
6815	-55.64	7.81
6816	-56.36	7.82
6817	-55.81	7.81
6818	-56.49	7.82
6819	-56.92	7.83
6820	-57.55	7.84
6821	-56.56	7.82
6822	-57.86	7.85
6823	-57.19	7.84
6824	-56.30	7.82
6825	-56.70	7.83
6826	-57.33	7.84
6827	-58.39	7.86
6828	-57.25	7.84
6829	-57.61	7.84
6830	-58.63	7.86
6831	-59.11	7.87
6832	-59.38	7.87
6833	-58.94	7.87
6834	-58.97	7.87
6835	-57.60	7.84
6836	-57.11	7.83
6837	-56.69	7.83
6838	-56.89	7.83
6839	-57.97	7.85
6840	-58.31	7.85
6841	-58.80	7.86
6842	-61.44	7.91
6843	-62.41	7.93

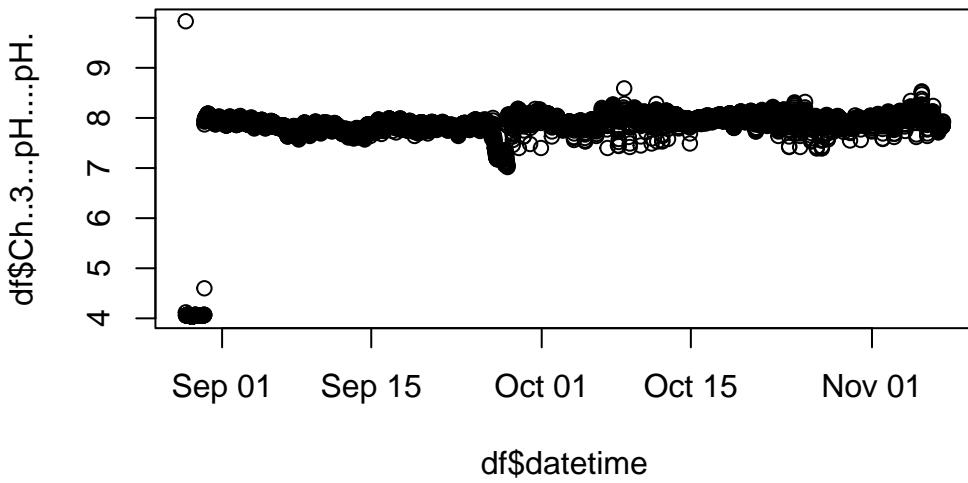
6844	NA	NA	Logged
6845	NA	NA	Logged
6846	NA	NA	
6847	NA	NA	
Host.Connected.Start.pH.Calibration.pH.Calibration.Values			
6768			
6769			
6770			
6771			
6772			
6773			
6774			
6775			
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6779			
6780			
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6787			
6788			
6789			
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6792			
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6800			
6801			
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6803			
6804			
6805			

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6840  
6841  
6842  
6843  
6844  
6845  
6846        Logged  
6847  
pH.Calibration.Buffers End.pH.Calibration Stopped End.of.File

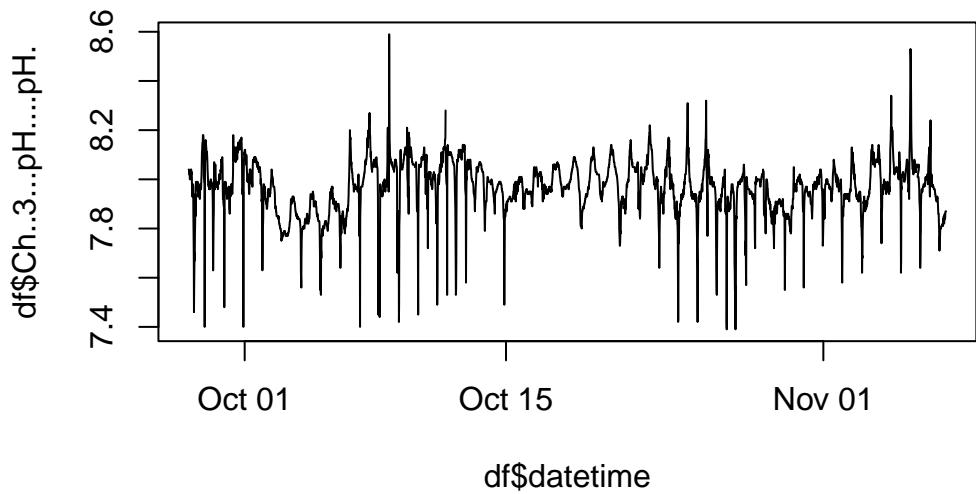
6768  
6769  
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6780  
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6785  
6786  
6787  
6788  
6789  
6790  
6791  
6792  
6793  
6794  
6795  
6796  
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6798  
6799  
6800  
6801  
6802  
6803  
6804  
6805  
6806  
6807  
6808  
6809  
6810

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6832
6833
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6838
6839
6840
6841
6842
6843
6844
6845
6846
6847           Logged      Logged
```

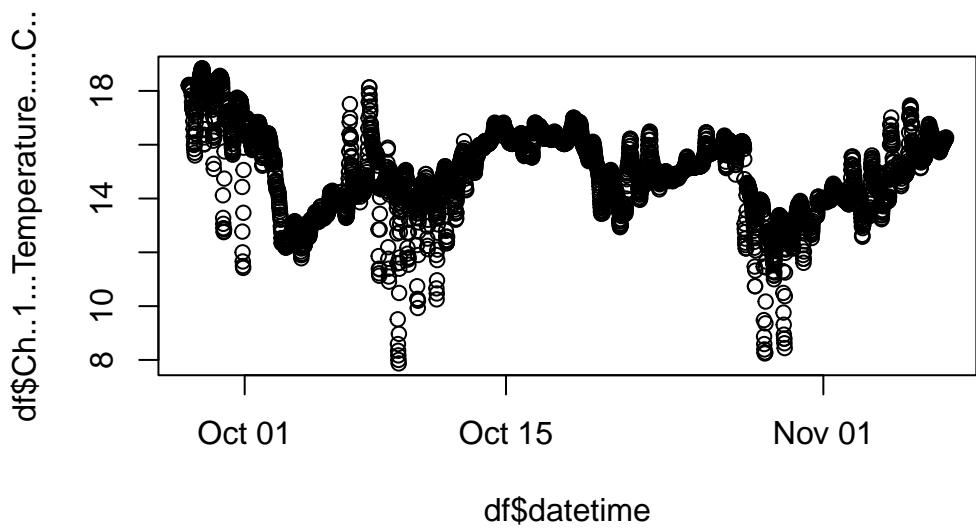
```
df$datetime <- as.POSIXct(strptime(df$Date.Time..EST., format = "%m/%d/%Y %H:%M:%S")) #Swi
plot(df$datetime, df$Ch..3...pH....pH.)
```



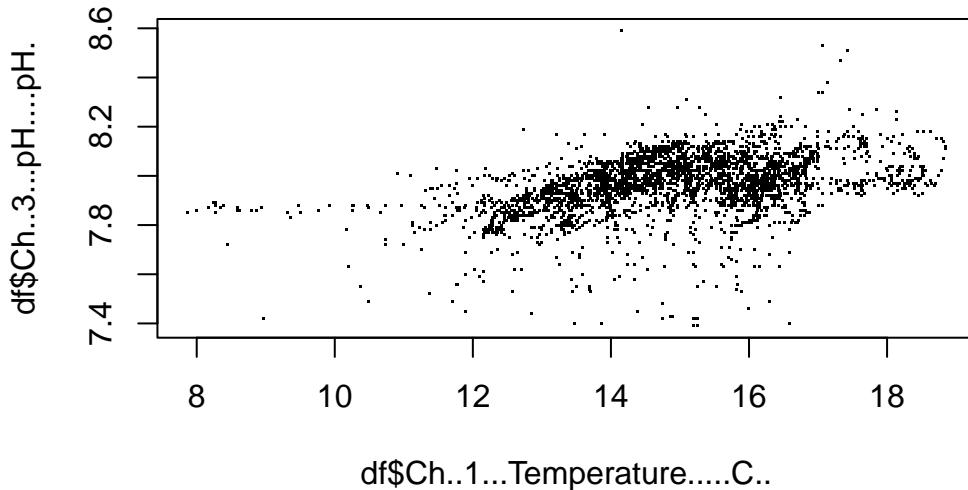
```
# df <- df[df$datetime>"2022-09-25 00:00:00 EDT",]
# df <- df[df$datetime<"2022-09-29 13:00:00 EDT",]
df <- df[df$datetime>"2022-09-28 00:00:00 EDT",]
df <- df[df$datetime<"2022-11-07 13:00:00 EDT",]
plot(df$datetime, df$Ch..3...pH....pH., type = "l")
```



```
plot(df$datetime, df$Ch..1...Temperature.....C., type = "p")
```



```
plot(df$Ch..1...Temperature.....C., df$Ch..3...pH....pH., pch = '.')
```



```
data_combined_new <- data.frame(
  Site = rep("Ptown",times = nrow(df)),
  Date = df$datetime,
  Temp = df$Ch..1...Temperature.....C.,
  pH = df$Ch..3...pH....pH.
)

data_combined <- rbind(data_combined,data_combined_new)

setwd(wdPtown)
# November

open_file <- "Ptown_076 2022-12-05 21_20_00 EST (Data EST).csv"
df <- read.csv(open_file, stringsAsFactors = F)
head(df)
```

X.	Date.Time..EST.	Ch..1...Temperature.....C..	Ch..2...Millivolts....mv..
1	11/07/2022 15:30:00	17.22	-74.78

```

2 2 11/07/2022 15:45:00          16.80          -80.85
3 3 11/07/2022 16:00:00          16.51          -83.35
4 4 11/07/2022 16:15:00          16.03          -83.33
5 5 11/07/2022 16:30:00          15.75          -80.56
6 6 11/07/2022 16:45:00          15.25          -70.85
Ch..3...pH....pH. Button.Down Button.Up Host.Connected End.of.File
1           8.23
2           8.34
3           8.39
4           8.39
5           8.34
6           8.17

```

```
tail(df,80)
```

X.	Date.Time..EST.	Ch..1...Temperature.....C..
2637	2637 12/05/2022 02:30:00	17.68
2638	2638 12/05/2022 02:45:00	17.75
2639	2639 12/05/2022 03:00:00	17.84
2640	2640 12/05/2022 03:15:00	17.91
2641	2641 12/05/2022 03:30:00	17.99
2642	2642 12/05/2022 03:45:00	18.06
2643	2643 12/05/2022 04:00:00	18.15
2644	2644 12/05/2022 04:15:00	18.22
2645	2645 12/05/2022 04:30:00	18.30
2646	2646 12/05/2022 04:45:00	18.37
2647	2647 12/05/2022 05:00:00	18.46
2648	2648 12/05/2022 05:15:00	18.53
2649	2649 12/05/2022 05:30:00	18.60
2650	2650 12/05/2022 05:45:00	18.68
2651	2651 12/05/2022 06:00:00	18.75
2652	2652 12/05/2022 06:15:00	18.79
2653	2653 12/05/2022 06:30:00	18.87
2654	2654 12/05/2022 06:45:00	18.91
2655	2655 12/05/2022 07:00:00	18.96
2656	2656 12/05/2022 07:15:00	19.01
2657	2657 12/05/2022 07:30:00	19.03
2658	2658 12/05/2022 07:45:00	19.08
2659	2659 12/05/2022 08:00:00	19.13
2660	2660 12/05/2022 08:15:00	19.15
2661	2661 12/05/2022 08:30:00	19.20
2662	2662 12/05/2022 08:45:00	19.22

2663	2663	12/05/2022	09:00:00	19.25
2664	2664	12/05/2022	09:15:00	19.29
2665	2665	12/05/2022	09:30:00	19.32
2666	2666	12/05/2022	09:45:00	19.37
2667	2667	12/05/2022	10:00:00	19.41
2668	2668	12/05/2022	10:15:00	19.34
2669	2669	12/05/2022	10:30:00	19.32
2670	2670	12/05/2022	10:45:00	19.22
2671	2671	12/05/2022	11:00:00	18.84
2672	2672	12/05/2022	11:15:00	18.58
2673	2673	12/05/2022	11:30:00	18.51
2674	2674	12/05/2022	11:45:00	18.53
2675	2675	12/05/2022	12:00:00	18.58
2676	2676	12/05/2022	12:15:00	18.68
2677	2677	12/05/2022	12:30:00	18.10
2678	2678	12/05/2022	12:45:00	17.15
2679	2679	12/05/2022	13:00:00	16.13
2680	2680	12/05/2022	13:15:00	15.32
2681	2681	12/05/2022	13:30:00	14.53
2682	2682	12/05/2022	13:45:00	14.03
2683	2683	12/05/2022	14:00:00	14.22
2684	2684	12/05/2022	14:15:00	14.46
2685	2685	12/05/2022	14:30:00	14.74
2686	2686	12/05/2022	14:45:00	14.96
2687	2687	12/05/2022	15:00:00	15.10
2688	2688	12/05/2022	15:15:00	15.13
2689	2689	12/05/2022	15:30:00	15.03
2690	2690	12/05/2022	15:45:00	14.84
2691	2691	12/05/2022	16:00:00	14.58
2692	2692	12/05/2022	16:15:00	14.24
2693	2693	12/05/2022	16:30:00	13.83
2694	2694	12/05/2022	16:45:00	13.35
2695	2695	12/05/2022	17:00:00	12.61
2696	2696	12/05/2022	17:15:00	11.83
2697	2697	12/05/2022	17:30:00	11.95
2698	2698	12/05/2022	17:45:00	12.44
2699	2699	12/05/2022	18:00:00	12.92
2700	2700	12/05/2022	18:15:00	13.35
2701	2701	12/05/2022	18:30:00	13.88
2702	2702	12/05/2022	18:45:00	14.41
2703	2703	12/05/2022	19:00:00	14.86
2704	2704	12/05/2022	19:15:00	15.22
2705	2705	12/05/2022	19:30:00	15.41

2706	2706	12/05/2022	19:45:00		15.53
2707	2707	12/05/2022	20:00:00		15.70
2708	2708	12/05/2022	20:15:00		15.84
2709	2709	12/05/2022	20:30:00		15.89
2710	2710	12/05/2022	20:45:00		15.91
2711	2711	12/05/2022	21:00:00		15.72
2712	2712	12/05/2022	21:15:00		14.82
2713	2713	12/05/2022	21:18:54		NA
2714	2714	12/05/2022	21:18:55		NA
2715	2715	12/05/2022	21:18:56		NA
2716	2716	12/05/2022	21:19:50		NA
Ch..2....Millivolts....mv. Ch..3....pH....pH. Button.Down Button.Up					
2637			180.02	3.66	
2638			180.05	3.66	
2639			180.08	3.66	
2640			180.10	3.66	
2641			180.13	3.66	
2642			180.15	3.66	
2643			180.18	3.66	
2644			180.21	3.66	
2645			180.22	3.66	
2646			180.26	3.66	
2647			180.29	3.66	
2648			180.32	3.66	
2649			180.33	3.66	
2650			180.36	3.67	
2651			180.40	3.67	
2652			180.41	3.67	
2653			180.41	3.67	
2654			180.43	3.67	
2655			180.44	3.67	
2656			180.44	3.67	
2657			180.46	3.67	
2658			180.46	3.67	
2659			180.46	3.67	
2660			180.46	3.67	
2661			180.46	3.67	
2662			180.47	3.67	
2663			180.47	3.67	
2664			180.47	3.67	
2665			180.47	3.67	
2666			180.49	3.67	
2667			180.49	3.67	

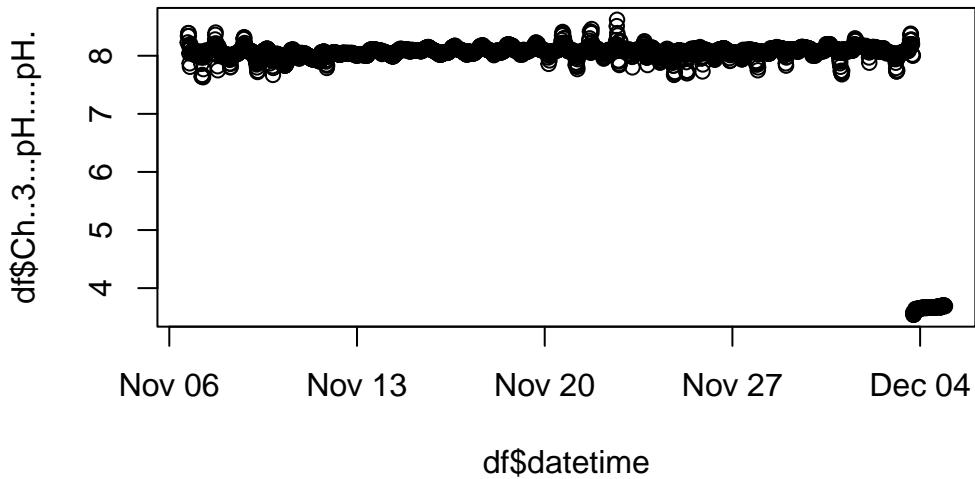
2668	180.47	3.67
2669	180.46	3.67
2670	180.40	3.67
2671	180.29	3.67
2672	180.26	3.67
2673	180.22	3.67
2674	180.16	3.67
2675	180.11	3.67
2676	180.10	3.67
2677	179.46	3.67
2678	178.94	3.67
2679	178.41	3.67
2680	177.91	3.67
2681	177.49	3.67
2682	177.11	3.67
2683	177.07	3.67
2684	177.07	3.68
2685	177.08	3.68
2686	177.08	3.68
2687	177.10	3.68
2688	177.08	3.68
2689	177.05	3.68
2690	176.99	3.68
2691	176.91	3.68
2692	176.79	3.68
2693	176.63	3.68
2694	176.44	3.67
2695	176.13	3.67
2696	175.86	3.67
2697	175.77	3.67
2698	175.76	3.68
2699	175.82	3.68
2700	175.88	3.68
2701	175.97	3.69
2702	176.11	3.69
2703	176.24	3.70
2704	176.40	3.70
2705	176.52	3.70
2706	176.63	3.70
2707	176.74	3.70
2708	176.83	3.70
2709	176.91	3.70
2710	176.93	3.70

2711	176.94	3.69	
2712	176.63	3.69	
2713	NA	NA	Logged
2714	NA	NA	Logged
2715	NA	NA	
2716	NA	NA	
Host.Connected End.of.File			
2637			
2638			
2639			
2640			
2641			
2642			
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2672			

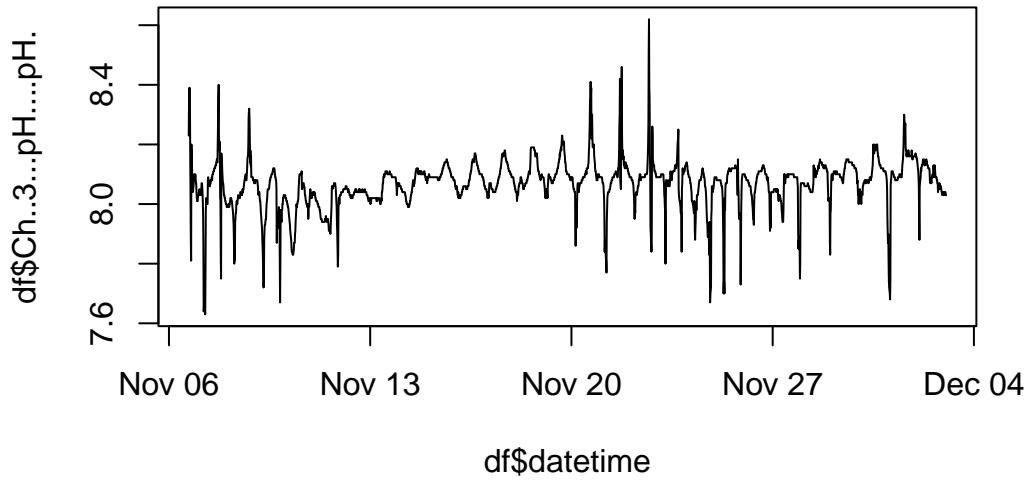
2673  
2674  
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2680  
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2710  
2711  
2712  
2713  
2714  
2715      Logged

2716            Logged            Logged

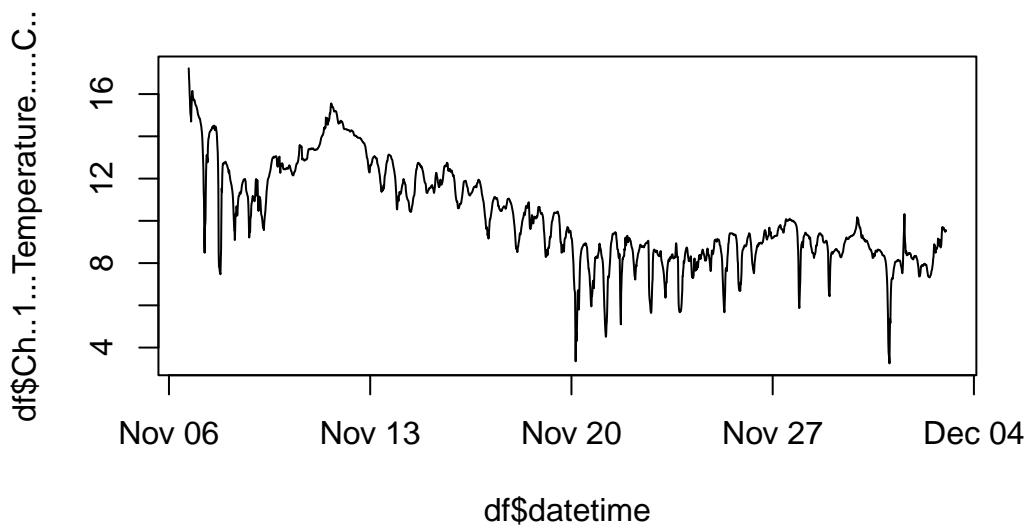
```
df$datetime <- as.POSIXct(strptime(df>Date.Time..EST., format = "%m/%d/%Y %H:%M:%S")) #Swi  
plot(df$datetime, df$Ch..3....pH....pH.)
```



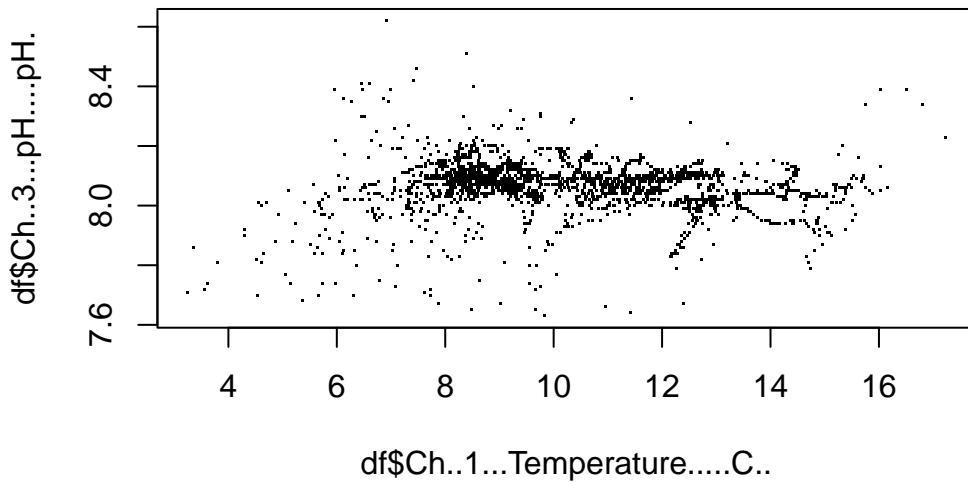
```
#df <- df[df$datetime>"2022-08-30 00:00:00 EDT",]  
df <- df[df$datetime<"2022-12-04 00:00:00 EDT",]  
plot(df$datetime, df$Ch..3....pH....pH., type = "l")
```



```
plot(df$datetime, df$Ch..1...Temperature.....C., type = "l")
```



```
plot(df$Ch..1...Temperature.....C., df$Ch..3...pH....pH., pch = '.')
```



```
data_combined_new <- data.frame(  
  Site = rep("Ptown", times = nrow(df)),  
  Date = df$datetime,  
  Temp = df$Ch..1...Temperature.....C.,  
  pH = df$Ch..3...pH....pH.  
)  
  
data_combined <- rbind(data_combined, data_combined_new)
```

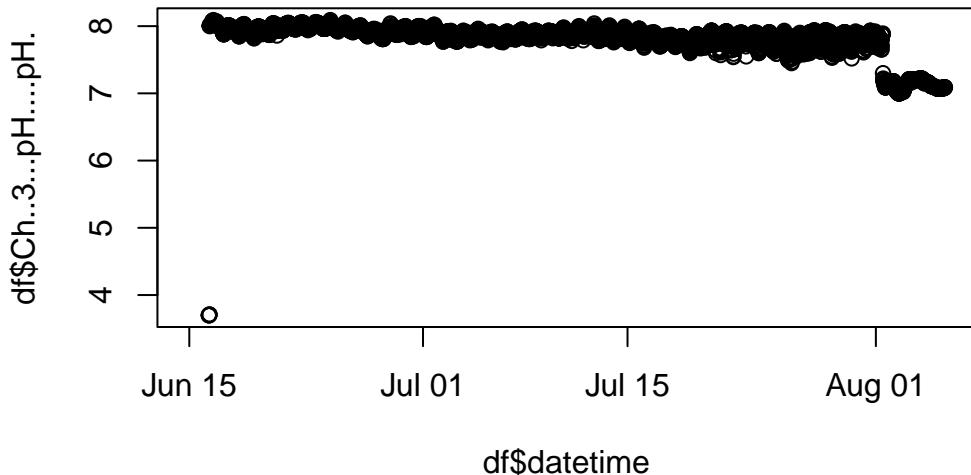
### 0.1.3 Eel Pond

```
setwd(wdEel)  
filenames <- dir()  
  
setwd(wdEel)  
#mid June to Aug  
#(open_file <- filenames[2])
```

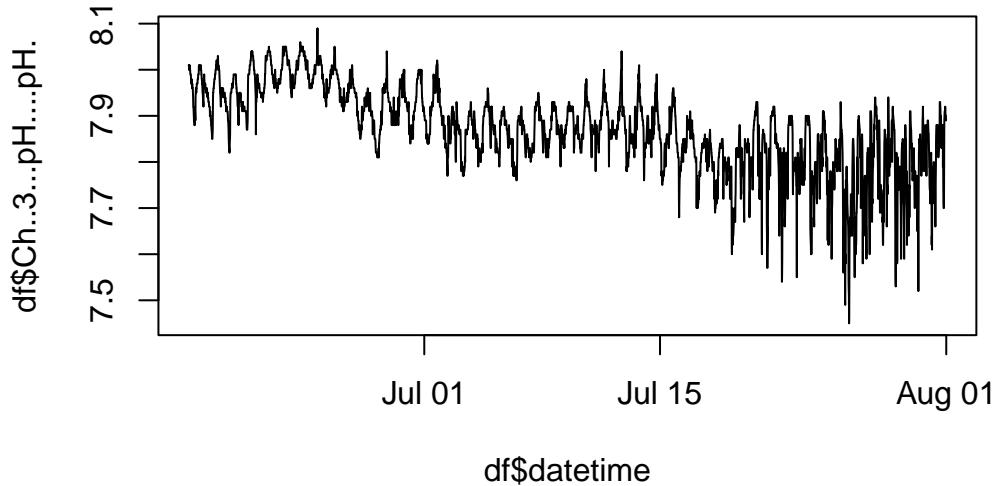
```
(open_file <- "21333340_Eel_Pond 2022-08-05 17_43_02 EDT (Data EDT).csv")

[1] "21333340_Eel_Pond 2022-08-05 17_43_02 EDT (Data EDT).csv"

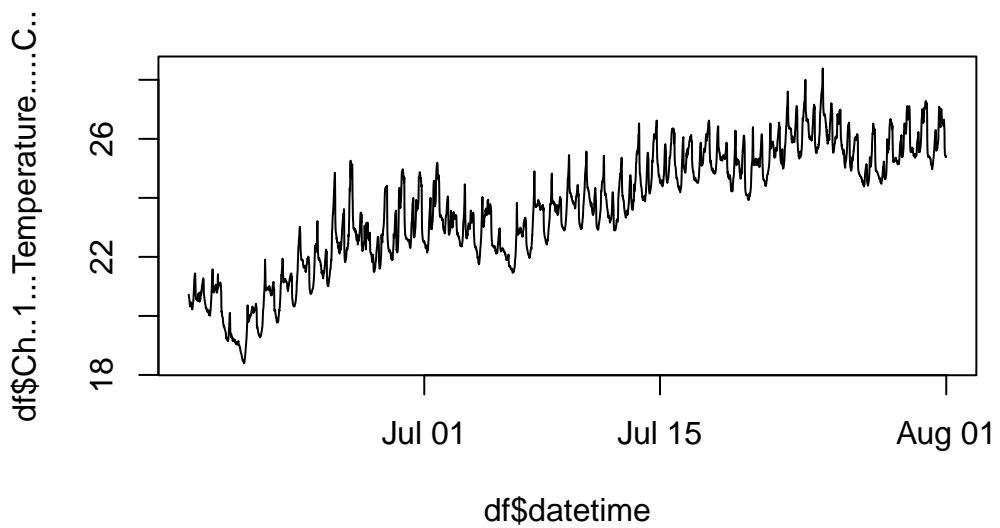
df <- read.csv(open_file, stringsAsFactors = F)
df$datetime <- as.POSIXct(strptime(df$date.Time..EDT., format = "%m/%d/%Y %H:%M:%S"))
plot(df$datetime, df$Ch..3...pH....pH.)
```



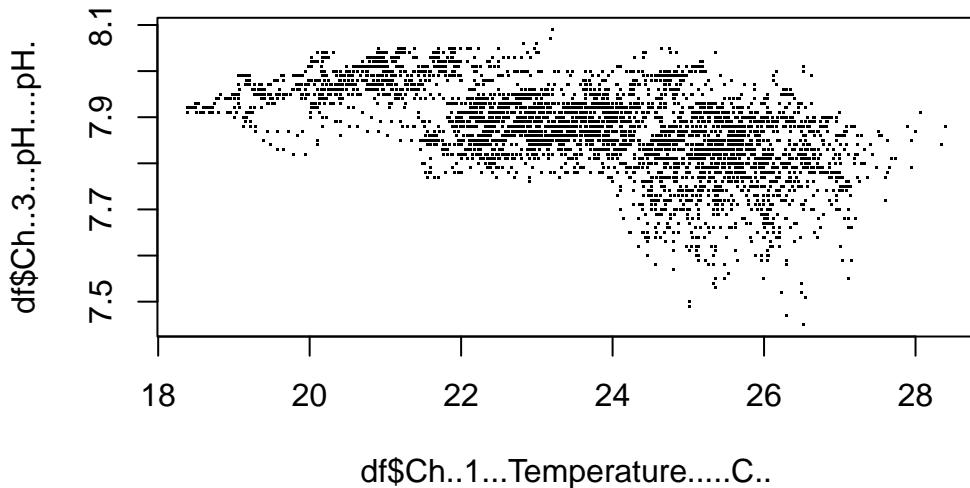
```
df <- df[df$datetime<"2022-08-01 00:00:00 EDT",]
df <- df[df$datetime>"2022-06-17 00:00:00 EDT",]
plot(df$datetime, df$Ch..3...pH....pH., type = "l")
```



```
plot(df$datetime, df$Ch..1...Temperature.....C., type = "l")
```



```
plot(df$Ch..1...Temperature.....C., df$Ch..3...pH....pH., pch = '.')
```



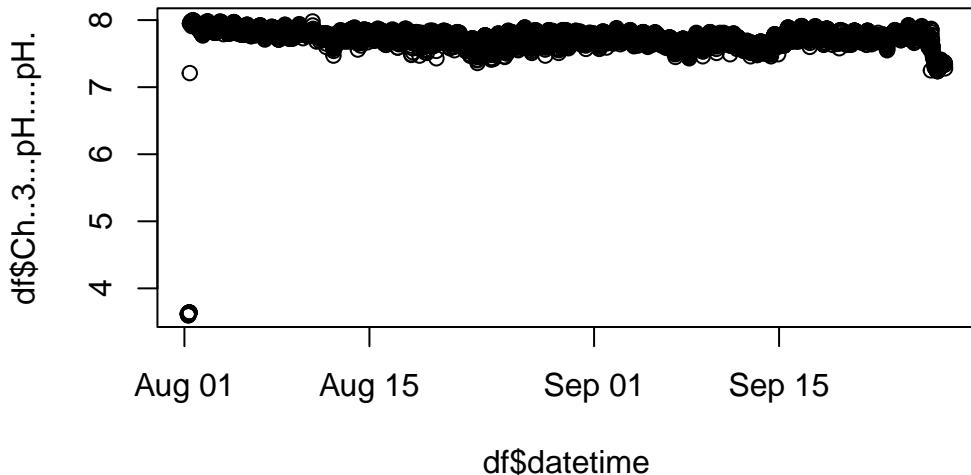
```
data_combined_new <- data.frame(  
  Site = rep("Eel", times = nrow(df)),  
  Date = df$datetime,  
  Temp = df$Ch..1...Temperature.....C.,  
  pH = df$Ch..3...pH....pH.  
)  
  
data_combined <- rbind(data_combined, data_combined_new)  
# Aug to lateAug is on logger that is still logging in Eel Pond and  
# needs to be retrieved.  
# There was an issue with the tool when swapping them out  
  
setwd(wdEel)  
#Aug to lateAug  
(open_file <- filenames[4])
```

```
[1] "21333340_Eel_Pond 2022-06-13 08_27_36 EDT (Data EDT).csv.orig"
```

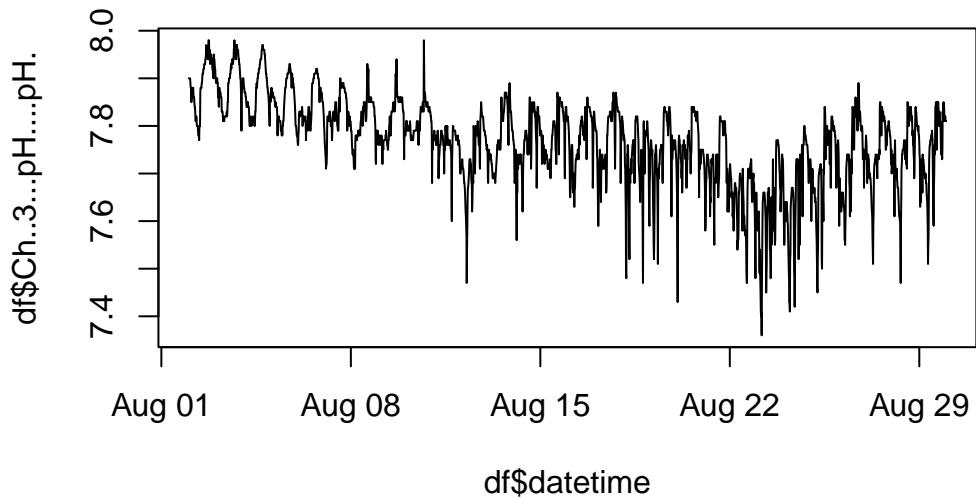
```
(open_file <- "Eel_076 2022-09-27 13_35_57 EDT (Data EDT).csv")
```

```
[1] "Eel_076 2022-09-27 13_35_57 EDT (Data EDT).csv"
```

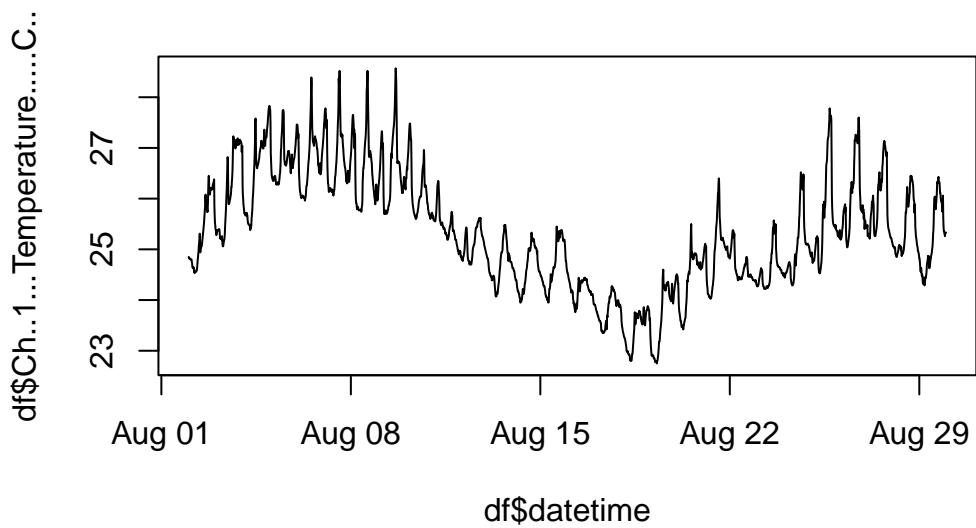
```
df <- read.csv(open_file, stringsAsFactors = F)
df$datetime <- as.POSIXct(strptime(df$date.Time..EDT., format = "%m/%d/%Y %H:%M:%S"))
plot(df$datetime, df$Ch..3...pH....pH.)
```



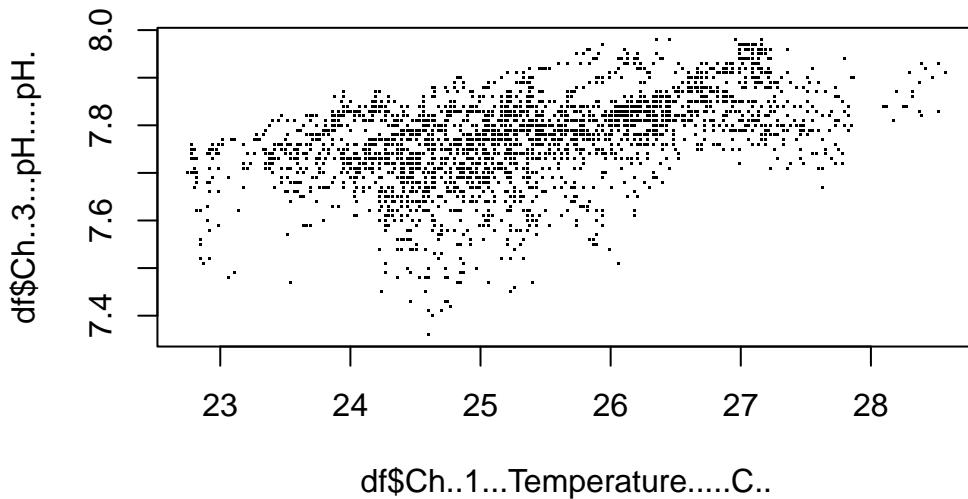
```
df <- df[df$datetime<"2022-08-30 00:00:00 EDT",]
df <- df[df$datetime>"2022-08-02 00:00:00 EDT",]
plot(df$datetime, df$Ch..3...pH....pH., type = "l")
```



```
plot(df$datetime, df$Ch..1...Temperature.....C., type = "l")
```



```
plot(df$Ch..1...Temperature.....C., df$Ch..3...pH....pH., pch = '.')
```



```
data_combined_new <- data.frame(
  Site = rep("Eel",times = nrow(df)),
  Date = df$datetime,
  Temp = df$Ch..1...Temperature.....C.,
  pH = df$Ch..3...pH....pH.
)

data_combined <- rbind(data_combined,data_combined_new)
# Aug to lateAug is on logger that is still logging in Eel Pond and
# needs to be retrieved.
# There was an issue with the tool when swapping them out

# # lateAug to mid Sep (was still logging and deployed -
# # but lost ~14 days of data due to calibrating before downloading data)
# (open_file <- filenames[3])
# open_file <- "21333340_Eel_Pond 2022-09-11 18_27_18 EDT (Data EDT).csv"
#
# df <- read.csv(open_file, stringsAsFactors = F)
```

```

# df$datetime <- as.POSIXct(strptime(df$date.Time..EDT., format = "%m/%d/%Y %H:%M:%S"))
# plot(df$datetime, df$Ch..3...pH....pH.)
# df <- df[df$datetime>"2022-08-31 00:00:00 EDT",]
# df <- df[df$datetime<"2022-09-11 00:00:00 EDT",]
# plot(df$datetime, df$Ch..3...pH....pH., type = "l")
# plot(df$datetime, df$Ch..1...Temperature.....C..., type = "l")
# plot(df$Ch..1...Temperature.....C..., df$Ch..3...pH....pH., pch = '.')
#
# data_combined_new <- data.frame(
#   Site = rep("Eel",times = nrow(df)),
#   Date = df$datetime,
#   Temp = df$Ch..1...Temperature.....C.,
#   pH = df$Ch..3...pH....pH.
# )
#
#
# data_combined <- rbind(data_combined,data_combined_new)

setwd(wdEel)
# #October???
# #October is not clear.
# #If the other logger was still logging and deployed at this site
# (open_file <- filenames[3])
# open_file <- "Eel_076 2022-11-07 15_16_01 EST (Data EST)(1).csv"
# head(df, 20)
# df <- read.csv(open_file, stringsAsFactors = F)
# df$datetime <- as.POSIXct(strptime(df$date.Time..EST., format = "%m/%d/%Y %H:%M:%S")) #O
# plot(df$datetime, df$Ch..3...pH....pH.)
# df <- df[df$datetime>"2022-09-25 00:00:00 EDT",]
# # df <- df[df$datetime<"2022-09-30 00:00:00 EDT",]
#
# #df <- df[df$datetime<"2022-08-31 00:00:00 EDT",]
# #df <- df[df$datetime>"2022-08-26 00:00:00 EDT",]
# plot(df$datetime, df$Ch..3...pH....pH., type = "l")
# plot(df$datetime, df$Ch..1...Temperature.....C..., type = "p")
# plot(df$Ch..1...Temperature.....C..., df$Ch..3...pH....pH., pch = '.')
#
# data_combined_new <- data.frame(
#   Site = rep("Eel",times = nrow(df)),
#   Date = df$datetime,
#   Temp = df$Ch..1...Temperature.....C.,

```

```

#   pH = df$Ch..3...pH....pH.
# )
#
#
# data_combined <- rbind(data_combined,data_combined_new)

# October
# This sensor seems to be deployed at Eel pond originally, recalibrated without a change in
# and then moved to Ptown. The segment at Eel Pond ends on Monday 9/26/22.
# It was deployed on 8/31/22. Which is a day we were at Eel Pond
filenames

[1] "20573560_Ptown 2022-12-05 16_55_15 EST (Data EST)_actuallyEel.csv"
[2] "20573560_Ptown 2022-12-05 16_55_15 EST (Data EST)_actuallyEel.csv.orig"
[3] "21333340_Eel_Pond 2022-06-13 08_27_36 EDT (Data EDT).csv"
[4] "21333340_Eel_Pond 2022-06-13 08_27_36 EDT (Data EDT).csv.orig"
[5] "21333340_Eel_Pond 2022-08-05 17_43_02 EDT (Data EDT).csv"
[6] "21333340_Eel_Pond 2022-08-05 17_43_02 EDT (Data EDT).csv.orig"
[7] "21333340_Eel_Pond 2022-09-11 18_27_18 EDT (Data EDT).csv"
[8] "21333340_Eel_Pond 2022-09-11 18_27_18 EDT (Data EDT).csv.orig"
[9] "21333340_Eel_Pond 2022-11-07 15_11_16 EST (Data EST)_actuallyPtown.csv"
[10] "21333340_Eel_Pond 2022-11-07 15_11_16 EST (Data EST)_actuallyPtown.csv.orig"
[11] "21333340_Eel_Pond 2023-05-08 09_10_54 EDT (Data EDT).csv"
[12] "21333340_Eel_Pond 2023-05-08 09_10_54 EDT (Data EDT).csv.orig"
[13] "Eel_076 2022-09-27 13_35_57 EDT (Data EDT).csv"
[14] "Eel_076 2022-09-27 13_35_57 EDT (Data EDT).csv.orig"
[15] "Eel_076 2022-11-07 09_15_44 EST (Data EST).xlsx"
[16] "Eel_076 2022-11-07 09_15_44 EST (Data EST).xlsx.orig"
[17] "Eel_076 2022-11-07 15_16_01 EST (Data EST)(1).csv"
[18] "Eel_076 2022-11-07 15_16_01 EST (Data EST)(1).csv.orig"

```

```

open_file <- "21333340_Eel_Pond 2022-11-07 15_11_16 EST (Data EST)_actuallyPtown.csv"
df <- read.csv(open_file, stringsAsFactors = F)
head(df)

```

	X. Date.Time..EST.EDT. Ch..1...Temperature.....C.. Ch..2...Millivolts....mv.	
1	1 08/28/2022 14:03:02	24.65
2	2 08/28/2022 14:12:50	NA
3	3 08/28/2022 14:12:51	NA
4	4 08/28/2022 14:12:53	NA

```

5 5 08/28/2022 14:18:02          24.63          152.60
6 6 08/28/2022 14:33:02          25.09          156.57
Ch..3...pH....pH. Button.Down Button.Up Host.Connected Start.pH.Calibration
1           9.93
2           NA      Logged
3           NA      Logged
4           NA      Logged
5           4.12
6           4.06
pH.Calibration.Values pH.Calibration.Buffers End.pH.Calibration Stopped
1
2
3
4
5
6
End.of.File
1
2
3
4
5
6

```

```
tail(df,80)
```

	X. Date.Time..EST.EDT.	Ch..1...Temperature.....C..
6768	6768 11/06/2022 20:18:02	16.08
6769	6769 11/06/2022 20:33:02	16.06
6770	6770 11/06/2022 20:48:02	16.08
6771	6771 11/06/2022 21:03:02	16.08
6772	6772 11/06/2022 21:18:02	16.06
6773	6773 11/06/2022 21:33:02	16.03
6774	6774 11/06/2022 21:48:02	16.01
6775	6775 11/06/2022 22:03:02	15.99
6776	6776 11/06/2022 22:18:02	15.99
6777	6777 11/06/2022 22:33:02	15.99
6778	6778 11/06/2022 22:48:02	16.01
6779	6779 11/06/2022 23:03:02	16.01
6780	6780 11/06/2022 23:18:02	16.01
6781	6781 11/06/2022 23:33:02	16.01
6782	6782 11/06/2022 23:48:02	16.03

6783	6783	11/07/2022	00:03:02	16.06
6784	6784	11/07/2022	00:18:02	16.06
6785	6785	11/07/2022	00:33:02	16.06
6786	6786	11/07/2022	00:48:02	16.06
6787	6787	11/07/2022	01:03:02	16.06
6788	6788	11/07/2022	01:18:02	16.03
6789	6789	11/07/2022	01:33:02	16.01
6790	6790	11/07/2022	01:48:02	15.99
6791	6791	11/07/2022	02:03:02	15.99
6792	6792	11/07/2022	02:18:02	15.96
6793	6793	11/07/2022	02:33:02	15.94
6794	6794	11/07/2022	02:48:02	15.91
6795	6795	11/07/2022	03:03:02	15.87
6796	6796	11/07/2022	03:18:02	15.84
6797	6797	11/07/2022	03:33:02	15.82
6798	6798	11/07/2022	03:48:02	15.80
6799	6799	11/07/2022	04:03:02	15.75
6800	6800	11/07/2022	04:18:02	15.72
6801	6801	11/07/2022	04:33:02	15.75
6802	6802	11/07/2022	04:48:02	15.77
6803	6803	11/07/2022	05:03:02	15.75
6804	6804	11/07/2022	05:18:02	15.80
6805	6805	11/07/2022	05:33:02	15.84
6806	6806	11/07/2022	05:48:02	15.87
6807	6807	11/07/2022	06:03:02	15.89
6808	6808	11/07/2022	06:18:02	15.89
6809	6809	11/07/2022	06:33:02	15.91
6810	6810	11/07/2022	06:48:02	15.91
6811	6811	11/07/2022	07:03:02	15.94
6812	6812	11/07/2022	07:18:02	15.94
6813	6813	11/07/2022	07:33:02	15.96
6814	6814	11/07/2022	07:48:02	15.96
6815	6815	11/07/2022	08:03:02	15.99
6816	6816	11/07/2022	08:18:02	16.01
6817	6817	11/07/2022	08:33:02	16.03
6818	6818	11/07/2022	08:48:02	16.06
6819	6819	11/07/2022	09:03:02	16.06
6820	6820	11/07/2022	09:18:02	16.06
6821	6821	11/07/2022	09:33:02	16.08
6822	6822	11/07/2022	09:48:02	16.11
6823	6823	11/07/2022	10:03:02	16.11
6824	6824	11/07/2022	10:18:02	16.11
6825	6825	11/07/2022	10:33:02	16.13

6826	6826	11/07/2022	10:48:02		16.15
6827	6827	11/07/2022	11:03:02		16.18
6828	6828	11/07/2022	11:18:02		16.22
6829	6829	11/07/2022	11:33:02		16.25
6830	6830	11/07/2022	11:48:02		16.25
6831	6831	11/07/2022	12:03:02		16.22
6832	6832	11/07/2022	12:18:02		16.22
6833	6833	11/07/2022	12:33:02		16.22
6834	6834	11/07/2022	12:48:02		16.27
6835	6835	11/07/2022	13:03:02		16.30
6836	6836	11/07/2022	13:18:02		16.32
6837	6837	11/07/2022	13:33:02		16.32
6838	6838	11/07/2022	13:48:02		16.34
6839	6839	11/07/2022	14:03:02		16.42
6840	6840	11/07/2022	14:18:02		16.53
6841	6841	11/07/2022	14:33:02		16.82
6842	6842	11/07/2022	14:48:02		17.08
6843	6843	11/07/2022	15:03:02		17.08
6844	6844	11/07/2022	15:10:04		NA
6845	6845	11/07/2022	15:10:05		NA
6846	6846	11/07/2022	15:10:09		NA
6847	6847	11/07/2022	15:10:40		NA
Ch..2...Millivolts....mv. Ch..3...pH....pH. Button.Down Button.Up					
6768		-64.69		7.97	
6769		-64.55		7.97	
6770		-64.52		7.97	
6771		-64.36		7.96	
6772		-64.25		7.96	
6773		-64.21		7.96	
6774		-64.00		7.96	
6775		-63.85		7.96	
6776		-64.30		7.96	
6777		-63.78		7.95	
6778		-63.22		7.94	
6779		-62.71		7.94	
6780		-62.49		7.93	
6781		-62.24		7.93	
6782		-61.89		7.92	
6783		-61.66		7.92	
6784		-61.64		7.92	
6785		-61.46		7.91	
6786		-61.74		7.92	
6787		-61.97		7.92	

6788	-62.08	7.92
6789	-62.28	7.93
6790	-62.03	7.92
6791	-61.81	7.92
6792	-60.53	7.90
6793	-59.64	7.88
6794	-58.67	7.86
6795	-58.45	7.86
6796	-58.30	7.86
6797	-57.08	7.83
6798	-55.08	7.80
6799	-52.36	7.75
6800	-49.95	7.71
6801	-51.99	7.74
6802	-53.28	7.77
6803	-53.67	7.77
6804	-54.91	7.80
6805	-55.33	7.80
6806	-55.11	7.80
6807	-55.20	7.80
6808	-55.42	7.80
6809	-55.92	7.81
6810	-55.91	7.81
6811	-55.97	7.81
6812	-55.74	7.81
6813	-55.56	7.81
6814	-55.61	7.81
6815	-55.64	7.81
6816	-56.36	7.82
6817	-55.81	7.81
6818	-56.49	7.82
6819	-56.92	7.83
6820	-57.55	7.84
6821	-56.56	7.82
6822	-57.86	7.85
6823	-57.19	7.84
6824	-56.30	7.82
6825	-56.70	7.83
6826	-57.33	7.84
6827	-58.39	7.86
6828	-57.25	7.84
6829	-57.61	7.84
6830	-58.63	7.86

6831	-59.11	7.87
6832	-59.38	7.87
6833	-58.94	7.87
6834	-58.97	7.87
6835	-57.60	7.84
6836	-57.11	7.83
6837	-56.69	7.83
6838	-56.89	7.83
6839	-57.97	7.85
6840	-58.31	7.85
6841	-58.80	7.86
6842	-61.44	7.91
6843	-62.41	7.93
6844	NA	NA      Logged
6845	NA	NA      Logged
6846	NA	NA
6847	NA	NA

Host.Connected Start.pH.Calibration pH.Calibration.Values

6768
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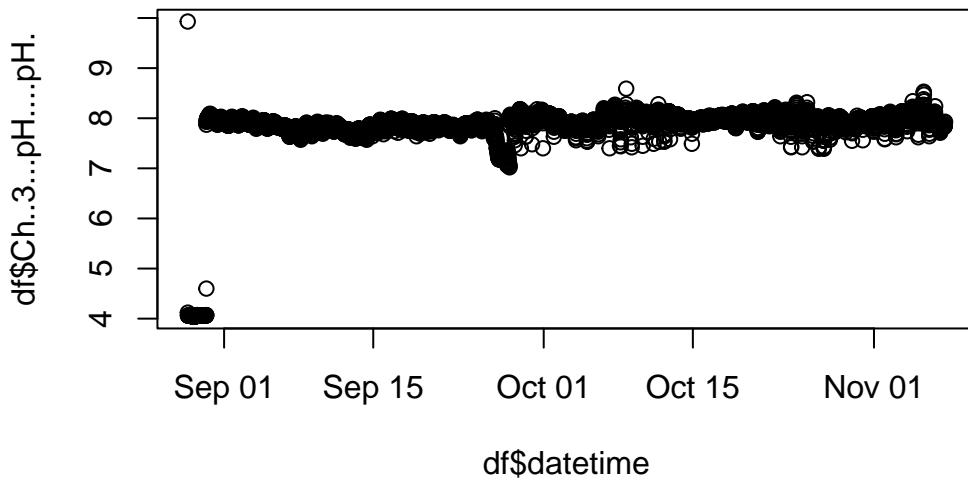
6836  
6837  
6838  
6839  
6840  
6841  
6842  
6843  
6844  
6845  
6846        Logged  
6847  
            pH.Calibration.Buffers End.pH.Calibration Stopped End.of.File  
6768  
6769  
6770  
6771  
6772  
6773  
6774  
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6778  
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6780  
6781  
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6783  
6784  
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6786  
6787  
6788  
6789  
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6791  
6792  
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6797

6798  
6799  
6800  
6801  
6802  
6803  
6804  
6805  
6806  
6807  
6808  
6809  
6810  
6811  
6812  
6813  
6814  
6815  
6816  
6817  
6818  
6819  
6820  
6821  
6822  
6823  
6824  
6825  
6826  
6827  
6828  
6829  
6830  
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6834  
6835  
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6837  
6838  
6839  
6840

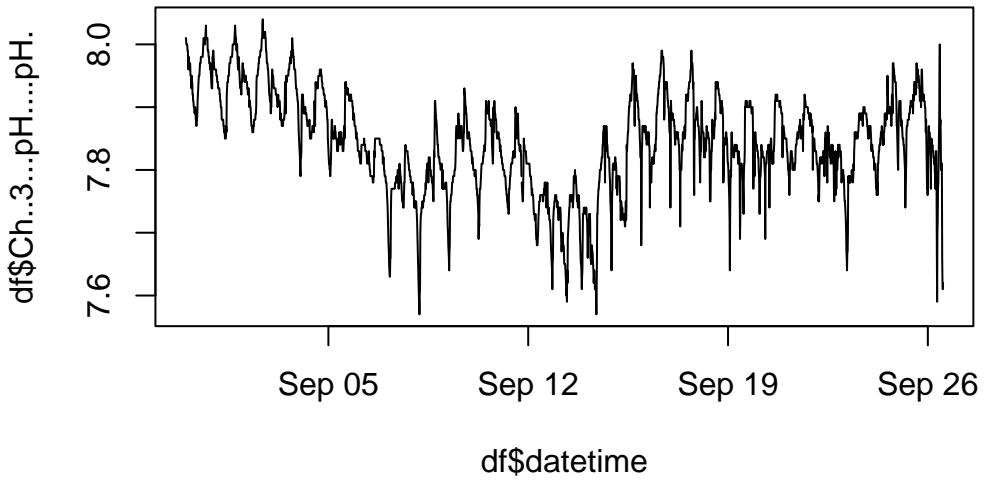
```
6841  
6842  
6843  
6844  
6845  
6846  
6847
```

Logged      Logged

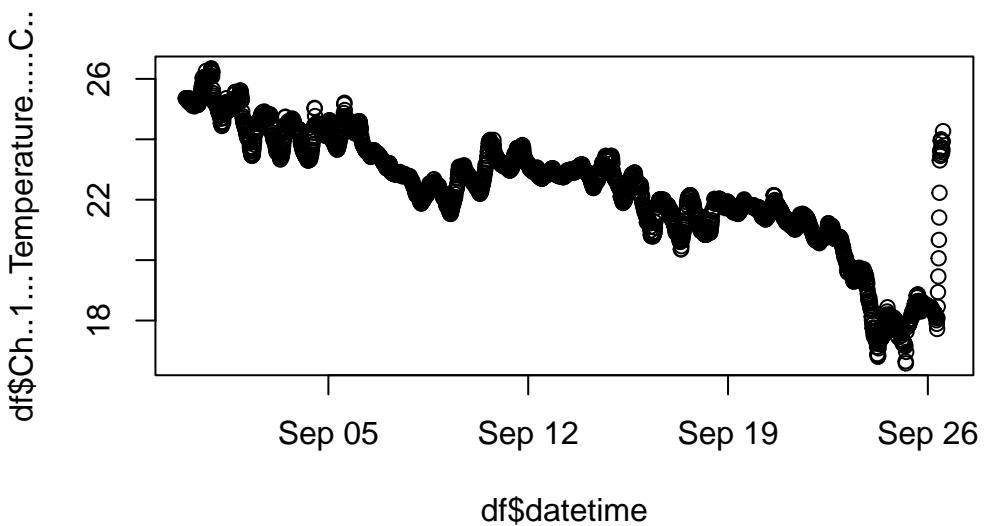
```
df$datetime <- as.POSIXct(strptime(df>Date.Time..EST., format = "%m/%d/%Y %H:%M:%S")) #Swi  
plot(df$datetime, df$Ch..3...pH....pH.)
```



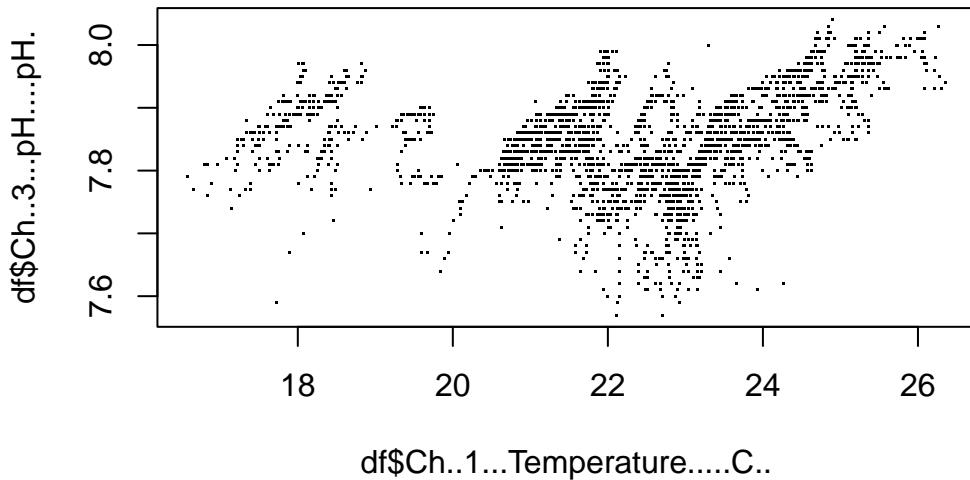
```
# df <- df[df$datetime>"2022-09-25 00:00:00 EDT",]  
# df <- df[df$datetime<"2022-09-29 13:00:00 EDT",]  
df <- df[df$datetime>"2022-08-31 00:00:00 EDT",]  
df <- df[df$datetime<"2022-09-26 13:00:00 EDT",]  
plot(df$datetime, df$Ch..3...pH....pH., type = "l")
```



```
plot(df$datetime, df$Ch..1...Temperature.....C., type = "p")
```



```
plot(df$Ch..1...Temperature.....C., df$Ch..3...pH....pH., pch = '.')
```



```
data_combined_new <- data.frame(
  Site = rep("Ptown", times = nrow(df)),
  Date = df$datetime,
  Temp = df$Ch..1...Temperature.....C.,
  pH = df$Ch..3...pH....pH.
)
data_combined <- rbind(data_combined, data_combined_new)

# October
(open_file <- filenames[3])
```

```
[1] "21333340_Eel_Pond 2022-06-13 08_27_36 EDT (Data EDT).csv"
```

```
open_file <- "Eel_076 2022-11-07 15_16_01 EST (Data EST)(1).csv"
head(df, 20)
```

X. Date.Time..EST.EDT. Ch..1...Temperature.....C..

236	236	08/31/2022	00:03:02	25.36
237	237	08/31/2022	00:18:02	25.36
238	238	08/31/2022	00:33:02	25.33
239	239	08/31/2022	00:48:02	25.36
240	240	08/31/2022	01:03:02	25.36
241	241	08/31/2022	01:18:02	25.33
242	242	08/31/2022	01:33:02	25.28
243	243	08/31/2022	01:48:02	25.31
244	244	08/31/2022	02:03:02	25.26
245	245	08/31/2022	02:18:02	25.36
246	246	08/31/2022	02:33:02	25.33
247	247	08/31/2022	02:48:02	25.36
248	248	08/31/2022	03:03:02	25.23
249	249	08/31/2022	03:18:02	25.21
250	250	08/31/2022	03:33:02	25.21
251	251	08/31/2022	03:48:02	25.21
252	252	08/31/2022	04:03:02	25.21
253	253	08/31/2022	04:18:02	25.19
254	254	08/31/2022	04:33:02	25.19
255	255	08/31/2022	04:48:02	25.16

Ch..2...Millivolts....mv. Ch..3....pH....pH. Button.Down Button.Up

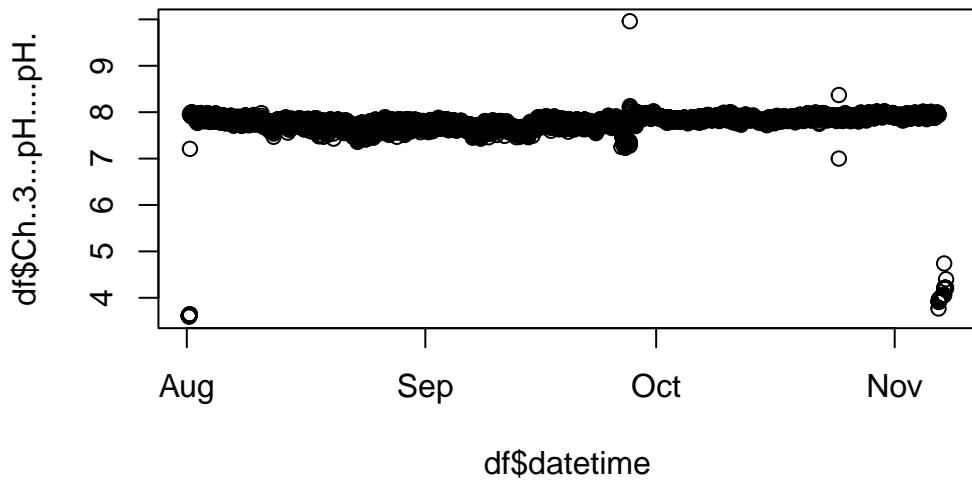
236	-69.21	8.01
237	-69.19	8.01
238	-68.96	8.00
239	-68.94	8.00
240	-68.55	8.00
241	-68.39	8.00
242	-68.25	7.99
243	-68.05	7.99
244	-67.47	7.98
245	-66.60	7.96
246	-67.31	7.98
247	-67.22	7.97
248	-66.75	7.97
249	-66.53	7.96
250	-66.77	7.97
251	-66.72	7.97
252	-65.96	7.95
253	-65.75	7.95
254	-65.58	7.95
255	-64.85	7.93

Host.Connected Start.pH.Calibration pH.Calibration.Values

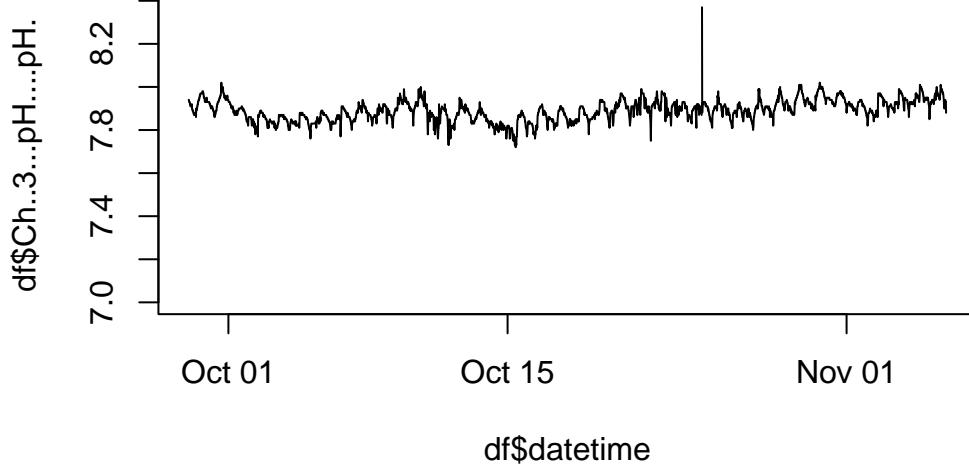
```
236
237
238
239
240
241
242
243
244
245
246
247
248
249
250
251
252
253
254
255
    pH.Calibration.Buffers End.pH.Calibration Stopped End.of.File
236
237
238
239
240
241
242
243
244
245
246
247
248
249
250
251
252
253
254
255
        datetime
236 2022-08-31 00:03:02
```

```
237 2022-08-31 00:18:02
238 2022-08-31 00:33:02
239 2022-08-31 00:48:02
240 2022-08-31 01:03:02
241 2022-08-31 01:18:02
242 2022-08-31 01:33:02
243 2022-08-31 01:48:02
244 2022-08-31 02:03:02
245 2022-08-31 02:18:02
246 2022-08-31 02:33:02
247 2022-08-31 02:48:02
248 2022-08-31 03:03:02
249 2022-08-31 03:18:02
250 2022-08-31 03:33:02
251 2022-08-31 03:48:02
252 2022-08-31 04:03:02
253 2022-08-31 04:18:02
254 2022-08-31 04:33:02
255 2022-08-31 04:48:02
```

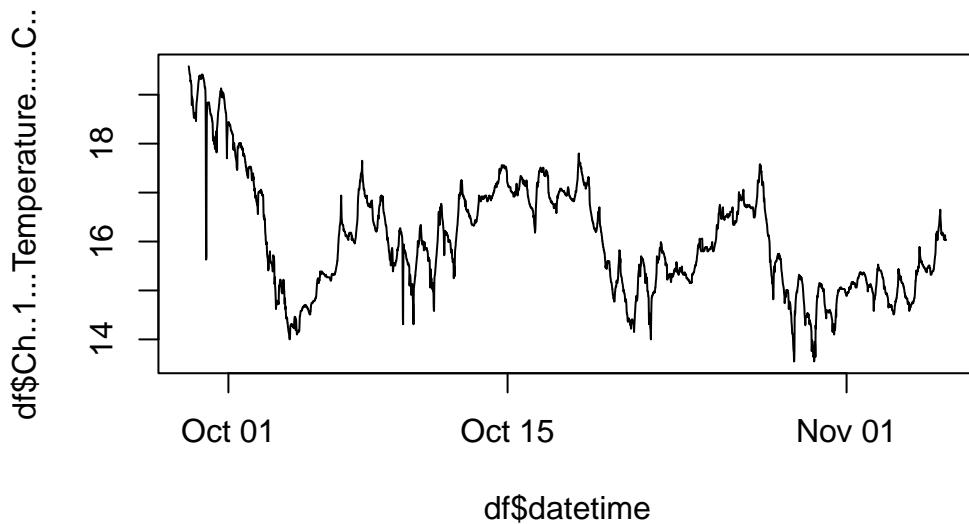
```
df <- read.csv(open_file, stringsAsFactors = F)
df$datetime <- as.POSIXct(strptime(df$date..Time..EST., format = "%m/%d/%Y %H:%M:%S")) #Change
plot(df$datetime, df$Ch..3...pH....pH.)
```



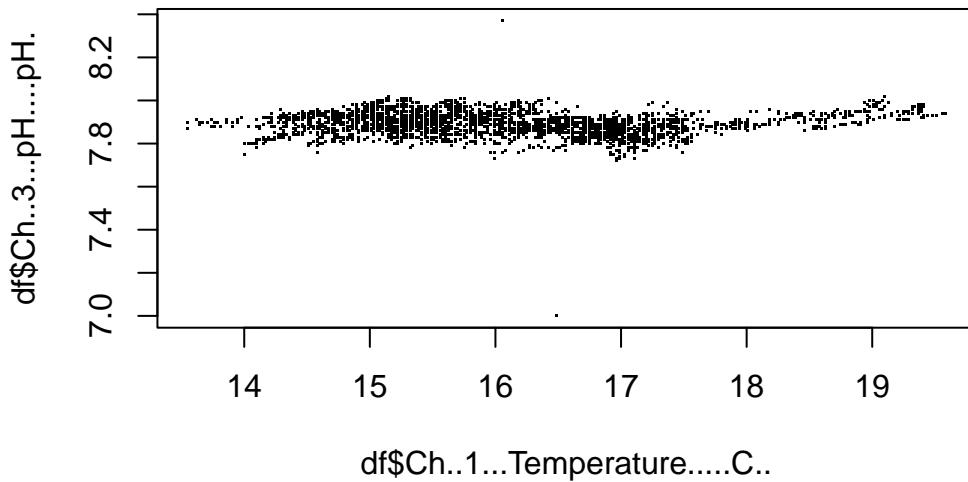
```
df <- df[df$datetime>"2022-09-29 00:00:00 EDT",]  
df <- df[df$datetime<"2022-11-06 00:00:00 EDT",]  
plot(df$datetime, df$Ch..3...pH....pH., type = "l")
```



```
plot(df$datetime, df$Ch..1...Temperature.....C., type = "l")
```



```
plot(df$Ch..1...Temperature.....C., df$Ch..3...pH....pH., pch = '.')
```

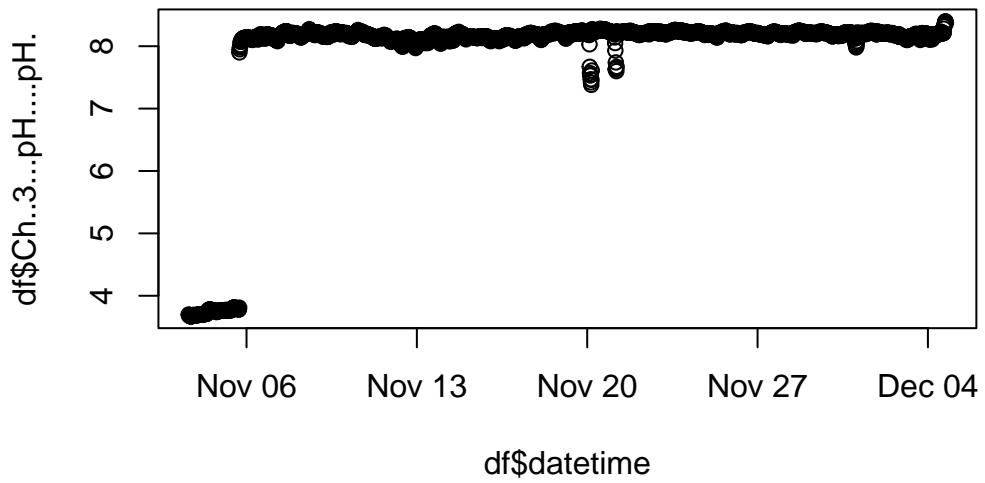


```
data_combined_new <- data.frame(
  Site = rep("Eel",times = nrow(df)),
  Date = df$datetime,
  Temp = df$Ch..1...Temperature.....C.,
  pH = df$Ch..3...pH....pH.
)

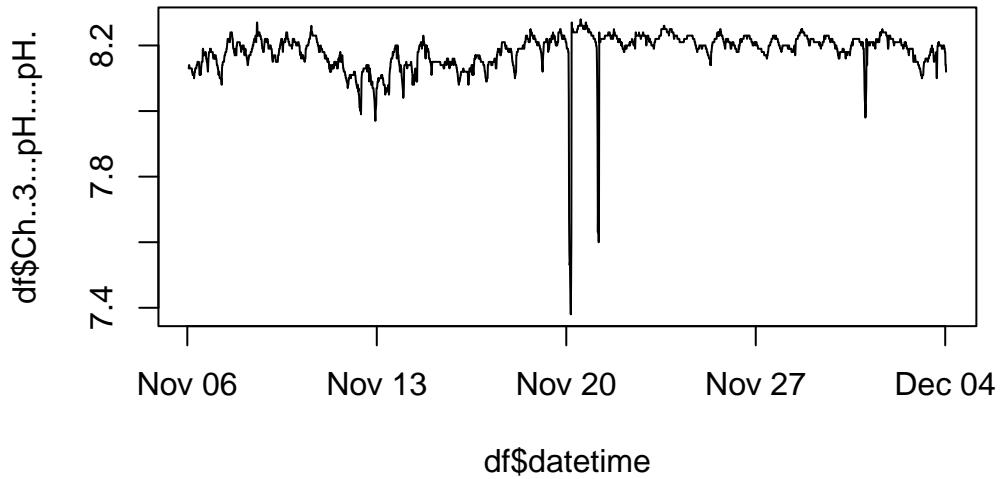
data_combined <- rbind(data_combined,data_combined_new)

setwd(wdEel)
# November
#(open_file <- filenames[3])
open_file <- "20573560_Ptown 2022-12-05 16_55_15 EST (Data EST)_actuallyEel.csv"

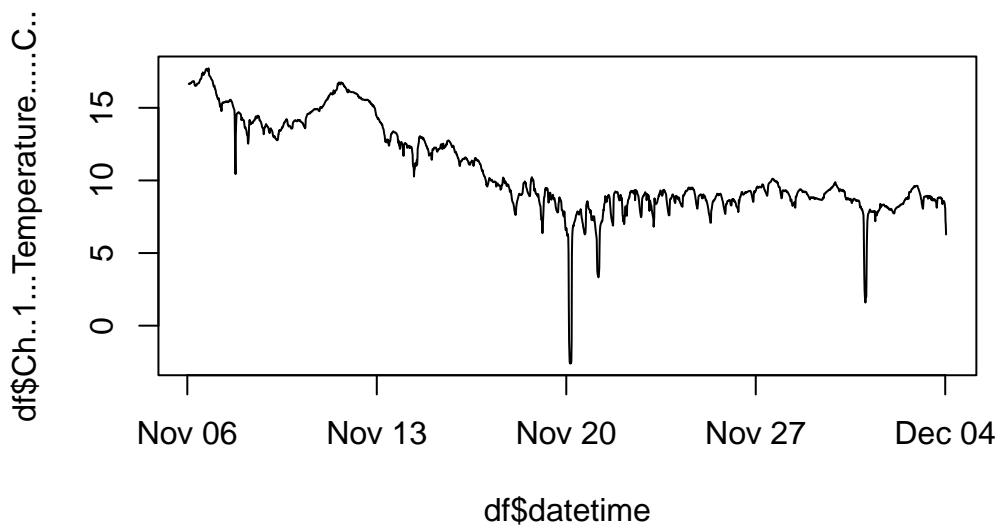
df <- read.csv(open_file, stringsAsFactors = F)
df$datetime <- as.POSIXct(strptime(df>Date.Time..EST., format = "%m/%d/%Y %H:%M:%S")) #Change
plot(df$datetime, df$Ch..3...pH....pH.)
```



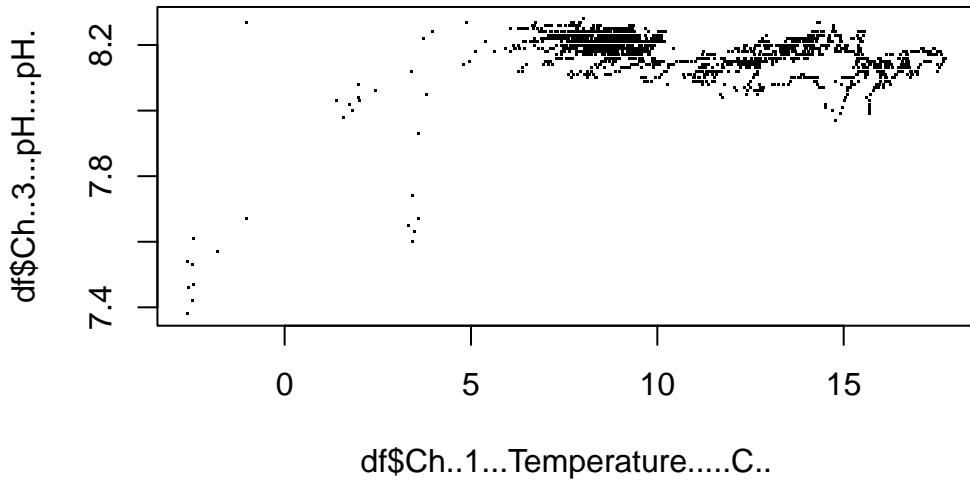
```
df <- df[df$datetime>"2022-11-07 00:00:00 EDT",]  
df <- df[df$datetime<"2022-12-05 00:00:00 EDT",]  
plot(df$datetime, df$Ch..3...pH....pH., type = "l")
```



```
plot(df$datetime, df$Ch..1...Temperature.....C., type = "l")
```



```
plot(df$Ch..1...Temperature.....C.., df$Ch..3...pH....pH., pch = '.')
```



```
data_combined_new <- data.frame(  
  Site = rep("Eel", times = nrow(df)),  
  Date = df$datetime,  
  Temp = df$Ch..1...Temperature.....C..,  
  pH = df$Ch..3...pH....pH.  
)
```

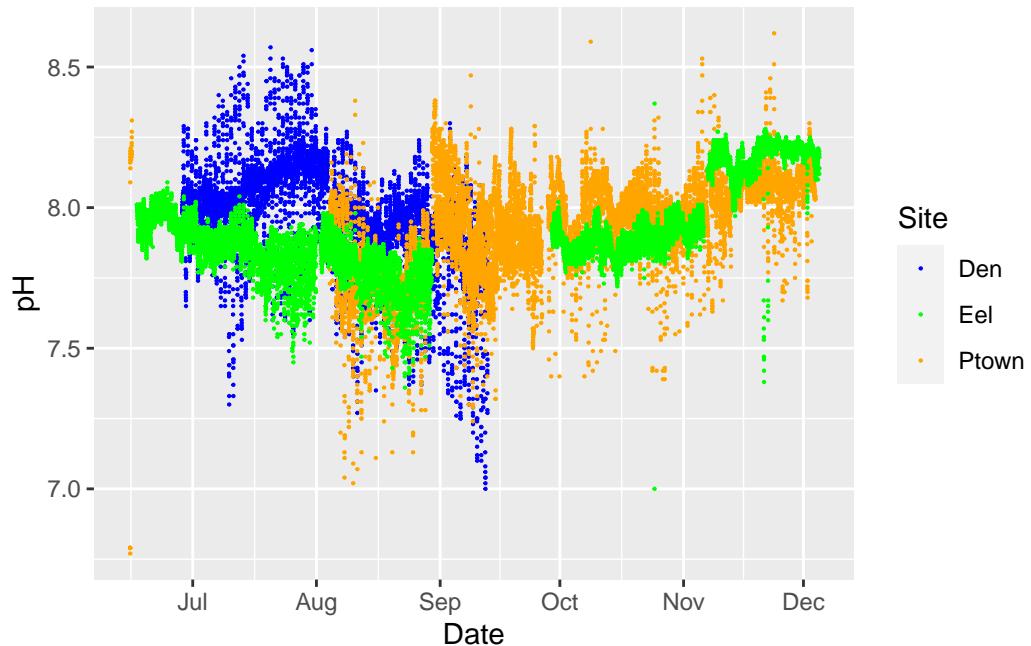
```
data_combined <- rbind(data_combined, data_combined_new)
```

## 0.2 Combine

```
#plot(data_combined>Date, data_combined$pH,  
#color = as.factor(data_combined$Site), pch = ".")  
  
g1 <- ggplot(data_combined, aes(x=Date, y=pH, colour = Site))+  
  geom_point(cex = .1) +
```

```
  scale_color_manual(values=c("blue", "green", "orange"))
g1
```

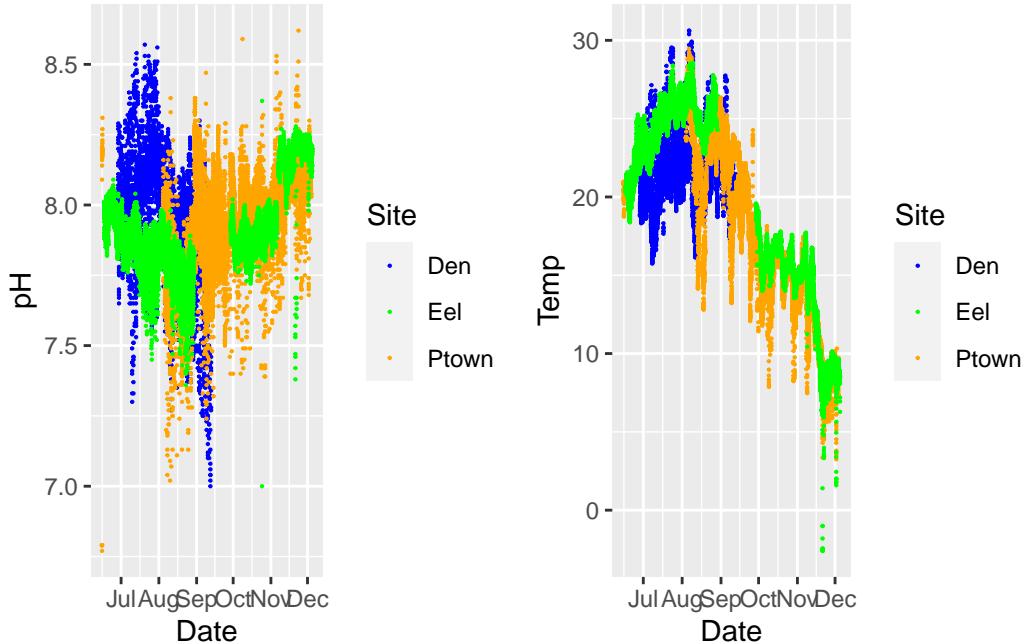
Warning: Removed 21 rows containing missing values (`geom\_point()`).



```
g2 <- ggplot(data_combined, aes(x=Date, y=Temp, colour = Site))+
  geom_point(cex = .1) +
  scale_color_manual(values=c("blue", "green", "orange"))

ggarrange(g1, g2)
```

Warning: Removed 21 rows containing missing values (`geom\_point()`).  
Removed 21 rows containing missing values (`geom\_point()`).



```
min(data_combined$Date)
```

```
[1] "2022-06-14 21:28:13 EDT"
```

### 0.2.1 Plot tides

```
# Plot tides
setwd("~/GitHub/EAD-ASEB-Ssolidissima-0A/projects/Seawater data/data/Tides")
dir()
```

```
[1] "Den_Aug.txt"      "Den_Jul.txt"      "Den_Sep.txt"      "Hyannis_Aug.txt"
[5] "Hyannis_Jul.txt"  "Hyannis_Sep.txt"  "Ptown_Aug.txt"    "Ptown_Jul.txt"
[9] "Ptown_Sep.txt"
```

```
tides.Ptown1 <- read.table("Ptown_Jul.txt", skip =14)
tides.Ptown2 <- read.table("Ptown_Aug.txt", skip =14)
tides.Ptown3 <- read.table("Ptown_Sep.txt", skip =14)
tides.Den1 <- read.table("Den_Jul.txt", skip =14)
tides.Den2 <- read.table("Den_Aug.txt", skip =14)
```

```

tides.Den3 <- read.table("Den_Sep.txt", skip =14)
tides.Eel1 <- read.table("Hyannis_Jul.txt", skip =14)
tides.Eel2 <- read.table("Hyannis_Aug.txt", skip =14)
tides.Eel3 <- read.table("Hyannis_Sep.txt", skip =14)

tides.Ptown <- rbind(tides.Ptown1, tides.Ptown2, tides.Ptown3)
tides.Den <- rbind(tides.Den1, tides.Den2, tides.Den3)
tides.Eel <- rbind(tides.Eel1, tides.Eel2, tides.Eel3)

tides <- data.frame(tides = rbind(tides.Ptown,tides.Den,tides.Eel),
                     Site = as.factor(c(rep("Ptown",times=nrow(tides.Ptown)),
                                         rep("Den",times=nrow(tides.Ptown)),
                                         rep("Eel",times=nrow(tides.Ptown)))))

names(tides)<- c("date","day","Time","Tideheight","Site")

Date1 <- paste(tides$date,tides$Time,sep=" ")

tides>Date <- as.POSIXct(strptime(Date1,format = "%Y/%m/%d %H:%M"))

data_combined>Date<-round_date(as.POSIXct(data_combined>Date),
                                 unit="minutes")
data_combined$Site<-as.factor(data_combined$Site)

head(data_combined)

```

	Site	Date	Temp	pH
1	Den	2022-06-28 08:00:00	18.79	7.86
2	Den	2022-06-28 08:15:00	18.87	7.96
3	Den	2022-06-28 08:30:00	18.82	7.94
4	Den	2022-06-28 08:45:00	18.87	7.94
5	Den	2022-06-28 09:00:00	19.08	7.98
6	Den	2022-06-28 09:15:00	19.25	7.99

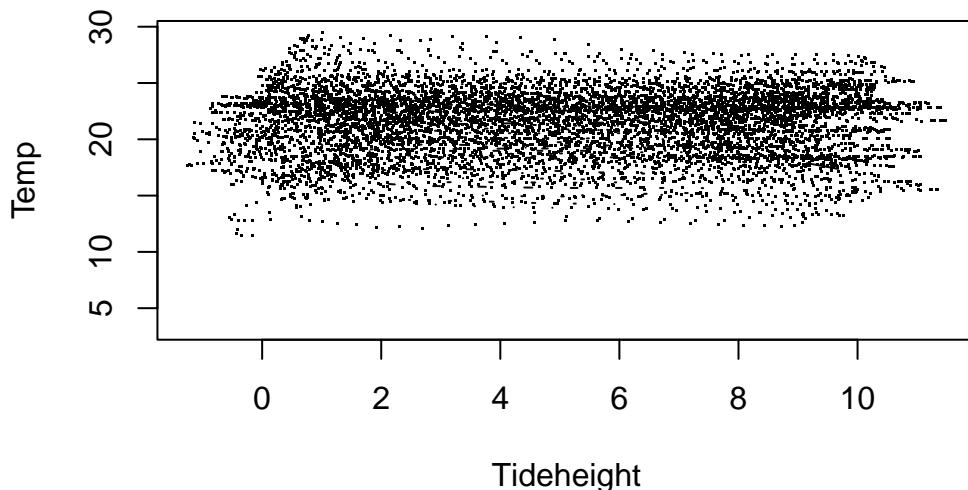
```
head(tides)
```

	date	day	Time	Tideheight	Site	Date
1	2022/07/01	Fri	00:00	8.46	Ptown	2022-07-01 00:00:00
2	2022/07/01	Fri	00:01	8.49	Ptown	2022-07-01 00:01:00
3	2022/07/01	Fri	00:02	8.51	Ptown	2022-07-01 00:02:00
4	2022/07/01	Fri	00:03	8.54	Ptown	2022-07-01 00:03:00

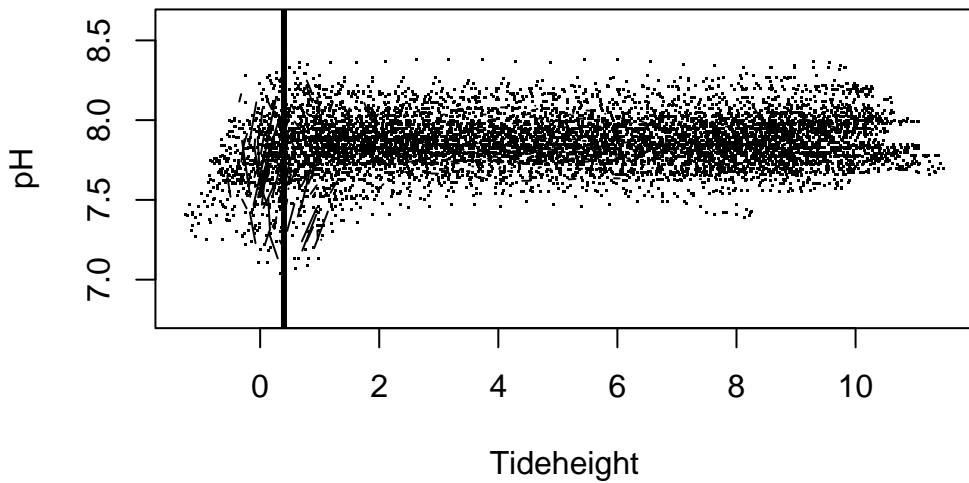
```
5 2022/07/01 Fri 00:04      8.56 Ptown 2022-07-01 00:04:00  
6 2022/07/01 Fri 00:05      8.59 Ptown 2022-07-01 00:05:00
```

```
joined_df <- left_join(x=data_combined, y=tides, by= c("Date","Site"))

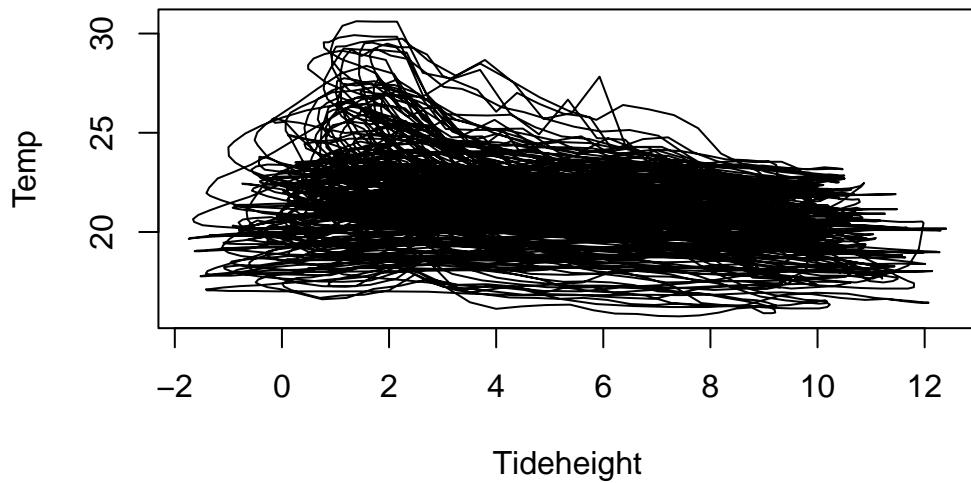
# Plot tides -----
Ptown <- joined_df[joined_df$Site=="Ptown",]
plot(Temp~Tideheight, pch =".",type ="b", data = Ptown)
```



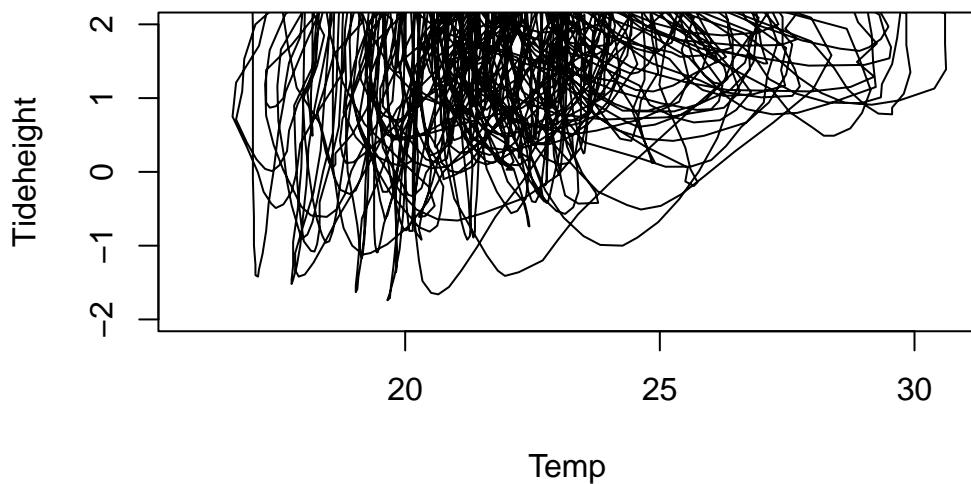
```
plot(pH~Tideheight,pch=".",data = Ptown, type = "b")
lines(x=c(.4,.4),y=c(5,9),lwd=3)
```



```
# This graph seems to demonstrate that pH goes up or down at low tide (I'm guessing night  
# but below a certain point goes to ~7.8 - I think this is when the pH probe is not  
# in water anymore.  
  
Den <- joined_df[joined_df$Site=="Den",]  
plot(Temp~Tideheight, pch =".", type ="l", data = Den)
```

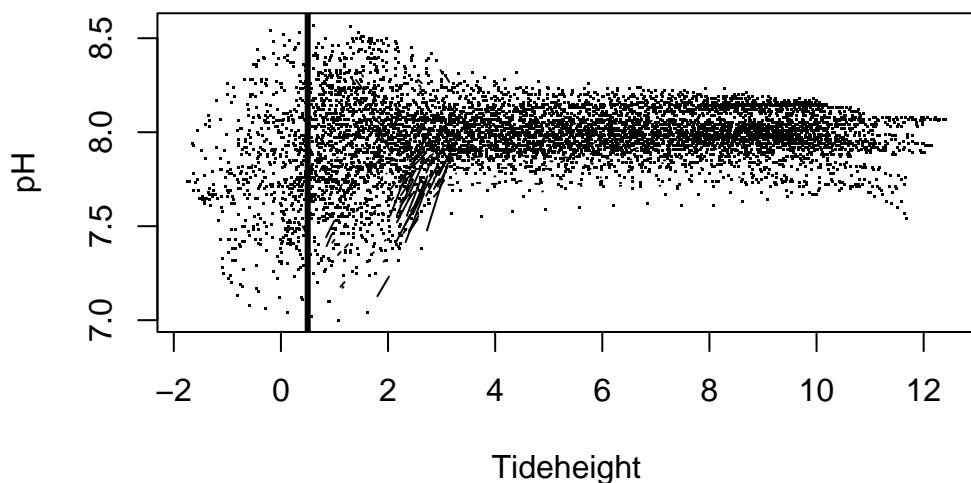


```
plot(Tideheight~Temp, pch =".",type ="l", data = Den, ylim = c(-2,2))
```

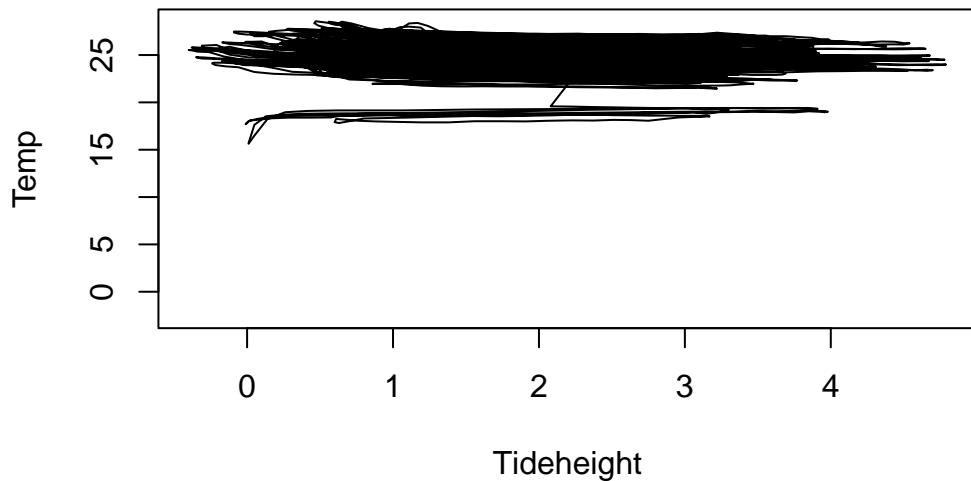


```
# What concerns me are the lines where temp rapidly increases at low tide. I expect some s  
# I also wonder about introducing a lag of a few hours after the sensor has been out of the
```

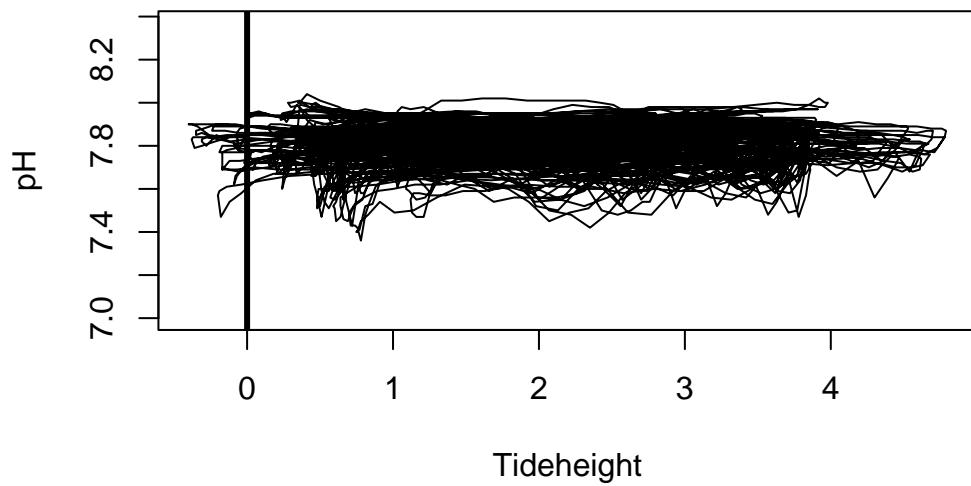
```
plot(pH~Tideheight,pch=". ",data = Den, type = "b")  
lines(x=c(.5,.5),y=c(5,9),lwd=3)
```



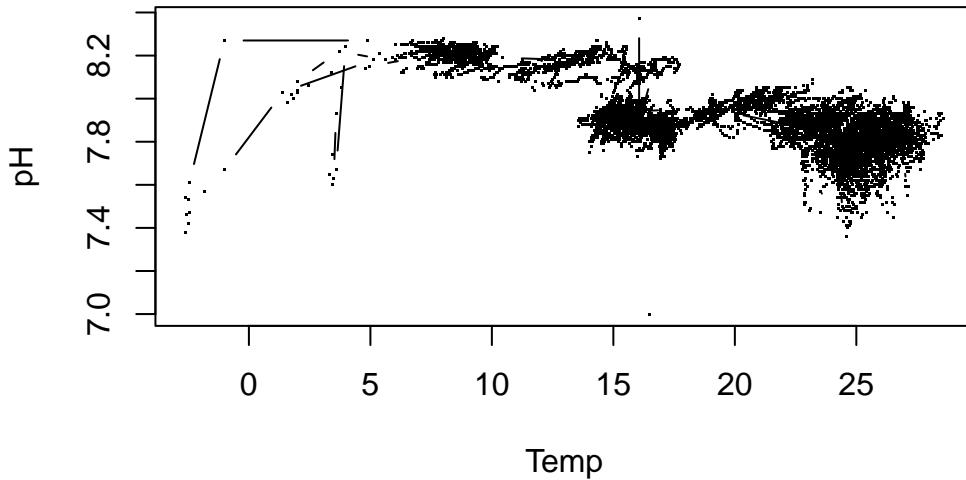
```
Eel <- joined_df[joined_df$Site=="Eel",]  
plot(Temp~Tideheight, pch =". ",type ="l", data = Eel)
```



```
plot(pH~Tideheight,pch=".",data = Eel, type = "l")
lines(x=c(0,0),y=c(5,30),lwd=3)
```



```
plot(pH~Temp, pch =".",type ="b", data = Eel)
```



```
# Not clear from data what tide is too low. It might be more wind-dependent.  
# At 0.5ft tide the cages are on sediment that is about 2.5 ft deep.  
# The sensor is installed <0.5ft above the sediment. However there is likely a mismatch be  
# The actual water level - the site water level does not vary much.  
# Honestly, I don't see anything in this data linked with the tides to suggest that I'm ge  
# If anything, the highest temps occur when the low tides are really minimal.  
# The HOBO temp logger will probably help the most in figuring this out,  
# it will help determine if there is some wind/tide-driven bad data or not due to sensor e  
  
# Subset data -----  
  
# all.data <- joined_df[joined_df$Site=="Ptown"&joined_df$Tideheight>0.4 |  
#                         joined_df$Site=="Den"&joined_df$Tideheight>0.5 |  
#                         joined_df$Site=="Eel"&joined_df$Tideheight>0,]  
  
Ptown <- Ptown[Ptown$Tideheight>0.4,]  
Den <- Den[Den$Tideheight>0.5,]  
Eel <- Eel[Eel$Tideheight>0,]
```

```

# Aggregate data -----
Ptown.hr <- aggregate(Ptown[,c("pH", "Temp")],
                      list(Date = cut(Ptown[,c("Date")], breaks="day")),
                      mean, na.rm = TRUE)
Den.hr <- aggregate(Den[,c("pH", "Temp")],
                      list(Date = cut(Den[,c("Date")], breaks="day")),
                      mean, na.rm = TRUE)
Eel.hr <- aggregate(Eel[,c("pH", "Temp")],
                      list(Date = cut(Eel[,c("Date")], breaks="day")),
                      mean, na.rm = TRUE)

all.data.hr <- data.frame(
  rbind(Ptown.hr, Den.hr, Eel.hr),
  Site = as.factor(c(rep("Ptown", times = nrow(Ptown.hr)),
                      rep("Den", times = nrow(Den.hr)),
                      rep("Eel", times = nrow(Eel.hr)))))
)
all.data.hr$Date<- as.POSIXct(all.data.hr$Date)
head(all.data.hr)

```

	Date	pH	Temp	Site
1	2022-08-04	7.962556	25.35567	Ptown
2	2022-08-05	7.954894	26.72702	Ptown
3	2022-08-06	7.857447	26.63447	Ptown
4	2022-08-07	7.790769	26.07648	Ptown
5	2022-08-08	7.791124	25.64764	Ptown
6	2022-08-09	7.726364	25.02966	Ptown

```

# Plot -----
# plot(all.data$date, all.data$pH,
#      color = as.factor(data_combined$Site), pch = ".")  

sampling.pH <- data.frame(
  x = as.POSIXct(c("2022-06-29 00:00:00 EDT", "2022-08-2 00:00:00 EDT", "2022-09-9 00:00:00"),
  y = c(7.5, 7.5, 7.5))
sampling.temp <- data.frame(
  x = as.POSIXct(c("2022-06-29 00:00:00 EDT", "2022-08-2 00:00:00 EDT", "2022-09-9 00:00:00"),
  y = c(14, 14, 14))

```

```
)
```

```
theme_set(theme_bw())
```

```
colors <- c(
```

```
  "Dennis"="blue",
```

```
  "Eel"="green",
```

```
  "Ptown"="orange",
```

```
  "Date sampled"="black"
```

```
)
```

```
#scale_color_manual(values=c("blue", "green", "orange"))
```

```
# Now I'm aggregating by day... and this is a bit easier to digest when comparing among sites
```

```
head(all.data.hr)
```

	Date	pH	Temp	Site
1	2022-08-04	7.962556	25.35567	Ptown
2	2022-08-05	7.954894	26.72702	Ptown
3	2022-08-06	7.857447	26.63447	Ptown
4	2022-08-07	7.790769	26.07648	Ptown
5	2022-08-08	7.791124	25.64764	Ptown
6	2022-08-09	7.726364	25.02966	Ptown

```
str(all.data.hr)
```

```
'data.frame': 190 obs. of 4 variables:  
 $ Date: POSIXct, format: "2022-08-04" "2022-08-05" ...  
 $ pH : num 7.96 7.95 7.86 7.79 7.79 ...  
 $ Temp: num 25.4 26.7 26.6 26.1 25.6 ...  
 $ Site: Factor w/ 3 levels "Den","Eel","Ptown": 3 3 3 3 3 3 3 3 3 3 ...
```

```
gg1 <- ggplot(all.data.hr, aes(x=Date, y=pH, colour = Site))+  
  geom_point(cex = 1) +  
  geom_line(cex = 1)+  
  ylim(7.5,8.3)+  
  xlim(as.POSIXct(c("2022-06-29 00:00:00 EDT","2022-09-9 00:00:00 EDT")))+  
  geom_point(data = sampling.pH, aes(x,y), color = "black", cex = 5)+  
  scale_color_manual(values=colors) +  
  guides(colour = guide_legend(override.aes = list(size=5)))+
```

```
ggttitle('B. pH')

Warning: Using `size` aesthetic for lines was deprecated in ggplot2 3.4.0.
  i Please use `linewidth` instead.

ylab = expression("Temperature " ( degree*C))

gg2 <- ggplot(all.data.hr, aes(x=Date, y=Temp, colour = Site))+
  geom_point(cex = 1) +
  geom_line(cex = 1)+ 
  labs(y=ylab)+ 
  ylim(14,30)+ 
  xlim(as.POSIXct(c("2022-06-29 00:00:00 EDT","2022-09-9 00:00:00 EDT")))+ 
  geom_point(data = sampling.temp, aes(x,y), color = "black", cex = 5)+ 
  scale_color_manual(values=colors) + 
  guides(colour = guide_legend(override.aes = list(size=5)))+
  ggttitle('A. Temp')

ggarrange(gg2, gg1, common.legend = TRUE, legend="bottom")
```

Warning: Removed 25 rows containing missing values (`geom\_point()`).

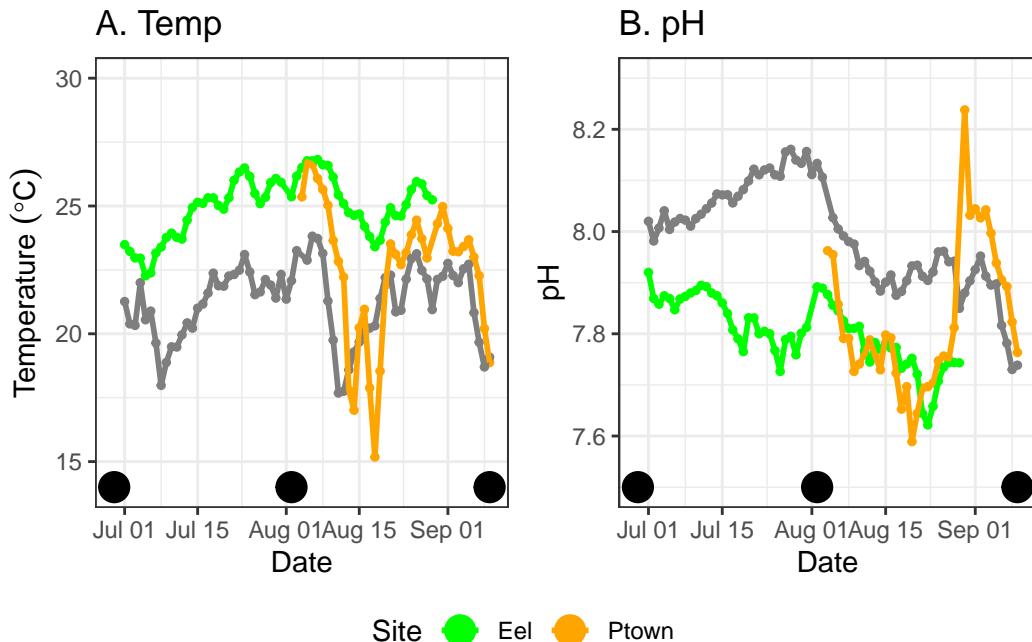
Warning: Removed 25 rows containing missing values (`geom\_line()`).

Warning: Removed 25 rows containing missing values (`geom\_point()`).

Warning: Removed 25 rows containing missing values (`geom\_line()`).

Warning: Removed 25 rows containing missing values (`geom\_point()`).

Warning: Removed 25 rows containing missing values (`geom\_line()`).



```
#
```

```
# Subset data - playing around -----
all.data <- joined_df[joined_df$Site=="Ptown"&joined_df$Tideheight>2 |
                      joined_df$Site=="Den"&joined_df$Tideheight>2 |
                      joined_df$Site=="Eel"&joined_df$Tideheight>2,]

# Plot -----
plot(all.data$date, all.data$pH,
     color = as.factor(data_combined$Site), pch = ".")
```

Warning in plot.window(...): "color" is not a graphical parameter

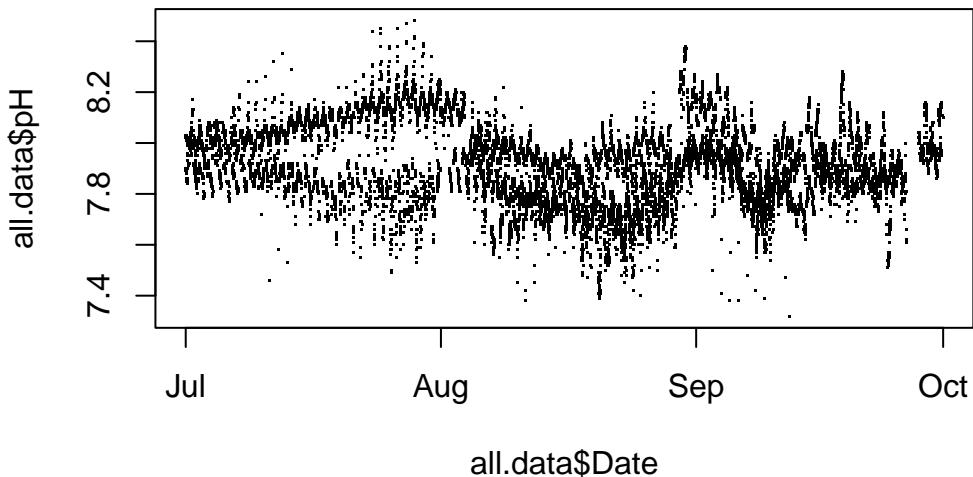
Warning in plot.xy(xy, type, ...): "color" is not a graphical parameter

Warning in axis(side, at = z, labels = labels, ...): "color" is not a graphical parameter

```
Warning in axis(side = side, at = at, labels = labels, ...): "color" is not a graphical parameter
```

```
Warning in box(...): "color" is not a graphical parameter
```

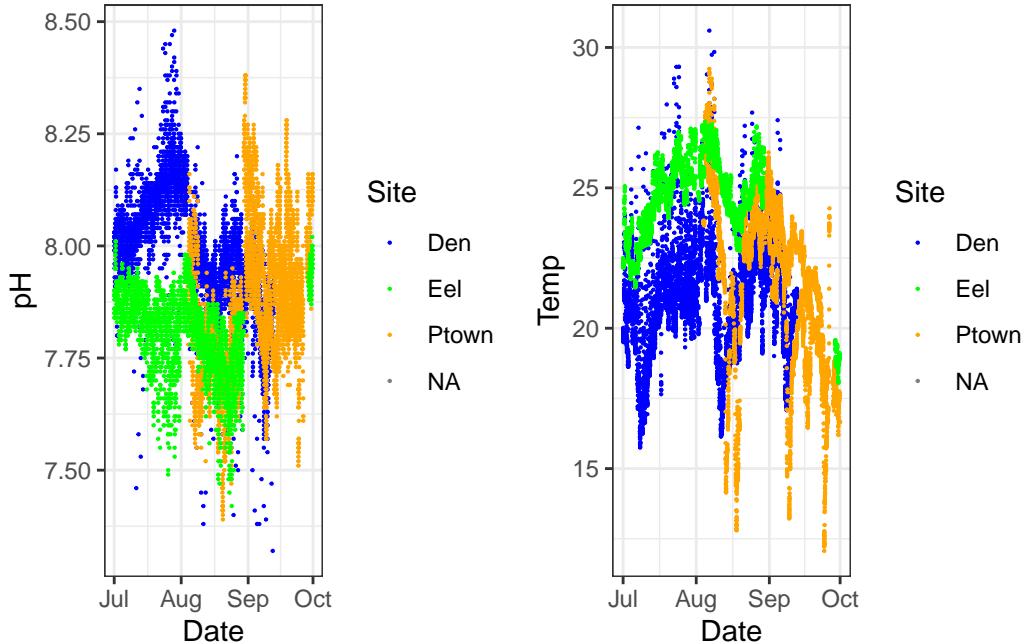
```
Warning in title(...): "color" is not a graphical parameter
```



```
g1 <- ggplot(all.data, aes(x=Date, y=pH, colour = Site))+  
  geom_point(cex = .1) +  
  scale_color_manual(values=c("blue", "green", "orange"))  
  
g2 <- ggplot(all.data, aes(x=Date, y=Temp, colour = Site))+  
  geom_point(cex = .1) +  
  scale_color_manual(values=c("blue", "green", "orange"))  
  
ggarrange(g1, g2)
```

```
Warning: Removed 13940 rows containing missing values (`geom_point()`).
```

```
Warning: Removed 13940 rows containing missing values (`geom_point()`).
```



```
min(data_combined$Date)
```

```
[1] "2022-06-14 21:28:00 EDT"
```

```
# I need to add all of the tide data so I can subset the data using tide data

# Tide data websites:
#https://tidesandcurrents.noaa.gov/map/index.html
# Dennis https://tidesandcurrents.noaa.gov/noaatidepredictions.html?id=8447241&units=stand
# Falmouth - only L/H: https://tidesandcurrents.noaa.gov/noaatidepredictions.html?id=84478
# Hyannis - https://tidesandcurrents.noaa.gov/noaatidepredictions.html?id=8447605
# Note I'm using the Hyannis dataset because they have down to 1min predictions. Falmouth
# Compared to Eel Pond Entrance on Willy Weather, Hyannis is ~30 min behind - which is per
# Willy Weather says it is.
```