A1 Supplementary information to methods

A1.1 Land use/land cover results

Table A1.1.1 Calculated percentages for agriculture, forest, and urban land use and land cover in the Buffalo River watershed, derived from the National Land Cover Database, 2012.

Site	Agriculture	Forest	Urban	Agriculture +Urban
BUFR01	5.2	92.8	1.9	7.2
BUFR02	8.5	89.1	2.3	10.7
BUFR03	9.1	88.2	2.4	11.5
BUFR04	11.0	85.7	3.1	14.1
BUFR05	11.6	85.1	3.1	14.7
BUFR06	14.0	82.6	3.2	17.2
BUFR07	16.6	79.8	3.4	19.9
BUFR08	16.3	80.1	3.3	19.7
BUFR09	16.6	79.8	3.3	19.9
BUFT01	9.2	89.6	1.1	10.4
BUFT02	11.8	82.7	5.5	17.3
BUFT03	13.3	84.1	2.5	15.8
BUFT04	17.8	77.6	4.7	22.4
BUFT05	11.0	85.0	3.8	14.8
BUFT06	16.4	80.2	3.3	19.7
BUFT07	26.6	70.0	3.3	30.0
BUFT08	13.8	82.6	3.6	17.4
BUFT09	6.4	90.9	2.4	8.8
BUFT10	32.3	64.2	3.5	35.8
BUFT11	26.9	68.6	4.6	31.4
BUFT12	31.8	63.4	4.3	36.2
BUFT13	27.8	66.8	5.4	33.2
BUFT14	33.8	63.4	2.8	36.6
BUFT15	18.5	78.3	3.2	21.7
BUFT16	9.0	87.5	3.6	12.5
BUFT17	24.5	73.6	1.8	26.3
BUFT18	25.8	70.4	3.7	29.5
BUFT23	0.6	96.9	2.5	3.1
BUFT24	0.4	97.2	2.4	2.8
BRSJ	13.5	83.1	3.2	16.7

A1.2 Workflow to Unify, Merge, and Calculate Parameters Within and Across Buffalo Nutrient Data Files

Data: EPA WQP - 1-25-1989 to 6-12-2019

Data Concerns:

-Redundant characteristic names for same nutrient species

-Full nutrient species ID stored in 2 columns: “Characteristic” and “Fraction”

-Units not consistent within or across redundant characteristics

Actions across parameters:

-“Characteristic names” will be merged with “Sample fraction”

-“Dissolved” & “Total” fractions for same characteristics will become distinct characteristics in database

-Units will be converted to N or P basis for all characteristics

-Redundant characteristics will be collapsed by merging under unified characteristic names and by removing characteristics with limited data

-Characteristics not directly quantified will be calculated from components, when possible

Ammonia+Ammonium-N_merge (Dissolved and Total):

-Characteristics to merge:

1. Ammonia and ammonium
2. Ammonia-nitrogen

-Characteristics to remove:

1. Ammonia-nitrogen as N (n=1 and in non-standard units [ueq/L])
2. Ammonium (n=1 and in non-standard units [ueq/L])

Nitrate+Nitrite-N_merge (Dissolved and Total):

-Characteristics to calculate: Nitrate+Nitrite_Calc = Nitrate + Nitrite

-Characteristics to merge:

1. Inorganic nitrogen (nitrate and nitrite)
2. Nitrate+Nitrite_Calc

-Characteristic to remove: Nitrate as N (n=1, no reported value or reporting limit)

Orthophosphate (Dissolved and Total):

-Characteristics to merge:

1. Orthophosphate
2. Phosphate-phosphorus (Total, USGS data only)

Total Nitrogen (Dissolved and Total):

-Characteristic to calculate: TN_calc = Kjehldahl nitrogen + Nitrate+Nitrite-N_merge

-Characteristics to merge:

1. Nitrogen, mixed forms (NH3), (NH4), organic, (NO2) and (NO3)
2. TN_calc

-Characteristic to remove: Nitrogen (n=26, where n=25 are "Suspended" fraction and n=1 from site with only 1 sample date)

Total phosphorus (Dissolved and Total):

-Characteristics to merge:

1. Phosphorus, Total
2. Phosphate-phosphorus (Total, ADEQ data only)
3.

Data: NPS – 4-8-1985 to 9-25-1990

Data Concerns:

-Nutrient species identified by ambiguous abbreviations (ex: TPO4)

-No information about analyses is available

Actions:

-Check STORET Legacy data for parameter code and specifications

-Identify nutrient species by the STORET parameter code specifications (ex: analytes, fractions), see Table 1

-Combine with EPA WQP data (see Table 2)

Table 1.2.1 A key for translating NPS abbreviations to EPA WQP characteristics using the codes under which data were identified in the EPA STORET database.

Abbreviation	STORET code	EPA WQP characteristic
TN	NA (Appears to be calculated parameter, TKN+NO3 = TN)	Nitrogen, mixed forms (NH3), (NH4), organic, (NO2) and (NO3), Total & TN_Calc, Total
TKN	00625 (Ammonia plus organic nitrogen, water, unfiltered, milligrams per liter as nitrogen)	Kjehldahl nitrogen, Total
NO3	00631 (Nitrate plus nitrite, water, filtered, milligrams per liter as nitrogen)	Inorganic nitrogen (nitrate and nitrite), Dissolved & Nitrate+Nitrite_Calc, Dissolved
TPO4	00665 (Phosphorus, water, unfiltered, milligrams per liter as phosphorus)	Phosphorus, Total

Data: ADEQ – 4-1-2018 to 6-24-2019

Data Concerns:

-Missing dates for some observations

-Nutrient species identified by ambiguous abbreviations (ex: OP)

Actions:

-Access data from new ADEQ data portal to obtain better documentation

-Combine with EPA WQP data, see Table 2

Table 1.2.2 Key for merging data stored under ADEQ parameter names with characteristic names from the EPA WQP database.

ADEQ Parameter	EPA WQP
Ammonia-nitrogen (mg/L)	Ammonia and ammonium, Dissolved & Ammonia-nitrogen, Dissolved
Nitrite+Nitrate as Nitrogen (mg/L)	Inorganic nitrogen (nitrate and nitrite), Dissolved & Nitrate+Nitrite_Calc, Dissolved
Orthophosate (mg/L)	Orthophosphate, Dissolved & Phosphate-phosphorus, Dissolved
Total Kjehldahl nitrogen (mg/L)	Kjehldahl nitrogen, Total
Total Nitrogen from Lachat	Nitrogen, mixed forms (NH3), (NH4), organic, (NO2) and (NO3), Total & TN_Calc, Total
Total Phosphorus	Phosphorus, Total

A1.3 Statistical code to analyze the BNR database for standard summary statistics and run trend analysis in R software

```
library(tidyverse)
library(lubridate)
library(TAFA)
library(rkt)

source("C:\\Users\\egrantz\\Documents\\R\\zacho.R")

#load and format data----------------------------------------------------

DB_int <- read_csv("BUFF_Full-Database_Final.csv",guess_max=10000)
DB <- DB_int %>% select(-Q_INSTANT,-QCAT,-Q_DAILY,
          -c("NO2-N_VALUE","NO2-N_FLAG","NO2-N_QC_NOTE"),
          -(contains(c("DON","Phosphate","TDKN","TDN","TDP","TON","NO3-N_","NO2-
N_Total",
                     "NH3+NH4-N_Total","NO3+NO2-N_Total","Ortho-P_Total")))) %>%
rename(c(AMM_N_VALUE = 'NH3+NH4-N_merge_VALUE', NOX_N_VALUE = 'NO3+NO2-
N_merge2_VALUE',
          SRP_VALUE = 'Ortho-P_VALUE',
          AMM_N_FLAG = 'NH3+NH4-N_merge_FLAG', NOX_N_FLAG = 'NO3+NO2-
N_merge2_FLAG',
          SRP_FLAG = 'Ortho-P_FLAG',
          AMM_N_QC_NOTE = 'NH3+NH4-N_merge_QC_NOTE',
          NOX_N_QC_NOTE = 'NO3+NO2-N_merge2_QC_NOTE',
          SRP_QC_NOTE = 'Ortho-P_QC_NOTE'))

WQ_LONG <- DB %>% select(-(contains("FLAG") | contains("QC_NOTE"))) %>%
pivot_longer(AMM_N_VALUE:ECOLI_VALUE, names_to="ANALYTE",values_to="VALUE")
%>%
mutate(ANALYTE = str_remove(ANALYTE, "_VALUE"))

CEN_LONG <- DB %>%
select(AGENCY_UNIFIER,SITE_UNIFIER,Date,Time,contains("FLAG"))%>%
pivot_longer(AMM_N_FLAG:ECOLI_FLAG, names_to="ANALYTE_FLAG",
values_to="FLAG") %>%
mutate(ANALYTE_FLAG = str_remove(ANALYTE_FLAG, "_FLAG"))

QC_NOTE_LONG <- DB %>%
select(AGENCY_UNIFIER,SITE_UNIFIER,Date,Time,contains("QC_NOTE"))%>%
pivot_longer(AMM_N_QC_NOTE:ECOLI_QC_NOTE, names_to="ANALYTE_QC_NOTE",
values_to = "QC_NOTE") %>%
mutate(ANALYTE_QC_NOTE = str_remove(ANALYTE_QC_NOTE,"_QC_NOTE"))

DB_LONG <- WQ_LONG %>%  drop_na(VALUE) %>%
left_join(.,CEN_LONG, by = c("AGENCY_UNIFIER" = "AGENCY_UNIFIER",
```

```
"SITE_UNIFIER" = "SITE_UNIFIER","Date" = "Date","Time" = "Time",
"ANALYTE" = "ANALYTE_FLAG")) %>%
left_join(.,QC_NOTE_LONG, by = c("AGENCY_UNIFIER" = "AGENCY_UNIFIER",
"SITE_UNIFIER" = "SITE_UNIFIER","Date" = "Date","Time" = "Time",
"ANALYTE" = "ANALYTE_QC_NOTE"))%>%
filter(is.na(QC_NOTE))%>%
mutate(Date=mdy(Date))

BIO_LOW = 0.9 #Value to substitute for 0's in FCOL, FSTREP, ECOLI

Q <- DB_LONG %>% select(AGENCY_UNIFIER,SITE_UNIFIER,Date,Time,Q_MERGE)

DB_all <- DB_LONG %>%
filter(year(Date)>1999)%>%
group_by(AGENCY_UNIFIER,SITE_UNIFIER,Date,ANALYTE)%>%
mutate(FLAG = ifelse(is.na(FLAG),0,1))%>%
summarize(Q_MERGE = mean(Q_MERGE,na.rm=T),
          VALUE = mean(VALUE,na.rm=T),
          FLAG = mean(FLAG, na.rm=T))%>%
mutate(FLAG = ifelse(FLAG >0, "<", NA))%>%
mutate(VALUE_corr = ifelse(VALUE == 0, BIO_LOW, VALUE),
           VALUE_corr = ifelse(ANALYTE == "pH", 10^VALUE, VALUE_corr))%>%
distinct()

DB_analysis <- DB_all %>% drop_na(Q_MERGE) %>%
filter(!(Q_MERGE == 0 | Q_MERGE < 0))

#SUMSTATS--------------------------------------------------------------------------
SUMSTATS_ALL_int <- DB_all %>% group_by(SITE_UNIFIER,ANALYTE) %>%
summarize(n_obs=n(),
median_obs=median(VALUE,na.rm=T),
geomean_obs = gm_mean(VALUE, na.rm=T), #custom fx in Zach's files
mean_obs=mean(VALUE,na.rm=T),
sd_obs=sd(VALUE,na.rm=T),
min_obs=min(VALUE,na.rm=T),
max_obs=max(VALUE,na.rm=T))

SUMSTATS_ALL_LAST5 <- DB_all %>% group_by(SITE_UNIFIER,ANALYTE) %>%
filter(year(Date)>2014)%>%
summarize(median_last5=median(VALUE,na.rm=T),
mean_last5=mean(VALUE,na.rm=T),
sd_last5=sd(VALUE,na.rm=T))

CENSTATS_ALL <- DB_all %>% group_by(SITE_UNIFIER,ANALYTE) %>%
drop_na(FLAG) %>%
summarize(n_cen=n())

SUMSTATS_ALL <- SUMSTATS_ALL_int %>% left_join(.,SUMSTATS_ALL_LAST5,
          by = c("SITE_UNIFIER" = "SITE_UNIFIER", "ANALYTE" = "ANALYTE"))%>%
```

```
left_join(., CENSTATS_ALL,
          by = c("SITE_UNIFIER" = "SITE_UNIFIER", "ANALYTE" = "ANALYTE"))

#TAFA analysis----------------------------------------------------------------------------------------------------
TAFAS <- DB_analysis %>% group_by(SITE_UNIFIER, ANALYTE)%>%
filter(n() > 50) %>%
nest() %>%
mutate(data_tafa = map(data, ~tafa(flow=.$Q_MERGE, constituent = .$VALUE_corr, dates =
.$Date)))

TAFAS_RESULTS <- TAFAS %>%
mutate(f_opt = map(data_tafa, ~unlist(.$f_opt)),
lr_pval = map(data_tafa, ~unlist(.$p_val)),
perc_slope = map(data_tafa, ~unlist(.$perc_slope)),
loess_RMSE = map(data_tafa, ~sqrt(mean((.$loess_fit$residuals)^2)))) %>%
unnest(f_opt, lr_pval, perc_slope, loess_RMSE) %>%
mutate(MK_test = map(data_tafa, ~rkt(date=as.ts(.$dates), y =.$FACs, rep="m")),
SKT_test = map(data_tafa, ~rkt(date=as.ts(.$dates), y = .$FACs, block = month(.$dates), rep="m")),
MK_score = map(MK_test, ~unlist(.$S)),
MK_pval = map(MK_test, ~unlist(.$sl)),
MK_slope = map(MK_test, ~unlist(.$B)),
SKT_score = map(SKT_test, ~unlist(.$S)),
SKT_pval  = map(SKT_test, ~unlist(.$sl)),
SKT_slope = map(SKT_test, ~unlist(.$B)))%>%
  unnest(MK_score, MK_pval, MK_slope, SKT_score, SKT_pval, SKT_slope) %>%
  mutate(MK_slope_perc = (exp(MK_slope)-1)*60*60*24*365*100,
         SKT_slope_perc = (exp(SKT_slope)-1)*60*60*24*365*100)

TAFAS_RESULTS <- TAFAS_RESULTS %>%
left_join(.,N_TAFA, by=c("SITE_UNIFIER"="SITE_UNIFIER", "ANALYTE"="ANALYTE"))
%>%
select(SITE_UNIFIER, ANALYTE, n_paired,f_opt:SKT_slope_perc)

FACS <- TAFAS %>%
mutate(FACs = map(data_tafa, ~unlist(.$FACs))) %>%
mutate(f_opt = map(data_tafa, ~unlist(.$f_opt))) %>%
unnest(data, FACs, f_opt)
```

A1.4 Statistical code to analyze nutrient variables in the BNR database for adapted summary statistics for datasets with non-detections

```
library(tidyverse)
library(lubridate)
library(NADA)
library(NADA2)
library(EnvStats)

#load data----------------------------------------------------------

DB_all <- read_csv("DB_all.csv")

SUMSTATS <- read_csv("BUFF_SUMSTATS_ALL.csv")

#reduce data----------------------------------------------------------
analyte_list <- c("NH4_N","NOX_N","SRP","TKN","TN_merge2","TP")

counts <- SUMSTATS %>% select(SITE_UNIFIER,ANALYTE,n_obs,n_cen) %>%
filter(ANALYTE %in% analyte_list)%>%
mutate(perc_cen = ifelse(is.na(n_cen),0,n_cen/n_obs*100))

DB_red <- DB_all %>% filter(ANALYTE %in% analyte_list)%>%
left_join(.,counts, by=c("SITE_UNIFIER"="SITE_UNIFIER", "ANALYTE"="ANALYTE"))%>%
filter(perc_cen < 80) %>%
mutate(FLAG = ifelse(is.na(FLAG),NA,ifelse(VALUE>0.50,NA,"<")),
       FLAG = ifelse(is.na(FLAG),FALSE,TRUE))

site_list <- unique(DB_red$SITE_UNIFIER)

#loop----------------------------------------------------------------

for(i in seq_along(site_list)) {
for(j in seq_along(analyte_list)) {

tmp <- DB_red %>% filter(SITE_UNIFIER==site_list[i] & ANALYTE==analyte_list[j])

if(nrow(tmp)>3) {

full_int1 <- censtats(tmp$VALUE,tmp$FLAG)
full <- full_int1 %>% as_tibble()%>%
mutate(Site=site_list[i], Analyte=analyte_list[j], Method=c("KM","ROS","MLE"),
       .before=median)

write_csv(full, file="/Users/egrantz/Desktop/BUF_CENSTATS.csv",
       append=TRUE)
}
```

```
else {
}}}
#data prep last 5-------------------------------------------------------------

DB_red_last5_int <- DB_all %>% filter(ANALYTE %in% analyte_list)%>%
filter(year(Date)>2014)

counts_last5_int <- DB_red_last5_int %>% group_by(SITE_UNIFIER,ANALYTE) %>%
summarize(n_obs_last5 = n())

counts_cen_last5 <- DB_red_last5_int %>% group_by(SITE_UNIFIER,ANALYTE) %>%
filter(!is.na(FLAG)) %>%
summarize(n_cen_last5 = n())

counts_last5 <- counts_last5_int %>%
left_join(.,counts_cen_last5, by =
c("SITE_UNIFIER"="SITE_UNIFIER","ANALYTE"="ANALYTE"))%>%
mutate(perc_cen_last5 = ifelse(is.na(n_cen_last5),0,n_cen_last5/n_obs_last5*100))

DB_red_last5 <- DB_red_last5_int %>%
left_join(.,counts_last5, by=c("SITE_UNIFIER"="SITE_UNIFIER",
"ANALYTE"="ANALYTE"))%>%
filter(perc_cen < 80) %>%
mutate(FLAG = ifelse(is.na(FLAG),NA,ifelse(VALUE>0.50,NA,"<")),
        FLAG = ifelse(is.na(FLAG),FALSE,TRUE))

site_list <- unique(DB_red_last5$SITE_UNIFIER)

#loop last5-------------------------------------------------------------------

for(i in seq_along(site_list)) {
for(j in seq_along(analyte_list)) {

tmp_red <- DB_red_last5 %>%
filter(SITE_UNIFIER==site_list[i] & ANALYTE==analyte_list[j])

if(nrow(tmp_red)>3) {

last5_int <- censtats(tmp_red$VALUE,tmp_red$FLAG)
last5 <- last5_int %>% as_tibble()%>%
mutate(Site=site_list[i], Analyte=analyte_list[j], Method=c("KM","ROS","MLE"),
        .before=median)

write_csv(last5, file="/Users/egrantz/Desktop/BUF_CENSTATS_LAST5.csv",
        append=TRUE)
}
else {
}}}
```

A1.5 Statistical code to analyze the BNR database for trends without flow-adjustment

```
library(tidyverse)
library(lubridate)
library(rkt)

#load and format data----------------------------------------------------

DB_int <- read_csv("BUFF_Full-Database_Final.csv",guess_max=10000)
DB <- DB_int %>% select(-Q_INSTANT,-QCAT,-Q_DAILY,
          -c("NO2-N_VALUE","NO2-N_FLAG","NO2-N_QC_NOTE"),
          -(contains(c("DON","Phosphate","TDKN","TDN","TDP","TON","NO3-N_","NO2-
N_Total",
                     "NH3+NH4-N_Total","NO3+NO2-N_Total","Ortho-P_Total")))) %>%
rename(c(AMM_N_VALUE = 'NH3+NH4-N_merge_VALUE', NOX_N_VALUE = 'NO3+NO2-
N_merge2_VALUE',
          SRP_VALUE = 'Ortho-P_VALUE',
          AMM_N_FLAG = 'NH3+NH4-N_merge_FLAG', NOX_N_FLAG = 'NO3+NO2-
N_merge2_FLAG',
          SRP_FLAG = 'Ortho-P_FLAG',
          AMM_N_QC_NOTE = 'NH3+NH4-N_merge_QC_NOTE',
          NOX_N_QC_NOTE = 'NO3+NO2-N_merge2_QC_NOTE',
          SRP_QC_NOTE = 'Ortho-P_QC_NOTE'))

WQ_LONG <- DB %>% select(-(contains("FLAG") | contains("QC_NOTE"))) %>%
pivot_longer(AMM_N_VALUE:ECOLI_VALUE, names_to="ANALYTE",values_to="VALUE")
%>%
mutate(ANALYTE = str_remove(ANALYTE, "_VALUE"))

CEN_LONG <- DB %>%
select(AGENCY_UNIFIER,SITE_UNIFIER,Date,Time,contains("FLAG"))%>%
pivot_longer(AMM_N_FLAG:ECOLI_FLAG, names_to="ANALYTE_FLAG",
values_to="FLAG") %>%
mutate(ANALYTE_FLAG = str_remove(ANALYTE_FLAG, "_FLAG"))

QC_NOTE_LONG <- DB %>%
select(AGENCY_UNIFIER,SITE_UNIFIER,Date,Time,contains("QC_NOTE"))%>%
pivot_longer(AMM_N_QC_NOTE:ECOLI_QC_NOTE, names_to="ANALYTE_QC_NOTE",
values_to = "QC_NOTE") %>%
mutate(ANALYTE_QC_NOTE = str_remove(ANALYTE_QC_NOTE,"_QC_NOTE"))

DB_LONG <- WQ_LONG %>%  drop_na(VALUE) %>%
left_join(.,CEN_LONG, by = c("AGENCY_UNIFIER" = "AGENCY_UNIFIER",
"SITE_UNIFIER" = "SITE_UNIFIER","Date" = "Date","Time" = "Time",
"ANALYTE" = "ANALYTE_FLAG")) %>%
left_join(.,QC_NOTE_LONG, by = c("AGENCY_UNIFIER" = "AGENCY_UNIFIER",
```

```
"SITE_UNIFIER" = "SITE_UNIFIER","Date" = "Date","Time" = "Time",
"ANALYTE" = "ANALYTE_QC_NOTE"))%>%
filter(is.na(QC_NOTE))%>%
mutate(Date=mdy(Date))

BIO_LOW = 0.9 #Value to substitute for 0's in FCOL, FSTREP, ECOLI

Q <- DB_LONG %>% select(AGENCY_UNIFIER,SITE_UNIFIER,Date,Time,Q_MERGE)

DB_all <- DB_LONG %>%
filter(year(Date)>1999)%>%
group_by(AGENCY_UNIFIER,SITE_UNIFIER,Date,ANALYTE)%>%
mutate(FLAG = ifelse(is.na(FLAG),0,1))%>%
summarize(Q_MERGE = mean(Q_MERGE,na.rm=T),
          VALUE = mean(VALUE,na.rm=T),
          FLAG = mean(FLAG, na.rm=T))%>%
mutate(FLAG = ifelse(FLAG >0, "<", NA))%>%
mutate(VALUE_corr = ifelse(VALUE == 0, BIO_LOW, VALUE),
           VALUE_corr = ifelse(ANALYTE == "pH", 10^VALUE, VALUE_corr))%>%
distinct()

#Trend analysis no flow-------------------------------------------------------------------------------------------

TRENDS <- DB_all %>% mutate(DATE = as.POSIXct(Date))%>%
group_by(SITE_UNIFIER, ANALYTE)%>%
filter(n() >= 50) %>%
nest() %>%
mutate(lr_test = map(data, ~lm(log(.$VALUE_corr)~.$DATE)),
          lr_pval = map(lr_test, ~summary(.)$coefficients[2,4]),
          lr_slope = map(lr_test, ~summary(.)$coefficients[2])) %>%
unnest(lr_pval, lr_slope) %>%
mutate(MK_test = map(data, ~rkt(date=as.ts(.$DATE), y=log(.$VALUE_corr), rep="m")),
          SKT_test = map(data, ~rkt(date=as.ts(.$DATE), y =log(.$VALUE_corr), block =
month(.$DATE), rep="m")),
          MK_score = map(MK_test, ~unlist(.$S)),
          MK_pval = map(MK_test, ~unlist(.$sl)),
          MK_slope = map(MK_test, ~unlist(.$B)),
          SKT_score = map(SKT_test, ~unlist(.$S)),
          SKT_pval  = map(SKT_test, ~unlist(.$sl)),
          SKT_slope = map(SKT_test, ~unlist(.$B)))%>%
unnest(MK_score, MK_pval, MK_slope, SKT_score, SKT_pval, SKT_slope) %>%
mutate(perc_slope = (exp(lr_slope)-1)*60*60*24*365*100,
                    MK_slope_perc = (exp(MK_slope)-1)*60*60*24*365*100,
       SKT_slope_perc = (exp(SKT_slope)-1)*60*60*24*365*100)

TRENDS_RESULTS <- TRENDS %>%
select(SITE_UNIFIER, ANALYTE, lr_pval, perc_slope,
          MK_score, MK_pval, MK_slope, MK_slope_perc,
          SKT_score, SKT_pval, SKT_slope, SKT_slope_perc)
```

A1.6 Modified R function from Irvine et al. 2012 with seasonal grouping options “triannual” and “quarterly”

```
#R-Code for Power Analysis
# Power Code for GRYN Water Quality Power Analysis
# Author: Kathi Irvine and Cynthia Hollimon
# Date: March 2012
# The following power code can be used to determine the power of the Seasonal Mann-Kendall
#test for detecting a given
# magnitude of trend.
# The procedure requires historic data to re-sample from in order to estimate power.
# Also, the definition of season needs to be input by the user, typically based on the hydrograph.
# We assume that one observation per season is available.
# SUBMIT THE FOLLOWING LINES OF CODE FROM
# HERE TO
library(Kendall)
## Kendall Functions
power.kendall<-function (x, y) {
tau <- 0
ptau <- 0
sltau <- 0
score <- 0
varscore <- 0
denom <- 0
i <- ! (is.na(x) | is.na(y))
x <- x[i]
y <- y[i]
iws <- numeric (length(x) )
ifault <- 0
outF <- .Fortran("tauk2", as.single(x), as.single(y), as.integer(length(x)),
as.single(tau), as.single(ptau), as.single(sltau), as.single(score),
as.single(varscore), as.single(denom), as.integer(iws),
as.integer(ifault), PACKAGE = "Kendall")
tau <- outF[[4]]
sl <- outF[[6]]
sc <- outF[[7]]
var.sc <- outF[[8]]
denom <- outF[[9]]
ier <- outF[[11]]
ans <- list(tau = tau, sl = sl, S = sc, D = denom, varS = var.sc)
oldClass(ans) <- "Kendall"
ans

}
power.MannKendall<-function (x) {
power.kendall(1:length(x), x)
}
Power.fun_mod<-
```

```
function(data.in,alpha.level,nboot,change.of.interest,no.years,param.assigned,season.location,seasons
,month.compare){
# INPUTS FOR POWER FUNCTION
# data.in=
# alpha.level
# nboot
# change.of.interest
# no.years
# param.assigned
# season.location
# seasons
# month.compare
# definitions of hydrologic seasons
#TRI: Jan 1 - April previously Aug 10-April 14, April 15 - June 19, June 20- Aug. 9
#YELL: Nov 1 - April 15, April 16-June 15, June 16- Aug 15, Aug 16- Oct 31
#QUART: Aug 15-April 14, April 15-June 9, June 10-Aug. 14
# translating to day of the year
seasons.TRI<-c(1,121,122,244,245,366)
seasons.YELL<-c(306, 106,107,167,168,228,229,305)
seasons.QUART<-c(1,91,92,182,183,274,275,366)
seasons.OZARM <-c(92,121,122,152,153,182,183,213,214,244,245,274)
# defining months instead of seasons
months <-
c(1,31,32,60,61,91,92,121,122,152,153,182,183,213,214,244,245,274,275,305,306,335,336,366)
### subsettting to the parameter of interest
param1<-subset(data.in,data.in$ParamGroup==param.assigned)

# creating a season variable

day.of.year<-as.numeric(substr(param1$JulianDate,3,6))

# may need to be altered for different season definitions
if(missing(season.location)) season.intervals <- months else
if(season.location=="TRI") season.intervals<-seasons.TRI else
if(season.location=="QUART") season.intervals<-seasons.YELL else
season.intervals<-seasons.OZARM

if(length(season.intervals)/(2*seasons)!=1) print("Error Number of Seasons and Season Location
do not match")
if(month.compare == T | missing(season.location)) {month.var <- numeric() #setting up month
#vars for comparison
for(i in 1:length(day.of.year)) {
{
if(day.of.year[i] >=months[1]&day.of.year[i]<=months[2]) month.var[i] <- 1 else
if(day.of.year[i] >=months[3]&day.of.year[i]<=months[4]) month.var[i] <- 2 else
if(day.of.year[i] >=months[5]&day.of.year[i]<=months[6]) month.var[i] <- 3 else
if(day.of.year[i] >=months[7]&day.of.year[i]<=months[8]) month.var[i] <- 4 else
if(day.of.year[i] >=months[9]&day.of.year[i]<=months[10]) month.var[i] <- 5 else
if(day.of.year[i] >=months[11]&day.of.year[i]<=months[12]) month.var[i] <- 6 else
```

```
if(day.of.year[i] >=months[13]&day.of.year[i]<=months[14]) month.var[i] <- 7 else
if(day.of.year[i] >=months[15]&day.of.year[i]<=months[16]) month.var[i] <- 8 else
if(day.of.year[i] >=months[17]&day.of.year[i]<=months[18]) month.var[i] <- 9 else
if(day.of.year[i] >=months[19]&day.of.year[i]<=months[20]) month.var[i] <- 10 else
if(day.of.year[i] >=months[21]&day.of.year[i]<=months[22]) month.var[i] <- 11 else
if(day.of.year[i] >=months[23]&day.of.year[i]<=months[24]) month.var[i] <- 12}}}
if(missing(season.location)) {season.var <- month.var} else #if running only a monthly analysis

if(season.location=="TRI") {season.var<-numeric()
for(i in 1:length(day.of.year))
{if(day.of.year[i]<=season.intervals[2]) season.var[i]<-1 else
if(day.of.year[i]>=season.intervals[3]&day.of.year[i]<=season.intervals[4]) season.var[i]<-2 else
if(day.of.year[i]>=season.intervals[5]&day.of.year[i]<=season.intervals[6]) season.var[i]<-3}} else

if(season.location=="QUART") {season.var<-numeric()
for(i in 1:length(day.of.year))
{
if(day.of.year[i]<=season.intervals[2]) season.var[i]<-1 else
if(day.of.year[i]>=season.intervals[3]&day.of.year[i]<=season.intervals[4]) season.var[i]<-2 else
if(day.of.year[i]>=season.intervals[5]&day.of.year[i]<=season.intervals[6]) season.var[i]<-3 else
if(day.of.year[i]>=season.intervals[7]&day.of.year[i]<=season.intervals[8]) season.var[i]<-4}} else
if(season.location=="OZARM") {season.var<-numeric()
for(i in 1:length(day.of.year))
{
if(day.of.year[i]>=season.intervals[1]&day.of.year[i]<=season.intervals[2]) season.var[i]<-1 else
if(day.of.year[i]>=season.intervals[3]&day.of.year[i]<=season.intervals[4]) season.var[i]<-2 else
if(day.of.year[i]>=season.intervals[5]&day.of.year[i]<=season.intervals[6]) season.var[i]<-3 else
if(day.of.year[i]>=season.intervals[7]&day.of.year[i]<=season.intervals[8]) season.var[i]<-4 else
if(day.of.year[i]>=season.intervals[9]&day.of.year[i]<=season.intervals[10]) season.var[i] <-5 else
if(day.of.year[i]>=season.intervals[11]&day.of.year[i]<=season.intervals[12]) season.var[i] <-6
}}
Power.out<-
function(data.in,alpha.level,nboot,change.of.interest,no.years,param.assigned,season.location,seasons
,season.var){ #new function loop
## Determine median values for the different seasons
medians<-tapply(param1$Result,season.var,median)
## Find a set of epsilon stars based on medians. keep residuals within Seasons!
epsilons<-rep(NA,dim(param1)[1])
epsilons<- param1$Result-medians[as.character(season.var)]
# de-trended by seasonal medians
# Build a bunch of storage objects
tau<-
array(NA,dim=c(length(unique(season.var)),nboot,(length(no.years))))
sktau<-matrix(NA,nrow=nboot,ncol=(length(no.years)))
ts.out<-matrix(NA,nrow=nboot,ncol=(length(no.years)))
sim.out<-
matrix(NA,nrow=nboot,ncol=(length(no.years)))
S<-
array(NA,dim=c(length(unique(season.var)),nboot,(length(no.years))))
```

```
power<-rep(NA,(length(no.years)))
power.mat<-
matrix(NA,(length(change.of.interest)),(length(no.years)))
# Calculate denominator of Z-statistic for each timecut (since it's based on
#sample size alone, we can do it at this point)
# this is a normal approximation to the distribution of the test-statistic as stated in
#equation 8
denom.mat<-rep(NA,(length(no.years)))
for(j in 1:length(no.years)){
denom.mat[j]<-no.years[j]*(no.years[j]-1)*(2*no.years[j]+5)/18
}
denom.vec<-denom.mat*length(unique(season.var))

# For each change.of.interest
for(h in 1:length(change.of.interest)){
# Begin bootstrapping
for(i in 1:nboot){
# TIME LOOP
for(j in 1:length(no.years)){
years<-0:(no.years[j]-1) #years in this run
# Simulating realistic data with monotonic non-linear trend
# using T2 as defined in Eq 5b of Yue and Pilon 2004
# requires B2= baseline median each season, a2=multiplicative change for each one year
#increase in time
fixed.trend<-exp(change.of.interest[h]*years)
#bootstrap the residuals within a season to add onto the fixed.trend vector
boot.eps<-
tapply(epsilons,season.var,sample,length(years),replace=TRUE)
# create one realization of a time series for each season
for(k in 1:length(unique(season.var))){
boot.by.seas<-
medians[k]*fixed.trend+boot.eps[[k]]
# Calculate tau and S within each season and each timecut using the
#MannKendall function from package Kendall (see comment below)
out<-power.MannKendall(boot.by.seas)
tau[k,i,j]<-out$tau
S[k,i,j]<-out$S
}
# Calculate test statistic by #summing over
#seasons and dividing by appropriate sqrt(denominator)
# See Hirsch et al. 1982 Water Resources Research Eqn. 8 and 9
sktau[i,j]<-sum(S[,i,j])
ts.out[i,j]<-
ifelse(sktau[i,j]>=0,(sktau[i,j]-
1)/sqrt(denom.vec[j]),(sktau[i,j]+1)/sqrt(denom.vec[j]))

# Collect a 1 if null (no trend) is rejected; a 0 otherwise for both methods.
sim.out[i,j]<-
ifelse(abs(ts.out[i,j])>=qnorm(1-alpha.level),1,0)
```

```
} #end of j loop
} # end of i loop
## Section 4: Calculate Power
# Sum up number of times null was rejected within each timecut and
#divide by the number of bootstraps to get power under each method.
for(r in 1:(length(no.years))){
power[r]<-sum(sim.out[,r])/nboot
}
power.mat[h,] <- power
} #end of h loop
if(month.compare == F| length(unique(season.var)) <= 4) {
plot(1,ylim=c(0,1),xlim=c(min(no.years)-1,max(no.years)+1),type="l",xlab="Years
of Data Collection",ylab="Power",main=paste("Power to Detect Various Annual % Changes in",
param.assigned,sep=" "))
abline(h=.8,lty=2)
for(i in 1:length(change.of.interest)){
points(no.years,power.mat[i,],pch=i)
lines(no.years,power.mat[i,],lty=1)
if(month.compare==F & length(unique(season.var)) <= 4) {leg.text
=c(paste("Seasonal",change.of.interest*100,"%",sep=" "))
points=(1:length(change.of.interest))
lines=1} else
if(month.compare==F & length(unique(season.var)) > 4)
{leg.text = c(paste("Monthly",change.of.interest*100,"%",sep=" "))
points=(1:length(change.of.interest))
lines=1} else
leg.text =
c(paste("Seasonal",change.of.interest*100,"%",sep="
"),paste("Monthly",change.of.interest*100,"%",sep=""))
points=rep(1:length(change.of.interest),2)
lines=rep(1:2,
each=length(change.of.interest))
}
legend("bottomright",legend=leg.text,pch=c(points),lty=c(lines))
} else
for(i in 1:length(change.of.interest)){
points(no.years,power.mat[i,],pch=i)
lines(no.years,power.mat[i,],lty=2)
}
# output the number of observations available for the bootstrap within season
no.obs<-table(season.var)

list.out<-list(param.assigned, seasons, no.years, alpha.level, nboot,
change.of.interest, power.mat,no.obs)
names(list.out)<-c("Parameter","Number of Seasons","Years of Data
Collection","Alpha","Iterations","Annual Rate of Change ","Power","No. Obs. Available")
return(list.out)
}
season.out <-
```

```
Power.out(data.in,alpha.level,nboot,change.of.interest,no.years,param.assigned,season.location,seasons,season.var)
if(month.compare == T) {month.out <-
Power.out(data.in,alpha.level,nboot,change.of.interest,no.years,param.assigned,season.location,seasons=12,season.var=month.var)
}
if(month.compare == T) {list.out.all <- c(season.out,month.out)} else
list.out.all <- season.out
return(list.out.all)
}
## END POWER FUNCTIONS
## HERE
```

A1.7 Statistical code to run the power analysis function by Irvine et al. 2012 on the BNR database

```
library(tidyverse)
source("C:\\Users\\egrantz\\Documents\\R\\powerfunction_for_BUFF-OZAR.R")

BUFF_all_int <- read_csv("BUFF_DB_all.csv")
BUFF_SUMSTATS <- read_csv("BUFF_SUMSTATS_ALL.csv")

PERCEN <- BUFF_SUMSTATS %>% mutate(perc_cen = ifelse(is.na(n_cen),
        0,(n_cen/n_obs)*100))%>%
select(SITE_UNIFIER, ANALYTE, perc_cen)

site_remove <- c("BUFR0304","BUFR0414","BUFr0414","BUFR05.9","BUFR06.1","BUFR100",
                 "BUFT0401","BUFT0402","BUFT0405","BUFT0501","BUFT0601","BUFT0602",
                 "BUFT0801","BUFT0901","BUFT0902","BUFT0903","BUFT11.5","BUFT1201")

analyte_list_in <-
c("COND","DOSAT","ECOLI","FCOL","NOX_N","pH","TN","TP","TURB","WTEMP")

BUFF_all <- BUFF_all_int %>% left_join(.,PERCEN,
        by = c("SITE_UNIFIER"="SITE_UNIFIER","ANALYTE"="ANALYTE"))%>%
filter(year(ymd(Date))>=1985)%>%
filter(grepl("BUF",SITE_UNIFIER))%>%
filter(!SITE_UNIFIER %in% site_remove)%>%
filter(ANALYTE %in% analyte_list_in) %>%
filter(perc_cen <= 5)%>%
mutate(JulianDate = yday(Date),
          YEAR = year(Date),
          YEAR = str_sub(YEAR, 3,4),
          JulianDate = paste(YEAR,JulianDate,sep="")) %>%
select(SITE_UNIFIER,JulianDate,ANALYTE,VALUE)%>%
rename(StationID=SITE_UNIFIER,ParamGroup=ANALYTE,Result=VALUE)

site_list <- unique(BUFF_all$StationID)
analyte_list <- unique(BUFF_all$ParamGroup)

##########loop----------------------------------------------------------------------------

for(i in seq_along(site_list)) {

for(j in seq_along(analyte_list)) {

tmp_data <- BUFF_all %>%
        filter(StationID == site_list[i],ParamGroup == analyte_list[j])

if(nrow(tmp_data)>0) {
```

```
results1 <- Power.fun_mod(tmp_data,alpha.level=0.1,nboot=1000,
        change.of.interest=c(0.01,0.025,0.05),no.year=c(3,5,10,20),
        param.assigned=as.character(analyte_list[j]),
        season.location=as.character("TRI"),
        seasons=3,month.compare=F)

power_out1 <- as.tibble(results1$Power)
rate_out1 <- as.tibble(results1$"Annual Rate of Change")

results_export1 <- bind_cols(rate_out1,power_out1) %>%
        mutate(Site = unique(tmp_data$StationID),
                Variable = unique(tmp_data$ParamGroup),
                Season = "TRI", .before=V1)

results2 <- Power.fun_mod(tmp_data,alpha.level=0.1,nboot=1000,
        change.of.interest=c(0.01,0.025,0.05),no.year=c(3,5,10,20),
        param.assigned=as.character(analyte_list[j]),
        season.location=as.character("QUART"),
        seasons=4,month.compare=F)

power_out2 <- as.tibble(results2$Power)
rate_out2 <- as.tibble(results2$"Annual Rate of Change")

results_export2 <- bind_cols(rate_out2,power_out2) %>%
        mutate(Site = unique(tmp_data$StationID),
                Variable = unique(tmp_data$ParamGroup),
                Season = "QUART", .before=V1)

results3 <- Power.fun_mod(tmp_data,alpha.level=0.1,nboot=1000,
        change.of.interest=c(0.01,0.025,0.05),no.year=c(3,5,10,20),
        param.assigned=as.character(analyte_list[j]),
        seasons=12,month.compare=F)

power_out3 <- as.tibble(results3$Power)
rate_out3 <- as.tibble(results3$"Annual Rate of Change")

results_export3 <- bind_cols(rate_out3,power_out3) %>%
        mutate(Site = unique(tmp_data$StationID),
                Variable = unique(tmp_data$ParamGroup),
                Season = "MONTHS", .before=V1)

results_export<- bind_rows(results_export1,results_export2,results_export3)

write_csv(results_export, file="/Users/egrantz/Desktop/Power Analysis/BUFF_power-analysis-
results.csv", append = TRUE)
}
else{
}}}
```

A2 Supplemental information across sites

A2.1 Summary statistics for all BUFF sites

Table A2.1.1 Summary statistics of the measured water quality variables sites located in the Buffalo River watershed (n>2 events) during the full focus period (2000-2019) and the most recent five years of data (2015-2019), including count (n), frequency of non-detection (%ND), and measures of central tendency (median = 50th percentile or middle value in ranked data, geomean = average of log-transformed values, and mean = average), variability (SD = standard deviation) and range (Min = minimum and Max = maximum). For variables with %NDs > 0, summary statistics were estimated using methods adapted for datasets with non-detections. A dash indicates no available data or that non-detections were too frequent to allow estimation of a summary statistic with the adapted methods. These methods do not provide estimates of geomean. Variable abbreviations: Cond = specific conductance, DO = dissolved oxygen, E. coli = Escherischia coli, FCB = fecal coliform bacteria, NH3-N = Ammonia-nitrogen, NOx-N = Nitrate+nitrite-nitrogen, Ortho-P = orthophosphate-phosphorus, TCB = total coliform bacteria, TKN= Total Kjeldahl nitrogen, TN = total nitrogen, TP = total phosphorus, Turb = Turbidity, W Temp = water temperature.

				2000-2019						2015-2019		
Site	**Variable**	**n**	**%ND**	**Median**	**Geo mean**	**Mean**	**SD**	**Min**	**Max**	**Median**	**Mean**	**SD**
UWBRK01	NH3-N (mg/L)	23	74	0.03	0.026	0.033	0.029	0.005	0.156	0.03	0.032	0.003
UWBRK01	NOx-N (mg/L)	23	0	0.57	0.62	0.7	0.35	0.26	1.36	0.49	0.69	0.37
UWBRK01	Ortho-P (mg/L)	23	9	0.03	-	0.039	0.04	0.02	0.21	0.021	0.022	0.006
UWBRK01	TKN (mg/L)	23	13	0.19	-	0.35	0.62	0.09	3.11	0.24	0.24	0.09
UWBRK01	TN (mg/L)	23	13	0.9	-	1.05	0.65	0.48	3.37	0.85	0.93	0.39
UWBRK01	TP (mg/L)	23	17	0.057	-	0.102	0.207	0.02	1.03	0.035	0.036	0.019
WHI0049	NH3-N (mg/L)	4	75	0.03	0.025	0.026	0.007	0.015	0.03	-	-	-
WHI0049	NOx-N (mg/L)	4	25	0.06	-	0.21	0.34	0.01	0.71	-	-	-
WHI0049	Ortho-P (mg/L)	4	75	0.154	-	0.154	0	0.005	0.154	-	-	-
WHI0049	TKN (mg/L)	4	0	0.28	0.25	0.26	0.09	0.14	0.36	-	-	-
WHI0049	TN (mg/L)	4	25	0.3	-	0.45	0.4	0.17	1.01	-	-	-
WHI0049	TP (mg/L)	4	25	0.018	-	0.058	0.084	0.015	0.183	-	-	-
WHI0155	NH3-N (mg/L)	8	88	0.03	0.031	0.031	0.003	0.03	0.039	0.03	0.03	0
WHI0155	NOx-N (mg/L)	8	12	0.03	-	0.03	0.01	0.03	0.06	0.03	0.03	0.02
WHI0155	Ortho-P (mg/L)	8	62	0.005	-	0.132	0.304	0.02	0.877	-	-	-

				2000-2019						2015-2019		
Site	Variable	n	%ND	Median	Geo mean	Mean	SD	Min	Max	Median	Mean	SD
WHI0155	TKN (mg/L)	8	12	0.13	-	0.15	0.1	0.05	0.35	0.09	0.11	0.08
WHI0155	TN (mg/L)	8	25	0.16	-	0.17	0.11	0.08	0.4	0.09	0.13	0.08
WHI0155	TP (mg/L)	8	38	0.024	-	0.148	0.314	0.02	0.915	0.022	0.022	0.002
WHI0211	NH3-N (mg/L)	3	33	0.044	0.049	0.054	0.03	0.03	0.088	0.044	0.054	0.03
WHI0211	NOx-N (mg/L)	3	0	1.5	1.46	1.48	0.32	1.16	1.79	1.5	1.48	0.32
WHI0211	Ortho-P (mg/L)	3	67	-	-	-	-	0.02	0.073	-	-	-
WHI0211	TKN (mg/L)	3	0	0.2	0.22	0.28	0.23	0.1	0.54	0.2	0.28	0.23
WHI0211	TN (mg/L)	3	0	1.7	1.76	1.76	0.11	1.7	1.89	1.7	1.76	0.11
WHI0211	TP (mg/L)	3	0	0.041	0.048	0.062	0.055	0.021	0.125	0.041	0.062	0.055
WHI0213	NH3-N (mg/L)	3	67	0.03	0.059	0.094	0.111	0.03	0.223	0.03	0.094	0.111
WHI0213	NOx-N (mg/L)	3	0	1.86	1.41	1.52	0.64	0.78	1.93	1.86	1.52	0.64
WHI0213	Ortho-P (mg/L)	3	0	0.025	0.058	0.129	0.181	0.023	0.338	0.025	0.129	0.181
WHI0213	TKN (mg/L)	3	67	-	-	-	-	0.1	1.18	-	-	-
WHI0213	TN (mg/L)	3	67	-	-	-	-	1.96	2.03	-	-	-
WHI0213	TP (mg/L)	3	0	0.049	0.085	0.177	0.24	0.028	0.453	0.049	0.177	0.24
WHI0215	NH3-N (mg/L)	3	67	0.03	0.052	0.072	0.073	0.03	0.156	0.03	0.072	0.073
WHI0215	NOx-N (mg/L)	3	0	1.35	1.2	1.23	0.31	0.88	1.47	1.35	1.23	0.31
WHI0215	Ortho-P (mg/L)	3	67	-	-	-	-	0.02	0.348	-	-	-
WHI0215	TKN (mg/L)	3	67	-	-	-	-	0.1	1.08	-	-	-
WHI0215	TN (mg/L)	3	67	-	-	-	-	1.45	1.96	-	-	-
WHI0215	TP (mg/L)	3	67	-	-	-	-	0.02	0.47	-	-	-
BCBF	NH3-N (mg/L)	13	69	0.03	0.018	0.023	0.013	0.005	0.045	-	-	-
BCBF	NOx-N (mg/L)	13	0	0.32	0.35	0.41	0.26	0.18	0.98	-	-	-
BCBF	Ortho-P (mg/L)	13	0	0.027	0.028	0.038	0.041	0.01	0.17	-	-	-
BCBF	TKN (mg/L)	11	18	0.2	-	0.29	0.31	0.11	1.12	-	-	-
BCBF	TN (mg/L)	13	15	0.52	-	0.65	0.41	0.24	1.6	-	-	-
BCBF	TP (mg/L)	13	23	0.035	-	0.073	0.082	0.02	0.267	-	-	-
BRSJ	NH3-N (mg/L)	268	92	0.03	0.026	0.029	0.01	0.005	0.09	0.03	0.03	0.002
BRSJ	NOx-N (mg/L)	269	12	0.09	-	0.14	0.14	0.01	1.1	0.09	0.14	0.13
BRSJ	Ortho-P (mg/L)	268	51	0.01	-	0.013	0.025	0.005	0.309	-	-	-

				2000-2019						2015-2019		
Site	Variable	n	%ND	Median	Geo mean	Mean	SD	Min	Max	Median	Mean	SD
BRSJ	TKN (mg/L)	266	11	0.12	-	0.19	0.26	0.05	2.5	0.12	0.14	0.09
BRSJ	TN (mg/L)	266	21	0.21	-	0.31	0.3	0.06	2.6	0.21	0.26	0.17
BRSJ	TP (mg/L)	267	22	0.02	-	0.04	0.077	0.003	0.79	0.011	0.032	0.069
BUFR01	Cond (µS/cm)	353	0	74	82	90	40	25	206	71	89	38
BUFR01	DO (%)	336	0	98	97	97	10	58	145	99	98	10
BUFR01	DO (mg/L)	341	0	10.1	10	10.1	1.8	4.8	14.3	10.1	10.2	1.7
BUFR01	E. coli (col/100 mL)	317	1	22	24	99	384	0	5226	22	106	408
BUFR01	FCB (col/100 mL)	75	0	13	11	27	41	0	240	14	21	23
BUFR01	NH3-N (mg/L)	135	97	0.03	0.023	0.027	0.012	0.005	0.041	0.03	0.024	0.009
BUFR01	NOx-N (mg/L)	135	41	0.03	-	0.04	0.04	0.01	0.23	0.03	0.04	0.03
BUFR01	Ortho-P (mg/L)	129	65	0.005	-	0.007	0.006	0.003	0.036	-	-	-
BUFR01	pH	352	0	7.6	7.5	7.5	0.4	5.9	8.6	7.6	7.5	0.4
BUFR01	TCB (col/100 mL)	62	52	2420	1365	1860	1527	133	11528	2420	1901	1539
BUFR01	TKN (mg/L)	67	51	0.06	-	0.08	0.08	0.05	0.66	0.06	0.08	0.04
BUFR01	TN (mg/L)	81	69	0.07	-	0.09	0.08	0.03	0.71	-	-	-
BUFR01	TP (mg/L)	81	31	0.005	-	0.009	0.019	0.002	0.164	0.009	0.014	0.012
BUFR01	Turb (NTU)	351	0	3	3	6	13	0	185	3	6	15
BUFR01	W Temp (°C)	353	0	13.9	12.5	14.2	6.5	1.8	28.4	14.1	14.5	6.6
BUFR02	Cond (µS/cm)	147	0	116	121	131	53	41	259	106	130	51
BUFR02	DO (%)	140	0	103	103	104	12	69	148	107	108	10
BUFR02	DO (mg/L)	143	0	10.7	10.4	10.5	1.9	5.7	14.8	10.8	10.8	1.6
BUFR02	E. coli (col/100 mL)	111	0	29	32	159	894	1	9222	29	185	1004
BUFR02	FCB (col/100 mL)	77	0	25	21	45	63	0	446	16	27	22
BUFR02	NH3-N (mg/L)	84	93	0.03	0.024	0.027	0.009	0.005	0.049	0.03	0.031	0.004
BUFR02	NOx-N (mg/L)	84	6	0.07	-	0.09	0.08	0.01	0.44	0.08	0.09	0.04
BUFR02	Ortho-P (mg/L)	78	50	0.009	-	0.011	0.012	0.005	0.064	-	-	-
BUFR02	pH	147	0	7.8	7.7	7.7	0.3	6.8	8.4	7.8	7.8	0.3
BUFR02	TCB (col/100 mL)	62	63	2420	1612	2252	3191	144	26155	2420	2302	3259
BUFR02	TKN (mg/L)	29	38	0.08	-	0.15	0.24	0.05	1.31	0.05	0.14	0.28
BUFR02	TN (mg/L)	29	45	0.16	-	0.21	0.26	0.08	1.46	0.09	0.2	0.31

				2000-2019						2015-2019		
Site	Variable	n	%ND	Median	Geo mean	Mean	SD	Min	Max	Median	Mean	SD
BUFR02	TP (mg/L)	29	59	0.02	-	0.024	0.016	0.02	0.073	0.019	0.024	0.017
BUFR02	Turb (NTU)	146	0	2	2	5	13	0	116	3	6	15
BUFR02	W Temp (°C)	147	0	14.6	13.1	15.2	7.3	1.2	29.8	14.8	16	7.4
BUFR03	Cond (µS/cm)	88	0	164	158	167	53	64	284	133	162	56
BUFR03	DO (%)	84	0	98	98	99	12	69	172	100	101	6
BUFR03	DO (mg/L)	87	0	10.1	9.8	10	2	5.7	14.6	10.6	10.5	1.8
BUFR03	E. coli (col/100 mL)	53	2	19	17	97	366	0	2420	26	141	479
BUFR03	FCB (col/100 mL)	78	0	12	10	53	234	0	1850	13	16	11
BUFR03	NH3-N (mg/L)	74	93	0.03	0.024	0.027	0.01	0.005	0.064	0.03	0.03	0
BUFR03	NOx-N (mg/L)	74	32	0.03	-	0.07	0.12	0.01	0.88	0.03	0.06	0.06
BUFR03	Ortho-P (mg/L)	68	49	0.008	-	0.01	0.01	0.005	0.065	-	-	-
BUFR03	pH	88	0	7.8	7.8	7.8	0.3	6.9	8.4	7.8	7.7	0.2
BUFR03	TCB (col/100 mL)	4	25	517	514	894	1044	121	2420	1270	1270	1625
BUFR03	TKN (mg/L)	16	38	0.1	-	0.12	0.09	0.05	0.32	0.08	0.11	0.08
BUFR03	TN (mg/L)	16	69	0.1	-	0.13	0.09	0.08	0.41	0.09	0.13	0.1
BUFR03	TP (mg/L)	16	69	0.016	-	0.022	0.018	0.02	0.06	0.018	0.025	0.018
BUFR03	Turb (NTU)	87	0	2	2	8	23	0	146	3	11	29
BUFR03	W Temp (°C)	88	0	14.7	12.7	15.7	8.5	0.5	30.5	14	14.3	7.8
BUFR0304	Cond (µS/cm)	16	0	248	205	215	65	113	290	164	196	64
BUFR0304	DO (%)	16	0	98	95	96	16	64	124	100	99	8
BUFR0304	DO (mg/L)	16	0	9.5	8.6	8.8	1.8	5.2	11.4	9.7	9.4	1.2
BUFR0304	E. coli (col/100 mL)	16	6	24	42	194	595	11	2420	22	244	687
BUFR0304	NH3-N (mg/L)	3	100	0.03	0.03	0.03	0	0.03	0.03	-	-	-
BUFR0304	NOx-N (mg/L)	3	0	0.16	0.11	0.13	0.08	0.04	0.2	-	-	-
BUFR0304	Ortho-P (mg/L)	3	33	-	-	-	-	0.005	0.007	-	-	-
BUFR0304	pH	16	0	7.8	7.8	7.8	0.1	7.5	8.1	7.8	7.8	0.1
BUFR0304	Turb (NTU)	15	0	2	3	12	29	1	113	2	15	32
BUFR0304	W Temp (°C)	16	0	20.7	19.6	20.2	4.8	13.6	28.2	18.7	18.1	3.6
BUFR04	Cond (µS/cm)	197	0	195	190	196	48	74	339	195	198	46
BUFR04	DO (%)	188	0	98	97	98	11	68	162	97	96	10

				2000-2019						2015-2019		
Site	Variable	n	%ND	Median	Geo mean	Mean	SD	Min	Max	Median	Mean	SD
BUFR04	DO (mg/L)	193	0	9.8	9.6	9.8	2.1	6	15	9.8	9.7	2.1
BUFR04	E. coli (col/100 mL)	162	1	15	17	167	1050	0	12262	15	190	1148
BUFR04	FCB (col/100 mL)	79	1	9	9	48	167	0	1110	8	76	259
BUFR04	NH3-N (mg/L)	95	91	0.03	0.02	0.024	0.011	0.005	0.063	0.01	0.018	0.01
BUFR04	NOx-N (mg/L)	95	18	0.08	-	0.11	0.1	0.01	0.43	0.08	0.11	0.09
BUFR04	Ortho-P (mg/L)	90	56	0.006	-	0.009	0.009	0.004	0.065	-	-	-
BUFR04	pH	197	0	7.8	7.8	7.8	0.2	7.1	8.9	7.8	7.8	0.2
BUFR04	TCB (col/100 mL)	66	53	2420	1479	2630	7280	71	60490	2420	2697	7445
BUFR04	TKN (mg/L)	37	30	0.09	-	0.11	0.06	0.05	0.37	0.09	0.1	0.06
BUFR04	TN (mg/L)	37	43	0.16	-	0.19	0.12	0.1	0.63	0.15	0.19	0.13
BUFR04	TP (mg/L)	37	30	0.009	-	0.015	0.016	0.004	0.07	0.009	0.016	0.017
BUFR04	Turb (NTU)	195	0	2	3	9	44	0	435	2	11	51
BUFR04	W Temp (°C)	197	0	15.2	13.8	16.2	8	0.9	29.9	14.9	16	7.8
BUFR0414	Cond (µS/cm)	364	0	194	192	197	41	82	284	195	200	43
BUFR0414	DO (%)	353	0	98	98	98	11	60	153	97	96	10
BUFR0414	DO (mg/L)	353	0	9.6	9.7	9.9	2.1	5.9	16.1	9.5	9.8	2
BUFR0414	E. coli (col/100 mL)	364	1	20	25	123	487	0	6896	20	145	571
BUFR0414	FCB (col/100 mL)	1	0	5	5	5	-	5	5	-	-	-
BUFR0414	pH	364	0	7.8	7.8	7.8	0.2	7.1	8.3	7.8	7.8	0.2
BUFR0414	TCB (col/100 mL)	56	61	2420	1418	1811	865	61	2420	2420	1811	865
BUFR0414	Turb (NTU)	363	0	2	2	7	26	0	323	2	9	31
BUFR0414	W Temp (°C)	364	0	15.6	13.6	16	7.6	0.3	31.5	15.4	16	7.5
BUFR0415	Cond (µS/cm)	370	0	198	194	199	42	82	285	198	201	44
BUFR0415	DO (%)	359	0	98	97	98	11	58	144	97	96	11
BUFR0415	DO (mg/L)	359	0	9.6	9.7	9.9	2.2	5.8	18.7	9.5	9.7	2
BUFR0415	E. coli (col/100 mL)	370	1	24	28	144	548	0	7308	23	161	632
BUFR0415	FCB (col/100 mL)	1	0	5	5	5	-	5	5	-	-	-
BUFR0415	NH3-N (mg/L)	21	71	0.01	0.012	0.013	0.008	0.01	0.04	0.01	0.013	0.008
BUFR0415	NOx-N (mg/L)	21	24	0.09	-	0.11	0.08	0.04	0.37	0.09	0.11	0.08
BUFR0415	Ortho-P (mg/L)	21	90	-	-	-	-	0.004	0.008	-	-	-

				2000-2019						2015-2019		
Site	Variable	n	%ND	Median	Geo mean	Mean	SD	Min	Max	Median	Mean	SD
BUFR0415	pH	370	0	7.8	7.8	7.8	0.2	7	8.6	7.8	7.7	0.3
BUFR0415	TCB (col/100 mL)	57	60	2420	1493	2821	7822	51	60490	2420	2821	7822
BUFR0415	TKN (mg/L)	21	14	0.11	-	0.11	0.03	0.07	0.17	0.11	0.11	0.03
BUFR0415	TN (mg/L)	21	33	0.21	-	0.21	0.1	0.11	0.54	0.21	0.21	0.1
BUFR0415	TP (mg/L)	21	5	0.007	-	0.009	0.006	0.004	0.031	0.007	0.009	0.006
BUFR0415	Turb (NTU)	369	0	2	3	9	42	0	492	2	12	50
BUFR0415	W Temp (°C)	369	0	15.6	13.8	16.1	8.2	0.7	81.6	15.4	16.2	8.3
BUFR05	Cond (µS/cm)	74	0	217	203	208	45	100	286	195	217	49
BUFR05	DO (%)	71	0	103	103	104	11	74	140	101	101	5
BUFR05	DO (mg/L)	74	0	10.4	10.1	10.3	2.1	5.8	15.2	10.6	10.7	2.2
BUFR05	E. coli (col/100 mL)	40	0	5	7	16	34	0	201	10	29	49
BUFR05	FCB (col/100 mL)	74	1	4	5	14	30	0	227	8	17	23
BUFR05	NH3-N (mg/L)	69	94	0.03	0.024	0.026	0.009	0.005	0.031	0.03	0.03	0
BUFR05	NOx-N (mg/L)	69	6	0.12	-	0.16	0.13	0.01	0.56	0.14	0.18	0.11
BUFR05	Ortho-P (mg/L)	63	51	0.008	-	0.01	0.008	0.005	0.051	-	-	-
BUFR05	pH	73	0	8	8	8	0.3	7.1	8.7	7.8	7.8	0.2
BUFR05	TCB (col/100 mL)	6	17	378	510	876	960	172	2420	411	772	841
BUFR05	TKN (mg/L)	16	25	0.14	-	0.14	0.08	0.05	0.36	0.14	0.14	0.08
BUFR05	TN (mg/L)	16	38	0.23	-	0.27	0.13	0.17	0.57	0.28	0.29	0.14
BUFR05	TP (mg/L)	16	50	0.02	-	0.028	0.025	0.02	0.08	0.023	0.031	0.026
BUFR05	Turb (NTU)	73	0	2	2	3	4	0	27	2	4	4
BUFR05	W Temp (°C)	74	0	15	13.7	16.5	8.7	2	31.7	12.8	14.5	9.4
BUFR05.9	NH3-N (mg/L)	20	75	0.005	0.006	0.006	0.003	0.005	0.014	-	-	-
BUFR05.9	NOx-N (mg/L)	19	16	0.09	-	0.11	0.12	0.01	0.48	-	-	-
BUFR05.9	Ortho-P (mg/L)	19	58	0.003	-	0.005	0.005	0.005	0.018	-	-	-
BUFR05.9	TKN (mg/L)	6	33	0.09	-	0.19	0.29	0.05	0.76	-	-	-
BUFR05.9	TN (mg/L)	6	50	0.13	-	0.25	0.3	0.07	0.82	-	-	-
BUFR05.9	TP (mg/L)	6	67	0.013	-	0.025	0.028	0.02	0.075	-	-	-
BUFR06	Cond (µS/cm)	81	0	207	200	205	44	106	369	226	211	44
BUFR06	DO (%)	75	0	106	108	108	14	88	146	104	105	10

				2000-2019						2015-2019		
Site	Variable	n	%ND	Median	Geo mean	Mean	SD	Min	Max	Median	Mean	SD
BUFR06	DO (mg/L)	79	0	10.6	10.4	10.6	2	6.6	16.3	10.5	10.7	1.6
BUFR06	E. coli (col/100 mL)	41	0	6	8	62	309	0	1986	11	20	25
BUFR06	FCB (col/100 mL)	79	0	6	7	146	990	0	8700	8	13	12
BUFR06	NH3-N (mg/L)	78	94	0.03	0.024	0.027	0.01	0.005	0.066	0.03	0.023	0.01
BUFR06	NOx-N (mg/L)	78	19	0.1	-	0.17	0.17	0.01	0.65	0.1	0.16	0.14
BUFR06	Ortho-P (mg/L)	74	50	0.009	-	0.012	0.015	0.004	0.095	-	-	-
BUFR06	pH	80	0	8.1	8	8	0.3	7.2	8.8	7.8	7.9	0.2
BUFR06	TCB (col/100 mL)	6	17	289	196	701	936	4	2420	84	403	622
BUFR06	TKN (mg/L)	20	25	0.1	-	0.1	0.03	0.05	0.14	0.1	0.1	0.03
BUFR06	TN (mg/L)	20	45	0.16	-	0.22	0.15	0.11	0.55	0.17	0.23	0.16
BUFR06	TP (mg/L)	20	45	0.01	-	0.02	0.02	0.004	0.08	0.009	0.02	0.021
BUFR06	Turb (NTU)	79	0	2	2	6	19	0	159	2	4	4
BUFR06	W Temp (°C)	81	0	15.6	14.3	16.6	8.3	4.5	31.7	12.8	15	8.6
BUFR06.1	NH3-N (mg/L)	20	65	0.005	0.007	0.008	0.007	0.005	0.031	-	-	-
BUFR06.1	NOx-N (mg/L)	19	16	0.1	-	0.11	0.11	0.01	0.49	-	-	-
BUFR06.1	Ortho-P (mg/L)	19	53	0.004	-	0.008	0.009	0.005	0.04	-	-	-
BUFR06.1	TKN (mg/L)	6	17	0.1	-	0.23	0.29	0.05	0.78	-	-	-
BUFR06.1	TN (mg/L)	6	33	0.21	-	0.3	0.28	0.17	0.85	-	-	-
BUFR06.1	TP (mg/L)	6	67	0.006	-	0.023	0.033	0.02	0.086	-	-	-
BUFR07	Cond (µS/cm)	77	0	209	200	203	36	120	262	200	208	40
BUFR07	DO (%)	70	0	105	107	108	16	76	151	104	105	15
BUFR07	DO (mg/L)	75	0	10.6	10.4	10.6	2	5.6	15.1	10.4	10.8	2.2
BUFR07	E. coli (col/100 mL)	40	0	12	12	32	70	0	361	18	37	64
BUFR07	FCB (col/100 mL)	76	0	6	6	19	45	0	340	12	36	79
BUFR07	NH3-N (mg/L)	74	96	0.03	0.022	0.026	0.009	0.005	0.03	0.03	0.026	0.009
BUFR07	NOx-N (mg/L)	74	15	0.07	-	0.18	0.23	0.01	1.46	0.18	0.26	0.34
BUFR07	Ortho-P (mg/L)	69	48	0.009	-	0.01	0.008	0.004	0.06	0.006	0.008	0.005
BUFR07	pH	75	0	8.1	8.1	8.1	0.3	7.4	8.9	8	8	0.3
BUFR07	TCB (col/100 mL)	5	20	980	278	930	970	5	2420	980	742	539
BUFR07	TKN (mg/L)	21	24	0.12	-	0.12	0.06	0.05	0.26	0.12	0.12	0.05

				2000-2019						2015-2019		
Site	Variable	n	%ND	Median	Geo mean	Mean	SD	Min	Max	Median	Mean	SD
BUFR07	TN (mg/L)	21	48	0.14	-	0.31	0.34	0.11	1.56	0.17	0.33	0.36
BUFR07	TP (mg/L)	21	43	0.013	-	0.022	0.022	0.004	0.08	0.016	0.024	0.023
BUFR07	Turb (NTU)	77	0	2	2	4	8	0	69	3	5	6
BUFR07	W Temp (°C)	77	0	15.7	14.1	16.8	8.9	2.2	33.1	12.8	15.2	9
BUFR08	Cond (µS/cm)	76	0	210	208	211	37	127	361	200	207	37
BUFR08	DO (%)	71	0	103	102	103	11	70	146	103	101	11
BUFR08	DO (mg/L)	74	0	9.9	9.9	10.1	2.1	5	15.8	10.3	10.5	2.4
BUFR08	E. coli (col/100 mL)	40	0	9	9	20	37	0	225	13	31	52
BUFR08	FCB (col/100 mL)	75	1	6	7	18	40	0	265	8	21	39
BUFR08	NH3-N (mg/L)	76	93	0.03	0.021	0.025	0.01	0.005	0.033	0.03	0.023	0.01
BUFR08	NOx-N (mg/L)	76	21	0.06	-	0.15	0.17	0.01	0.66	0.12	0.18	0.17
BUFR08	Ortho-P (mg/L)	71	48	0.009	-	0.01	0.008	0.004	0.06	-	-	-
BUFR08	pH	76	0	8.1	8.1	8.1	0.3	7.2	8.7	8	8	0.2
BUFR08	TCB (col/100 mL)	5	20	649	613	988	939	114	2420	649	725	653
BUFR08	TKN (mg/L)	23	26	0.12	-	0.13	0.08	0.05	0.33	0.12	0.13	0.07
BUFR08	TN (mg/L)	23	48	0.13	-	0.25	0.2	0.11	0.62	0.16	0.28	0.2
BUFR08	TP (mg/L)	23	35	0.018	-	0.024	0.024	0.004	0.09	0.02	0.026	0.025
BUFR08	Turb (NTU)	76	0	1	2	4	8	0	67	3	5	7
BUFR08	W Temp (°C)	76	0	15.8	14.4	17	8.9	2.8	33.4	12.5	15.4	9.4
BUFR09	Cond (µS/cm)	73	0	228	214	218	41	104	303	229	220	40
BUFR09	DO (%)	65	0	105	105	105	13	79	139	107	109	14
BUFR09	DO (mg/L)	68	0	10.2	10.1	10.2	1.7	6.8	14.4	10.2	10.7	1.6
BUFR09	E. coli (col/100 mL)	40	0	7	10	79	209	0	1046	5	101	272
BUFR09	FCB (col/100 mL)	71	0	4	6	56	150	0	840	2	66	215
BUFR09	NH3-N (mg/L)	66	89	0.03	0.026	0.029	0.011	0.005	0.085	0.03	0.031	0.005
BUFR09	NOx-N (mg/L)	66	38	0.06	-	0.14	0.17	0.01	0.66	0.06	0.13	0.14
BUFR09	Ortho-P (mg/L)	62	47	0.009	-	0.013	0.015	0.005	0.092	-	-	-
BUFR09	pH	72	0	8.2	8.2	8.2	0.3	7.6	8.7	8.2	8.1	0.3
BUFR09	TCB (col/100 mL)	4	0	604	461	651	496	96	1300	698	698	851
BUFR09	TKN (mg/L)	20	15	0.13	-	0.15	0.08	0.05	0.4	0.14	0.16	0.09

				2000-2019						2015-2019		
Site	Variable	n	%ND	Median	Geo mean	Mean	SD	Min	Max	Median	Mean	SD
BUFR09	TN (mg/L)	20	65	0.06	-	0.16	0.21	0.07	0.88	0.09	0.22	0.24
BUFR09	TP (mg/L)	20	35	0.022	-	0.03	0.024	0.019	0.092	0.02	0.032	0.03
BUFR09	Turb (NTU)	72	0	1	2	7	15	0	90	2	9	18
BUFR09	W Temp (°C)	72	0	14.9	14.7	17.1	8.6	2.5	32.9	16.8	17.1	8.7
BUFR100	NH3-N (mg/L)	5	60	0.005	0.007	0.008	0.008	0.005	0.022	-	-	-
BUFR100	NOx-N (mg/L)	5	0	0.05	0.05	0.06	0.03	0.02	0.1	-	-	-
BUFR100	Ortho-P (mg/L)	5	60	0.002	-	0.004	0.004	0.005	0.011	-	-	-
BUFS02	Cond (µS/cm)	76	0	236	225	231	51	103	326	240	236	50
BUFS02	DO (%)	73	0	96	95	96	7	55	108	94	95	7
BUFS02	DO (mg/L)	76	0	9.9	9.9	10	0.9	5.7	12.7	10.1	10	0.8
BUFS02	E. coli (col/100 mL)	43	0	4	6	17	22	0	78	3	19	27
BUFS02	FCB (col/100 mL)	76	1	5	6	36	174	0	1500	5	13	16
BUFS02	NH3-N (mg/L)	71	97	0.03	0.024	0.027	0.008	0.005	0.03	0.03	0.03	0
BUFS02	NOx-N (mg/L)	71	0	0.19	0.17	0.19	0.09	0.05	0.38	0.13	0.16	0.08
BUFS02	Ortho-P (mg/L)	67	12	0.019	-	0.02	0.008	0.01	0.069	0.018	0.019	0.004
BUFS02	pH	76	0	7.5	7.4	7.4	0.4	6.4	8.3	7.5	7.4	0.2
BUFS02	TCB (col/100 mL)	6	33	1372	1096	1429	909	219	2420	1733	1641	829
BUFS02	TKN (mg/L)	14	79	0.03	-	0.04	0.04	0.05	0.16	-	-	-
BUFS02	TN (mg/L)	14	79	0.12	-	0.16	0.1	0.14	0.45	-	-	-
BUFS02	TP (mg/L)	14	14	0.035	-	0.037	0.021	0.02	0.09	0.04	0.038	0.022
BUFS02	Turb (NTU)	76	0	2	2	3	4	0	20	2	4	4
BUFS02	W Temp (°C)	76	0	13.1	12.9	12.9	1.3	9.4	18.5	13	13	1.2
BUFS33	Cond (µS/cm)	77	0	425	404	408	52	272	480	423	410	53
BUFS33	DO (%)	72	0	80	79	80	13	53	132	79	79	8
BUFS33	DO (mg/L)	78	0	8.3	8.1	8.2	1.2	5.2	12.6	7.9	8.1	0.9
BUFS33	E. coli (col/100 mL)	41	0	17	19	48	105	0	579	15	27	33
BUFS33	FCB (col/100 mL)	76	0	10	9	26	66	0	504	9	26	39
BUFS33	NH3-N (mg/L)	69	97	0.03	0.023	0.026	0.009	0.005	0.045	0.03	0.03	0
BUFS33	NOx-N (mg/L)	69	0	1.14	1.05	1.15	0.45	0.2	2.4	1.56	1.28	0.56
BUFS33	Ortho-P (mg/L)	63	19	0.014	-	0.016	0.01	0.005	0.077	-	-	-

				2000-2019						2015-2019		
Site	Variable	n	%ND	Median	Geo mean	Mean	SD	Min	Max	Median	Mean	SD
BUFS33	pH	75	0	7.2	7.2	7.2	0.2	6.8	7.7	7.1	7.2	0.3
BUFS33	TCB (col/100 mL)	4	0	192	147	235	223	38	517	308	288	240
BUFS33	TKN (mg/L)	16	38	0.12	-	0.12	0.09	0.05	0.33	0.07	0.1	0.08
BUFS33	TN (mg/L)	16	38	1.59	-	1.43	0.52	0.41	2.11	1.61	1.39	0.58
BUFS33	TP (mg/L)	16	25	0.028	-	0.033	0.018	0.02	0.07	0.024	0.029	0.019
BUFS33	Turb (NTU)	78	0	1	1	1	1	0	10	1	1	1
BUFS33	W Temp (°C)	78	0	14.7	14.5	14.5	1.1	12.5	16.8	14.7	14.5	1.1
BUFS41	Cond (µS/cm)	103	0	410	385	389	55	231	493	389	385	41
BUFS41	DO (%)	91	0	91	89	90	9	59	112	89	89	6
BUFS41	DO (mg/L)	100	0	9.2	9	9.1	1.1	5.9	12.6	9.3	9.3	0.9
BUFS41	E. coli (col/100 mL)	49	0	11	18	234	572	0	2420	15	245	550
BUFS41	FCB (col/100 mL)	95	1	6	10	555	4801	0	46800	6	54	128
BUFS41	NH3-N (mg/L)	89	92	0.03	0.019	0.024	0.012	0.005	0.07	0.03	0.03	0
BUFS41	NOx-N (mg/L)	88	0	0.9	0.87	0.93	0.29	0.03	1.96	0.86	0.86	0.2
BUFS41	Ortho-P (mg/L)	84	2	0.029	-	0.032	0.016	0.009	0.12	0.026	0.025	0.003
BUFS41	pH	99	0	7.5	7.5	7.5	0.2	6.6	8.1	7.4	7.4	0.2
BUFS41	TCB (col/100 mL)	6	0	260	214	267	164	58	488	248	286	186
BUFS41	TKN (mg/L)	22	50	0.08	-	0.12	0.17	0.05	0.68	0.08	0.1	0.04
BUFS41	TN (mg/L)	22	50	0.99	-	1.06	0.4	0.66	2.64	0.95	0.96	0.2
BUFS41	TP (mg/L)	22	5	0.04	-	0.048	0.024	0.02	0.108	0.037	0.043	0.017
BUFS41	Turb (NTU)	103	0	1	1	1	1	0	12	1	1	1
BUFS41	W Temp (°C)	102	0	14.2	13.9	14.1	2.4	9.5	18.4	13.4	13.4	2
BUFT01	Cond (µS/cm)	44	0	70	66	74	33	7	203	74	79	23
BUFT01	DO (%)	39	0	100	100	100	7	80	116	101	102	7
BUFT01	DO (mg/L)	42	0	11.5	11	11.2	1.7	6.8	14.8	10.9	11	1
BUFT01	E. coli (col/100 mL)	24	0	17	14	29	41	2	150	19	31	43
BUFT01	FCB (col/100 mL)	43	0	13	14	120	615	1	4050	12	28	40
BUFT01	NH3-N (mg/L)	41	98	0.03	0.022	0.026	0.01	0.005	0.04	0.03	0.03	0
BUFT01	NOx-N (mg/L)	41	29	0.04	-	0.05	0.04	0.01	0.13	0.04	0.04	0.02
BUFT01	Ortho-P (mg/L)	36	50	0.008	-	0.011	0.009	0.005	0.043	-	-	-

				2000-2019						2015-2019		
Site	Variable	n	%ND	Median	Geo mean	Mean	SD	Min	Max	Median	Mean	SD
BUFT01	pH	43	0	7.8	7.7	7.7	0.3	7	8.3	7.5	7.5	0.2
BUFT01	TCB (col/100 mL)	6	33	734	643	1104	1055	116	2420	2420	1679	1282
BUFT01	TKN (mg/L)	10	60	0.07	-	0.08	0.05	0.05	0.2	0.04	0.07	0.06
BUFT01	TN (mg/L)	10	80	-	-	-	-	0.08	0.3	-	-	-
BUFT01	TP (mg/L)	10	60	0.025	-	0.026	0.009	0.02	0.04	0.025	0.027	0.009
BUFT01	Turb (NTU)	44	0	5	5	9	21	0	138	6	8	5
BUFT01	W Temp (°C)	44	0	9.2	8.6	10.3	5.4	0.4	22.8	9.9	11.7	5.4
BUFT02	Cond (µS/cm)	69	0	254	236	249	68	44	356	259	268	49
BUFT02	DO (%)	62	0	100	98	98	13	67	141	99	100	17
BUFT02	DO (mg/L)	64	0	10.9	10.1	10.4	2.2	6.1	14.7	11	10.4	2.2
BUFT02	E. coli (col/100 mL)	37	0	22	17	71	175	0	920	31	77	141
BUFT02	FCB (col/100 mL)	68	1	13	12	59	217	0	1730	22	25	29
BUFT02	NH3-N (mg/L)	66	95	0.03	0.027	0.034	0.045	0.005	0.389	0.03	0.03	0
BUFT02	NOx-N (mg/L)	66	5	0.12	-	0.14	0.09	0.02	0.51	0.14	0.15	0.09
BUFT02	Ortho-P (mg/L)	60	42	0.01	-	0.016	0.043	0.001	0.335	-	-	-
BUFT02	pH	68	0	8	8	8	0.3	7.3	8.4	7.8	7.9	0.2
BUFT02	TCB (col/100 mL)	6	33	489	716	1077	1046	313	2420	613	1133	1121
BUFT02	TKN (mg/L)	16	25	0.1	-	0.11	0.05	0.05	0.23	0.1	0.11	0.06
BUFT02	TN (mg/L)	16	38	0.19	-	0.22	0.1	0.09	0.45	0.19	0.23	0.1
BUFT02	TP (mg/L)	16	31	0.028	-	0.027	0.009	0.02	0.04	0.028	0.028	0.009
BUFT02	Turb (NTU)	69	0	1	2	9	42	0	320	2	4	5
BUFT02	W Temp (°C)	68	0	11.9	11.2	13.3	6.6	0.9	25.9	13.4	14.6	7.5
BUFT03	Cond (µS/cm)	74	0	240	220	230	61	80	340	259	248	46
BUFT03	DO (%)	70	0	98	97	97	10	75	119	101	97	12
BUFT03	DO (mg/L)	74	0	10	9.8	10	1.8	6.5	13.8	10	9.8	1.6
BUFT03	E. coli (col/100 mL)	41	0	29	22	53	97	0	614	28	42	42
BUFT03	FCB (col/100 mL)	74	3	17	14	37	53	0	296	20	37	38
BUFT03	NH3-N (mg/L)	70	94	0.03	0.025	0.028	0.008	0.005	0.06	0.03	0.03	0
BUFT03	NOx-N (mg/L)	70	31	0.04	-	0.08	0.16	0.01	0.89	0.05	0.05	0.02
BUFT03	Ortho-P (mg/L)	64	48	0.009	-	0.01	0.006	0.005	0.035	-	-	-

				2000-2019						2015-2019		
Site	Variable	n	%ND	Median	Geo mean	Mean	SD	Min	Max	Median	Mean	SD
BUFT03	pH	73	0	7.8	7.8	7.8	0.2	7.2	8.5	7.7	7.7	0.2
BUFT03	TCB (col/100 mL)	4	25	1211	752	1249	1122	153	2420	1986	1520	1203
BUFT03	TKN (mg/L)	16	38	0.11	-	0.11	0.03	0.05	0.16	0.1	0.1	0.03
BUFT03	TN (mg/L)	16	62	0.14	-	0.15	0.03	0.08	0.22	0.13	0.14	0.04
BUFT03	TP (mg/L)	16	44	0.021	-	0.023	0.011	0.02	0.05	0.021	0.024	0.012
BUFT03	Turb (NTU)	75	0	2	2	3	5	0	33	3	2	1
BUFT03	W Temp (°C)	75	0	14.6	13	14.5	6.1	3.4	27.4	15.5	15.4	6.3
BUFT04	Cond (µS/cm)	326	0	349	335	339	47	107	655	350	345	41
BUFT04	DO (%)	313	0	104	103	104	15	54	176	104	105	15
BUFT04	DO (mg/L)	315	0	10.4	10.4	10.5	2	5.1	15.1	10.5	10.7	1.9
BUFT04	E. coli (col/100 mL)	291	2	57	55	204	493	0	3675	57	212	515
BUFT04	FCB (col/100 mL)	78	1	32	29	97	242	0	2000	34	57	64
BUFT04	NH3-N (mg/L)	94	89	0.03	0.027	0.029	0.012	0.005	0.122	0.03	0.033	0.017
BUFT04	NOx-N (mg/L)	94	0	0.7	0.68	0.75	0.31	0.15	1.6	0.78	0.87	0.35
BUFT04	Ortho-P (mg/L)	73	32	0.011	-	0.016	0.027	0.005	0.229	-	-	-
BUFT04	pH	326	0	7.9	7.9	7.9	0.2	7.2	8.4	7.9	7.9	0.1
BUFT04	TCB (col/100 mL)	59	66	2420	1824	2925	7658	345	60490	2420	2972	7788
BUFT04	TKN (mg/L)	29	14	0.14	-	0.19	0.22	0.05	1.25	0.14	0.2	0.22
BUFT04	TN (mg/L)	29	14	0.98	-	1.09	0.36	0.63	1.76	0.98	1.11	0.36
BUFT04	TP (mg/L)	28	29	0.03	-	0.043	0.067	0.02	0.377	0.03	0.044	0.069
BUFT04	Turb (NTU)	327	0	1	2	4	11	0	122	1	4	9
BUFT04	W Temp (°C)	327	0	14.9	14	15.3	5.9	2.5	26.9	14.8	15.2	5.8
BUFT0401	NH3-N (mg/L)	24	92	0.03	0.032	0.034	0.015	0.03	0.104	0.03	0.034	0.017
BUFT0401	NOx-N (mg/L)	24	0	1.02	1.07	1.14	0.41	0.45	1.98	1.02	1.17	0.42
BUFT0401	Ortho-P (mg/L)	6	33	0.018	-	0.048	0.076	0.012	0.203	-	-	-
BUFT0401	TKN (mg/L)	18	28	0.14	-	0.2	0.24	0.1	1.09	0.14	0.2	0.24
BUFT0401	TN (mg/L)	18	28	1.38	-	1.44	0.41	0.77	2.1	1.38	1.44	0.41
BUFT0401	TP (mg/L)	18	22	0.036	-	0.052	0.074	0.02	0.339	0.036	0.052	0.074
BUFT0402	NH3-N (mg/L)	3	100	0.03	0.03	0.03	0	0.03	0.03	-	-	-
BUFT0402	NOx-N (mg/L)	3	0	1.12	1.2	1.21	0.16	1.11	1.39	-	-	-

				2000-2019						2015-2019		
Site	Variable	n	%ND	Median	Geo mean	Mean	SD	Min	Max	Median	Mean	SD
BUFT0402	Ortho-P (mg/L)	3	0	0.016	0.016	0.016	0.004	0.012	0.02	-	-	-
BUFT0405	NH3-N (mg/L)	3	100	0.03	0.03	0.03	0	0.03	0.03	-	-	-
BUFT0405	NOx-N (mg/L)	3	0	0.31	0.32	0.33	0.13	0.22	0.47	-	-	-
BUFT0405	Ortho-P (mg/L)	3	0	0.022	0.019	0.019	0.005	0.014	0.022	-	-	-
BUFT05	Cond (µS/cm)	338	0	196	187	194	50	62	293	192	194	49
BUFT05	DO (%)	325	0	101	99	100	12	55	153	101	100	12
BUFT05	DO (mg/L)	327	0	10	9.9	10	1.8	4.8	14.9	10	10.1	1.8
BUFT05	E. coli (col/100 mL)	304	1	33	41	166	589	2	7746	33	169	612
BUFT05	FCB (col/100 mL)	75	0	18	16	106	530	0	4500	20	25	21
BUFT05	NH3-N (mg/L)	72	92	0.03	0.025	0.037	0.086	0.005	0.751	0.03	0.031	0.003
BUFT05	NOx-N (mg/L)	72	12	0.1	-	0.13	0.18	0.01	1.43	0.11	0.12	0.09
BUFT05	Ortho-P (mg/L)	67	43	0.01	-	0.013	0.025	0.005	0.208	-	-	-
BUFT05	pH	339	0	7.8	7.8	7.8	0.2	7.1	8.7	7.8	7.8	0.2
BUFT05	TCB (col/100 mL)	58	64	2420	1622	2682	6330	99	49657	2420	2743	6436
BUFT05	TKN (mg/L)	15	20	0.15	-	0.14	0.05	0.05	0.24	0.15	0.14	0.06
BUFT05	TN (mg/L)	15	27	0.26	-	0.26	0.09	0.08	0.45	0.26	0.26	0.09
BUFT05	TP (mg/L)	14	36	0.029	-	0.029	0.015	0.02	0.07	0.03	0.031	0.016
BUFT05	Turb (NTU)	340	0	2	3	10	43	0	498	2	11	47
BUFT05	W Temp (°C)	340	0	14.8	13.6	15.8	7.5	0.1	30.1	14.9	16	7.5
BUFT0501	NH3-N (mg/L)	5	60	0.005	0.006	0.007	0.002	0.005	0.01	-	-	-
BUFT0501	NOx-N (mg/L)	5	0	0.08	0.06	0.07	0.03	0.03	0.09	-	-	-
BUFT0501	Ortho-P (mg/L)	5	20	0.008	-	0.007	0.003	0.005	0.01	-	-	-
BUFT06	Cond (µS/cm)	442	0	221	209	214	43	56	326	217	213	41
BUFT06	DO (%)	423	0	97	94	96	17	53	152	97	95	17
BUFT06	DO (mg/L)	430	0	9.9	9.4	9.8	2.4	4.3	16.2	10	9.7	2.3
BUFT06	E. coli (col/100 mL)	407	1	39	44	182	762	0	12262	38	191	854
BUFT06	FCB (col/100 mL)	77	0	10	12	154	784	0	6300	23	40	36
BUFT06	NH3-N (mg/L)	108	70	0.03	0.023	0.032	0.067	0.005	0.704	0.02	0.02	0.009
BUFT06	NOx-N (mg/L)	131	3	0.14	-	0.18	0.16	0.01	1.42	0.15	0.18	0.11
BUFT06	Ortho-P (mg/L)	103	29	0.011	-	0.017	0.028	0.004	0.207	0.008	0.014	0.019

				2000-2019						2015-2019		
Site	Variable	n	%ND	Median	Geo mean	Mean	SD	Min	Max	Median	Mean	SD
BUFT06	pH	442	0	7.7	7.7	7.7	0.3	6.7	8.6	7.7	7.7	0.3
BUFT06	TCB (col/100 mL)	63	71	2420	1827	2921	7406	111	60490	2420	2954	7462
BUFT06	TKN (mg/L)	49	18	0.14	-	0.24	0.45	0.05	2.5	0.11	0.24	0.46
BUFT06	TN (mg/L)	50	20	0.3	-	0.41	0.48	0.1	2.7	0.3	0.42	0.49
BUFT06	TP (mg/L)	48	8	0.021	-	0.066	0.164	0.008	0.947	0.02	0.068	0.167
BUFT06	Turb (NTU)	444	0	2	3	7	21	0	271	3	6	16
BUFT06	W Temp (°C)	442	0	15	13.8	15.6	6.8	0.4	32.3	14.9	15.4	6.5
BUFT0601	NH3-N (mg/L)	5	60	0.005	0.007	0.008	0.006	0.005	0.019	-	-	-
BUFT0601	NOx-N (mg/L)	5	0	0.08	0.06	0.07	0.03	0.03	0.09	-	-	-
BUFT0601	Ortho-P (mg/L)	5	20	0.008	-	0.008	0.003	0.005	0.012	-	-	-
BUFT0602	NH3-N (mg/L)	5	80	0.005	0.006	0.007	0.004	0.005	0.013	-	-	-
BUFT0602	NOx-N (mg/L)	5	0	0.13	0.15	0.17	0.09	0.08	0.29	-	-	-
BUFT0602	Ortho-P (mg/L)	5	0	0.009	0.008	0.008	0.002	0.005	0.011	-	-	-
BUFT07	Cond (µS/cm)	77	0	407	380	385	58	156	465	407	388	71
BUFT07	DO (%)	72	0	104	100	101	16	52	142	105	100	22
BUFT07	DO (mg/L)	78	0	10.4	10	10.2	2	4.4	14.3	10.6	10.3	2.4
BUFT07	E. coli (col/100 mL)	41	2	27	27	110	374	0	2420	27	49	53
BUFT07	FCB (col/100 mL)	77	0	23	21	84	255	0	1700	20	46	56
BUFT07	NH3-N (mg/L)	75	96	0.03	0.023	0.027	0.009	0.005	0.036	0.03	0.03	0
BUFT07	NOx-N (mg/L)	75	0	0.48	0.45	0.57	0.34	0.01	1.53	0.69	0.74	0.43
BUFT07	Ortho-P (mg/L)	69	39	0.011	-	0.011	0.007	0.005	0.041	-	-	-
BUFT07	pH	77	0	8	7.9	7.9	0.3	7.3	8.5	7.8	7.8	0.2
BUFT07	TCB (col/100 mL)	4	0	652	521	687	493	142	1300	816	868	408
BUFT07	TKN (mg/L)	16	44	0.07	-	0.1	0.06	0.05	0.26	0.06	0.08	0.05
BUFT07	TN (mg/L)	16	44	0.76	-	0.8	0.41	0.32	1.71	0.76	0.82	0.45
BUFT07	TP (mg/L)	16	31	0.032	-	0.033	0.013	0.02	0.06	0.03	0.032	0.015
BUFT07	Turb (NTU)	78	0	1	1	2	5	0	32	1	1	1
BUFT07	W Temp (°C)	78	0	14.6	14	14.8	4.8	3.8	25.4	14.1	14.6	4
BUFT08	Cond (µS/cm)	79	0	207	193	199	43	61	286	207	209	34
BUFT08	DO (%)	72	0	102	102	103	14	65	132	106	109	12

				2000-2019						2015-2019		
Site	Variable	n	%ND	Median	Geo mean	Mean	SD	Min	Max	Median	Mean	SD
BUFT08	DO (mg/L)	75	0	10.3	9.9	10.1	2.1	5.6	14.1	10.9	10.3	1.9
BUFT08	E. coli (col/100 mL)	42	0	49	42	121	372	1	2420	62	69	37
BUFT08	FCB (col/100 mL)	77	0	22	17	93	380	0	2950	44	56	39
BUFT08	NH3-N (mg/L)	73	90	0.03	0.026	0.028	0.007	0.005	0.037	0.03	0.03	0
BUFT08	NOx-N (mg/L)	73	10	0.09	-	0.14	0.18	0.01	1.29	0.07	0.18	0.34
BUFT08	Ortho-P (mg/L)	69	35	0.012	-	0.013	0.011	0.003	0.061	-	-	-
BUFT08	pH	77	0	8	8	8	0.3	7.2	8.6	7.9	7.8	0.3
BUFT08	TCB (col/100 mL)	4	25	1029	1088	1256	808	548	2420	1484	1484	1324
BUFT08	TKN (mg/L)	16	19	0.12	-	0.12	0.04	0.05	0.2	0.12	0.12	0.05
BUFT08	TN (mg/L)	16	38	0.2	-	0.27	0.31	0.08	1.39	0.19	0.27	0.35
BUFT08	TP (mg/L)	15	33	0.031	-	0.031	0.013	0.02	0.05	0.027	0.03	0.013
BUFT08	Turb (NTU)	79	0	1	2	4	16	0	140	1	2	2
BUFT08	W Temp (°C)	78	0	15.3	14.4	16	6.8	4	30.3	15.5	16.4	5
BUFT0801	NH3-N (mg/L)	5	80	0.005	0.006	0.006	0.002	0.005	0.009	-	-	-
BUFT0801	NOx-N (mg/L)	5	0	0.08	0.07	0.08	0.03	0.03	0.12	-	-	-
BUFT0801	Ortho-P (mg/L)	5	60	0.002	-	0.004	0.004	0.005	0.011	-	-	-
BUFT09	Cond (µS/cm)	67	0	104	107	117	52	41	281	112	134	65
BUFT09	DO (%)	65	0	104	104	105	10	81	154	105	105	8
BUFT09	DO (mg/L)	67	0	10.5	10.4	10.6	1.5	7.5	15	11.2	10.8	1.3
BUFT09	E. coli (col/100 mL)	36	0	35	27	74	152	2	866	28	48	63
BUFT09	FCB (col/100 mL)	66	2	10	12	75	265	0	1950	21	26	25
BUFT09	NH3-N (mg/L)	81	93	0.03	0.024	0.027	0.009	0.005	0.04	0.03	0.031	0.002
BUFT09	NOx-N (mg/L)	81	17	0.05	-	0.07	0.14	0.01	1.23	0.04	0.11	0.29
BUFT09	Ortho-P (mg/L)	78	53	0.008	-	0.018	0.055	0.005	0.477	-	-	-
BUFT09	pH	66	0	7.9	7.8	7.9	0.4	6.6	8.5	8	7.8	0.5
BUFT09	TCB (col/100 mL)	4	0	1164	1184	1344	787	629	2420	1414	1414	-
BUFT09	TKN (mg/L)	26	23	0.09	-	0.12	0.11	0.05	0.59	0.08	0.12	0.13
BUFT09	TN (mg/L)	26	46	0.12	-	0.19	0.34	0.08	1.82	0.06	0.19	0.43
BUFT09	TP (mg/L)	26	58	0.009	-	0.037	0.098	0.02	0.505	0.015	0.019	0.014
BUFT09	Turb (NTU)	66	0	3	3	5	10	0	69	2	3	2

				2000-2019						2015-2019		
Site	Variable	n	%ND	Median	Geo mean	Mean	SD	Min	Max	Median	Mean	SD
BUFT09	W Temp (°C)	67	0	14.5	13.9	15.1	6.1	6.1	30.8	12	14.5	6.9
BUFT0901	NH3-N (mg/L)	5	100	0.005	0.005	0.005	0	0.005	0.005	-	-	-
BUFT0901	NOx-N (mg/L)	5	0	0.05	0.05	0.06	0.04	0.03	0.12	-	-	-
BUFT0901	Ortho-P (mg/L)	5	100	-	-	-	-	0.005	0.005	-	-	-
BUFT0902	NH3-N (mg/L)	5	80	0.005	0.007	0.008	0.007	0.005	0.02	-	-	-
BUFT0902	NOx-N (mg/L)	5	0	0.03	0.04	0.04	0.01	0.03	0.05	-	-	-
BUFT0902	Ortho-P (mg/L)	5	80	-	-	-	-	0.005	0.007	-	-	-
BUFT0903	NH3-N (mg/L)	20	95	0.03	0.019	0.024	0.011	0.005	0.038	0.03	0.03	0
BUFT0903	NOx-N (mg/L)	20	25	0.04	-	0.04	0.02	0.02	0.08	0.02	0.03	0.02
BUFT0903	Ortho-P (mg/L)	20	80	-	-	-	-	0.005	0.813	-	-	-
BUFT0903	TKN (mg/L)	15	13	0.09	-	0.12	0.09	0.05	0.31	0.1	0.13	0.11
BUFT0903	TN (mg/L)	15	40	0.11	-	0.14	0.1	0.08	0.34	0.07	0.15	0.12
BUFT0903	TP (mg/L)	15	53	0.006	-	0.072	0.212	0.02	0.832	-	-	-
BUFT10	Cond (µS/cm)	79	0	280	263	269	53	133	358	282	281	36
BUFT10	DO (%)	75	0	107	104	106	22	55	160	114	114	28
BUFT10	DO (mg/L)	77	0	10.5	10.1	10.4	2.5	4.8	17.3	12.2	11.4	3.1
BUFT10	E. coli (col/100 mL)	42	0	18	24	106	210	0	1011	44	90	149
BUFT10	FCB (col/100 mL)	75	0	12	14	380	1942	0	15400	16	27	45
BUFT10	NH3-N (mg/L)	105	87	0.03	0.029	0.034	0.022	0.005	0.162	0.03	0.03	0
BUFT10	NOx-N (mg/L)	105	0	0.33	0.35	0.42	0.28	0.05	1.94	0.3	0.31	0.16
BUFT10	Ortho-P (mg/L)	100	3	0.025	-	0.034	0.039	0.01	0.269	0.025	0.025	0.005
BUFT10	pH	79	0	7.9	7.9	7.9	0.4	7.1	8.8	7.9	7.9	0.4
BUFT10	TCB (col/100 mL)	5	20	172	279	626	1005	84	2420	291	959	1267
BUFT10	TKN (mg/L)	46	15	0.1	-	0.15	0.22	0.05	1.1	0.08	0.09	0.03
BUFT10	TN (mg/L)	48	15	0.41	-	0.55	0.36	0.15	1.8	0.33	0.39	0.14
BUFT10	TP (mg/L)	48	2	0.033	-	0.042	0.043	0.018	0.31	0.043	0.039	0.016
BUFT10	Turb (NTU)	79	0	1	2	17	69	0	490	1	1	1
BUFT10	W Temp (°C)	79	0	16.4	15.4	16.3	5.2	6.8	26	15.3	15.9	5
BUFT11	Cond (µS/cm)	76	0	344	325	329	48	115	399	350	351	25
BUFT11	DO (%)	73	0	106	105	106	13	52	138	106	108	12

				2000-2019						2015-2019		
Site	Variable	n	%ND	Median	Geo mean	Mean	SD	Min	Max	Median	Mean	SD
BUFT11	DO (mg/L)	74	0	10.6	10.5	10.7	1.7	4.9	14.1	11	11.1	1.7
BUFT11	E. coli (col/100 mL)	40	0	29	30	86	188	1	1046	39	57	52
BUFT11	FCB (col/100 mL)	76	0	15	17	102	407	0	3400	27	47	55
BUFT11	NH3-N (mg/L)	75	95	0.03	0.024	0.028	0.019	0.005	0.172	0.03	0.025	0.009
BUFT11	NOx-N (mg/L)	75	0	0.28	0.29	0.32	0.16	0.09	1.34	0.3	0.33	0.1
BUFT11	Ortho-P (mg/L)	71	31	0.012	-	0.016	0.018	0.005	0.109	0.009	0.01	0.002
BUFT11	pH	76	0	8	8	8	0.2	7.4	8.7	8	7.9	0.2
BUFT11	TCB (col/100 mL)	4	25	1192	785	1250	1117	199	2420	2203	2203	306
BUFT11	TKN (mg/L)	19	58	0.06	-	0.07	0.03	0.05	0.14	0.05	0.06	0.03
BUFT11	TN (mg/L)	19	58	0.3	-	0.34	0.12	0.25	0.61	0.28	0.33	0.14
BUFT11	TP (mg/L)	19	26	0.021	-	0.024	0.014	0.004	0.053	0.022	0.025	0.014
BUFT11	Turb (NTU)	76	0	1	1	3	8	0	51	1	1	1
BUFT11	W Temp (°C)	76	0	15.4	14.3	14.9	4.2	6.9	23	14.5	14.8	3.6
BUFT11.5	NH3-N (mg/L)	21	62	0.005	0.007	0.009	0.013	0.005	0.067	-	-	-
BUFT11.5	NOx-N (mg/L)	20	0	0.9	0.93	0.99	0.38	0.57	1.79	-	-	-
BUFT11.5	Ortho-P (mg/L)	20	0	0.035	0.033	0.038	0.021	0.01	0.1	-	-	-
BUFT11.5	TKN (mg/L)	7	57	0.05	-	0.25	0.35	0.05	0.81	-	-	-
BUFT11.5	TN (mg/L)	7	57	1.1	-	1.26	0.63	0.66	2.6	-	-	-
BUFT11.5	TP (mg/L)	7	0	0.049	0.047	0.057	0.041	0.023	0.138	-	-	-
BUFT12	Cond (µS/cm)	80	0	219	209	215	49	101	310	229	231	31
BUFT12	DO (%)	68	0	110	113	114	16	84	148	122	119	10
BUFT12	DO (mg/L)	76	0	10.8	11	11.2	2.3	6.6	17.2	12.1	12	1.8
BUFT12	E. coli (col/100 mL)	41	2	29	33	118	384	1	2420	36	52	48
BUFT12	FCB (col/100 mL)	77	0	15	19	303	1853	0	16100	24	34	27
BUFT12	NH3-N (mg/L)	74	89	0.03	0.026	0.03	0.017	0.005	0.148	0.03	0.03	0
BUFT12	NOx-N (mg/L)	74	8	0.3	-	0.32	0.26	0.01	1.56	0.21	0.28	0.24
BUFT12	Ortho-P (mg/L)	69	25	0.016	-	0.023	0.028	0.005	0.167	-	-	-
BUFT12	pH	75	0	8.2	8.1	8.1	0.4	7	9.1	8.2	8.2	0.3
BUFT12	TCB (col/100 mL)	5	20	817	832	1034	814	345	2420	579	1115	1136
BUFT12	TKN (mg/L)	15	27	0.12	-	0.13	0.04	0.08	0.22	0.12	0.11	0.04

				2000-2019						2015-2019		
Site	Variable	n	%ND	Median	Geo mean	Mean	SD	Min	Max	Median	Mean	SD
BUFT12	TN (mg/L)	15	33	0.36	-	0.38	0.22	0.12	1.01	0.26	0.35	0.26
BUFT12	TP (mg/L)	15	27	0.03	-	0.031	0.012	0.02	0.058	0.03	0.03	0.013
BUFT12	Turb (NTU)	79	0	2	2	8	23	0	162	3	3	3
BUFT12	W Temp (°C)	79	0	15.7	14.5	16.4	7.4	3.5	30.9	13.1	16.5	6.6
BUFT1201	NH3-N (mg/L)	11	91	0.03	0.014	0.019	0.013	0.005	0.03	-	-	-
BUFT1201	NOx-N (mg/L)	11	9	0.06	-	0.06	0.03	0.01	0.12	-	-	-
BUFT1201	Ortho-P (mg/L)	11	45	0.005	-	0.008	0.006	0.005	0.021	-	-	-
BUFT13	Cond (µS/cm)	65	0	326	311	314	46	200	390	331	332	19
BUFT13	DO (%)	59	0	106	106	106	13	74	135	116	116	10
BUFT13	DO (mg/L)	62	0	10.8	10.9	11	2	7	15.8	11.8	11.7	1.8
BUFT13	E. coli (col/100 mL)	36	0	23	25	71	108	1	411	25	62	99
BUFT13	FCB (col/100 mL)	64	2	18	15	43	72	0	420	23	40	55
BUFT13	NH3-N (mg/L)	58	97	0.03	0.024	0.027	0.009	0.005	0.048	0.03	0.03	0
BUFT13	NOx-N (mg/L)	58	0	0.72	0.67	0.73	0.23	0.02	1.66	0.74	0.77	0.19
BUFT13	Ortho-P (mg/L)	53	15	0.018	-	0.026	0.05	0.005	0.371	0.02	0.02	0.001
BUFT13	pH	64	0	8.1	8.1	8.1	0.3	7.5	8.8	8.2	8.2	0.2
BUFT13	TCB (col/100 mL)	5	0	649	758	894	638	435	1986	649	1023	841
BUFT13	TKN (mg/L)	16	50	0.07	-	0.1	0.06	0.05	0.24	0.06	0.09	0.05
BUFT13	TN (mg/L)	16	50	0.84	-	0.87	0.18	0.5	1.37	0.82	0.87	0.17
BUFT13	TP (mg/L)	16	12	0.035	-	0.035	0.013	0.02	0.054	0.034	0.034	0.012
BUFT13	Turb (NTU)	64	0	1	1	1	2	0	17	1	1	1
BUFT13	W Temp (°C)	64	0	14.3	13	14.3	5.6	1.9	24.4	13.6	15.1	5
BUFT14	Cond (µS/cm)	79	0	352	328	333	51	169	404	352	343	33
BUFT14	DO (%)	72	0	109	110	110	11	90	139	114	112	11
BUFT14	DO (mg/L)	78	0	10.9	10.9	11	1.6	7.7	14.4	11.1	11.6	1.4
BUFT14	E. coli (col/100 mL)	43	0	70	63	142	254	0	1553	64	105	136
BUFT14	FCB (col/100 mL)	75	0	37	36	149	635	0	5450	47	57	53
BUFT14	NH3-N (mg/L)	73	90	0.03	0.024	0.027	0.009	0.005	0.055	0.03	0.03	0
BUFT14	NOx-N (mg/L)	72	1	0.4	-	0.46	0.25	0.03	1.12	0.49	0.53	0.25
BUFT14	Ortho-P (mg/L)	67	48	0.009	-	0.011	0.012	0.002	0.078	-	-	-

				2000-2019						2015-2019		
Site	Variable	n	%ND	Median	Geo mean	Mean	SD	Min	Max	Median	Mean	SD
BUFT14	pH	78	0	8.2	8.1	8.1	0.2	7.1	8.5	8.1	8.1	0.1
BUFT14	TCB (col/100 mL)	8	25	1016	1148	1305	732	579	2420	1120	1270	715
BUFT14	TKN (mg/L)	16	31	0.11	-	0.12	0.04	0.05	0.2	0.11	0.12	0.05
BUFT14	TN (mg/L)	16	31	0.63	-	0.61	0.25	0.29	1.02	0.64	0.65	0.24
BUFT14	TP (mg/L)	16	50	0.02	-	0.022	0.014	0.02	0.05	0.019	0.022	0.014
BUFT14	Turb (NTU)	78	0	1	1	3	15	0	130	1	1	1
BUFT14	W Temp (°C)	79	0	15.3	14.1	15.4	6	4.8	26.2	11.3	14.1	5.5
BUFT15	Cond (µS/cm)	71	0	302	285	289	48	156	413	309	296	37
BUFT15	DO (%)	69	0	106	104	105	11	50	127	108	107	10
BUFT15	DO (mg/L)	71	0	11.2	10.7	11	2.2	4.8	14.7	11.3	11.4	1.9
BUFT15	E. coli (col/100 mL)	37	0	23	18	29	28	2	140	19	23	16
BUFT15	FCB (col/100 mL)	70	1	13	9	16	22	0	159	12	15	11
BUFT15	NH3-N (mg/L)	64	98	0.03	0.024	0.027	0.008	0.005	0.03	0.03	0.03	0
BUFT15	NOx-N (mg/L)	63	0	0.24	0.19	0.26	0.19	0.01	1.15	0.26	0.28	0.13
BUFT15	Ortho-P (mg/L)	61	61	0.006	-	0.007	0.005	0.005	0.028	-	-	-
BUFT15	pH	70	0	8.2	8.1	8.1	0.3	7.4	8.7	8.2	8.1	0.2
BUFT15	TCB (col/100 mL)	3	0	687	304	499	387	54	755	687	687	-
BUFT15	TKN (mg/L)	12	25	0.1	-	0.11	0.05	0.05	0.2	0.1	0.11	0.05
BUFT15	TN (mg/L)	12	25	0.28	-	0.34	0.17	0.17	0.68	0.3	0.35	0.18
BUFT15	TP (mg/L)	12	50	0.016	-	0.034	0.049	0.02	0.179	0.014	0.035	0.054
BUFT15	Turb (NTU)	71	0	0	1	1	1	0	3	1	1	0
BUFT15	W Temp (°C)	71	0	14.2	12.2	14.3	7.2	3.2	27.4	11.9	13.3	6.7
BUFT16	Cond (µS/cm)	79	0	346	328	331	43	184	385	336	338	24
BUFT16	DO (%)	75	0	103	104	104	10	82	128	107	107	8
BUFT16	DO (mg/L)	79	0	10.5	10.4	10.5	1.4	7.4	13.8	10.9	10.9	1.2
BUFT16	E. coli (col/100 mL)	42	0	14	14	31	53	0	326	16	27	28
BUFT16	FCB (col/100 mL)	78	0	12	10	23	38	0	276	17	19	20
BUFT16	NH3-N (mg/L)	74	100	0.03	0.024	0.027	0.009	0.005	0.03	0.03	0.03	0
BUFT16	NOx-N (mg/L)	73	0	0.23	0.24	0.26	0.11	0.07	0.65	0.23	0.26	0.08
BUFT16	Ortho-P (mg/L)	69	55	0.008	-	0.009	0.005	0.005	0.027	-	-	-

				2000-2019						2015-2019		
Site	Variable	n	%ND	Median	Geo mean	Mean	SD	Min	Max	Median	Mean	SD
BUFT16	pH	77	0	8.1	8	8	0.2	7.4	8.8	7.9	7.9	0.2
BUFT16	TCB (col/100 mL)	7	14	575	516	770	791	166	2420	436	865	1064
BUFT16	TKN (mg/L)	18	39	0.09	-	0.09	0.02	0.05	0.14	0.08	0.09	0.02
BUFT16	TN (mg/L)	18	39	0.3	-	0.33	0.08	0.23	0.49	0.3	0.32	0.09
BUFT16	TP (mg/L)	18	39	0.024	-	0.03	0.019	0.02	0.08	0.024	0.029	0.021
BUFT16	Turb (NTU)	78	0	1	1	1	1	0	9	1	1	0
BUFT16	W Temp (°C)	78	0	15	13.9	14.6	4.3	6.2	22.4	13.2	14.4	4
BUFT17	Cond (µS/cm)	81	0	432	405	410	57	178	477	428	418	32
BUFT17	DO (%)	77	0	106	105	106	11	83	136	110	108	12
BUFT17	DO (mg/L)	81	0	10.7	10.5	10.7	1.9	6.7	14.3	10.8	11	1.7
BUFT17	E. coli (col/100 mL)	44	2	42	41	123	365	1	2420	44	90	94
BUFT17	FCB (col/100 mL)	79	0	12	15	86	279	0	1720	36	72	106
BUFT17	NH3-N (mg/L)	75	100	0.03	0.024	0.027	0.009	0.005	0.03	0.03	0.03	0
BUFT17	NOx-N (mg/L)	74	22	0.05	-	0.14	0.29	0.01	2.33	0.12	0.12	0.09
BUFT17	Ortho-P (mg/L)	70	63	0.007	-	0.008	0.006	0.005	0.037	-	-	-
BUFT17	pH	79	0	8.2	8.2	8.2	0.2	7.8	8.5	8.2	8.2	0.1
BUFT17	TCB (col/100 mL)	7	0	435	674	1254	1290	93	3420	1084	1462	1461
BUFT17	TKN (mg/L)	18	11	0.12	-	0.14	0.09	0.05	0.5	0.13	0.15	0.1
BUFT17	TN (mg/L)	18	39	0.2	-	0.23	0.15	0.12	0.63	0.22	0.26	0.15
BUFT17	TP (mg/L)	18	39	0.022	-	0.026	0.019	0.02	0.09	0.022	0.025	0.02
BUFT17	Turb (NTU)	81	0	1	1	1	4	0	35	1	1	1
BUFT17	W Temp (°C)	81	0	14.9	13.5	15.6	7.4	3.1	31.1	13.1	15.4	7.4
BUFT18	Cond (µS/cm)	72	0	273	265	268	37	143	321	274	274	28
BUFT18	DO (%)	63	0	100	94	96	18	52	146	107	106	14
BUFT18	DO (mg/L)	67	0	9.8	9.2	9.6	2.5	4.1	14.6	10.6	10.6	1.9
BUFT18	E. coli (col/100 mL)	39	0	18	21	61	128	2	727	9	29	56
BUFT18	FCB (col/100 mL)	71	0	16	15	39	72	0	450	7	17	22
BUFT18	NH3-N (mg/L)	69	94	0.03	0.024	0.027	0.009	0.005	0.058	0.03	0.03	0
BUFT18	NOx-N (mg/L)	69	9	0.12	-	0.21	0.24	0.01	0.98	0.1	0.15	0.14
BUFT18	Ortho-P (mg/L)	65	25	0.012	-	0.016	0.011	0.005	0.064	-	-	-

				2000-2019						2015-2019		
Site	Variable	n	%ND	Median	Geo mean	Mean	SD	Min	Max	Median	Mean	SD
BUFT18	pH	71	0	8	8	8	0.3	7.1	8.6	8	8	0.3
BUFT18	TCB (col/100 mL)	4	25	473	586	896	1023	219	2420	1454	1454	1366
BUFT18	TKN (mg/L)	15	33	0.1	-	0.12	0.06	0.05	0.25	0.11	0.13	0.06
BUFT18	TN (mg/L)	15	33	0.17	-	0.24	0.17	0.13	0.65	0.23	0.26	0.17
BUFT18	TP (mg/L)	15	27	0.036	-	0.037	0.013	0.02	0.058	0.03	0.033	0.013
BUFT18	Turb (NTU)	71	0	1	1	1	3	0	19	1	1	1
BUFT18	W Temp (°C)	71	0	14.1	13.9	15.9	7.5	2.8	30	16.9	16	7.4
BUFT23	Cond (µS/cm)	73	0	415	388	394	63	153	484	390	390	45
BUFT23	DO (%)	64	0	95	95	95	11	69	123	101	99	11
BUFT23	DO (mg/L)	69	0	9.9	9.5	9.7	1.8	4.5	14.3	9.9	10.2	1.3
BUFT23	E. coli (col/100 mL)	40	0	23	21	43	54	0	261	31	43	39
BUFT23	FCB (col/100 mL)	73	0	12	12	33	58	0	328	26	39	59
BUFT23	NH3-N (mg/L)	69	96	0.03	0.024	0.027	0.008	0.005	0.03	0.03	0.03	0
BUFT23	NOx-N (mg/L)	69	62	0.01	-	0.02	0.02	0.01	0.12	-	-	-
BUFT23	Ortho-P (mg/L)	65	60	0.006	-	0.008	0.006	0.005	0.04	-	-	-
BUFT23	pH	71	0	8.1	8	8	0.2	7	8.5	8	8	0.1
BUFT23	TCB (col/100 mL)	4	0	379	403	614	650	147	1553	1050	1050	711
BUFT23	TKN (mg/L)	16	38	0.09	-	0.09	0.03	0.05	0.18	0.1	0.1	0.03
BUFT23	TN (mg/L)	16	81	-	-	-	-	0.08	0.21	-	-	-
BUFT23	TP (mg/L)	16	31	0.025	-	0.028	0.015	0.02	0.07	0.022	0.026	0.016
BUFT23	Turb (NTU)	72	0	0	1	1	1	0	5	1	1	1
BUFT23	W Temp (°C)	73	0	13.8	13.3	14.5	5.6	4	25.6	14	14.4	5.5
BUFT24	Cond (µS/cm)	74	0	385	363	369	57	171	461	376	366	50
BUFT24	DO (%)	66	0	98	96	97	12	62	127	105	103	11
BUFT24	DO (mg/L)	69	0	9.9	9.4	9.7	2	5.1	14.2	10.3	10.3	1.5
BUFT24	E. coli (col/100 mL)	40	0	20	17	34	52	1	308	27	36	34
BUFT24	FCB (col/100 mL)	74	1	14	12	31	47	0	216	16	26	31
BUFT24	NH3-N (mg/L)	70	93	0.03	0.026	0.029	0.013	0.005	0.111	0.03	0.03	0
BUFT24	NOx-N (mg/L)	70	46	0.02	-	0.03	0.04	0.01	0.25	0.02	0.04	0.03
BUFT24	Ortho-P (mg/L)	66	62	0.007	-	0.008	0.006	0.005	0.043	-	-	-

				2000-2019						2015-2019		
Site	Variable	n	%ND	Median	Geo mean	Mean	SD	Min	Max	Median	Mean	SD
BUFT24	pH	73	0	8.1	8.1	8.1	0.2	7.4	8.5	8	8	0.1
BUFT24	TCB (col/100 mL)	4	0	426	494	751	833	166	1986	1211	1211	1097
BUFT24	TKN (mg/L)	16	25	0.09	-	0.11	0.06	0.05	0.23	0.11	0.12	0.05
BUFT24	TN (mg/L)	16	69	0.09	-	0.11	0.06	0.1	0.27	0.11	0.13	0.06
BUFT24	TP (mg/L)	16	31	0.021	-	0.024	0.01	0.02	0.041	0.02	0.022	0.011
BUFT24	Turb (NTU)	73	0	1	1	1	1	0	4	1	1	1
BUFT24	W Temp (°C)	73	0	15	14.1	15.8	6.9	2.9	32.1	14.4	15.5	7.5
07055760	NH3-N (mg/L)	19	79	0.01	0.01	0.01	0	0.01	0.01	0.01	0.01	0
07055760	NOx-N (mg/L)	19	11	0.09	-	0.11	0.08	0.04	0.37	0.09	0.11	0.08
07055760	Ortho-P (mg/L)	19	95	-	-	-	-	0.004	0.007	-	-	-
07055760	TKN (mg/L)	19	26	0.11	-	0.11	0.03	0.07	0.19	0.11	0.11	0.03
07055760	TN (mg/L)	19	37	0.18	-	0.19	0.1	0.13	0.51	0.18	0.19	0.1
07055760	TP (mg/L)	19	16	0.008	-	0.009	0.005	0.004	0.027	0.008	0.009	0.005
07055790	NH3-N (mg/L)	2	50	0.01	0.01	0.01	0	0.01	0.01	0.01	0.01	0
07055790	NOx-N (mg/L)	17	0	0.24	0.25	0.28	0.15	0.1	0.61	0.23	0.27	0.17
07055828	NH3-N (mg/L)	20	60	0.01	0.011	0.011	0.005	0.01	0.03	0.01	0.011	0.005
07055828	NOx-N (mg/L)	20	35	0.06	-	0.09	0.09	0.04	0.37	0.06	0.09	0.09
07055828	Ortho-P (mg/L)	20	85	-	-	-	-	0.004	0.008	-	-	-
07055828	TKN (mg/L)	20	15	0.11	-	0.11	0.03	0.07	0.17	0.11	0.11	0.03
07055828	TN (mg/L)	20	45	0.16	-	0.18	0.1	0.11	0.52	0.16	0.18	0.1
07055828	TP (mg/L)	20	5	0.008	-	0.01	0.008	0.004	0.04	0.008	0.01	0.008
07055832	NH3-N (mg/L)	19	74	0.01	0.011	0.011	0.003	0.01	0.02	0.01	0.011	0.003
07055832	NOx-N (mg/L)	19	21	0.07	-	0.1	0.09	0.04	0.38	0.07	0.1	0.09
07055832	Ortho-P (mg/L)	19	84	-	-	-	-	0.004	0.008	-	-	-
07055832	TKN (mg/L)	19	21	0.08	-	0.09	0.03	0.07	0.15	0.08	0.09	0.03
07055832	TN (mg/L)	19	37	0.14	-	0.17	0.11	0.11	0.53	0.14	0.17	0.11
07055832	TP (mg/L)	19	11	0.007	-	0.009	0.007	0.004	0.036	0.007	0.009	0.007
07055866	NOx-N (mg/L)	1	100	-	-	-	-	0.05	0.05	-	-	-
07055900	NH3-N (mg/L)	6	100	0.01	0.011	0.012	0.004	0.01	0.02	0.01	0.012	0.004
07055900	NOx-N (mg/L)	6	17	0.08	-	0.14	0.14	0.04	0.39	0.08	0.14	0.14

				2000-2019						2015-2019		
Site	Variable	n	%ND	Median	Geo mean	Mean	SD	Min	Max	Median	Mean	SD
07055900	Ortho-P (mg/L)	5	60	0.002	-	0.004	0.003	0.004	0.008	0.002	0.004	0.003
07055900	TKN (mg/L)	6	0	0.11	0.1	0.11	0.03	0.07	0.15	0.11	0.11	0.03
07055900	TN (mg/L)	6	17	0.18	-	0.24	0.17	0.15	0.54	0.18	0.24	0.17
07055900	TP (mg/L)	6	0	0.009	0.011	0.015	0.016	0.005	0.047	0.009	0.015	0.016
07056515	NH3-N (mg/L)	65	77	0.04	0.033	0.035	0.013	0.02	0.11	-	-	-
07056515	NOx-N (mg/L)	98	0	0.53	0.52	0.6	0.3	0.13	1.45	0.74	0.75	0.29
07056515	Ortho-P (mg/L)	65	12	0.02	-	0.026	0.022	0.01	0.11	-	-	-
07056515	TKN (mg/L)	65	11	0.13	-	0.35	0.83	0.05	6.1	-	-	-
07056515	TN (mg/L)	65	11	0.72	-	0.89	0.8	0.3	6.3	-	-	-
07056515	TP (mg/L)	65	0	0.038	0.049	0.124	0.384	0.016	2.98	-	-	-
355817092502701	NH3-N (mg/L)	6	100	0.01	0.01	0.01	0	0.01	0.01	0.01	0.01	0
355817092502701	NOx-N (mg/L)	6	0	0.11	0.15	0.17	0.11	0.1	0.38	0.11	0.17	0.11
355817092502701	Ortho-P (mg/L)	6	50	0.003	-	0.004	0.003	0.004	0.008	0.003	0.004	0.003
355817092502701	TKN (mg/L)	6	17	0.1	-	0.11	0.04	0.07	0.15	0.1	0.11	0.04
355817092502701	TN (mg/L)	6	17	0.22	-	0.26	0.15	0.18	0.52	0.22	0.26	0.15
355817092502701	TP (mg/L)	6	0	0.011	0.012	0.014	0.011	0.005	0.035	0.011	0.014	0.011
355848092484901	NH3-N (mg/L)	4	50	0.01	0.012	0.012	0.005	0.01	0.02	0.01	0.012	0.005
355848092484901	NOx-N (mg/L)	4	25	0.08	-	0.09	0.08	0.04	0.19	0.08	0.09	0.08
355848092484901	Ortho-P (mg/L)	4	100	-	-	-	-	0.004	0.004	-	-	-
355848092484901	TKN (mg/L)	4	0	0.11	0.1	0.1	0.02	0.08	0.12	0.11	0.1	0.02
355848092484901	TN (mg/L)	4	25	0.19	-	0.19	0.09	0.12	0.31	0.19	0.19	0.09
355848092484901	TP (mg/L)	4	0	0.006	0.007	0.008	0.005	0.005	0.015	0.006	0.008	0.005
355951092414101	NH3-N (mg/L)	6	100	0.01	0.01	0.01	0	0.01	0.01	0.01	0.01	0
355951092414101	NOx-N (mg/L)	6	33	0.08	-	0.15	0.16	0.04	0.41	0.08	0.15	0.16
355951092414101	Ortho-P (mg/L)	6	67	0.007	-	0.008	0.002	0.004	0.01	0.007	0.008	0.002
355951092414101	TKN (mg/L)	6	50	0.07	-	0.08	0.06	0.07	0.19	0.07	0.08	0.06
355951092414101	TN (mg/L)	6	67	0.05	-	0.16	0.22	0.11	0.6	0.05	0.16	0.22
355951092414101	TP (mg/L)	6	0	0.008	0.013	0.018	0.019	0.005	0.053	0.008	0.018	0.019
360103092382601	NH3-N (mg/L)	5	100	0.01	0.01	0.01	0	0.01	0.01	0.01	0.01	0
360103092382601	NOx-N (mg/L)	5	20	0.08	-	0.17	0.17	0.04	0.41	0.08	0.17	0.17

				2000-2019						2015-2019		
Site	Variable	n	%ND	Median	Geo mean	Mean	SD	Min	Max	Median	Mean	SD
360103092382601	Ortho-P (mg/L)	5	60	0.007	-	0.007	0.003	0.004	0.011	0.007	0.007	0.003
360103092382601	TKN (mg/L)	5	0	0.12	0.12	0.13	0.03	0.1	0.17	0.12	0.13	0.03
360103092382601	TN (mg/L)	5	20	0.18	-	0.3	0.2	0.15	0.58	0.18	0.3	0.2
360103092382601	TP (mg/L)	5	0	0.008	0.013	0.02	0.02	0.005	0.05	0.008	0.02	0.02
360113092351801	NH3-N (mg/L)	4	100	0.01	0.01	0.01	0	0.01	0.01	0.01	0.01	0
360113092351801	NOx-N (mg/L)	4	0	0.85	0.85	0.88	0.22	0.69	1.1	0.85	0.88	0.22
360113092351801	Ortho-P (mg/L)	4	0	0.01	0.01	0.01	0.002	0.008	0.012	0.01	0.01	0.002
360113092351801	TKN (mg/L)	4	50	0.07	-	0.07	0.01	0.07	0.09	0.07	0.07	0.01
360113092351801	TN (mg/L)	4	50	0.94	-	0.96	0.23	0.76	1.2	0.94	0.96	0.23
360113092351801	TP (mg/L)	4	0	0.011	0.009	0.01	0.004	0.004	0.013	0.011	0.01	0.004
360130092403201	NH3-N (mg/L)	6	100	0.01	0.01	0.01	0	0.01	0.01	0.01	0.01	0
360130092403201	NOx-N (mg/L)	6	33	0.07	-	0.15	0.18	0.04	0.44	0.07	0.15	0.18
360130092403201	Ortho-P (mg/L)	6	67	0.006	-	0.007	0.003	0.004	0.011	0.006	0.007	0.003
360130092403201	TKN (mg/L)	6	0	0.1	0.11	0.11	0.03	0.08	0.16	0.1	0.11	0.03
360130092403201	TN (mg/L)	6	33	0.16	-	0.25	0.21	0.13	0.6	0.16	0.25	0.21
360130092403201	TP (mg/L)	6	0	0.008	0.012	0.019	0.023	0.005	0.064	0.008	0.019	0.023
360132092352801	NH3-N (mg/L)	5	100	0.01	0.01	0.01	0	0.01	0.01	0.01	0.01	0
360132092352801	NOx-N (mg/L)	5	20	0.05	-	0.16	0.17	0.04	0.39	0.05	0.16	0.17
360132092352801	Ortho-P (mg/L)	5	60	0.004	-	0.006	0.005	0.004	0.013	0.004	0.006	0.005
360132092352801	TKN (mg/L)	5	0	0.1	0.11	0.12	0.04	0.09	0.19	0.1	0.12	0.04
360132092352801	TN (mg/L)	5	20	0.16	-	0.27	0.22	0.12	0.58	0.16	0.27	0.22
360132092352801	TP (mg/L)	5	20	0.009	-	0.021	0.027	0.004	0.067	0.009	0.021	0.027
360508092331901	NH3-N (mg/L)	5	80	0.01	0.011	0.012	0.004	0.01	0.02	0.01	0.012	0.004
360508092331901	NOx-N (mg/L)	6	0	0.56	0.54	0.61	0.3	0.33	0.94	0.56	0.61	0.3
360508092331901	Ortho-P (mg/L)	6	0	0.013	0.014	0.016	0.01	0.009	0.035	0.013	0.016	0.01
360508092331901	TKN (mg/L)	6	50	0.08	-	0.08	0.02	0.07	0.12	0.08	0.08	0.02
360508092331901	TN (mg/L)	6	50	0.66	-	0.66	0.33	0.41	1	0.66	0.66	0.33
360508092331901	TP (mg/L)	6	0	0.018	0.017	0.018	0.008	0.01	0.032	0.018	0.018	0.008

A2.2 Trend analysis on FAVS results for all qualifying BUFF sites

Table A2.2.1 Results of trend analysis with flow adjustment (TAFA) on flow-adjusted values of water quality variables (2000-2019) at Buffalo National River monitoring sites meeting data availability requirements (i.e. n ≥50, minimum 5 continuous years, and data collection since 2010). Locally estimated scatterplot smoothing (LOESS) with smoothing parameter optimization (f_opt) was used to relate water quality variables to streamflow, where root mean square error (RMSE) expresses goodness of fit (i.e. lower RMSE suggests stronger water quality variable-flow relationship). Trend analyses (linear regression, Mann-Kendall test, and seasonal Kendall test) were interpreted as follows: p≥0.10 suggested no change, 0.05≤p<0.10 suggested a likely increase or decrease (positive or negative slope, respectively), and p<0.05 suggested a very likely increase or decrease. A dash indicates that a significant trend was not detected. Variable abbreviations are: Cond = specific conductance, DO = dissolved oxygen, E. coli = Escherischia coli, FCB = fecal coliform bacteria, NOx-N = Nitrate+nitrite-nitrogen, TKN = Total Kjeldahl nitrogen, TN = total nitrogen, TP = total phosphorus, Turb = Turbidity, W Temp = water temperature.

			LOESS		Linear regression		Mann-Kendall test		Seasonal Kendall test	
Site	**Variable**	**n**	**f_opt**	**RMSE**	**p**	**% change**	**p**	**% change**	**p**	**% change**
BRSJ	NOx-N (mg/L)	269	0.4	0.69	0.39	-	0.23	-	0.11	-
BRSJ	TKN (mg/L)	266	0.3	0.52	0.95	-	0.47	-	0.63	-
BRSJ	TN (mg/L)	266	0.75	0.44	0.59	-	0.17	-	0.15	-
BRSJ	TP (mg/L)	267	0.7	0.72	<0.0001	3.3	<0.0001	3.3	<0.0001	3.1
BUFR01	Cond (µS/cm)	352	0.2	0.19	0.0097	0.6	<0.0001	1	0.00021	0.87
BUFR01	DO (mg/L)	340	0.2	0.14	0.022	0.41	0.058	0.45	<0.0001	0.72
BUFR01	DO (%)	335	0.8	0.1	0.0012	0.43	<0.0001	0.83	<0.0001	0.77
BUFR01	E. coli (col/100 mL)	317	0.6	1.29	0.87	-	0.18	-	0.21	-
BUFR01	FCB (col/100 mL)	74	0.68	1.36	0.9	-	0.69	-	0.72	-
BUFR01	NOx-N (mg/L)	134	0.9	0.68	0.46	-	0.15	-	0.81	-
BUFR01	pH	351	1	0.86	0.39	-	0.032	2.5	0.31	-
BUFR01	TKN (mg/L)	67	0.95	0.35	0.9	-	0.52	-	0.18	-
BUFR01	Turb (NTU)	350	0.5	0.42	<0.0001	2.1	0.0011	1.8	0.00092	1.7
BUFR01	W Temp (°C)	352	0.15	0.5	0.074	1.1	0.029	1.7	0.16	-
BUFR02	Cond (µS/cm)	147	0.55	0.18	0.00017	0.9	<0.0001	1.1	0.00013	0.89
BUFR02	DO (mg/L)	143	0.95	0.15	0.11	-	0.2	-	0.0031	0.58
BUFR02	DO (%)	140	0.25	0.1	<0.0001	0.58	<0.0001	0.56	0.00035	0.51
BUFR02	E. coli (col/100 mL)	111	0.7	1.11	0.31	-	0.93	-	0.74	-

			LOESS		Linear regression		Mann-Kendall test		Seasonal Kendall test	
Site	**Variable**	**n**	**f_opt**	**RMSE**	**p**	**% change**	**p**	**% change**	**p**	**% change**
BUFR02	FCB (col/100 mL)	76	0.6	1.3	0.74	-	0.68	-	0.34	-
BUFR02	NOx-N (mg/L)	81	0.4	0.63	0.98	-	0.5	-	0.77	-
BUFR02	pH	147	0.8	0.63	0.019	2	0.013	2.4	0.056	2.2
BUFR02	Turb (NTU)	146	0.25	0.44	0.15	-	0.15	-	0.26	-
BUFR02	W Temp (°C)	147	0.4	0.55	0.01	1.9	0.0066	1.6	0.044	0.83
BUFR03	Cond (µS/cm)	87	0.65	0.2	0.22	-	0.22	-	0.5	-
BUFR03	DO (mg/L)	87	0.6	0.18	0.38	-	0.58	-	0.42	-
BUFR03	DO (%)	84	0.57	0.1	0.94	-	0.39	-	0.97	-
BUFR03	E. coli (col/100 mL)	53	0.75	1.18	0.28	-	0.85	-	0.73	-
BUFR03	FCB (col/100 mL)	75	0.92	1.27	0.73	-	0.67	-	0.3	-
BUFR03	NOx-N (mg/L)	71	0.95	0.82	0.26	-	0.31	-	0.074	3.2
BUFR03	pH	87	0.95	0.56	0.14	-	0.14	-	0.18	-
BUFR03	Turb (NTU)	86	0.3	0.45	0.033	1.8	0.051	1.8	0.0021	2.4
BUFR03	W Temp (°C)	87	0.95	0.72	0.98	-	0.82	-	0.74	-
BUFR04	Cond (µS/cm)	173	0.45	0.15	0.053	0.38	0.0083	0.49	0.058	0.32
BUFR04	DO (mg/L)	171	1	0.2	0.92	-	0.28	-	0.91	-
BUFR04	DO (%)	168	0.9	0.11	0.017	-0.35	0.24	-	0.99	-
BUFR04	E. coli (col/100 mL)	140	0.57	1.11	0.67	-	0.35	-	0.17	-
BUFR04	FCB (col/100 mL)	72	0.45	1.31	0.94	-	0.9	-	1	-
BUFR04	NOx-N (mg/L)	63	0.32	0.77	0.29	-	0.47	-	0.24	-
BUFR04	pH	173	0.9	0.45	0.003	-1.8	0.00022	-2.3	0.00033	-2.5
BUFR04	Turb (NTU)	171	0.55	0.62	0.029	1.8	0.04	1.6	0.0089	2
BUFR04	W Temp (°C)	173	1	0.62	0.91	-	0.45	-	0.79	-
BUFR0414	Cond (µS/cm)	222	0.47	0.11	0.013	0.97	0.0046	1.1	0.0064	1.2
BUFR0414	DO (mg/L)	217	0.5	0.21	0.022	-1.8	0.073	-1.5	0.0018	-1.6
BUFR0414	DO (%)	217	0.45	0.12	0.0062	-1.2	0.0083	-1	0.0017	-1.3
BUFR0414	E. coli (col/100 mL)	222	0.95	1.11	0.076	-7.3	0.033	-7.8	0.0011	-10
BUFR0414	pH	222	0.95	0.39	0.011	3.7	0.004	4	0.0072	3.3
BUFR0414	Turb (NTU)	222	0.25	0.47	0.0014	5.6	0.00011	6.7	0.0023	5.9
BUFR0414	W Temp (°C)	222	0.25	0.66	0.18	-	0.7	-	0.14	-

			LOESS		Linear regression		Mann-Kendall test		Seasonal Kendall test	
Site	**Variable**	**n**	**f_opt**	**RMSE**	**p**	**% change**	**p**	**% change**	**p**	**% change**
BUFR0415	Cond (µS/cm)	227	0.6	0.09	0.0008	1.1	0.0016	1.1	0.00042	1.2
BUFR0415	DO (mg/L)	222	0.42	0.21	0.037	-1.6	0.14	-	0.0043	-1.6
BUFR0415	DO (%)	222	0.9	0.12	0.0089	-1.2	0.029	-0.88	0.001	-1.3
BUFR0415	E. coli (col/100 mL)	227	1	1.23	0.69	-	0.23	-	0.19	-
BUFR0415	pH	227	0.9	0.46	0.32	-	0.093	2.5	0.13	-
BUFR0415	Turb (NTU)	227	0.5	0.58	0.024	4.8	0.031	4	0.092	2.9
BUFR0415	W Temp (°C)	226	0.1	0.61	0.16	-	0.68	-	0.069	2
BUFR05	Cond (µS/cm)	72	0.55	0.15	0.064	0.57	0.034	0.49	0.091	0.37
BUFR05	DO (mg/L)	72	0.45	0.2	0.47	-	0.62	-	1	-
BUFR05	DO (%)	69	1	0.1	0.54	-	0.68	-	0.89	-
BUFR05	FCB (col/100 mL)	72	0.4	1.12	0.1	-	0.048	4.4	0.035	5.2
BUFR05	NOx-N (mg/L)	65	0.7	0.78	0.078	3	0.12	-	0.4	-
BUFR05	pH	71	0.95	0.55	0.002	-3.4	0.00059	-3.7	0.11	-
BUFR05	Turb (NTU)	71	0.45	0.58	0.11	-	0.013	2.6	0.13	-
BUFR05	W Temp (°C)	72	0.48	0.63	0.4	-	0.6	-	0.61	-
BUFR06	Cond (µS/cm)	74	0.25	0.16	0.73	-	0.96	-	0.68	-
BUFR06	DO (mg/L)	73	1	0.2	0.44	-	0.47	-	0.56	-
BUFR06	DO (%)	69	1	0.12	0.21	-	0.38	-	0.12	-
BUFR06	FCB (col/100 mL)	73	0.7	1.32	0.79	-	0.31	-	0.28	-
BUFR06	NOx-N (mg/L)	64	0.6	0.81	0.25	-	0.27	-	0.091	4
BUFR06	pH	73	1	0.62	0.012	-3.2	0.0057	-3.6	0.021	-4.6
BUFR06	Turb (NTU)	73	0.35	0.49	0.71	-	0.39	-	0.77	-
BUFR06	W Temp (°C)	74	0.42	0.54	0.5	-	0.49	-	0.87	-
BUFR07	Cond (µS/cm)	77	0.6	0.15	0.7	-	0.37	-	0.19	-
BUFR07	DO (mg/L)	75	0.55	0.19	0.97	-	0.99	-	0.63	-
BUFR07	DO (%)	70	0.15	0.11	0.57	-	0.9	-	0.76	-
BUFR07	FCB (col/100 mL)	76	0.9	1.19	0.63	-	0.52	-	0.55	-
BUFR07	NOx-N (mg/L)	74	0.95	0.93	0.15	-	0.11	-	0.098	3.1
BUFR07	pH	75	0.92	0.61	0.083	-2.2	0.087	-2.3	0.45	-
BUFR07	Turb (NTU)	77	0.32	0.42	0.14	-	0.21	-	0.37	-

			LOESS		Linear regression		Mann-Kendall test		Seasonal Kendall test	
Site	**Variable**	**n**	**f_opt**	**RMSE**	**p**	**% change**	**p**	**% change**	**p**	**% change**
BUFR07	W Temp (°C)	77	1	0.63	0.6	-	0.58	-	0.29	-
BUFR08	Cond (µS/cm)	63	0.65	0.12	0.78	-	0.51	-	0.31	-
BUFR08	DO (mg/L)	62	1	0.21	0.39	-	0.25	-	0.26	-
BUFR08	DO (%)	59	1	0.11	0.74	-	0.76	-	0.91	-
BUFR08	FCB (col/100 mL)	62	0.85	1.07	0.88	-	0.7	-	0.74	-
BUFR08	NOx-N (mg/L)	52	0.3	0.81	0.12	-	0.15	-	0.05	3.9
BUFR08	pH	63	1	0.59	0.1	-	0.16	-	0.12	-
BUFR08	Turb (NTU)	63	0.45	0.4	0.017	2	0.017	2.1	0.49	-
BUFR08	W Temp (°C)	63	1	0.63	0.25	-	0.35	-	0.22	-
BUFS02	Cond (µS/cm)	71	0.95	0.2	0.19	-	0.38	-	0.73	-
BUFS02	DO (mg/L)	71	0.45	0.09	0.4	-	0.27	-	0.42	-
BUFS02	DO (%)	68	1	0.09	0.8	-	0.62	-	0.63	-
BUFS02	FCB (col/100 mL)	71	1	1.49	0.99	-	0.65	-	0.82	-
BUFS02	NOx-N (mg/L)	62	0.57	0.38	0.0024	-2.6	0.006	-2.4	0.0038	-2.6
BUFS02	pH	71	0.7	0.81	0.36	-	0.4	-	0.77	-
BUFS02	Turb (NTU)	71	0.8	0.68	0.027	3.2	0.057	2.9	0.3	-
BUFS02	W Temp (°C)	71	0.5	0.09	0.7	-	0.4	-	0.092	0.19
BUFS33	Cond (µS/cm)	76	0.95	0.13	0.18	-	0.12	-	0.13	-
BUFS33	DO (mg/L)	77	0.62	0.14	0.61	-	0.62	-	0.65	-
BUFS33	DO (%)	71	0.75	0.15	0.58	-	0.53	-	0.94	-
BUFS33	FCB (col/100 mL)	75	0.55	1.28	0.0039	7.2	0.009	6.1	0.062	6.8
BUFS33	NOx-N (mg/L)	64	0.8	0.33	0.00063	2.4	<0.0001	2.6	<0.0001	3.4
BUFS33	pH	74	1	0.45	0.059	-1.7	0.011	-2.4	0.037	-3
BUFS33	Turb (NTU)	77	0.6	0.66	0.0013	4.1	<0.0001	4.6	0.016	2.9
BUFS33	W Temp (°C)	77	0.25	0.06	0.045	0.23	0.0045	0.28	0.0089	0.23
BUFS41	Cond (µS/cm)	101	0.42	0.12	0.56	-	0.82	-	0.7	-
BUFS41	DO (mg/L)	98	0.25	0.12	0.031	0.42	0.033	0.39	0.095	0.29
BUFS41	DO (%)	89	0.2	0.09	0.3	-	0.49	-	0.35	-
BUFS41	FCB (col/100 mL)	94	1	1.78	0.042	-6.1	0.011	-7.2	0.024	-8
BUFS41	NOx-N (mg/L)	77	0.5	0.25	0.53	-	0.64	-	0.64	-

			LOESS		Linear regression		Mann-Kendall test		Seasonal Kendall test	
Site	**Variable**	**n**	**f_opt**	**RMSE**	**p**	**% change**	**p**	**% change**	**p**	**% change**
BUFS41	pH	97	0.52	0.47	0.24	-	0.27	-	0.36	-
BUFS41	Turb (NTU)	101	1	0.6	0.94	-	0.7	-	0.64	-
BUFS41	W Temp (°C)	100	0.35	0.16	0.83	-	1	-	0.076	0.27
BUFT02	Cond (µS/cm)	62	1	0.26	0.86	-	0.69	-	0.91	-
BUFT02	DO (mg/L)	58	1	0.21	0.19	-	0.18	-	0.25	-
BUFT02	DO (%)	56	0.85	0.13	0.056	0.65	0.081	0.51	0.19	-
BUFT02	FCB (col/100 mL)	62	1	1.52	0.44	-	0.36	-	0.34	-
BUFT02	NOx-N (mg/L)	56	1	0.68	0.31	-	0.48	-	0.28	-
BUFT02	pH	61	0.8	0.58	0.031	-2.9	0.022	-3.2	0.14	-
BUFT02	Turb (NTU)	62	1	0.82	0.61	-	0.22	-	0.21	-
BUFT02	W Temp (°C)	61	0.8	0.61	0.77	-	0.64	-	0.3	-
BUFT03	Cond (µS/cm)	70	0.7	0.2	0.17	-	0.23	-	0.58	-
BUFT03	DO (mg/L)	70	1	0.16	0.94	-	0.68	-	0.85	-
BUFT03	DO (%)	66	0.5	0.09	0.8	-	0.76	-	0.14	-
BUFT03	FCB (col/100 mL)	70	0.6	1.5	0.54	-	0.45	-	0.32	-
BUFT03	NOx-N (mg/L)	60	0.68	0.84	0.4	-	0.41	-	0.86	-
BUFT03	pH	69	0.8	0.49	0.0032	-3.1	0.0021	-3.1	0.47	-
BUFT03	Turb (NTU)	71	0.57	0.51	0.69	-	0.49	-	0.36	-
BUFT03	W Temp (°C)	71	0.57	0.49	0.34	-	0.2	-	0.14	-
BUFT04	Cond (µS/cm)	285	0.9	0.13	<0.0001	0.67	0.0018	0.48	0.0028	0.44
BUFT04	DO (mg/L)	276	0.4	0.18	0.009	0.62	0.019	0.73	0.0014	0.85
BUFT04	DO (%)	274	0.52	0.14	0.00091	0.63	<0.0001	0.87	<0.0001	1.1
BUFT04	E. coli (col/100 mL)	251	0.5	1.22	0.063	-6.8	0.024	-8.9	0.0015	-9.8
BUFT04	FCB (col/100 mL)	74	1	1.5	0.41	-	0.51	-	0.57	-
BUFT04	NOx-N (mg/L)	65	0.7	0.36	0.0066	2.2	0.0031	2.2	0.037	1.9
BUFT04	pH	285	0.2	0.32	0.0011	-1.4	0.0012	-1.7	0.0019	-1.6
BUFT04	Turb (NTU)	286	0.4	0.66	0.31	-	0.75	-	0.69	-
BUFT04	W Temp (°C)	286	0.5	0.46	0.78	-	0.53	-	0.011	0.55
BUFT05	Cond (µS/cm)	268	0.15	0.14	0.00055	0.69	0.082	0.29	0.13	-
BUFT05	DO (mg/L)	262	0.98	0.17	0.33	-	0.62	-	0.068	0.37

			LOESS		Linear regression		Mann-Kendall test		Seasonal Kendall test	
Site	**Variable**	**n**	**f_opt**	**RMSE**	**p**	**% change**	**p**	**% change**	**p**	**% change**
BUFT05	DO (%)	260	0.2	0.11	0.91	-	0.21	-	0.27	-
BUFT05	E. coli (col/100 mL)	238	0.48	1.05	0.032	-7.5	<0.0001	-15	<0.0001	-18
BUFT05	FCB (col/100 mL)	68	1	1.41	0.08	5.4	0.078	4.9	0.053	5.5
BUFT05	NOx-N (mg/L)	60	0.88	0.81	0.87	-	0.9	-	0.82	-
BUFT05	pH	269	0.22	0.47	0.0033	-1.9	0.68	-	0.73	-
BUFT05	Turb (NTU)	270	0.35	0.59	0.011	2.1	0.0028	2.4	0.0049	2.3
BUFT05	W Temp (°C)	270	0.65	0.67	0.48	-	0.33	-	0.79	-
BUFT06	Cond (µS/cm)	334	0.45	0.11	0.14	-	0.0034	0.5	0.022	0.39
BUFT06	DO (mg/L)	328	0.2	0.21	0.14	-	0.03	-0.8	0.0054	-0.88
BUFT06	DO (%)	323	0.35	0.15	<0.0001	-0.84	<0.0001	-1.1	<0.0001	-1.1
BUFT06	E. coli (col/100 mL)	303	0.55	1.22	0.3	-	0.27	-	0.31	-
BUFT06	FCB (col/100 mL)	68	1	1.49	0.0012	10	0.0012	12	0.025	9.8
BUFT06	NOx-N (mg/L)	60	1	0.67	0.49	-	0.75	-	1	-
BUFT06	pH	334	0.85	0.53	<0.0001	-3.7	0.0071	-2.6	0.0091	-2.2
BUFT06	Turb (NTU)	336	0.4	0.62	0.00042	3	<0.0001	4.5	<0.0001	4.2
BUFT06	W Temp (°C)	334	0.38	0.54	0.56	-	0.2	-	0.0061	1.1
BUFT07	Cond (µS/cm)	74	1	0.17	0.12	-	0.53	-	0.88	-
BUFT07	DO (mg/L)	75	0.5	0.19	0.43	-	0.23	-	0.34	-
BUFT07	DO (%)	69	0.42	0.14	0.99	-	0.77	-	0.49	-
BUFT07	FCB (col/100 mL)	74	0.5	1.49	0.65	-	0.55	-	0.11	-
BUFT07	NOx-N (mg/L)	66	0.85	0.43	0.00025	3.3	0.00011	3.7	<0.0001	4.4
BUFT07	pH	74	0.62	0.54	0.032	-2.4	0.0018	-3.6	0.017	-3.4
BUFT07	Turb (NTU)	75	0.45	0.82	0.78	-	0.24	-	0.34	-
BUFT07	W Temp (°C)	75	1	0.36	0.72	-	0.99	-	0.94	-
BUFT08	Cond (µS/cm)	75	0.65	0.14	0.95	-	0.97	-	0.63	-
BUFT08	DO (mg/L)	72	0.5	0.19	0.12	-	0.19	-	0.087	0.64
BUFT08	DO (%)	69	0.35	0.13	0.0015	0.88	0.0022	0.85	0.00096	0.83
BUFT08	FCB (col/100 mL)	73	0.57	1.46	<0.0001	13	<0.0001	13	0.00016	12
BUFT08	NOx-N (mg/L)	66	0.65	0.7	0.85	-	0.89	-	0.37	-
BUFT08	pH	73	0.98	0.64	0.16	-	0.11	-	0.12	-

			LOESS		Linear regression		Mann-Kendall test		Seasonal Kendall test	
Site	**Variable**	**n**	**f_opt**	**RMSE**	**p**	**% change**	**p**	**% change**	**p**	**% change**
BUFT08	Turb (NTU)	75	0.35	0.38	0.083	1.4	0.16	-	0.24	-
BUFT08	W Temp (°C)	74	0.7	0.45	0.039	1.9	0.24	-	0.1	-
BUFT10	Cond (µS/cm)	74	0.85	0.14	0.91	-	0.67	-	0.59	-
BUFT10	DO (mg/L)	73	0.45	0.22	0.17	-	0.11	-	0.47	-
BUFT10	DO (%)	72	1	0.2	0.57	-	0.43	-	0.4	-
BUFT10	FCB (col/100 mL)	72	1	1.7	0.81	-	0.8	-	1	-
BUFT10	NOx-N (mg/L)	68	1	0.59	0.46	-	0.74	-	0.88	-
BUFT10	pH	74	0.35	0.72	0.28	-	0.37	-	0.25	-
BUFT10	Turb (NTU)	74	0.45	0.69	0.43	-	0.54	-	0.86	-
BUFT10	W Temp (°C)	74	0.95	0.3	0.98	-	0.84	-	0.66	-
BUFT11	Cond (µS/cm)	73	1	0.16	0.35	-	0.35	-	0.47	-
BUFT11	DO (mg/L)	71	0.6	0.16	0.29	-	0.35	-	0.32	-
BUFT11	DO (%)	70	0.95	0.13	0.19	-	0.32	-	0.06	0.58
BUFT11	FCB (col/100 mL)	73	0.95	1.34	0.18	-	0.093	4.8	0.53	-
BUFT11	NOx-N (mg/L)	66	0.95	0.36	0.97	-	0.73	-	0.42	-
BUFT11	pH	73	0.95	0.44	0.058	-1.8	0.06	-1.4	0.72	-
BUFT11	Turb (NTU)	73	0.68	0.55	0.75	-	0.38	-	0.72	-
BUFT11	W Temp (°C)	73	0.55	0.3	0.76	-	0.68	-	0.86	-
BUFT12	Cond (µS/cm)	75	0.65	0.17	0.67	-	0.47	-	0.64	-
BUFT12	DO (mg/L)	72	0.15	0.15	0.6	-	0.43	-	0.78	-
BUFT12	DO (%)	65	0.3	0.11	0.31	-	0.42	-	0.96	-
BUFT12	FCB (col/100 mL)	74	0.55	1.32	0.098	4.7	0.11	-	0.2	-
BUFT12	NOx-N (mg/L)	65	0.4	0.61	0.94	-	0.76	-	0.14	-
BUFT12	pH	70	0.9	0.76	0.41	-	0.99	-	0.51	-
BUFT12	Turb (NTU)	74	0.38	0.52	0.033	2.4	0.033	2.3	0.23	-
BUFT12	W Temp (°C)	74	1	0.51	0.35	-	0.74	-	0.51	-
BUFT13	Cond (µS/cm)	60	0.68	0.13	0.37	-	0.27	-	0.7	-
BUFT13	DO (mg/L)	57	0.9	0.18	0.59	-	0.6	-	0.5	-
BUFT13	DO (%)	54	0.9	0.11	0.015	0.66	0.013	0.72	0.6	-
BUFT13	FCB (col/100 mL)	59	0.62	1.38	0.86	-	0.77	-	0.088	5

			LOESS		Linear regression		Mann-Kendall test		Seasonal Kendall test	
Site	**Variable**	**n**	**f_opt**	**RMSE**	**p**	**% change**	**p**	**% change**	**p**	**% change**
BUFT13	NOx-N (mg/L)	51	0.5	0.51	0.11	-	0.21	-	0.15	-
BUFT13	pH	59	1	0.58	0.75	-	0.62	-	1	-
BUFT13	Turb (NTU)	59	0.35	0.62	0.052	2.6	0.038	2.5	0.2	-
BUFT13	W Temp (°C)	59	1	0.49	0.14	-	0.42	-	0.17	-
BUFT14	Cond (µS/cm)	73	0.95	0.16	0.47	-	0.4	-	0.34	-
BUFT14	DO (mg/L)	72	0.35	0.13	0.16	-	0.3	-	0.07	0.41
BUFT14	DO (%)	67	0.65	0.1	0.44	-	0.36	-	0.38	-
BUFT14	FCB (col/100 mL)	71	1	1.43	0.98	-	0.87	-	0.69	-
BUFT14	NOx-N (mg/L)	64	0.8	0.48	0.97	-	0.79	-	0.62	-
BUFT14	pH	72	1	0.47	0.83	-	0.57	-	0.22	-
BUFT14	Turb (NTU)	73	0.5	0.49	0.74	-	0.92	-	0.71	-
BUFT14	W Temp (°C)	73	0.35	0.42	0.56	-	0.61	-	0.38	-
BUFT15	Cond (µS/cm)	64	0.57	0.16	0.11	-	0.087	-0.39	0.13	-
BUFT15	DO (mg/L)	64	0.9	0.21	0.13	-	0.23	-	0.064	0.73
BUFT15	DO (%)	62	1	0.13	0.16	-	0.056	0.46	0.066	0.47
BUFT15	FCB (col/100 mL)	63	1	1.28	0.13	-	0.14	-	0.065	5.6
BUFT15	NOx-N (mg/L)	52	0.75	0.67	0.0092	4.5	0.031	3.8	0.055	3.4
BUFT15	pH	63	1	0.57	0.94	-	0.91	-	0.97	-
BUFT15	Turb (NTU)	64	1	0.67	0.25	-	0.17	-	0.27	-
BUFT15	W Temp (°C)	64	0.95	0.6	0.56	-	0.57	-	0.61	-
BUFT16	Cond (µS/cm)	78	0.3	0.11	0.57	-	0.44	-	0.13	-
BUFT16	DO (mg/L)	78	0.82	0.13	0.22	-	0.38	-	0.017	0.49
BUFT16	DO (%)	74	1	0.09	0.41	-	0.34	-	0.086	0.33
BUFT16	FCB (col/100 mL)	77	1	1.38	0.46	-	0.43	-	0.94	-
BUFT16	NOx-N (mg/L)	63	0.95	0.37	0.84	-	0.96	-	0.92	-
BUFT16	pH	76	0.9	0.45	0.29	-	0.078	-1.6	0.16	-
BUFT16	Turb (NTU)	77	0.68	0.55	0.56	-	0.81	-	0.64	-
BUFT16	W Temp (°C)	77	0.95	0.32	0.58	-	0.73	-	0.94	-
BUFT17	Cond (µS/cm)	78	0.68	0.14	0.43	-	0.2	-	0.24	-
BUFT17	DO (mg/L)	78	0.8	0.16	0.48	-	0.57	-	0.048	0.34

			LOESS		Linear regression		Mann-Kendall test		Seasonal Kendall test	
Site	**Variable**	**n**	**f_opt**	**RMSE**	**p**	**% change**	**p**	**% change**	**p**	**% change**
BUFT17	DO (%)	74	0.78	0.1	0.23	-	0.097	0.29	0.061	0.41
BUFT17	FCB (col/100 mL)	76	0.75	1.65	0.035	6.8	0.0069	8.2	0.069	4.9
BUFT17	NOx-N (mg/L)	64	0.95	1.04	0.23	-	0.11	-	0.27	-
BUFT17	pH	76	0.6	0.33	0.56	-	0.68	-	0.36	-
BUFT17	Turb (NTU)	78	1	0.66	0.058	2.4	0.022	2.6	0.0012	3.7
BUFT17	W Temp (°C)	78	1	0.57	0.68	-	0.76	-	0.68	-
BUFT18	Cond (µS/cm)	64	0.3	0.1	0.14	-	0.081	-0.33	0.12	-
BUFT18	DO (mg/L)	60	0.55	0.26	0.077	1.1	0.11	-	0.024	1.3
BUFT18	DO (%)	56	1	0.17	0.13	-	0.069	0.65	0.031	0.68
BUFT18	FCB (col/100 mL)	64	0.65	1.25	0.22	-	0.23	-	0.25	-
BUFT18	NOx-N (mg/L)	58	1	0.83	0.5	-	0.26	-	0.91	-
BUFT18	pH	63	0.85	0.57	0.37	-	0.36	-	0.65	-
BUFT18	Turb (NTU)	63	0.3	0.66	0.97	-	0.55	-	0.97	-
BUFT18	W Temp (°C)	63	0.3	0.48	0.87	-	0.88	-	0.86	-
BUFT23	Cond (µS/cm)	67	0.15	0.09	0.1	-	0.026	-0.29	0.12	-
BUFT23	DO (mg/L)	63	1	0.16	0.63	-	0.86	-	0.3	-
BUFT23	DO (%)	58	0.9	0.1	0.68	-	0.55	-	0.85	-
BUFT23	FCB (col/100 mL)	67	0.2	1.23	0.49	-	0.16	-	0.41	-
BUFT23	NOx-N (mg/L)	60	0.95	0.63	0.00016	5.5	0.0002	6.5	0.0021	5
BUFT23	pH	65	1	0.52	0.67	-	0.28	-	0.37	-
BUFT23	Turb (NTU)	66	0.5	0.58	<0.0001	5.1	0.00018	5.2	0.0011	4.7
BUFT23	W Temp (°C)	67	0.25	0.37	0.8	-	0.97	-	0.092	-0.88
BUFT24	Cond (µS/cm)	66	0.25	0.11	0.071	-0.47	0.02	-0.48	0.023	-0.54
BUFT24	DO (mg/L)	61	0.62	0.17	0.032	0.89	0.092	0.82	0.00097	1.2
BUFT24	DO (%)	58	1	0.1	0.024	0.59	0.012	0.66	0.023	0.66
BUFT24	FCB (col/100 mL)	66	0.6	1.37	0.33	-	0.5	-	0.39	-
BUFT24	NOx-N (mg/L)	58	1	0.62	0.0083	4.1	0.003	4.3	0.041	3.7
BUFT24	pH	65	1	0.49	0.89	-	0.95	-	0.57	-
BUFT24	Turb (NTU)	65	0.57	0.54	0.11	-	0.13	-	0.15	-
BUFT24	W Temp (°C)	65	1	0.51	0.57	-	0.83	-	0.6	-

A2.3 Trend analysis results on raw water quality variables values

Table A2.3.1 Results of trend analysis without flow adjustment on water quality variables at Buffalo National River monitoring sites meeting data availability requirements (i.e. n = at least 50 observations, minimum 5 continuous years, and data collection since 2010). Trend analyses (linear regression, Mann-Kendall test, and seasonal Kendall test) were interpreted as follows: p≥0.10 suggested no change, 0.05≤p<0.10 suggested a likely increase or decrease (positive or negative slope, respectively), and p<0.05 suggested a very likely increase or decrease. A dash indicates that a significant trend was not detected. Variable abbreviations are: Cond = specific conductance, DO = dissolved oxygen, E. coli = Escherischia coli, FCB = fecal coliform bacteria, NOx-N = Nitrate+nitrite-nitrogen, TKN = Total Kjeldahl nitrogen, TN = total nitrogen, TP = total phosphorus, Turb = Turbidity, W Temp = water temperature.

			Linear regression		Mann-Kendall test		Seasonal Kendall test	
Site	**Variable**	**n**	**p**	**% change**	**p**	**% change**	**p**	**% change**
BRSJ	NOx-N (mg/L)	269	0.73	-	0.74	-	0.18	-
BRSJ	TKN (mg/L)	266	0.53	-	0.59	-	0.47	-
BRSJ	TN (mg/L)	266	0.56	-	0.82	-	0.32	-
BRSJ	TP (mg/L)	267	0.016	2.5	0.00075	2.8	0.0008	3
BUFR01	Cond (µS/cm)	353	0.7	-	0.44	-	0.0073	1.1
BUFR01	DO (mg/L)	341	0.031	0.49	0.048	0.54	0.00038	0.54
BUFR01	DO (%)	336	0.00024	0.54	<0.0001	1	<0.0001	0.84
BUFR01	E. coli (col/100 mL)	317	0.46	-	0.47	-	0.35	-
BUFR01	FCB (col/100 mL)	75	0.89	-	0.87	-	0.94	-
BUFR01	NOx-N (mg/L)	135	0.76	-	0.49	-	0.76	-
BUFR01	pH	352	0.73	-	0.076	2.1	0.31	-
BUFR01	Turb (NTU)	351	0.0097	3.2	0.037	3.1	0.12	-
BUFR01	W Temp (°C)	353	0.075	1.2	0.013	1.8	<0.0001	1.3
BUFR02	Cond (µS/cm)	147	0.95	-	0.23	-	0.49	-
BUFR02	DO (mg/L)	143	0.017	0.59	0.015	0.7	0.00021	0.77
BUFR02	DO (%)	140	<0.0001	0.68	<0.0001	0.75	0.0008	0.59
BUFR02	E. coli (col/100 mL)	111	0.32	-	0.98	-	0.76	-
BUFR02	FCB (col/100 mL)	77	0.71	-	0.59	-	0.16	-

			Linear regression		Mann-Kendall test		Seasonal Kendall test	
Site	**Variable**	**n**	**p**	**% change**	**p**	**% change**	**p**	**% change**
BUFR02	NOx-N (mg/L)	84	0.8	-	0.63	-	0.92	-
BUFR02	pH	147	0.16	-	0.28	-	0.36	-
BUFR02	Turb (NTU)	146	0.021	3.5	0.00037	5.9	0.058	2.4
BUFR02	W Temp (°C)	147	0.097	1.3	0.3	-	0.22	-
BUFR03	Cond (µS/cm)	88	0.97	-	0.83	-	0.41	-
BUFR03	DO (mg/L)	87	0.16	-	0.18	-	0.099	0.36
BUFR03	DO (%)	84	0.49	-	0.048	0.27	0.54	-
BUFR03	E. coli (col/100 mL)	53	0.098	12	0.16	-	0.33	-
BUFR03	FCB (col/100 mL)	78	0.79	-	0.75	-	0.43	-
BUFR03	NOx-N (mg/L)	74	0.5	-	0.29	-	0.29	-
BUFR03	pH	88	0.053	-2.3	0.032	-2.1	0.13	-
BUFR03	Turb (NTU)	87	0.036	4.7	0.022	3.8	0.13	-
BUFR03	W Temp (°C)	88	0.82	-	0.84	-	0.84	-
BUFR04	Cond (µS/cm)	197	0.49	-	0.086	-0.7	0.55	-
BUFR04	DO (mg/L)	193	0.86	-	0.57	-	0.061	0.38
BUFR04	DO (%)	188	0.1	-	0.65	-	0.81	-
BUFR04	E. coli (col/100 mL)	162	0.26	-	0.00053	18	0.048	11
BUFR04	FCB (col/100 mL)	79	0.74	-	0.87	-	0.69	-
BUFR04	NOx-N (mg/L)	95	0.4	-	0.59	-	0.46	-
BUFR04	pH	197	0.0009	-2	<0.0001	-2.8	<0.0001	-2.9
BUFR04	Turb (NTU)	195	0.038	2.9	0.00032	4.5	0.026	2.4
BUFR04	W Temp (°C)	197	0.86	-	0.67	-	0.11	-
BUFR0414	Cond (µS/cm)	364	0.12	-	0.075	1.2	0.00013	1.6
BUFR0414	DO (mg/L)	353	0.036	-1.3	0.094	-1.2	<0.0001	-1.6
BUFR0414	DO (%)	353	0.014	-0.83	0.018	-0.72	0.006	-0.76
BUFR0414	E. coli (col/100 mL)	364	0.98	-	0.42	-	0.13	-
BUFR0414	pH	364	0.0035	4	0.0018	4.1	0.006	3.1
BUFR0414	Turb (NTU)	363	0.015	8.1	0.012	6.7	0.0084	6.4
BUFR0414	W Temp (°C)	364	0.14	-	0.33	-	0.00031	1.9
BUFR0415	Cond (µS/cm)	370	0.26	-	0.14	-	<0.0001	1.6

			Linear regression		Mann-Kendall test		Seasonal Kendall test	
Site	**Variable**	**n**	**p**	**% change**	**p**	**% change**	**p**	**% change**
BUFR0415	DO (mg/L)	359	0.1	-	0.2	-	<0.0001	-1.4
BUFR0415	DO (%)	359	0.058	-0.66	0.095	-0.53	0.0069	-0.72
BUFR0415	E. coli (col/100 mL)	370	0.69	-	0.76	-	0.77	-
BUFR0415	pH	370	0.17	-	0.1	-	0.06	2.3
BUFR0415	Turb (NTU)	369	0.014	8.7	0.032	6.4	0.093	4.6
BUFR0415	W Temp (°C)	369	0.1	-	0.25	-	<0.0001	2
BUFR05	Cond (µS/cm)	74	0.32	-	0.27	-	0.15	-
BUFR05	DO (mg/L)	74	0.28	-	0.38	-	0.19	-
BUFR05	DO (%)	71	0.53	-	0.8	-	0.93	-
BUFR05	FCB (col/100 mL)	74	0.19	-	0.11	-	0.34	-
BUFR05	NOx-N (mg/L)	69	0.14	-	0.23	-	0.53	-
BUFR05	pH	73	0.002	-3.6	0.00071	-3.7	0.034	-2.5
BUFR05	Turb (NTU)	73	0.18	-	0.07	3.2	0.4	-
BUFR05	W Temp (°C)	74	0.27	-	0.42	-	0.39	-
BUFR06	Cond (µS/cm)	81	0.97	-	0.76	-	0.4	-
BUFR06	DO (mg/L)	79	0.41	-	0.48	-	0.94	-
BUFR06	DO (%)	75	0.24	-	0.33	-	0.1	-
BUFR06	FCB (col/100 mL)	79	0.83	-	0.45	-	0.76	-
BUFR06	NOx-N (mg/L)	78	0.8	-	0.84	-	0.91	-
BUFR06	pH	80	0.032	-2.9	0.043	-2.8	0.38	-
BUFR06	Turb (NTU)	79	0.56	-	0.34	-	0.97	-
BUFR06	W Temp (°C)	81	0.44	-	0.46	-	0.22	-
BUFR07	Cond (µS/cm)	77	0.81	-	0.65	-	0.34	-
BUFR07	DO (mg/L)	75	0.86	-	0.68	-	0.28	-
BUFR07	DO (%)	70	0.43	-	0.67	-	0.83	-
BUFR07	FCB (col/100 mL)	76	0.53	-	0.53	-	0.55	-
BUFR07	NOx-N (mg/L)	74	0.19	-	0.29	-	0.13	-
BUFR07	pH	75	0.076	-2.5	0.21	-	0.87	-
BUFR07	Turb (NTU)	77	0.31	-	0.43	-	0.55	-
BUFR07	W Temp (°C)	77	0.51	-	0.65	-	0.75	-

			Linear regression		Mann-Kendall test		Seasonal Kendall test	
Site	**Variable**	**n**	**p**	**% change**	**p**	**% change**	**p**	**% change**
BUFR08	Cond (µS/cm)	76	0.69	-	0.75	-	0.9	-
BUFR08	DO (mg/L)	74	0.46	-	0.26	-	0.2	-
BUFR08	DO (%)	71	0.74	-	0.57	-	0.86	-
BUFR08	FCB (col/100 mL)	75	0.46	-	0.29	-	0.84	-
BUFR08	NOx-N (mg/L)	76	0.22	-	0.24	-	0.029	4.1
BUFR08	pH	76	0.081	-2.4	0.17	-	0.21	-
BUFR08	Turb (NTU)	76	0.05	3.7	0.024	3.1	0.54	-
BUFR08	W Temp (°C)	76	0.34	-	0.42	-	0.24	-
BUFR09	Cond (µS/cm)	73	0.64	-	0.89	-	0.61	-
BUFR09	DO (mg/L)	68	0.17	-	0.22	-	0.085	0.64
BUFR09	DO (%)	65	0.31	-	0.28	-	0.45	-
BUFR09	FCB (col/100 mL)	71	0.61	-	0.59	-	0.91	-
BUFR09	NOx-N (mg/L)	66	0.82	-	0.7	-	0.1	-
BUFR09	pH	72	0.26	-	0.23	-	0.56	-
BUFR09	Turb (NTU)	72	0.21	-	0.093	3.1	0.035	3.3
BUFR09	W Temp (°C)	72	0.96	-	0.88	-	0.14	-
BUFS02	Cond (µS/cm)	76	0.83	-	0.86	-	0.77	-
BUFS02	DO (mg/L)	76	0.37	-	0.27	-	0.85	-
BUFS02	DO (%)	73	0.63	-	0.5	-	0.38	-
BUFS02	FCB (col/100 mL)	76	0.95	-	0.66	-	0.91	-
BUFS02	NOx-N (mg/L)	71	0.13	-	0.17	-	0.015	-1.7
BUFS02	pH	76	0.51	-	0.72	-	1	-
BUFS02	Turb (NTU)	76	0.23	-	0.31	-	0.49	-
BUFS02	W Temp (°C)	76	0.65	-	0.54	-	0.39	-
BUFS33	Cond (µS/cm)	77	0.18	-	0.24	-	0.045	-0.38
BUFS33	DO (mg/L)	78	0.76	-	0.84	-	0.71	-
BUFS33	DO (%)	72	0.74	-	0.84	-	0.73	-
BUFS33	FCB (col/100 mL)	76	0.0044	7.3	0.0059	6.4	0.038	6.6
BUFS33	NOx-N (mg/L)	69	0.018	2.3	0.00085	2.8	0.00044	3.1
BUFS33	pH	75	0.062	-1.7	0.012	-2.6	0.11	-

			Linear regression		Mann-Kendall test		Seasonal Kendall test	
Site	**Variable**	**n**	**p**	**% change**	**p**	**% change**	**p**	**% change**
BUFS33	Turb (NTU)	78	0.002	4.1	0.00017	4.5	0.05	3.6
BUFS33	W Temp (°C)	78	0.14	-	0.17	-	0.091	0.17
BUFS41	Cond (µS/cm)	103	0.015	-0.57	0.008	-0.39	0.063	-0.36
BUFS41	DO (mg/L)	100	0.0084	0.53	0.012	0.49	0.086	0.34
BUFS41	DO (%)	91	0.3	-	0.58	-	0.64	-
BUFS41	FCB (col/100 mL)	95	0.35	-	0.12	-	0.27	-
BUFS41	NOx-N (mg/L)	88	0.73	-	0.68	-	0.45	-
BUFS41	pH	99	0.18	-	0.1	-	0.21	-
BUFS41	Turb (NTU)	103	0.33	-	0.11	-	0.11	-
BUFS41	W Temp (°C)	102	0.27	-	0.28	-	0.36	-
BUFT02	Cond (µS/cm)	69	0.83	-	0.91	-	0.77	-
BUFT02	DO (mg/L)	64	0.3	-	0.31	-	0.15	-
BUFT02	DO (%)	62	0.17	-	0.28	-	0.36	-
BUFT02	FCB (col/100 mL)	68	0.42	-	0.26	-	0.29	-
BUFT02	NOx-N (mg/L)	66	0.51	-	0.7	-	0.35	-
BUFT02	pH	68	0.02	-2.9	0.02	-2.9	0.092	-1.8
BUFT02	Turb (NTU)	69	0.74	-	0.84	-	0.83	-
BUFT02	W Temp (°C)	68	0.85	-	0.51	-	0.098	0.78
BUFT03	Cond (µS/cm)	74	0.15	-	0.35	-	0.21	-
BUFT03	DO (mg/L)	74	0.92	-	0.75	-	1	-
BUFT03	DO (%)	70	0.98	-	0.57	-	0.75	-
BUFT03	FCB (col/100 mL)	74	0.74	-	0.69	-	0.92	-
BUFT03	NOx-N (mg/L)	70	0.12	-	0.12	-	0.14	-
BUFT03	pH	73	0.0028	-3.2	0.0029	-3.2	0.49	-
BUFT03	Turb (NTU)	75	0.68	-	0.77	-	0.97	-
BUFT03	W Temp (°C)	75	0.4	-	0.39	-	0.3	-
BUFT04	Cond (µS/cm)	326	0.00037	0.73	0.0014	0.54	0.0013	0.47
BUFT04	DO (mg/L)	315	0.012	0.63	0.055	0.63	0.0081	0.6
BUFT04	DO (%)	313	0.0026	0.61	0.0019	0.67	0.00018	0.82
BUFT04	E. coli (col/100 mL)	291	0.023	-10	0.0012	-14	<0.0001	-18

			Linear regression		Mann-Kendall test		Seasonal Kendall test	
Site	**Variable**	**n**	**p**	**% change**	**p**	**% change**	**p**	**% change**
BUFT04	FCB (col/100 mL)	78	0.33	-	0.34	-	0.55	-
BUFT04	NOx-N (mg/L)	94	0.018	1.9	0.052	1.4	0.3	-
BUFT04	pH	326	0.00038	-1.7	<0.0001	-2.3	<0.0001	-2.5
BUFT04	Turb (NTU)	327	0.25	-	0.17	-	0.0055	-3
BUFT04	W Temp (°C)	327	0.61	-	0.33	-	0.0013	0.9
BUFT05	Cond (µS/cm)	338	0.22	-	0.72	-	0.081	0.41
BUFT05	DO (mg/L)	327	0.17	-	0.59	-	0.076	0.37
BUFT05	DO (%)	325	0.043	0.34	0.014	0.44	0.032	0.33
BUFT05	E. coli (col/100 mL)	304	0.9	-	0.11	-	0.027	-9.7
BUFT05	FCB (col/100 mL)	75	0.23	-	0.16	-	0.16	-
BUFT05	NOx-N (mg/L)	72	0.99	-	0.78	-	0.97	-
BUFT05	pH	339	0.0015	-2.2	0.15	-	0.12	-
BUFT05	Turb (NTU)	340	0.01	3.8	0.0053	4.3	0.071	2.2
BUFT05	W Temp (°C)	340	0.37	-	0.12	-	0.24	-
BUFT06	Cond (µS/cm)	442	0.75	-	0.77	-	0.057	0.33
BUFT06	DO (mg/L)	430	0.53	-	0.6	-	0.86	-
BUFT06	DO (%)	423	0.51	-	0.77	-	0.58	-
BUFT06	E. coli (col/100 mL)	407	0.045	7.1	0.26	-	0.2	-
BUFT06	FCB (col/100 mL)	77	0.0009	12	0.00012	14	0.012	13
BUFT06	NOx-N (mg/L)	131	0.25	-	0.17	-	0.42	-
BUFT06	pH	442	0.0012	-2.5	0.41	-	0.37	-
BUFT06	TN (mg/L)	50	0.28	-	0.52	-	0.81	-
BUFT06	Turb (NTU)	444	0.00057	4.4	<0.0001	6.1	<0.0001	5.8
BUFT06	W Temp (°C)	442	0.87	-	0.67	-	0.34	-
BUFT07	Cond (µS/cm)	77	0.084	-0.6	0.28	-	0.59	-
BUFT07	DO (mg/L)	78	0.48	-	0.35	-	0.2	-
BUFT07	DO (%)	72	0.9	-	0.37	-	0.11	-
BUFT07	FCB (col/100 mL)	77	0.56	-	0.53	-	0.36	-
BUFT07	NOx-N (mg/L)	75	0.008	4.5	0.0046	4	0.00028	4.9
BUFT07	pH	77	0.082	-2.1	0.017	-3.1	0.038	-3

			Linear regression		Mann-Kendall test		Seasonal Kendall test	
Site	Variable	n	p	% change	p	% change	p	% change
BUFT07	Turb (NTU)	78	0.57	-	0.24	-	0.26	-
BUFT07	W Temp (°C)	78	0.99	-	0.74	-	0.78	-
BUFT08	Cond (µS/cm)	79	0.63	-	0.75	-	0.38	-
BUFT08	DO (mg/L)	75	0.092	0.78	0.17	-	0.017	0.87
BUFT08	DO (%)	72	0.00094	1	0.0027	0.92	0.033	0.75
BUFT08	FCB (col/100 mL)	77	<0.0001	15	<0.0001	14	0.00017	12
BUFT08	NOx-N (mg/L)	73	0.46	-	0.66	-	0.065	4.2
BUFT08	pH	77	0.37	-	0.24	-	0.094	-2.5
BUFT08	Turb (NTU)	79	0.076	3.3	0.07	2.5	0.014	4.4
BUFT08	W Temp (°C)	78	0.13	-	0.45	-	0.3	-
BUFT09	Cond (µS/cm)	67	0.77	-	0.87	-	0.67	-
BUFT09	DO (mg/L)	67	0.19	-	0.15	-	0.028	0.69
BUFT09	DO (%)	65	0.84	-	0.52	-	0.8	-
BUFT09	FCB (col/100 mL)	66	0.14	-	0.072	7	0.022	11
BUFT09	NOx-N (mg/L)	81	0.28	-	0.51	-	0.78	-
BUFT09	pH	66	0.15	-	0.34	-	0.46	-
BUFT09	Turb (NTU)	66	0.38	-	0.34	-	0.46	-
BUFT09	W Temp (°C)	67	0.64	-	0.63	-	0.15	-
BUFT10	Cond (µS/cm)	79	0.83	-	0.89	-	0.69	-
BUFT10	DO (mg/L)	77	0.44	-	0.18	-	0.93	-
BUFT10	DO (%)	75	0.64	-	0.43	-	0.9	-
BUFT10	FCB (col/100 mL)	75	0.87	-	0.92	-	1	-
BUFT10	NOx-N (mg/L)	105	0.17	-	0.33	-	0.39	-
BUFT10	pH	79	0.76	-	0.71	-	0.3	-
BUFT10	Turb (NTU)	79	0.55	-	0.99	-	0.84	-
BUFT10	W Temp (°C)	79	0.78	-	0.89	-	0.45	-
BUFT11	Cond (µS/cm)	76	0.14	-	0.16	-	0.9	-
BUFT11	DO (mg/L)	74	0.12	-	0.14	-	0.083	0.48
BUFT11	DO (%)	73	0.23	-	0.5	-	0.17	-
BUFT11	FCB (col/100 mL)	76	0.3	-	0.044	6.4	0.34	-

			Linear regression		Mann-Kendall test		Seasonal Kendall test	
Site	**Variable**	**n**	**p**	**% change**	**p**	**% change**	**p**	**% change**
BUFT11	NOx-N (mg/L)	75	0.5	-	0.48	-	0.029	1.5
BUFT11	pH	76	0.065	-1.8	0.046	-1.7	0.16	-
BUFT11	Turb (NTU)	76	0.86	-	0.093	2.1	0.9	-
BUFT11	W Temp (°C)	76	0.96	-	0.84	-	0.34	-
BUFT12	Cond (µS/cm)	80	0.87	-	0.69	-	0.12	-
BUFT12	DO (mg/L)	76	0.25	-	0.067	0.87	1	-
BUFT12	DO (%)	68	0.18	-	0.14	-	0.81	-
BUFT12	FCB (col/100 mL)	77	0.25	-	0.12	-	0.11	-
BUFT12	NOx-N (mg/L)	74	0.59	-	0.93	-	0.02	4
BUFT12	pH	75	0.4	-	0.96	-	0.71	-
BUFT12	Turb (NTU)	79	0.31	-	0.013	4	0.043	4.2
BUFT12	W Temp (°C)	79	0.44	-	0.63	-	0.58	-
BUFT13	Cond (µS/cm)	65	0.27	-	0.4	-	1	-
BUFT13	DO (mg/L)	62	0.27	-	0.26	-	0.74	-
BUFT13	DO (%)	59	0.0012	0.87	0.00076	0.92	0.12	-
BUFT13	FCB (col/100 mL)	64	0.61	-	0.5	-	0.0061	8.6
BUFT13	NOx-N (mg/L)	58	0.048	2.4	0.039	1.3	0.0054	2.4
BUFT13	pH	64	0.82	-	0.86	-	0.76	-
BUFT13	Turb (NTU)	64	0.04	4.1	0.0053	5.2	0.01	4.8
BUFT13	W Temp (°C)	64	0.09	1.8	0.26	-	0.16	-
BUFT14	Cond (µS/cm)	79	0.5	-	0.16	-	0.18	-
BUFT14	DO (mg/L)	78	0.19	-	0.13	-	0.029	0.64
BUFT14	DO (%)	72	0.55	-	0.45	-	0.46	-
BUFT14	FCB (col/100 mL)	75	0.8	-	0.71	-	0.9	-
BUFT14	NOx-N (mg/L)	72	0.59	-	0.43	-	0.094	1.5
BUFT14	pH	78	0.87	-	0.95	-	0.72	-
BUFT14	Turb (NTU)	78	0.72	-	0.32	-	0.41	-
BUFT14	W Temp (°C)	79	0.43	-	0.45	-	0.16	-
BUFT15	Cond (µS/cm)	71	0.21	-	0.21	-	0.046	-0.47
BUFT15	DO (mg/L)	71	0.18	-	0.31	-	0.057	0.36

			Linear regression		Mann-Kendall test		Seasonal Kendall test	
Site	Variable	n	p	% change	p	% change	p	% change
BUFT15	DO (%)	69	0.22	-	0.043	0.35	0.075	0.29
BUFT15	FCB (col/100 mL)	70	0.17	-	0.22	-	0.15	-
BUFT15	NOx-N (mg/L)	63	0.032	4.6	0.091	3.4	0.007	3.7
BUFT15	pH	70	0.88	-	0.82	-	0.42	-
BUFT15	Turb (NTU)	71	0.21	-	0.2	-	0.25	-
BUFT15	W Temp (°C)	71	0.61	-	0.56	-	0.57	-
BUFT16	Cond (µS/cm)	79	0.11	-	0.015	-0.43	0.00078	-0.76
BUFT16	DO (mg/L)	79	0.089	0.47	0.2	-	0.025	0.46
BUFT16	DO (%)	75	0.24	-	0.17	-	0.08	0.4
BUFT16	FCB (col/100 mL)	78	0.66	-	0.66	-	0.74	-
BUFT16	NOx-N (mg/L)	73	0.37	-	0.61	-	0.54	-
BUFT16	pH	77	0.17	-	0.044	-2.1	0.036	-2.4
BUFT16	Turb (NTU)	78	0.38	-	0.45	-	0.47	-
BUFT16	W Temp (°C)	78	0.9	-	0.88	-	0.37	-
BUFT17	Cond (µS/cm)	81	0.33	-	0.02	-0.31	0.005	-0.45
BUFT17	DO (mg/L)	81	0.34	-	0.35	-	0.092	0.37
BUFT17	DO (%)	77	0.25	-	0.073	0.33	0.071	0.34
BUFT17	FCB (col/100 mL)	79	0.034	7.2	0.0077	8	0.068	6.8
BUFT17	NOx-N (mg/L)	74	0.077	4.7	0.052	5	0.035	5.5
BUFT17	pH	79	0.86	-	0.57	-	0.4	-
BUFT17	Turb (NTU)	81	0.11	-	0.02	2.7	0.0025	4
BUFT17	W Temp (°C)	81	0.91	-	0.8	-	0.34	-
BUFT18	Cond (µS/cm)	72	0.33	-	0.27	-	0.33	-
BUFT18	DO (mg/L)	67	0.025	1.5	0.071	1.1	0.0056	1.3
BUFT18	DO (%)	63	0.0074	1.3	0.0077	0.93	0.034	0.77
BUFT18	FCB (col/100 mL)	71	0.45	-	0.55	-	0.34	-
BUFT18	NOx-N (mg/L)	69	0.81	-	0.87	-	0.56	-
BUFT18	pH	71	0.28	-	0.39	-	0.45	-
BUFT18	Turb (NTU)	71	0.69	-	0.84	-	0.55	-
BUFT18	W Temp (°C)	71	0.91	-	0.71	-	0.74	-

			Linear regression		Mann-Kendall test		Seasonal Kendall test	
Site	**Variable**	**n**	**p**	**% change**	**p**	**% change**	**p**	**% change**
BUFT23	Cond (µS/cm)	73	0.11	-	0.007	-0.58	0.0044	-0.79
BUFT23	DO (mg/L)	69	0.14	-	0.34	-	0.24	-
BUFT23	DO (%)	64	0.44	-	0.39	-	0.56	-
BUFT23	FCB (col/100 mL)	73	0.23	-	0.15	-	0.074	6.2
BUFT23	NOx-N (mg/L)	69	<0.0001	5.7	<0.0001	4.1	0.0015	3.7
BUFT23	pH	71	0.94	-	0.51	-	0.24	-
BUFT23	Turb (NTU)	72	0.00024	5.7	0.00013	5.5	0.00072	5
BUFT23	W Temp (°C)	73	0.99	-	0.98	-	0.5	-
BUFT24	Cond (µS/cm)	74	0.077	-0.68	0.025	-0.55	0.029	-0.65
BUFT24	DO (mg/L)	69	0.0067	1.3	0.04	0.96	0.00024	1.2
BUFT24	DO (%)	66	0.0018	0.91	0.0011	0.93	0.023	0.79
BUFT24	FCB (col/100 mL)	74	0.54	-	0.68	-	1	-
BUFT24	NOx-N (mg/L)	70	0.00064	5.2	0.00098	4.6	0.0075	3.9
BUFT24	pH	73	0.86	-	0.9	-	0.95	-
BUFT24	Turb (NTU)	73	0.28	-	0.18	-	0.14	-
BUFT24	W Temp (°C)	73	0.75	-	0.94	-	0.45	-
USGS-07056515	NOx-N (mg/L)	98	0.00074	3	0.00076	3.4	<0.0001	3.1
USGS-07056515	TKN (mg/L)	65	0.49	-	0.14	-	0.21	-
USGS-07056515	TN (mg/L)	65	0.38	-	0.19	-	0.12	-
USGS-07056515	TP (mg/L)	65	0.5	-	0.055	12	0.043	16

A2.4 Power analysis results for all qualifying BUFF site-variable combinations

Table A2.4.1 Estimated statistical power for the seasonal Kendall test to detect change in variables in the Buffalo National River water quality database (2000 – 2019) for all eligible site-variable combinations for three sampling intervals, three target levels of annual change, and three monitoring periods. Quarterly = January – March, April – June, July – September, and October – December. Triannual = January – April, April – August, and September – December. Variable abbreviations: Cond = specific conductance, DO sat = dissolved oxygen % saturation, E. coli = Escherischia coli, FCB = fecal coliform bacteria, NOx-N = Nitrate+nitrite-nitrogen, TCB = total coliform bacteria, TP = total phosphorus, Turb = Turbidity, W Temp = water temperature.

				Monitoring Period		
				5 YR	10 YR	20 YR
Site	Variable	Sampling Interval	Annual Change (%)	Estimated Statistical Power (%)		
BUFR01	Cond	Monthly	1	28	66	100
BUFR01	Cond	Monthly	2.5	50	99	100
BUFR01	Cond	Monthly	5	87	100	100
BUFR01	Cond	Quarterly	1	20	31	81
BUFR01	Cond	Quarterly	2.5	25	72	100
BUFR01	Cond	Quarterly	5	44	99	100
BUFR01	Cond	Triannual	1	14	24	63
BUFR01	Cond	Triannual	2.5	19	53	100
BUFR01	Cond	Triannual	5	28	94	100
BUFR01	DO sat	Monthly	1	58	100	100
BUFR01	DO sat	Monthly	2.5	99	100	100
BUFR01	DO sat	Monthly	5	100	100	100
BUFR01	DO sat	Quarterly	1	33	83	100
BUFR01	DO sat	Quarterly	2.5	69	100	100
BUFR01	DO sat	Quarterly	5	98	100	100
BUFR01	DO sat	Triannual	1	21	69	100
BUFR01	DO sat	Triannual	2.5	48	100	100
BUFR01	DO sat	Triannual	5	90	100	100
BUFR01	E. coli	Monthly	1	25	37	74
BUFR01	E. coli	Monthly	2.5	25	55	99
BUFR01	E. coli	Monthly	5	34	89	100
BUFR01	E. coli	Quarterly	1	17	23	31
BUFR01	E. coli	Quarterly	2.5	20	27	74
BUFR01	E. coli	Quarterly	5	22	48	99
BUFR01	E. coli	Triannual	1	13	21	29
BUFR01	E. coli	Triannual	2.5	14	24	59
BUFR01	E. coli	Triannual	5	16	35	98
BUFR01	FCB	Monthly	1	73	98	100
BUFR01	FCB	Monthly	2.5	75	99	100
BUFR01	FCB	Monthly	5	78	100	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFR01	FCB	Quarterly	1	23	30	50
BUFR01	FCB	Quarterly	2.5	21	37	76
BUFR01	FCB	Quarterly	5	23	51	98
BUFR01	FCB	Triannual	1	13	23	38
BUFR01	FCB	Triannual	2.5	15	28	59
BUFR01	FCB	Triannual	5	15	39	96
BUFR01	pH	Monthly	1	91	100	100
BUFR01	pH	Monthly	2.5	100	100	100
BUFR01	pH	Monthly	5	100	100	100
BUFR01	pH	Quarterly	1	58	100	100
BUFR01	pH	Quarterly	2.5	98	100	100
BUFR01	pH	Quarterly	5	100	100	100
BUFR01	pH	Triannual	1	39	99	100
BUFR01	pH	Triannual	2.5	89	100	100
BUFR01	pH	Triannual	5	100	100	100
BUFR01	Turb	Monthly	1	22	39	84
BUFR01	Turb	Monthly	2.5	30	65	100
BUFR01	Turb	Monthly	5	43	97	100
BUFR01	Turb	Quarterly	1	19	20	41
BUFR01	Turb	Quarterly	2.5	22	33	89
BUFR01	Turb	Quarterly	5	22	68	100
BUFR01	Turb	Triannual	1	10	19	32
BUFR01	Turb	Triannual	2.5	14	28	76
BUFR01	Turb	Triannual	5	14	48	99
BUFR01	W Temp	Monthly	1	37	89	100
BUFR01	W Temp	Monthly	2.5	74	100	100
BUFR01	W Temp	Monthly	5	99	100	100
BUFR01	W Temp	Quarterly	1	20	40	92
BUFR01	W Temp	Quarterly	2.5	33	82	100
BUFR01	W Temp	Quarterly	5	52	100	100
BUFR01	W Temp	Triannual	1	13	25	71
BUFR01	W Temp	Triannual	2.5	17	57	100
BUFR01	W Temp	Triannual	5	28	96	100
BUFR02	Cond	Monthly	1	46	91	100
BUFR02	Cond	Monthly	2.5	72	100	100
BUFR02	Cond	Monthly	5	95	100	100
BUFR02	Cond	Quarterly	1	20	40	89
BUFR02	Cond	Quarterly	2.5	29	80	100
BUFR02	Cond	Quarterly	5	47	100	100
BUFR02	Cond	Triannual	1	14	29	68
BUFR02	Cond	Triannual	2.5	15	52	100
BUFR02	Cond	Triannual	5	24	94	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFR02	DO sat	Monthly	1	69	100	100
BUFR02	DO sat	Monthly	2.5	98	100	100
BUFR02	DO sat	Monthly	5	100	100	100
BUFR02	DO sat	Quarterly	1	27	72	100
BUFR02	DO sat	Quarterly	2.5	61	100	100
BUFR02	DO sat	Quarterly	5	93	100	100
BUFR02	DO sat	Triannual	1	15	58	100
BUFR02	DO sat	Triannual	2.5	39	100	100
BUFR02	DO sat	Triannual	5	81	100	100
BUFR02	E. coli	Monthly	1	43	75	99
BUFR02	E. coli	Monthly	2.5	52	89	100
BUFR02	E. coli	Monthly	5	61	99	100
BUFR02	E. coli	Quarterly	1	19	26	45
BUFR02	E. coli	Quarterly	2.5	20	38	83
BUFR02	E. coli	Quarterly	5	26	61	100
BUFR02	E. coli	Triannual	1	14	20	35
BUFR02	E. coli	Triannual	2.5	13	29	74
BUFR02	E. coli	Triannual	5	16	48	100
BUFR02	FCB	Monthly	1	71	98	100
BUFR02	FCB	Monthly	2.5	75	99	100
BUFR02	FCB	Monthly	5	82	100	100
BUFR02	FCB	Quarterly	1	23	31	49
BUFR02	FCB	Quarterly	2.5	23	38	86
BUFR02	FCB	Quarterly	5	26	61	100
BUFR02	FCB	Triannual	1	14	22	39
BUFR02	FCB	Triannual	2.5	14	28	76
BUFR02	FCB	Triannual	5	15	51	100
BUFR02	pH	Monthly	1	98	100	100
BUFR02	pH	Monthly	2.5	100	100	100
BUFR02	pH	Monthly	5	100	100	100
BUFR02	pH	Quarterly	1	62	100	100
BUFR02	pH	Quarterly	2.5	100	100	100
BUFR02	pH	Quarterly	5	100	100	100
BUFR02	pH	Triannual	1	40	100	100
BUFR02	pH	Triannual	2.5	94	100	100
BUFR02	pH	Triannual	5	100	100	100
BUFR02	Turb	Monthly	1	32	58	95
BUFR02	Turb	Monthly	2.5	39	84	100
BUFR02	Turb	Monthly	5	54	98	100
BUFR02	Turb	Quarterly	1	18	25	43
BUFR02	Turb	Quarterly	2.5	20	38	90
BUFR02	Turb	Quarterly	5	24	66	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFR02	Turb	Triannual	1	13	22	33
BUFR02	Turb	Triannual	2.5	12	26	73
BUFR02	Turb	Triannual	5	16	49	100
BUFR02	W Temp	Monthly	1	48	92	100
BUFR02	W Temp	Monthly	2.5	74	100	100
BUFR02	W Temp	Monthly	5	98	100	100
BUFR02	W Temp	Quarterly	1	23	36	85
BUFR02	W Temp	Quarterly	2.5	26	76	100
BUFR02	W Temp	Quarterly	5	45	100	100
BUFR02	W Temp	Triannual	1	13	28	66
BUFR02	W Temp	Triannual	2.5	16	57	100
BUFR02	W Temp	Triannual	5	27	95	100
BUFR03	Cond	Monthly	1	72	99	100
BUFR03	Cond	Monthly	2.5	90	100	100
BUFR03	Cond	Monthly	5	99	100	100
BUFR03	Cond	Quarterly	1	21	46	94
BUFR03	Cond	Quarterly	2.5	30	84	100
BUFR03	Cond	Quarterly	5	56	100	100
BUFR03	Cond	Triannual	1	15	31	83
BUFR03	Cond	Triannual	2.5	18	68	100
BUFR03	Cond	Triannual	5	35	98	100
BUFR03	DO sat	Monthly	1	88	100	100
BUFR03	DO sat	Monthly	2.5	100	100	100
BUFR03	DO sat	Monthly	5	100	100	100
BUFR03	DO sat	Quarterly	1	34	86	100
BUFR03	DO sat	Quarterly	2.5	68	100	100
BUFR03	DO sat	Quarterly	5	99	100	100
BUFR03	DO sat	Triannual	1	22	78	100
BUFR03	DO sat	Triannual	2.5	54	100	100
BUFR03	DO sat	Triannual	5	90	100	100
BUFR03	E. coli	Monthly	1	95	100	100
BUFR03	E. coli	Monthly	2.5	97	100	100
BUFR03	E. coli	Monthly	5	98	100	100
BUFR03	E. coli	Quarterly	1	23	35	62
BUFR03	E. coli	Quarterly	2.5	25	47	92
BUFR03	E. coli	Quarterly	5	29	73	100
BUFR03	E. coli	Triannual	1	15	26	47
BUFR03	E. coli	Triannual	2.5	14	32	83
BUFR03	E. coli	Triannual	5	17	52	100
BUFR03	FCB	Monthly	1	73	97	100
BUFR03	FCB	Monthly	2.5	72	98	100
BUFR03	FCB	Monthly	5	74	100	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFR03	FCB	Quarterly	1	23	33	55
BUFR03	FCB	Quarterly	2.5	27	39	81
BUFR03	FCB	Quarterly	5	26	56	100
BUFR03	FCB	Triannual	1	13	26	42
BUFR03	FCB	Triannual	2.5	14	30	73
BUFR03	FCB	Triannual	5	20	46	100
BUFR03	pH	Monthly	1	100	100	100
BUFR03	pH	Monthly	2.5	100	100	100
BUFR03	pH	Monthly	5	100	100	100
BUFR03	pH	Quarterly	1	76	100	100
BUFR03	pH	Quarterly	2.5	100	100	100
BUFR03	pH	Quarterly	5	100	100	100
BUFR03	pH	Triannual	1	56	100	100
BUFR03	pH	Triannual	2.5	98	100	100
BUFR03	pH	Triannual	5	100	100	100
BUFR03	Turb	Monthly	1	61	95	100
BUFR03	Turb	Monthly	2.5	68	99	100
BUFR03	Turb	Monthly	5	81	100	100
BUFR03	Turb	Quarterly	1	21	33	52
BUFR03	Turb	Quarterly	2.5	24	41	94
BUFR03	Turb	Quarterly	5	28	75	100
BUFR03	Turb	Triannual	1	13	24	46
BUFR03	Turb	Triannual	2.5	14	33	86
BUFR03	Turb	Triannual	5	18	62	100
BUFR03	W Temp	Monthly	1	70	99	100
BUFR03	W Temp	Monthly	2.5	93	100	100
BUFR03	W Temp	Monthly	5	100	100	100
BUFR03	W Temp	Quarterly	1	22	41	93
BUFR03	W Temp	Quarterly	2.5	32	83	100
BUFR03	W Temp	Quarterly	5	49	100	100
BUFR03	W Temp	Triannual	1	15	30	72
BUFR03	W Temp	Triannual	2.5	16	58	100
BUFR03	W Temp	Triannual	5	33	94	100
BUFR04	Cond	Monthly	1	51	97	100
BUFR04	Cond	Monthly	2.5	83	100	100
BUFR04	Cond	Monthly	5	100	100	100
BUFR04	Cond	Quarterly	1	24	56	99
BUFR04	Cond	Quarterly	2.5	40	95	100
BUFR04	Cond	Quarterly	5	71	100	100
BUFR04	Cond	Triannual	1	15	37	93
BUFR04	Cond	Triannual	2.5	22	83	100
BUFR04	Cond	Triannual	5	49	100	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFR04	DO sat	Monthly	1	71	100	100
BUFR04	DO sat	Monthly	2.5	99	100	100
BUFR04	DO sat	Monthly	5	100	100	100
BUFR04	DO sat	Quarterly	1	31	82	100
BUFR04	DO sat	Quarterly	2.5	68	100	100
BUFR04	DO sat	Quarterly	5	98	100	100
BUFR04	DO sat	Triannual	1	18	68	100
BUFR04	DO sat	Triannual	2.5	45	99	100
BUFR04	DO sat	Triannual	5	86	100	100
BUFR04	E. coli	Monthly	1	32	59	93
BUFR04	E. coli	Monthly	2.5	37	76	100
BUFR04	E. coli	Monthly	5	45	96	100
BUFR04	E. coli	Quarterly	1	16	23	35
BUFR04	E. coli	Quarterly	2.5	22	30	71
BUFR04	E. coli	Quarterly	5	20	47	99
BUFR04	E. coli	Triannual	1	13	22	29
BUFR04	E. coli	Triannual	2.5	11	22	61
BUFR04	E. coli	Triannual	5	15	38	97
BUFR04	FCB	Monthly	1	61	93	100
BUFR04	FCB	Monthly	2.5	69	97	100
BUFR04	FCB	Monthly	5	73	100	100
BUFR04	FCB	Quarterly	1	23	31	50
BUFR04	FCB	Quarterly	2.5	21	36	78
BUFR04	FCB	Quarterly	5	24	53	99
BUFR04	FCB	Triannual	1	15	25	43
BUFR04	FCB	Triannual	2.5	15	30	69
BUFR04	FCB	Triannual	5	16	45	99
BUFR04	pH	Monthly	1	100	100	100
BUFR04	pH	Monthly	2.5	100	100	100
BUFR04	pH	Monthly	5	100	100	100
BUFR04	pH	Quarterly	1	90	100	100
BUFR04	pH	Quarterly	2.5	100	100	100
BUFR04	pH	Quarterly	5	100	100	100
BUFR04	pH	Triannual	1	71	100	100
BUFR04	pH	Triannual	2.5	100	100	100
BUFR04	pH	Triannual	5	100	100	100
BUFR04	Turb	Monthly	1	29	55	96
BUFR04	Turb	Monthly	2.5	39	80	100
BUFR04	Turb	Monthly	5	57	100	100
BUFR04	Turb	Quarterly	1	18	26	49
BUFR04	Turb	Quarterly	2.5	24	41	96
BUFR04	Turb	Quarterly	5	28	77	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFR04	Turb	Triannual	1	11	21	44
BUFR04	Turb	Triannual	2.5	15	35	87
BUFR04	Turb	Triannual	5	17	62	100
BUFR04	W Temp	Monthly	1	42	93	100
BUFR04	W Temp	Monthly	2.5	76	100	100
BUFR04	W Temp	Monthly	5	98	100	100
BUFR04	W Temp	Quarterly	1	19	34	86
BUFR04	W Temp	Quarterly	2.5	27	74	100
BUFR04	W Temp	Quarterly	5	45	100	100
BUFR04	W Temp	Triannual	1	13	27	70
BUFR04	W Temp	Triannual	2.5	16	58	100
BUFR04	W Temp	Triannual	5	28	95	100
BUFR0415	Cond	Monthly	1	38	92	100
BUFR0415	Cond	Monthly	2.5	79	100	100
BUFR0415	Cond	Monthly	5	99	100	100
BUFR0415	Cond	Quarterly	1	24	51	99
BUFR0415	Cond	Quarterly	2.5	36	96	100
BUFR0415	Cond	Quarterly	5	75	100	100
BUFR0415	Cond	Triannual	1	14	37	95
BUFR0415	Cond	Triannual	2.5	24	88	100
BUFR0415	Cond	Triannual	5	52	100	100
BUFR0415	DO sat	Monthly	1	54	99	100
BUFR0415	DO sat	Monthly	2.5	94	100	100
BUFR0415	DO sat	Monthly	5	100	100	100
BUFR0415	DO sat	Quarterly	1	28	76	100
BUFR0415	DO sat	Quarterly	2.5	60	100	100
BUFR0415	DO sat	Quarterly	5	94	100	100
BUFR0415	DO sat	Triannual	1	17	56	100
BUFR0415	DO sat	Triannual	2.5	40	99	100
BUFR0415	DO sat	Triannual	5	81	100	100
BUFR0415	E. coli	Monthly	1	22	37	72
BUFR0415	E. coli	Monthly	2.5	26	54	99
BUFR0415	E. coli	Monthly	5	34	88	100
BUFR0415	E. coli	Quarterly	1	17	21	29
BUFR0415	E. coli	Quarterly	2.5	20	28	69
BUFR0415	E. coli	Quarterly	5	18	49	100
BUFR0415	E. coli	Triannual	1	12	21	29
BUFR0415	E. coli	Triannual	2.5	11	25	62
BUFR0415	E. coli	Triannual	5	12	40	97
BUFR0415	FCB	Monthly	1	100	100	100
BUFR0415	FCB	Monthly	2.5	100	100	100
BUFR0415	FCB	Monthly	5	100	100	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFR0415	FCB	Quarterly	1	100	100	100
BUFR0415	FCB	Quarterly	2.5	100	100	100
BUFR0415	FCB	Quarterly	5	100	100	100
BUFR0415	FCB	Triannual	1	100	100	100
BUFR0415	FCB	Triannual	2.5	100	100	100
BUFR0415	FCB	Triannual	5	100	100	100
BUFR0415	pH	Monthly	1	99	100	100
BUFR0415	pH	Monthly	2.5	100	100	100
BUFR0415	pH	Monthly	5	100	100	100
BUFR0415	pH	Quarterly	1	71	100	100
BUFR0415	pH	Quarterly	2.5	100	100	100
BUFR0415	pH	Quarterly	5	100	100	100
BUFR0415	pH	Triannual	1	54	100	100
BUFR0415	pH	Triannual	2.5	99	100	100
BUFR0415	pH	Triannual	5	100	100	100
BUFR0415	TP	Monthly	1	100	100	100
BUFR0415	TP	Monthly	2.5	100	100	100
BUFR0415	TP	Monthly	5	100	100	100
BUFR0415	TP	Quarterly	1	57	90	100
BUFR0415	TP	Quarterly	2.5	59	95	100
BUFR0415	TP	Quarterly	5	65	99	100
BUFR0415	TP	Triannual	1	31	61	93
BUFR0415	TP	Triannual	2.5	30	69	100
BUFR0415	TP	Triannual	5	36	94	100
BUFR0415	Turb	Monthly	1	20	39	77
BUFR0415	Turb	Monthly	2.5	27	61	100
BUFR0415	Turb	Monthly	5	39	95	100
BUFR0415	Turb	Quarterly	1	18	25	37
BUFR0415	Turb	Quarterly	2.5	20	37	84
BUFR0415	Turb	Quarterly	5	25	63	100
BUFR0415	Turb	Triannual	1	12	18	34
BUFR0415	Turb	Triannual	2.5	14	26	76
BUFR0415	Turb	Triannual	5	16	48	100
BUFR0415	W Temp	Monthly	1	33	86	100
BUFR0415	W Temp	Monthly	2.5	68	100	100
BUFR0415	W Temp	Monthly	5	98	100	100
BUFR0415	W Temp	Quarterly	1	22	37	91
BUFR0415	W Temp	Quarterly	2.5	29	80	100
BUFR0415	W Temp	Quarterly	5	51	99	100
BUFR0415	W Temp	Triannual	1	12	23	63
BUFR0415	W Temp	Triannual	2.5	18	53	100
BUFR0415	W Temp	Triannual	5	25	94	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFR05	Cond	Monthly	1	81	100	100
BUFR05	Cond	Monthly	2.5	96	100	100
BUFR05	Cond	Monthly	5	100	100	100
BUFR05	Cond	Quarterly	1	24	59	100
BUFR05	Cond	Quarterly	2.5	44	97	100
BUFR05	Cond	Quarterly	5	74	100	100
BUFR05	Cond	Triannual	1	15	41	97
BUFR05	Cond	Triannual	2.5	27	86	100
BUFR05	Cond	Triannual	5	55	100	100
BUFR05	DO sat	Monthly	1	93	100	100
BUFR05	DO sat	Monthly	2.5	100	100	100
BUFR05	DO sat	Monthly	5	100	100	100
BUFR05	DO sat	Quarterly	1	33	85	100
BUFR05	DO sat	Quarterly	2.5	68	100	100
BUFR05	DO sat	Quarterly	5	96	100	100
BUFR05	DO sat	Triannual	1	22	72	100
BUFR05	DO sat	Triannual	2.5	48	100	100
BUFR05	DO sat	Triannual	5	85	100	100
BUFR05	E. coli	Monthly	1	100	100	100
BUFR05	E. coli	Monthly	2.5	100	100	100
BUFR05	E. coli	Monthly	5	100	100	100
BUFR05	E. coli	Quarterly	1	28	44	75
BUFR05	E. coli	Quarterly	2.5	31	53	94
BUFR05	E. coli	Quarterly	5	29	72	100
BUFR05	E. coli	Triannual	1	17	31	48
BUFR05	E. coli	Triannual	2.5	14	34	79
BUFR05	E. coli	Triannual	5	18	54	99
BUFR05	FCB	Monthly	1	71	98	100
BUFR05	FCB	Monthly	2.5	71	97	100
BUFR05	FCB	Monthly	5	73	100	100
BUFR05	FCB	Quarterly	1	24	41	58
BUFR05	FCB	Quarterly	2.5	26	40	70
BUFR05	FCB	Quarterly	5	24	45	97
BUFR05	FCB	Triannual	1	16	31	46
BUFR05	FCB	Triannual	2.5	16	30	61
BUFR05	FCB	Triannual	5	14	36	92
BUFR05	pH	Monthly	1	100	100	100
BUFR05	pH	Monthly	2.5	100	100	100
BUFR05	pH	Monthly	5	100	100	100
BUFR05	pH	Quarterly	1	79	100	100
BUFR05	pH	Quarterly	2.5	100	100	100
BUFR05	pH	Quarterly	5	100	100	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFR05	pH	Triannual	1	62	100	100
BUFR05	pH	Triannual	2.5	100	100	100
BUFR05	pH	Triannual	5	100	100	100
BUFR05	Turb	Monthly	1	76	99	100
BUFR05	Turb	Monthly	2.5	82	100	100
BUFR05	Turb	Monthly	5	92	100	100
BUFR05	Turb	Quarterly	1	20	29	56
BUFR05	Turb	Quarterly	2.5	24	44	95
BUFR05	Turb	Quarterly	5	28	76	100
BUFR05	Turb	Triannual	1	14	27	46
BUFR05	Turb	Triannual	2.5	15	33	88
BUFR05	Turb	Triannual	5	20	59	100
BUFR05	W Temp	Monthly	1	83	100	100
BUFR05	W Temp	Monthly	2.5	96	100	100
BUFR05	W Temp	Monthly	5	100	100	100
BUFR05	W Temp	Quarterly	1	23	43	91
BUFR05	W Temp	Quarterly	2.5	33	79	100
BUFR05	W Temp	Quarterly	5	52	100	100
BUFR05	W Temp	Triannual	1	14	30	77
BUFR05	W Temp	Triannual	2.5	18	64	100
BUFR05	W Temp	Triannual	5	33	96	100
BUFR06	Cond	Monthly	1	78	100	100
BUFR06	Cond	Monthly	2.5	94	100	100
BUFR06	Cond	Monthly	5	100	100	100
BUFR06	Cond	Quarterly	1	24	53	99
BUFR06	Cond	Quarterly	2.5	39	96	100
BUFR06	Cond	Quarterly	5	75	100	100
BUFR06	Cond	Triannual	1	15	42	96
BUFR06	Cond	Triannual	2.5	25	89	100
BUFR06	Cond	Triannual	5	51	100	100
BUFR06	DO sat	Monthly	1	93	100	100
BUFR06	DO sat	Monthly	2.5	99	100	100
BUFR06	DO sat	Monthly	5	100	100	100
BUFR06	DO sat	Quarterly	1	28	72	100
BUFR06	DO sat	Quarterly	2.5	54	100	100
BUFR06	DO sat	Quarterly	5	91	100	100
BUFR06	DO sat	Triannual	1	19	55	100
BUFR06	DO sat	Triannual	2.5	34	98	100
BUFR06	DO sat	Triannual	5	75	100	100
BUFR06	E. coli	Monthly	1	100	100	100
BUFR06	E. coli	Monthly	2.5	100	100	100
BUFR06	E. coli	Monthly	5	100	100	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFR06	E. coli	Quarterly	1	26	44	68
BUFR06	E. coli	Quarterly	2.5	28	45	91
BUFR06	E. coli	Quarterly	5	29	66	100
BUFR06	E. coli	Triannual	1	16	33	55
BUFR06	E. coli	Triannual	2.5	18	37	80
BUFR06	E. coli	Triannual	5	20	53	99
BUFR06	FCB	Monthly	1	71	97	100
BUFR06	FCB	Monthly	2.5	72	97	100
BUFR06	FCB	Monthly	5	74	99	100
BUFR06	FCB	Quarterly	1	23	35	51
BUFR06	FCB	Quarterly	2.5	23	40	77
BUFR06	FCB	Quarterly	5	27	50	99
BUFR06	FCB	Triannual	1	16	27	40
BUFR06	FCB	Triannual	2.5	16	28	65
BUFR06	FCB	Triannual	5	15	40	96
BUFR06	pH	Monthly	1	100	100	100
BUFR06	pH	Monthly	2.5	100	100	100
BUFR06	pH	Monthly	5	100	100	100
BUFR06	pH	Quarterly	1	73	100	100
BUFR06	pH	Quarterly	2.5	100	100	100
BUFR06	pH	Quarterly	5	100	100	100
BUFR06	pH	Triannual	1	47	100	100
BUFR06	pH	Triannual	2.5	97	100	100
BUFR06	pH	Triannual	5	100	100	100
BUFR06	Turb	Monthly	1	68	97	100
BUFR06	Turb	Monthly	2.5	72	100	100
BUFR06	Turb	Monthly	5	88	100	100
BUFR06	Turb	Quarterly	1	22	30	56
BUFR06	Turb	Quarterly	2.5	24	45	94
BUFR06	Turb	Quarterly	5	30	73	100
BUFR06	Turb	Triannual	1	13	22	46
BUFR06	Turb	Triannual	2.5	15	34	88
BUFR06	Turb	Triannual	5	18	59	100
BUFR06	W Temp	Monthly	1	75	100	100
BUFR06	W Temp	Monthly	2.5	93	100	100
BUFR06	W Temp	Monthly	5	100	100	100
BUFR06	W Temp	Quarterly	1	23	44	95
BUFR06	W Temp	Quarterly	2.5	32	88	100
BUFR06	W Temp	Quarterly	5	58	100	100
BUFR06	W Temp	Triannual	1	15	31	77
BUFR06	W Temp	Triannual	2.5	19	64	100
BUFR06	W Temp	Triannual	5	33	97	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFR07	Cond	Monthly	1	84	100	100
BUFR07	Cond	Monthly	2.5	99	100	100
BUFR07	Cond	Monthly	5	100	100	100
BUFR07	Cond	Quarterly	1	21	53	100
BUFR07	Cond	Quarterly	2.5	40	97	100
BUFR07	Cond	Quarterly	5	78	100	100
BUFR07	Cond	Triannual	1	14	43	98
BUFR07	Cond	Triannual	2.5	25	91	100
BUFR07	Cond	Triannual	5	58	100	100
BUFR07	DO sat	Monthly	1	89	100	100
BUFR07	DO sat	Monthly	2.5	99	100	100
BUFR07	DO sat	Monthly	5	100	100	100
BUFR07	DO sat	Quarterly	1	29	73	100
BUFR07	DO sat	Quarterly	2.5	53	100	100
BUFR07	DO sat	Quarterly	5	91	100	100
BUFR07	DO sat	Triannual	1	17	56	100
BUFR07	DO sat	Triannual	2.5	34	97	100
BUFR07	DO sat	Triannual	5	66	100	100
BUFR07	E. coli	Monthly	1	97	100	100
BUFR07	E. coli	Monthly	2.5	98	100	100
BUFR07	E. coli	Monthly	5	99	100	100
BUFR07	E. coli	Quarterly	1	27	42	79
BUFR07	E. coli	Quarterly	2.5	27	57	96
BUFR07	E. coli	Quarterly	5	33	76	100
BUFR07	E. coli	Triannual	1	17	29	54
BUFR07	E. coli	Triannual	2.5	17	39	84
BUFR07	E. coli	Triannual	5	17	59	100
BUFR07	FCB	Monthly	1	82	99	100
BUFR07	FCB	Monthly	2.5	82	100	100
BUFR07	FCB	Monthly	5	85	100	100
BUFR07	FCB	Quarterly	1	26	31	49
BUFR07	FCB	Quarterly	2.5	23	35	75
BUFR07	FCB	Quarterly	5	26	50	99
BUFR07	FCB	Triannual	1	17	26	41
BUFR07	FCB	Triannual	2.5	15	32	68
BUFR07	FCB	Triannual	5	15	42	97
BUFR07	pH	Monthly	1	100	100	100
BUFR07	pH	Monthly	2.5	100	100	100
BUFR07	pH	Monthly	5	100	100	100
BUFR07	pH	Quarterly	1	68	100	100
BUFR07	pH	Quarterly	2.5	100	100	100
BUFR07	pH	Quarterly	5	100	100	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFR07	pH	Triannual	1	43	100	100
BUFR07	pH	Triannual	2.5	96	100	100
BUFR07	pH	Triannual	5	100	100	100
BUFR07	Turb	Monthly	1	72	98	100
BUFR07	Turb	Monthly	2.5	79	100	100
BUFR07	Turb	Monthly	5	89	100	100
BUFR07	Turb	Quarterly	1	21	30	60
BUFR07	Turb	Quarterly	2.5	23	46	96
BUFR07	Turb	Quarterly	5	30	77	100
BUFR07	Turb	Triannual	1	14	24	49
BUFR07	Turb	Triannual	2.5	15	39	92
BUFR07	Turb	Triannual	5	19	73	100
BUFR07	W Temp	Monthly	1	83	100	100
BUFR07	W Temp	Monthly	2.5	97	100	100
BUFR07	W Temp	Monthly	5	100	100	100
BUFR07	W Temp	Quarterly	1	24	43	91
BUFR07	W Temp	Quarterly	2.5	30	80	100
BUFR07	W Temp	Quarterly	5	52	100	100
BUFR07	W Temp	Triannual	1	14	30	74
BUFR07	W Temp	Triannual	2.5	18	62	100
BUFR07	W Temp	Triannual	5	31	97	100
BUFR08	Cond	Monthly	1	88	100	100
BUFR08	Cond	Monthly	2.5	97	100	100
BUFR08	Cond	Monthly	5	100	100	100
BUFR08	Cond	Quarterly	1	35	74	100
BUFR08	Cond	Quarterly	2.5	57	99	100
BUFR08	Cond	Quarterly	5	88	100	100
BUFR08	Cond	Triannual	1	18	52	99
BUFR08	Cond	Triannual	2.5	31	94	100
BUFR08	Cond	Triannual	5	60	100	100
BUFR08	DO sat	Monthly	1	95	100	100
BUFR08	DO sat	Monthly	2.5	100	100	100
BUFR08	DO sat	Monthly	5	100	100	100
BUFR08	DO sat	Quarterly	1	36	86	100
BUFR08	DO sat	Quarterly	2.5	68	100	100
BUFR08	DO sat	Quarterly	5	98	100	100
BUFR08	DO sat	Triannual	1	20	70	100
BUFR08	DO sat	Triannual	2.5	47	100	100
BUFR08	DO sat	Triannual	5	90	100	100
BUFR08	E. coli	Monthly	1	100	100	100
BUFR08	E. coli	Monthly	2.5	100	100	100
BUFR08	E. coli	Monthly	5	100	100	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFR08	E. coli	Quarterly	1	24	40	62
BUFR08	E. coli	Quarterly	2.5	26	44	89
BUFR08	E. coli	Quarterly	5	27	65	100
BUFR08	E. coli	Triannual	1	16	30	49
BUFR08	E. coli	Triannual	2.5	16	35	83
BUFR08	E. coli	Triannual	5	19	52	100
BUFR08	FCB	Monthly	1	87	100	100
BUFR08	FCB	Monthly	2.5	87	100	100
BUFR08	FCB	Monthly	5	90	100	100
BUFR08	FCB	Quarterly	1	22	32	51
BUFR08	FCB	Quarterly	2.5	22	37	77
BUFR08	FCB	Quarterly	5	27	54	100
BUFR08	FCB	Triannual	1	14	27	44
BUFR08	FCB	Triannual	2.5	14	30	67
BUFR08	FCB	Triannual	5	16	44	96
BUFR08	pH	Monthly	1	100	100	100
BUFR08	pH	Monthly	2.5	100	100	100
BUFR08	pH	Monthly	5	100	100	100
BUFR08	pH	Quarterly	1	69	100	100
BUFR08	pH	Quarterly	2.5	100	100	100
BUFR08	pH	Quarterly	5	100	100	100
BUFR08	pH	Triannual	1	49	100	100
BUFR08	pH	Triannual	2.5	96	100	100
BUFR08	pH	Triannual	5	100	100	100
BUFR08	Turb	Monthly	1	72	98	100
BUFR08	Turb	Monthly	2.5	79	99	100
BUFR08	Turb	Monthly	5	86	100	100
BUFR08	Turb	Quarterly	1	18	33	60
BUFR08	Turb	Quarterly	2.5	24	49	97
BUFR08	Turb	Quarterly	5	27	81	100
BUFR08	Turb	Triannual	1	14	28	47
BUFR08	Turb	Triannual	2.5	14	36	92
BUFR08	Turb	Triannual	5	17	70	100
BUFR08	W Temp	Monthly	1	78	100	100
BUFR08	W Temp	Monthly	2.5	95	100	100
BUFR08	W Temp	Monthly	5	100	100	100
BUFR08	W Temp	Quarterly	1	23	41	90
BUFR08	W Temp	Quarterly	2.5	30	80	100
BUFR08	W Temp	Quarterly	5	49	100	100
BUFR08	W Temp	Triannual	1	15	29	73
BUFR08	W Temp	Triannual	2.5	17	59	100
BUFR08	W Temp	Triannual	5	29	97	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFR09	Cond	Monthly	1	93	100	100
BUFR09	Cond	Monthly	2.5	100	100	100
BUFR09	Cond	Monthly	5	100	100	100
BUFR09	Cond	Quarterly	1	25	56	99
BUFR09	Cond	Quarterly	2.5	42	98	100
BUFR09	Cond	Quarterly	5	74	100	100
BUFR09	Cond	Triannual	1	16	47	97
BUFR09	Cond	Triannual	2.5	29	91	100
BUFR09	Cond	Triannual	5	57	100	100
BUFR09	DO sat	Monthly	1	100	100	100
BUFR09	DO sat	Monthly	2.5	100	100	100
BUFR09	DO sat	Monthly	5	100	100	100
BUFR09	DO sat	Quarterly	1	32	78	100
BUFR09	DO sat	Quarterly	2.5	61	100	100
BUFR09	DO sat	Quarterly	5	96	100	100
BUFR09	DO sat	Triannual	1	18	61	100
BUFR09	DO sat	Triannual	2.5	41	100	100
BUFR09	DO sat	Triannual	5	82	100	100
BUFR09	E. coli	Monthly	1	100	100	100
BUFR09	E. coli	Monthly	2.5	100	100	100
BUFR09	E. coli	Monthly	5	100	100	100
BUFR09	E. coli	Quarterly	1	29	40	71
BUFR09	E. coli	Quarterly	2.5	27	48	87
BUFR09	E. coli	Quarterly	5	29	61	99
BUFR09	E. coli	Triannual	1	17	30	48
BUFR09	E. coli	Triannual	2.5	17	33	72
BUFR09	E. coli	Triannual	5	19	49	96
BUFR09	FCB	Monthly	1	96	100	100
BUFR09	FCB	Monthly	2.5	97	100	100
BUFR09	FCB	Monthly	5	96	100	100
BUFR09	FCB	Quarterly	1	24	34	55
BUFR09	FCB	Quarterly	2.5	23	40	71
BUFR09	FCB	Quarterly	5	25	50	97
BUFR09	FCB	Triannual	1	16	28	47
BUFR09	FCB	Triannual	2.5	15	30	66
BUFR09	FCB	Triannual	5	17	40	93
BUFR09	pH	Monthly	1	100	100	100
BUFR09	pH	Monthly	2.5	100	100	100
BUFR09	pH	Monthly	5	100	100	100
BUFR09	pH	Quarterly	1	76	100	100
BUFR09	pH	Quarterly	2.5	100	100	100
BUFR09	pH	Quarterly	5	100	100	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFR09	pH	Triannual	1	50	100	100
BUFR09	pH	Triannual	2.5	97	100	100
BUFR09	pH	Triannual	5	100	100	100
BUFR09	Turb	Monthly	1	90	100	100
BUFR09	Turb	Monthly	2.5	90	100	100
BUFR09	Turb	Monthly	5	95	100	100
BUFR09	Turb	Quarterly	1	21	29	55
BUFR09	Turb	Quarterly	2.5	21	44	95
BUFR09	Turb	Quarterly	5	28	70	100
BUFR09	Turb	Triannual	1	13	24	45
BUFR09	Turb	Triannual	2.5	14	36	87
BUFR09	Turb	Triannual	5	18	62	100
BUFR09	W Temp	Monthly	1	95	100	100
BUFR09	W Temp	Monthly	2.5	99	100	100
BUFR09	W Temp	Monthly	5	100	100	100
BUFR09	W Temp	Quarterly	1	24	54	98
BUFR09	W Temp	Quarterly	2.5	37	92	100
BUFR09	W Temp	Quarterly	5	65	100	100
BUFR09	W Temp	Triannual	1	12	31	79
BUFR09	W Temp	Triannual	2.5	21	64	100
BUFR09	W Temp	Triannual	5	29	98	100
BUFS02	Cond	Monthly	1	100	100	100
BUFS02	Cond	Monthly	2.5	100	100	100
BUFS02	Cond	Monthly	5	100	100	100
BUFS02	Cond	Quarterly	1	29	59	99
BUFS02	Cond	Quarterly	2.5	40	96	100
BUFS02	Cond	Quarterly	5	72	100	100
BUFS02	Cond	Triannual	1	15	42	95
BUFS02	Cond	Triannual	2.5	25	86	100
BUFS02	Cond	Triannual	5	48	100	100
BUFS02	DO sat	Monthly	1	100	100	100
BUFS02	DO sat	Monthly	2.5	100	100	100
BUFS02	DO sat	Monthly	5	100	100	100
BUFS02	DO sat	Quarterly	1	45	97	100
BUFS02	DO sat	Quarterly	2.5	86	100	100
BUFS02	DO sat	Quarterly	5	100	100	100
BUFS02	DO sat	Triannual	1	26	90	100
BUFS02	DO sat	Triannual	2.5	70	100	100
BUFS02	DO sat	Triannual	5	99	100	100
BUFS02	E. coli	Monthly	1	100	100	100
BUFS02	E. coli	Monthly	2.5	100	100	100
BUFS02	E. coli	Monthly	5	100	100	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFS02	E. coli	Quarterly	1	27	49	74
BUFS02	E. coli	Quarterly	2.5	29	50	86
BUFS02	E. coli	Quarterly	5	33	62	99
BUFS02	E. coli	Triannual	1	17	34	63
BUFS02	E. coli	Triannual	2.5	17	39	82
BUFS02	E. coli	Triannual	5	20	54	99
BUFS02	FCB	Monthly	1	100	100	100
BUFS02	FCB	Monthly	2.5	100	100	100
BUFS02	FCB	Monthly	5	100	100	100
BUFS02	FCB	Quarterly	1	25	34	56
BUFS02	FCB	Quarterly	2.5	23	40	79
BUFS02	FCB	Quarterly	5	24	51	99
BUFS02	FCB	Triannual	1	16	28	40
BUFS02	FCB	Triannual	2.5	14	28	58
BUFS02	FCB	Triannual	5	14	37	93
BUFS02	NOx-N	Monthly	1	100	100	100
BUFS02	NOx-N	Monthly	2.5	100	100	100
BUFS02	NOx-N	Monthly	5	100	100	100
BUFS02	NOx-N	Quarterly	1	26	45	86
BUFS02	NOx-N	Quarterly	2.5	32	74	100
BUFS02	NOx-N	Quarterly	5	43	98	100
BUFS02	NOx-N	Triannual	1	14	31	71
BUFS02	NOx-N	Triannual	2.5	18	54	99
BUFS02	NOx-N	Triannual	5	30	90	100
BUFS02	pH	Monthly	1	100	100	100
BUFS02	pH	Monthly	2.5	100	100	100
BUFS02	pH	Monthly	5	100	100	100
BUFS02	pH	Quarterly	1	55	100	100
BUFS02	pH	Quarterly	2.5	97	100	100
BUFS02	pH	Quarterly	5	100	100	100
BUFS02	pH	Triannual	1	31	97	100
BUFS02	pH	Triannual	2.5	83	100	100
BUFS02	pH	Triannual	5	100	100	100
BUFS02	Turb	Monthly	1	100	100	100
BUFS02	Turb	Monthly	2.5	100	100	100
BUFS02	Turb	Monthly	5	100	100	100
BUFS02	Turb	Quarterly	1	19	29	54
BUFS02	Turb	Quarterly	2.5	23	41	92
BUFS02	Turb	Quarterly	5	28	69	100
BUFS02	Turb	Triannual	1	12	24	45
BUFS02	Turb	Triannual	2.5	14	32	87
BUFS02	Turb	Triannual	5	16	59	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFS02	W Temp	Monthly	1	100	100	100
BUFS02	W Temp	Monthly	2.5	100	100	100
BUFS02	W Temp	Monthly	5	100	100	100
BUFS02	W Temp	Quarterly	1	50	99	100
BUFS02	W Temp	Quarterly	2.5	90	100	100
BUFS02	W Temp	Quarterly	5	100	100	100
BUFS02	W Temp	Triannual	1	36	95	100
BUFS02	W Temp	Triannual	2.5	75	100	100
BUFS02	W Temp	Triannual	5	98	100	100
BUFS33	Cond	Monthly	1	96	100	100
BUFS33	Cond	Monthly	2.5	100	100	100
BUFS33	Cond	Monthly	5	100	100	100
BUFS33	Cond	Quarterly	1	33	84	100
BUFS33	Cond	Quarterly	2.5	65	100	100
BUFS33	Cond	Quarterly	5	94	100	100
BUFS33	Cond	Triannual	1	22	70	100
BUFS33	Cond	Triannual	2.5	46	99	100
BUFS33	Cond	Triannual	5	81	100	100
BUFS33	DO sat	Monthly	1	87	100	100
BUFS33	DO sat	Monthly	2.5	98	100	100
BUFS33	DO sat	Monthly	5	100	100	100
BUFS33	DO sat	Quarterly	1	29	68	100
BUFS33	DO sat	Quarterly	2.5	52	99	100
BUFS33	DO sat	Quarterly	5	85	100	100
BUFS33	DO sat	Triannual	1	15	49	99
BUFS33	DO sat	Triannual	2.5	31	94	100
BUFS33	DO sat	Triannual	5	66	100	100
BUFS33	E. coli	Monthly	1	100	100	100
BUFS33	E. coli	Monthly	2.5	100	100	100
BUFS33	E. coli	Monthly	5	100	100	100
BUFS33	E. coli	Quarterly	1	23	36	59
BUFS33	E. coli	Quarterly	2.5	23	43	87
BUFS33	E. coli	Quarterly	5	29	64	100
BUFS33	E. coli	Triannual	1	15	30	52
BUFS33	E. coli	Triannual	2.5	16	36	83
BUFS33	E. coli	Triannual	5	18	58	99
BUFS33	FCB	Monthly	1	82	99	100
BUFS33	FCB	Monthly	2.5	85	100	100
BUFS33	FCB	Monthly	5	90	100	100
BUFS33	FCB	Quarterly	1	23	33	56
BUFS33	FCB	Quarterly	2.5	23	41	85
BUFS33	FCB	Quarterly	5	28	60	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFS33	FCB	Triannual	1	17	24	47
BUFS33	FCB	Triannual	2.5	15	33	77
BUFS33	FCB	Triannual	5	19	49	100
BUFS33	NOx-N	Monthly	1	81	100	100
BUFS33	NOx-N	Monthly	2.5	88	100	100
BUFS33	NOx-N	Monthly	5	97	100	100
BUFS33	NOx-N	Quarterly	1	21	36	75
BUFS33	NOx-N	Quarterly	2.5	26	62	100
BUFS33	NOx-N	Quarterly	5	37	97	100
BUFS33	NOx-N	Triannual	1	13	26	61
BUFS33	NOx-N	Triannual	2.5	15	50	99
BUFS33	NOx-N	Triannual	5	23	89	100
BUFS33	pH	Monthly	1	100	100	100
BUFS33	pH	Monthly	2.5	100	100	100
BUFS33	pH	Monthly	5	100	100	100
BUFS33	pH	Quarterly	1	79	100	100
BUFS33	pH	Quarterly	2.5	100	100	100
BUFS33	pH	Quarterly	5	100	100	100
BUFS33	pH	Triannual	1	57	100	100
BUFS33	pH	Triannual	2.5	100	100	100
BUFS33	pH	Triannual	5	100	100	100
BUFS33	Turb	Monthly	1	76	99	100
BUFS33	Turb	Monthly	2.5	81	100	100
BUFS33	Turb	Monthly	5	91	100	100
BUFS33	Turb	Quarterly	1	22	30	66
BUFS33	Turb	Quarterly	2.5	22	50	99
BUFS33	Turb	Quarterly	5	34	86	100
BUFS33	Turb	Triannual	1	12	23	45
BUFS33	Turb	Triannual	2.5	14	34	90
BUFS33	Turb	Triannual	5	17	66	100
BUFS33	W Temp	Monthly	1	100	100	100
BUFS33	W Temp	Monthly	2.5	100	100	100
BUFS33	W Temp	Monthly	5	100	100	100
BUFS33	W Temp	Quarterly	1	48	99	100
BUFS33	W Temp	Quarterly	2.5	96	100	100
BUFS33	W Temp	Quarterly	5	100	100	100
BUFS33	W Temp	Triannual	1	32	97	100
BUFS33	W Temp	Triannual	2.5	83	100	100
BUFS33	W Temp	Triannual	5	100	100	100
BUFS41	Cond	Monthly	1	84	100	100
BUFS41	Cond	Monthly	2.5	99	100	100
BUFS41	Cond	Monthly	5	100	100	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFS41	Cond	Quarterly	1	35	82	100
BUFS41	Cond	Quarterly	2.5	61	100	100
BUFS41	Cond	Quarterly	5	90	100	100
BUFS41	Cond	Triannual	1	22	68	100
BUFS41	Cond	Triannual	2.5	42	98	100
BUFS41	Cond	Triannual	5	77	100	100
BUFS41	DO sat	Monthly	1	82	100	100
BUFS41	DO sat	Monthly	2.5	100	100	100
BUFS41	DO sat	Monthly	5	100	100	100
BUFS41	DO sat	Quarterly	1	31	85	100
BUFS41	DO sat	Quarterly	2.5	70	100	100
BUFS41	DO sat	Quarterly	5	98	100	100
BUFS41	DO sat	Triannual	1	20	67	100
BUFS41	DO sat	Triannual	2.5	47	100	100
BUFS41	DO sat	Triannual	5	88	100	100
BUFS41	E. coli	Monthly	1	96	100	100
BUFS41	E. coli	Monthly	2.5	97	100	100
BUFS41	E. coli	Monthly	5	98	100	100
BUFS41	E. coli	Quarterly	1	26	44	70
BUFS41	E. coli	Quarterly	2.5	29	52	88
BUFS41	E. coli	Quarterly	5	30	66	100
BUFS41	E. coli	Triannual	1	16	35	57
BUFS41	E. coli	Triannual	2.5	17	39	76
BUFS41	E. coli	Triannual	5	21	52	96
BUFS41	FCB	Monthly	1	64	94	100
BUFS41	FCB	Monthly	2.5	66	97	100
BUFS41	FCB	Monthly	5	68	99	100
BUFS41	FCB	Quarterly	1	24	29	41
BUFS41	FCB	Quarterly	2.5	22	33	69
BUFS41	FCB	Quarterly	5	19	48	98
BUFS41	FCB	Triannual	1	16	24	38
BUFS41	FCB	Triannual	2.5	14	30	69
BUFS41	FCB	Triannual	5	14	43	97
BUFS41	NOx-N	Monthly	1	67	98	100
BUFS41	NOx-N	Monthly	2.5	85	100	100
BUFS41	NOx-N	Monthly	5	97	100	100
BUFS41	NOx-N	Quarterly	1	22	40	91
BUFS41	NOx-N	Quarterly	2.5	31	80	100
BUFS41	NOx-N	Quarterly	5	54	100	100
BUFS41	NOx-N	Triannual	1	13	27	76
BUFS41	NOx-N	Triannual	2.5	18	66	100
BUFS41	NOx-N	Triannual	5	34	98	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFS41	pH	Monthly	1	100	100	100
BUFS41	pH	Monthly	2.5	100	100	100
BUFS41	pH	Monthly	5	100	100	100
BUFS41	pH	Quarterly	1	80	100	100
BUFS41	pH	Quarterly	2.5	100	100	100
BUFS41	pH	Quarterly	5	100	100	100
BUFS41	pH	Triannual	1	57	100	100
BUFS41	pH	Triannual	2.5	99	100	100
BUFS41	pH	Triannual	5	100	100	100
BUFS41	TP	Monthly	1	100	100	100
BUFS41	TP	Monthly	2.5	100	100	100
BUFS41	TP	Monthly	5	100	100	100
BUFS41	TP	Quarterly	1	39	72	97
BUFS41	TP	Quarterly	2.5	49	84	100
BUFS41	TP	Quarterly	5	53	98	100
BUFS41	TP	Triannual	1	22	49	87
BUFS41	TP	Triannual	2.5	30	62	100
BUFS41	TP	Triannual	5	27	87	100
BUFS41	Turb	Monthly	1	43	81	100
BUFS41	Turb	Monthly	2.5	55	96	100
BUFS41	Turb	Monthly	5	70	100	100
BUFS41	Turb	Quarterly	1	21	30	57
BUFS41	Turb	Quarterly	2.5	23	50	98
BUFS41	Turb	Quarterly	5	29	84	100
BUFS41	Turb	Triannual	1	12	24	46
BUFS41	Turb	Triannual	2.5	14	37	93
BUFS41	Turb	Triannual	5	19	71	100
BUFS41	W Temp	Monthly	1	92	100	100
BUFS41	W Temp	Monthly	2.5	100	100	100
BUFS41	W Temp	Monthly	5	100	100	100
BUFS41	W Temp	Quarterly	1	37	88	100
BUFS41	W Temp	Quarterly	2.5	73	100	100
BUFS41	W Temp	Quarterly	5	98	100	100
BUFS41	W Temp	Triannual	1	17	60	100
BUFS41	W Temp	Triannual	2.5	35	99	100
BUFS41	W Temp	Triannual	5	80	100	100
BUFT01	Cond	Monthly	1	100	100	100
BUFT01	Cond	Monthly	2.5	100	100	100
BUFT01	Cond	Monthly	5	100	100	100
BUFT01	Cond	Quarterly	1	67	98	100
BUFT01	Cond	Quarterly	2.5	72	100	100
BUFT01	Cond	Quarterly	5	86	100	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFT01	Cond	Triannual	1	16	36	85
BUFT01	Cond	Triannual	2.5	21	62	100
BUFT01	Cond	Triannual	5	32	97	100
BUFT01	DO sat	Monthly	1	100	100	100
BUFT01	DO sat	Monthly	2.5	100	100	100
BUFT01	DO sat	Monthly	5	100	100	100
BUFT01	DO sat	Quarterly	1	83	100	100
BUFT01	DO sat	Quarterly	2.5	97	100	100
BUFT01	DO sat	Quarterly	5	100	100	100
BUFT01	DO sat	Triannual	1	32	89	100
BUFT01	DO sat	Triannual	2.5	65	100	100
BUFT01	DO sat	Triannual	5	99	100	100
BUFT01	E. coli	Monthly	1	100	100	100
BUFT01	E. coli	Monthly	2.5	100	100	100
BUFT01	E. coli	Monthly	5	100	100	100
BUFT01	E. coli	Quarterly	1	75	99	100
BUFT01	E. coli	Quarterly	2.5	76	100	100
BUFT01	E. coli	Quarterly	5	80	100	100
BUFT01	E. coli	Triannual	1	22	46	78
BUFT01	E. coli	Triannual	2.5	22	57	97
BUFT01	E. coli	Triannual	5	27	77	100
BUFT01	FCB	Monthly	1	100	100	100
BUFT01	FCB	Monthly	2.5	100	100	100
BUFT01	FCB	Monthly	5	100	100	100
BUFT01	FCB	Quarterly	1	62	94	100
BUFT01	FCB	Quarterly	2.5	61	96	100
BUFT01	FCB	Quarterly	5	69	98	100
BUFT01	FCB	Triannual	1	17	29	54
BUFT01	FCB	Triannual	2.5	17	36	80
BUFT01	FCB	Triannual	5	16	50	100
BUFT01	pH	Monthly	1	100	100	100
BUFT01	pH	Monthly	2.5	100	100	100
BUFT01	pH	Monthly	5	100	100	100
BUFT01	pH	Quarterly	1	88	100	100
BUFT01	pH	Quarterly	2.5	100	100	100
BUFT01	pH	Quarterly	5	100	100	100
BUFT01	pH	Triannual	1	40	98	100
BUFT01	pH	Triannual	2.5	88	100	100
BUFT01	pH	Triannual	5	100	100	100
BUFT01	Turb	Monthly	1	100	100	100
BUFT01	Turb	Monthly	2.5	100	100	100
BUFT01	Turb	Monthly	5	100	100	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFT01	Turb	Quarterly	1	62	96	100
BUFT01	Turb	Quarterly	2.5	66	98	100
BUFT01	Turb	Quarterly	5	76	100	100
BUFT01	Turb	Triannual	1	16	30	63
BUFT01	Turb	Triannual	2.5	15	43	92
BUFT01	Turb	Triannual	5	21	67	100
BUFT01	W Temp	Monthly	1	100	100	100
BUFT01	W Temp	Monthly	2.5	100	100	100
BUFT01	W Temp	Monthly	5	100	100	100
BUFT01	W Temp	Quarterly	1	59	96	100
BUFT01	W Temp	Quarterly	2.5	71	100	100
BUFT01	W Temp	Quarterly	5	83	100	100
BUFT01	W Temp	Triannual	1	15	36	84
BUFT01	W Temp	Triannual	2.5	24	69	100
BUFT01	W Temp	Triannual	5	33	99	100
BUFT02	Cond	Monthly	1	100	100	100
BUFT02	Cond	Monthly	2.5	100	100	100
BUFT02	Cond	Monthly	5	100	100	100
BUFT02	Cond	Quarterly	1	26	59	100
BUFT02	Cond	Quarterly	2.5	44	97	100
BUFT02	Cond	Quarterly	5	74	100	100
BUFT02	Cond	Triannual	1	18	45	95
BUFT02	Cond	Triannual	2.5	27	87	100
BUFT02	Cond	Triannual	5	50	100	100
BUFT02	DO sat	Monthly	1	98	100	100
BUFT02	DO sat	Monthly	2.5	100	100	100
BUFT02	DO sat	Monthly	5	100	100	100
BUFT02	DO sat	Quarterly	1	32	78	100
BUFT02	DO sat	Quarterly	2.5	58	100	100
BUFT02	DO sat	Quarterly	5	92	100	100
BUFT02	DO sat	Triannual	1	17	62	100
BUFT02	DO sat	Triannual	2.5	38	99	100
BUFT02	DO sat	Triannual	5	78	100	100
BUFT02	E. coli	Monthly	1	98	100	100
BUFT02	E. coli	Monthly	2.5	97	100	100
BUFT02	E. coli	Monthly	5	99	100	100
BUFT02	E. coli	Quarterly	1	28	48	75
BUFT02	E. coli	Quarterly	2.5	30	52	95
BUFT02	E. coli	Quarterly	5	34	73	100
BUFT02	E. coli	Triannual	1	16	29	50
BUFT02	E. coli	Triannual	2.5	15	37	84
BUFT02	E. coli	Triannual	5	20	56	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFT02	FCB	Monthly	1	100	100	100
BUFT02	FCB	Monthly	2.5	100	100	100
BUFT02	FCB	Monthly	5	100	100	100
BUFT02	FCB	Quarterly	1	24	37	58
BUFT02	FCB	Quarterly	2.5	26	43	78
BUFT02	FCB	Quarterly	5	26	55	99
BUFT02	FCB	Triannual	1	13	23	40
BUFT02	FCB	Triannual	2.5	13	28	69
BUFT02	FCB	Triannual	5	16	45	98
BUFT02	NOx-N	Monthly	1	99	100	100
BUFT02	NOx-N	Monthly	2.5	99	100	100
BUFT02	NOx-N	Monthly	5	100	100	100
BUFT02	NOx-N	Quarterly	1	23	36	65
BUFT02	NOx-N	Quarterly	2.5	24	51	98
BUFT02	NOx-N	Quarterly	5	32	81	100
BUFT02	NOx-N	Triannual	1	14	27	52
BUFT02	NOx-N	Triannual	2.5	17	38	93
BUFT02	NOx-N	Triannual	5	20	67	100
BUFT02	pH	Monthly	1	100	100	100
BUFT02	pH	Monthly	2.5	100	100	100
BUFT02	pH	Monthly	5	100	100	100
BUFT02	pH	Quarterly	1	78	100	100
BUFT02	pH	Quarterly	2.5	100	100	100
BUFT02	pH	Quarterly	5	100	100	100
BUFT02	pH	Triannual	1	52	100	100
BUFT02	pH	Triannual	2.5	100	100	100
BUFT02	pH	Triannual	5	100	100	100
BUFT02	Turb	Monthly	1	99	100	100
BUFT02	Turb	Monthly	2.5	100	100	100
BUFT02	Turb	Monthly	5	100	100	100
BUFT02	Turb	Quarterly	1	21	36	62
BUFT02	Turb	Quarterly	2.5	23	45	93
BUFT02	Turb	Quarterly	5	29	73	100
BUFT02	Turb	Triannual	1	14	26	46
BUFT02	Turb	Triannual	2.5	15	37	88
BUFT02	Turb	Triannual	5	20	60	100
BUFT02	W Temp	Monthly	1	99	100	100
BUFT02	W Temp	Monthly	2.5	100	100	100
BUFT02	W Temp	Monthly	5	100	100	100
BUFT02	W Temp	Quarterly	1	27	47	95
BUFT02	W Temp	Quarterly	2.5	34	87	100
BUFT02	W Temp	Quarterly	5	55	100	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFT02	W Temp	Triannual	1	17	32	78
BUFT02	W Temp	Triannual	2.5	18	64	100
BUFT02	W Temp	Triannual	5	33	97	100
BUFT03	Cond	Monthly	1	93	100	100
BUFT03	Cond	Monthly	2.5	99	100	100
BUFT03	Cond	Monthly	5	100	100	100
BUFT03	Cond	Quarterly	1	27	56	100
BUFT03	Cond	Quarterly	2.5	40	97	100
BUFT03	Cond	Quarterly	5	74	100	100
BUFT03	Cond	Triannual	1	17	45	97
BUFT03	Cond	Triannual	2.5	26	91	100
BUFT03	Cond	Triannual	5	55	100	100
BUFT03	DO sat	Monthly	1	97	100	100
BUFT03	DO sat	Monthly	2.5	100	100	100
BUFT03	DO sat	Monthly	5	100	100	100
BUFT03	DO sat	Quarterly	1	36	86	100
BUFT03	DO sat	Quarterly	2.5	64	100	100
BUFT03	DO sat	Quarterly	5	96	100	100
BUFT03	DO sat	Triannual	1	19	62	100
BUFT03	DO sat	Triannual	2.5	38	100	100
BUFT03	DO sat	Triannual	5	82	100	100
BUFT03	E. coli	Monthly	1	88	100	100
BUFT03	E. coli	Monthly	2.5	91	100	100
BUFT03	E. coli	Monthly	5	91	100	100
BUFT03	E. coli	Quarterly	1	22	35	59
BUFT03	E. coli	Quarterly	2.5	24	46	92
BUFT03	E. coli	Quarterly	5	25	68	100
BUFT03	E. coli	Triannual	1	15	25	46
BUFT03	E. coli	Triannual	2.5	14	35	81
BUFT03	E. coli	Triannual	5	16	52	100
BUFT03	FCB	Monthly	1	79	99	100
BUFT03	FCB	Monthly	2.5	83	100	100
BUFT03	FCB	Monthly	5	83	100	100
BUFT03	FCB	Quarterly	1	21	29	45
BUFT03	FCB	Quarterly	2.5	22	34	78
BUFT03	FCB	Quarterly	5	26	59	99
BUFT03	FCB	Triannual	1	15	24	37
BUFT03	FCB	Triannual	2.5	13	27	68
BUFT03	FCB	Triannual	5	16	45	97
BUFT03	pH	Monthly	1	100	100	100
BUFT03	pH	Monthly	2.5	100	100	100
BUFT03	pH	Monthly	5	100	100	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFT03	pH	Quarterly	1	86	100	100
BUFT03	pH	Quarterly	2.5	100	100	100
BUFT03	pH	Quarterly	5	100	100	100
BUFT03	pH	Triannual	1	65	100	100
BUFT03	pH	Triannual	2.5	100	100	100
BUFT03	pH	Triannual	5	100	100	100
BUFT03	Turb	Monthly	1	76	99	100
BUFT03	Turb	Monthly	2.5	84	100	100
BUFT03	Turb	Monthly	5	92	100	100
BUFT03	Turb	Quarterly	1	20	26	55
BUFT03	Turb	Quarterly	2.5	22	42	92
BUFT03	Turb	Quarterly	5	27	72	100
BUFT03	Turb	Triannual	1	14	23	44
BUFT03	Turb	Triannual	2.5	15	31	84
BUFT03	Turb	Triannual	5	19	56	100
BUFT03	W Temp	Monthly	1	88	100	100
BUFT03	W Temp	Monthly	2.5	95	100	100
BUFT03	W Temp	Monthly	5	100	100	100
BUFT03	W Temp	Quarterly	1	26	46	95
BUFT03	W Temp	Quarterly	2.5	33	88	100
BUFT03	W Temp	Quarterly	5	61	100	100
BUFT03	W Temp	Triannual	1	15	35	82
BUFT03	W Temp	Triannual	2.5	21	69	100
BUFT03	W Temp	Triannual	5	33	99	100
BUFT04	Cond	Monthly	1	56	99	100
BUFT04	Cond	Monthly	2.5	97	100	100
BUFT04	Cond	Monthly	5	100	100	100
BUFT04	Cond	Quarterly	1	31	79	100
BUFT04	Cond	Quarterly	2.5	64	100	100
BUFT04	Cond	Quarterly	5	96	100	100
BUFT04	Cond	Triannual	1	17	65	100
BUFT04	Cond	Triannual	2.5	45	100	100
BUFT04	Cond	Triannual	5	85	100	100
BUFT04	DO sat	Monthly	1	45	98	100
BUFT04	DO sat	Monthly	2.5	85	100	100
BUFT04	DO sat	Monthly	5	100	100	100
BUFT04	DO sat	Quarterly	1	25	64	100
BUFT04	DO sat	Quarterly	2.5	52	100	100
BUFT04	DO sat	Quarterly	5	89	100	100
BUFT04	DO sat	Triannual	1	17	51	100
BUFT04	DO sat	Triannual	2.5	26	98	100
BUFT04	DO sat	Triannual	5	72	100	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFT04	E. coli	Monthly	1	23	37	71
BUFT04	E. coli	Monthly	2.5	25	54	99
BUFT04	E. coli	Monthly	5	34	86	100
BUFT04	E. coli	Quarterly	1	18	22	31
BUFT04	E. coli	Quarterly	2.5	21	30	68
BUFT04	E. coli	Quarterly	5	19	46	98
BUFT04	E. coli	Triannual	1	10	19	25
BUFT04	E. coli	Triannual	2.5	13	24	61
BUFT04	E. coli	Triannual	5	13	36	96
BUFT04	FCB	Monthly	1	99	100	100
BUFT04	FCB	Monthly	2.5	100	100	100
BUFT04	FCB	Monthly	5	100	100	100
BUFT04	FCB	Quarterly	1	18	28	45
BUFT04	FCB	Quarterly	2.5	20	38	83
BUFT04	FCB	Quarterly	5	24	61	100
BUFT04	FCB	Triannual	1	12	23	34
BUFT04	FCB	Triannual	2.5	12	28	70
BUFT04	FCB	Triannual	5	16	45	100
BUFT04	NOx-N	Monthly	1	83	99	100
BUFT04	NOx-N	Monthly	2.5	88	100	100
BUFT04	NOx-N	Monthly	5	95	100	100
BUFT04	NOx-N	Quarterly	1	22	35	77
BUFT04	NOx-N	Quarterly	2.5	24	61	100
BUFT04	NOx-N	Quarterly	5	38	94	100
BUFT04	NOx-N	Triannual	1	14	24	57
BUFT04	NOx-N	Triannual	2.5	14	46	99
BUFT04	NOx-N	Triannual	5	25	86	100
BUFT04	pH	Monthly	1	100	100	100
BUFT04	pH	Monthly	2.5	100	100	100
BUFT04	pH	Monthly	5	100	100	100
BUFT04	pH	Quarterly	1	97	100	100
BUFT04	pH	Quarterly	2.5	100	100	100
BUFT04	pH	Quarterly	5	100	100	100
BUFT04	pH	Triannual	1	85	100	100
BUFT04	pH	Triannual	2.5	100	100	100
BUFT04	pH	Triannual	5	100	100	100
BUFT04	Turb	Monthly	1	23	44	90
BUFT04	Turb	Monthly	2.5	31	74	100
BUFT04	Turb	Monthly	5	50	98	100
BUFT04	Turb	Quarterly	1	18	24	44
BUFT04	Turb	Quarterly	2.5	22	37	92
BUFT04	Turb	Quarterly	5	26	68	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFT04	Turb	Triannual	1	13	19	35
BUFT04	Turb	Triannual	2.5	12	33	81
BUFT04	Turb	Triannual	5	16	61	100
BUFT04	W Temp	Monthly	1	35	84	100
BUFT04	W Temp	Monthly	2.5	65	100	100
BUFT04	W Temp	Monthly	5	97	100	100
BUFT04	W Temp	Quarterly	1	20	34	90
BUFT04	W Temp	Quarterly	2.5	30	81	100
BUFT04	W Temp	Quarterly	5	54	100	100
BUFT04	W Temp	Triannual	1	13	28	70
BUFT04	W Temp	Triannual	2.5	18	60	100
BUFT04	W Temp	Triannual	5	29	98	100
BUFT05	Cond	Monthly	1	38	91	100
BUFT05	Cond	Monthly	2.5	74	100	100
BUFT05	Cond	Monthly	5	99	100	100
BUFT05	Cond	Quarterly	1	20	46	98
BUFT05	Cond	Quarterly	2.5	37	94	100
BUFT05	Cond	Quarterly	5	70	100	100
BUFT05	Cond	Triannual	1	14	35	93
BUFT05	Cond	Triannual	2.5	22	83	100
BUFT05	Cond	Triannual	5	45	100	100
BUFT05	DO sat	Monthly	1	57	99	100
BUFT05	DO sat	Monthly	2.5	95	100	100
BUFT05	DO sat	Monthly	5	100	100	100
BUFT05	DO sat	Quarterly	1	27	74	100
BUFT05	DO sat	Quarterly	2.5	59	100	100
BUFT05	DO sat	Quarterly	5	94	100	100
BUFT05	DO sat	Triannual	1	19	65	100
BUFT05	DO sat	Triannual	2.5	39	100	100
BUFT05	DO sat	Triannual	5	83	100	100
BUFT05	E. coli	Monthly	1	22	38	76
BUFT05	E. coli	Monthly	2.5	26	54	100
BUFT05	E. coli	Monthly	5	34	90	100
BUFT05	E. coli	Quarterly	1	16	23	31
BUFT05	E. coli	Quarterly	2.5	19	30	73
BUFT05	E. coli	Quarterly	5	23	50	100
BUFT05	E. coli	Triannual	1	12	21	28
BUFT05	E. coli	Triannual	2.5	12	24	63
BUFT05	E. coli	Triannual	5	14	41	98
BUFT05	FCB	Monthly	1	91	100	100
BUFT05	FCB	Monthly	2.5	93	100	100
BUFT05	FCB	Monthly	5	94	100	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFT05	FCB	Quarterly	1	19	29	46
BUFT05	FCB	Quarterly	2.5	23	36	80
BUFT05	FCB	Quarterly	5	26	54	99
BUFT05	FCB	Triannual	1	14	24	37
BUFT05	FCB	Triannual	2.5	14	29	64
BUFT05	FCB	Triannual	5	14	43	97
BUFT05	pH	Monthly	1	100	100	100
BUFT05	pH	Monthly	2.5	100	100	100
BUFT05	pH	Monthly	5	100	100	100
BUFT05	pH	Quarterly	1	81	100	100
BUFT05	pH	Quarterly	2.5	100	100	100
BUFT05	pH	Quarterly	5	100	100	100
BUFT05	pH	Triannual	1	58	100	100
BUFT05	pH	Triannual	2.5	100	100	100
BUFT05	pH	Triannual	5	100	100	100
BUFT05	Turb	Monthly	1	20	43	89
BUFT05	Turb	Monthly	2.5	32	77	100
BUFT05	Turb	Monthly	5	52	99	100
BUFT05	Turb	Quarterly	1	19	23	45
BUFT05	Turb	Quarterly	2.5	20	38	93
BUFT05	Turb	Quarterly	5	27	69	100
BUFT05	Turb	Triannual	1	13	20	35
BUFT05	Turb	Triannual	2.5	12	30	79
BUFT05	Turb	Triannual	5	16	52	100
BUFT05	W Temp	Monthly	1	35	85	100
BUFT05	W Temp	Monthly	2.5	72	100	100
BUFT05	W Temp	Monthly	5	98	100	100
BUFT05	W Temp	Quarterly	1	19	32	83
BUFT05	W Temp	Quarterly	2.5	25	75	100
BUFT05	W Temp	Quarterly	5	45	99	100
BUFT05	W Temp	Triannual	1	11	22	63
BUFT05	W Temp	Triannual	2.5	15	51	100
BUFT05	W Temp	Triannual	5	28	94	100
BUFT06	Cond	Monthly	1	43	95	100
BUFT06	Cond	Monthly	2.5	82	100	100
BUFT06	Cond	Monthly	5	100	100	100
BUFT06	Cond	Quarterly	1	23	57	100
BUFT06	Cond	Quarterly	2.5	42	98	100
BUFT06	Cond	Quarterly	5	83	100	100
BUFT06	Cond	Triannual	1	12	44	99
BUFT06	Cond	Triannual	2.5	29	93	100
BUFT06	Cond	Triannual	5	61	100	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFT06	DO sat	Monthly	1	39	90	100
BUFT06	DO sat	Monthly	2.5	77	100	100
BUFT06	DO sat	Monthly	5	99	100	100
BUFT06	DO sat	Quarterly	1	22	50	99
BUFT06	DO sat	Quarterly	2.5	41	97	100
BUFT06	DO sat	Quarterly	5	75	100	100
BUFT06	DO sat	Triannual	1	17	40	97
BUFT06	DO sat	Triannual	2.5	25	91	100
BUFT06	DO sat	Triannual	5	57	100	100
BUFT06	E. coli	Monthly	1	23	31	65
BUFT06	E. coli	Monthly	2.5	26	50	98
BUFT06	E. coli	Monthly	5	30	81	100
BUFT06	E. coli	Quarterly	1	19	21	30
BUFT06	E. coli	Quarterly	2.5	19	30	65
BUFT06	E. coli	Quarterly	5	22	49	99
BUFT06	E. coli	Triannual	1	10	19	27
BUFT06	E. coli	Triannual	2.5	12	23	57
BUFT06	E. coli	Triannual	5	15	37	97
BUFT06	FCB	Monthly	1	93	100	100
BUFT06	FCB	Monthly	2.5	94	100	100
BUFT06	FCB	Monthly	5	94	100	100
BUFT06	FCB	Quarterly	1	22	29	49
BUFT06	FCB	Quarterly	2.5	22	39	80
BUFT06	FCB	Quarterly	5	25	57	99
BUFT06	FCB	Triannual	1	15	26	38
BUFT06	FCB	Triannual	2.5	15	29	68
BUFT06	FCB	Triannual	5	16	45	95
BUFT06	NOx-N	Monthly	1	41	76	100
BUFT06	NOx-N	Monthly	2.5	50	94	100
BUFT06	NOx-N	Monthly	5	68	100	100
BUFT06	NOx-N	Quarterly	1	19	26	53
BUFT06	NOx-N	Quarterly	2.5	22	42	96
BUFT06	NOx-N	Quarterly	5	26	77	100
BUFT06	NOx-N	Triannual	1	13	23	42
BUFT06	NOx-N	Triannual	2.5	15	33	92
BUFT06	NOx-N	Triannual	5	18	65	100
BUFT06	pH	Monthly	1	99	100	100
BUFT06	pH	Monthly	2.5	100	100	100
BUFT06	pH	Monthly	5	100	100	100
BUFT06	pH	Quarterly	1	71	100	100
BUFT06	pH	Quarterly	2.5	100	100	100
BUFT06	pH	Quarterly	5	100	100	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFT06	pH	Triannual	1	53	100	100
BUFT06	pH	Triannual	2.5	99	100	100
BUFT06	pH	Triannual	5	100	100	100
BUFT06	Turb	Monthly	1	22	33	78
BUFT06	Turb	Monthly	2.5	27	64	100
BUFT06	Turb	Monthly	5	38	97	100
BUFT06	Turb	Quarterly	1	19	23	36
BUFT06	Turb	Quarterly	2.5	19	33	89
BUFT06	Turb	Quarterly	5	23	63	100
BUFT06	Turb	Triannual	1	13	19	32
BUFT06	Turb	Triannual	2.5	13	29	75
BUFT06	Turb	Triannual	5	17	50	100
BUFT06	W Temp	Monthly	1	30	77	100
BUFT06	W Temp	Monthly	2.5	62	100	100
BUFT06	W Temp	Monthly	5	96	100	100
BUFT06	W Temp	Quarterly	1	19	34	87
BUFT06	W Temp	Quarterly	2.5	29	78	100
BUFT06	W Temp	Quarterly	5	49	100	100
BUFT06	W Temp	Triannual	1	13	25	64
BUFT06	W Temp	Triannual	2.5	14	54	100
BUFT06	W Temp	Triannual	5	25	96	100
BUFT07	Cond	Monthly	1	92	100	100
BUFT07	Cond	Monthly	2.5	100	100	100
BUFT07	Cond	Monthly	5	100	100	100
BUFT07	Cond	Quarterly	1	28	76	100
BUFT07	Cond	Quarterly	2.5	58	100	100
BUFT07	Cond	Quarterly	5	90	100	100
BUFT07	Cond	Triannual	1	20	66	100
BUFT07	Cond	Triannual	2.5	42	99	100
BUFT07	Cond	Triannual	5	73	100	100
BUFT07	DO sat	Monthly	1	91	100	100
BUFT07	DO sat	Monthly	2.5	99	100	100
BUFT07	DO sat	Monthly	5	100	100	100
BUFT07	DO sat	Quarterly	1	28	66	100
BUFT07	DO sat	Quarterly	2.5	50	99	100
BUFT07	DO sat	Quarterly	5	82	100	100
BUFT07	DO sat	Triannual	1	15	49	99
BUFT07	DO sat	Triannual	2.5	27	93	100
BUFT07	DO sat	Triannual	5	60	100	100
BUFT07	E. coli	Monthly	1	100	100	100
BUFT07	E. coli	Monthly	2.5	100	100	100
BUFT07	E. coli	Monthly	5	100	100	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFT07	E. coli	Quarterly	1	21	36	63
BUFT07	E. coli	Quarterly	2.5	27	51	88
BUFT07	E. coli	Quarterly	5	31	63	100
BUFT07	E. coli	Triannual	1	15	27	48
BUFT07	E. coli	Triannual	2.5	16	33	77
BUFT07	E. coli	Triannual	5	18	51	99
BUFT07	FCB	Monthly	1	78	99	100
BUFT07	FCB	Monthly	2.5	77	99	100
BUFT07	FCB	Monthly	5	81	100	100
BUFT07	FCB	Quarterly	1	21	27	42
BUFT07	FCB	Quarterly	2.5	20	36	80
BUFT07	FCB	Quarterly	5	25	55	100
BUFT07	FCB	Triannual	1	12	23	34
BUFT07	FCB	Triannual	2.5	13	26	63
BUFT07	FCB	Triannual	5	13	37	97
BUFT07	NOx-N	Monthly	1	78	99	100
BUFT07	NOx-N	Monthly	2.5	86	100	100
BUFT07	NOx-N	Monthly	5	90	100	100
BUFT07	NOx-N	Quarterly	1	19	30	59
BUFT07	NOx-N	Quarterly	2.5	24	48	98
BUFT07	NOx-N	Quarterly	5	32	83	100
BUFT07	NOx-N	Triannual	1	13	23	46
BUFT07	NOx-N	Triannual	2.5	14	37	93
BUFT07	NOx-N	Triannual	5	18	66	100
BUFT07	pH	Monthly	1	100	100	100
BUFT07	pH	Monthly	2.5	100	100	100
BUFT07	pH	Monthly	5	100	100	100
BUFT07	pH	Quarterly	1	68	100	100
BUFT07	pH	Quarterly	2.5	100	100	100
BUFT07	pH	Quarterly	5	100	100	100
BUFT07	pH	Triannual	1	50	100	100
BUFT07	pH	Triannual	2.5	97	100	100
BUFT07	pH	Triannual	5	100	100	100
BUFT07	Turb	Monthly	1	74	99	100
BUFT07	Turb	Monthly	2.5	85	100	100
BUFT07	Turb	Monthly	5	94	100	100
BUFT07	Turb	Quarterly	1	19	33	61
BUFT07	Turb	Quarterly	2.5	23	47	97
BUFT07	Turb	Quarterly	5	31	79	100
BUFT07	Turb	Triannual	1	14	27	48
BUFT07	Turb	Triannual	2.5	15	36	86
BUFT07	Turb	Triannual	5	17	64	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFT07	W Temp	Monthly	1	88	100	100
BUFT07	W Temp	Monthly	2.5	96	100	100
BUFT07	W Temp	Monthly	5	100	100	100
BUFT07	W Temp	Quarterly	1	20	40	91
BUFT07	W Temp	Quarterly	2.5	28	81	100
BUFT07	W Temp	Quarterly	5	53	100	100
BUFT07	W Temp	Triannual	1	14	32	83
BUFT07	W Temp	Triannual	2.5	19	71	100
BUFT07	W Temp	Triannual	5	35	100	100
BUFT08	Cond	Monthly	1	84	100	100
BUFT08	Cond	Monthly	2.5	97	100	100
BUFT08	Cond	Monthly	5	100	100	100
BUFT08	Cond	Quarterly	1	28	66	100
BUFT08	Cond	Quarterly	2.5	51	98	100
BUFT08	Cond	Quarterly	5	84	100	100
BUFT08	Cond	Triannual	1	17	51	98
BUFT08	Cond	Triannual	2.5	27	91	100
BUFT08	Cond	Triannual	5	61	100	100
BUFT08	DO sat	Monthly	1	91	100	100
BUFT08	DO sat	Monthly	2.5	99	100	100
BUFT08	DO sat	Monthly	5	100	100	100
BUFT08	DO sat	Quarterly	1	29	68	100
BUFT08	DO sat	Quarterly	2.5	54	100	100
BUFT08	DO sat	Quarterly	5	87	100	100
BUFT08	DO sat	Triannual	1	18	50	100
BUFT08	DO sat	Triannual	2.5	31	97	100
BUFT08	DO sat	Triannual	5	68	100	100
BUFT08	E. coli	Monthly	1	97	100	100
BUFT08	E. coli	Monthly	2.5	99	100	100
BUFT08	E. coli	Monthly	5	100	100	100
BUFT08	E. coli	Quarterly	1	25	44	73
BUFT08	E. coli	Quarterly	2.5	29	56	95
BUFT08	E. coli	Quarterly	5	30	71	100
BUFT08	E. coli	Triannual	1	16	28	51
BUFT08	E. coli	Triannual	2.5	16	38	81
BUFT08	E. coli	Triannual	5	18	56	100
BUFT08	FCB	Monthly	1	77	99	100
BUFT08	FCB	Monthly	2.5	78	99	100
BUFT08	FCB	Monthly	5	81	100	100
BUFT08	FCB	Quarterly	1	22	32	48
BUFT08	FCB	Quarterly	2.5	22	36	72
BUFT08	FCB	Quarterly	5	24	51	98

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFT08	FCB	Triannual	1	14	22	40
BUFT08	FCB	Triannual	2.5	16	31	70
BUFT08	FCB	Triannual	5	16	45	97
BUFT08	pH	Monthly	1	100	100	100
BUFT08	pH	Monthly	2.5	100	100	100
BUFT08	pH	Monthly	5	100	100	100
BUFT08	pH	Quarterly	1	66	100	100
BUFT08	pH	Quarterly	2.5	100	100	100
BUFT08	pH	Quarterly	5	100	100	100
BUFT08	pH	Triannual	1	42	99	100
BUFT08	pH	Triannual	2.5	97	100	100
BUFT08	pH	Triannual	5	100	100	100
BUFT08	Turb	Monthly	1	69	97	100
BUFT08	Turb	Monthly	2.5	72	100	100
BUFT08	Turb	Monthly	5	86	100	100
BUFT08	Turb	Quarterly	1	20	30	59
BUFT08	Turb	Quarterly	2.5	22	46	97
BUFT08	Turb	Quarterly	5	33	80	100
BUFT08	Turb	Triannual	1	13	23	46
BUFT08	Turb	Triannual	2.5	14	37	92
BUFT08	Turb	Triannual	5	19	67	100
BUFT08	W Temp	Monthly	1	79	100	100
BUFT08	W Temp	Monthly	2.5	93	100	100
BUFT08	W Temp	Monthly	5	100	100	100
BUFT08	W Temp	Quarterly	1	23	46	92
BUFT08	W Temp	Quarterly	2.5	31	81	100
BUFT08	W Temp	Quarterly	5	53	100	100
BUFT08	W Temp	Triannual	1	15	33	76
BUFT08	W Temp	Triannual	2.5	18	61	100
BUFT08	W Temp	Triannual	5	28	96	100
BUFT09	Cond	Monthly	1	88	100	100
BUFT09	Cond	Monthly	2.5	96	100	100
BUFT09	Cond	Monthly	5	100	100	100
BUFT09	Cond	Quarterly	1	25	40	88
BUFT09	Cond	Quarterly	2.5	29	72	100
BUFT09	Cond	Quarterly	5	44	98	100
BUFT09	Cond	Triannual	1	13	30	68
BUFT09	Cond	Triannual	2.5	18	50	100
BUFT09	Cond	Triannual	5	24	92	100
BUFT09	DO sat	Monthly	1	98	100	100
BUFT09	DO sat	Monthly	2.5	100	100	100
BUFT09	DO sat	Monthly	5	100	100	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFT09	DO sat	Quarterly	1	35	88	100
BUFT09	DO sat	Quarterly	2.5	72	100	100
BUFT09	DO sat	Quarterly	5	99	100	100
BUFT09	DO sat	Triannual	1	24	81	100
BUFT09	DO sat	Triannual	2.5	55	100	100
BUFT09	DO sat	Triannual	5	94	100	100
BUFT09	E. coli	Monthly	1	100	100	100
BUFT09	E. coli	Monthly	2.5	100	100	100
BUFT09	E. coli	Monthly	5	100	100	100
BUFT09	E. coli	Quarterly	1	30	43	79
BUFT09	E. coli	Quarterly	2.5	31	54	95
BUFT09	E. coli	Quarterly	5	35	75	100
BUFT09	E. coli	Triannual	1	17	31	52
BUFT09	E. coli	Triannual	2.5	16	35	77
BUFT09	E. coli	Triannual	5	20	52	99
BUFT09	FCB	Monthly	1	88	100	100
BUFT09	FCB	Monthly	2.5	87	100	100
BUFT09	FCB	Monthly	5	88	100	100
BUFT09	FCB	Quarterly	1	23	30	49
BUFT09	FCB	Quarterly	2.5	24	38	77
BUFT09	FCB	Quarterly	5	25	50	99
BUFT09	FCB	Triannual	1	15	25	37
BUFT09	FCB	Triannual	2.5	11	26	60
BUFT09	FCB	Triannual	5	16	40	96
BUFT09	pH	Monthly	1	100	100	100
BUFT09	pH	Monthly	2.5	100	100	100
BUFT09	pH	Monthly	5	100	100	100
BUFT09	pH	Quarterly	1	63	100	100
BUFT09	pH	Quarterly	2.5	99	100	100
BUFT09	pH	Quarterly	5	100	100	100
BUFT09	pH	Triannual	1	39	99	100
BUFT09	pH	Triannual	2.5	92	100	100
BUFT09	pH	Triannual	5	100	100	100
BUFT09	Turb	Monthly	1	87	100	100
BUFT09	Turb	Monthly	2.5	89	100	100
BUFT09	Turb	Monthly	5	94	100	100
BUFT09	Turb	Quarterly	1	21	32	62
BUFT09	Turb	Quarterly	2.5	26	48	95
BUFT09	Turb	Quarterly	5	29	75	100
BUFT09	Turb	Triannual	1	14	25	46
BUFT09	Turb	Triannual	2.5	15	33	90
BUFT09	Turb	Triannual	5	18	64	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFT09	W Temp	Monthly	1	91	100	100
BUFT09	W Temp	Monthly	2.5	98	100	100
BUFT09	W Temp	Monthly	5	100	100	100
BUFT09	W Temp	Quarterly	1	23	47	94
BUFT09	W Temp	Quarterly	2.5	31	85	100
BUFT09	W Temp	Quarterly	5	54	100	100
BUFT09	W Temp	Triannual	1	16	33	73
BUFT09	W Temp	Triannual	2.5	16	62	100
BUFT09	W Temp	Triannual	5	29	98	100
BUFT10	Cond	Monthly	1	92	100	100
BUFT10	Cond	Monthly	2.5	99	100	100
BUFT10	Cond	Monthly	5	100	100	100
BUFT10	Cond	Quarterly	1	28	68	100
BUFT10	Cond	Quarterly	2.5	50	99	100
BUFT10	Cond	Quarterly	5	85	100	100
BUFT10	Cond	Triannual	1	19	56	100
BUFT10	Cond	Triannual	2.5	34	97	100
BUFT10	Cond	Triannual	5	69	100	100
BUFT10	DO sat	Monthly	1	81	100	100
BUFT10	DO sat	Monthly	2.5	96	100	100
BUFT10	DO sat	Monthly	5	100	100	100
BUFT10	DO sat	Quarterly	1	25	51	98
BUFT10	DO sat	Quarterly	2.5	34	93	100
BUFT10	DO sat	Quarterly	5	69	100	100
BUFT10	DO sat	Triannual	1	16	44	95
BUFT10	DO sat	Triannual	2.5	26	86	100
BUFT10	DO sat	Triannual	5	54	100	100
BUFT10	E. coli	Monthly	1	96	100	100
BUFT10	E. coli	Monthly	2.5	96	100	100
BUFT10	E. coli	Monthly	5	98	100	100
BUFT10	E. coli	Quarterly	1	24	40	63
BUFT10	E. coli	Quarterly	2.5	27	46	87
BUFT10	E. coli	Quarterly	5	31	60	100
BUFT10	E. coli	Triannual	1	14	32	54
BUFT10	E. coli	Triannual	2.5	14	35	80
BUFT10	E. coli	Triannual	5	16	51	98
BUFT10	FCB	Monthly	1	73	97	100
BUFT10	FCB	Monthly	2.5	72	98	100
BUFT10	FCB	Monthly	5	76	100	100
BUFT10	FCB	Quarterly	1	21	28	46
BUFT10	FCB	Quarterly	2.5	22	32	73
BUFT10	FCB	Quarterly	5	24	47	99

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFT10	FCB	Triannual	1	14	22	38
BUFT10	FCB	Triannual	2.5	16	28	58
BUFT10	FCB	Triannual	5	15	37	91
BUFT10	NOx-N	Monthly	1	53	91	100
BUFT10	NOx-N	Monthly	2.5	67	99	100
BUFT10	NOx-N	Monthly	5	89	100	100
BUFT10	NOx-N	Quarterly	1	19	32	64
BUFT10	NOx-N	Quarterly	2.5	24	54	99
BUFT10	NOx-N	Quarterly	5	34	90	100
BUFT10	NOx-N	Triannual	1	13	23	53
BUFT10	NOx-N	Triannual	2.5	15	42	97
BUFT10	NOx-N	Triannual	5	20	75	100
BUFT10	pH	Monthly	1	99	100	100
BUFT10	pH	Monthly	2.5	100	100	100
BUFT10	pH	Monthly	5	100	100	100
BUFT10	pH	Quarterly	1	52	99	100
BUFT10	pH	Quarterly	2.5	97	100	100
BUFT10	pH	Quarterly	5	100	100	100
BUFT10	pH	Triannual	1	38	98	100
BUFT10	pH	Triannual	2.5	90	100	100
BUFT10	pH	Triannual	5	100	100	100
BUFT10	TP	Monthly	1	89	100	100
BUFT10	TP	Monthly	2.5	95	100	100
BUFT10	TP	Monthly	5	100	100	100
BUFT10	TP	Quarterly	1	27	45	90
BUFT10	TP	Quarterly	2.5	30	72	100
BUFT10	TP	Quarterly	5	47	97	100
BUFT10	TP	Triannual	1	17	35	78
BUFT10	TP	Triannual	2.5	18	61	100
BUFT10	TP	Triannual	5	30	94	100
BUFT10	Turb	Monthly	1	63	95	100
BUFT10	Turb	Monthly	2.5	68	99	100
BUFT10	Turb	Monthly	5	85	100	100
BUFT10	Turb	Quarterly	1	20	30	54
BUFT10	Turb	Quarterly	2.5	27	47	98
BUFT10	Turb	Quarterly	5	29	83	100
BUFT10	Turb	Triannual	1	13	25	46
BUFT10	Turb	Triannual	2.5	15	36	91
BUFT10	Turb	Triannual	5	19	69	100
BUFT10	W Temp	Monthly	1	89	100	100
BUFT10	W Temp	Monthly	2.5	99	100	100
BUFT10	W Temp	Monthly	5	100	100	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFT10	W Temp	Quarterly	1	28	61	99
BUFT10	W Temp	Quarterly	2.5	42	96	100
BUFT10	W Temp	Quarterly	5	72	100	100
BUFT10	W Temp	Triannual	1	16	42	94
BUFT10	W Temp	Triannual	2.5	25	87	100
BUFT10	W Temp	Triannual	5	48	100	100
BUFT11	Cond	Monthly	1	89	100	100
BUFT11	Cond	Monthly	2.5	99	100	100
BUFT11	Cond	Monthly	5	100	100	100
BUFT11	Cond	Quarterly	1	32	74	100
BUFT11	Cond	Quarterly	2.5	59	100	100
BUFT11	Cond	Quarterly	5	92	100	100
BUFT11	Cond	Triannual	1	17	67	100
BUFT11	Cond	Triannual	2.5	40	99	100
BUFT11	Cond	Triannual	5	76	100	100
BUFT11	DO sat	Monthly	1	82	100	100
BUFT11	DO sat	Monthly	2.5	99	100	100
BUFT11	DO sat	Monthly	5	100	100	100
BUFT11	DO sat	Quarterly	1	32	79	100
BUFT11	DO sat	Quarterly	2.5	61	100	100
BUFT11	DO sat	Quarterly	5	96	100	100
BUFT11	DO sat	Triannual	1	16	61	100
BUFT11	DO sat	Triannual	2.5	41	99	100
BUFT11	DO sat	Triannual	5	82	100	100
BUFT11	E. coli	Monthly	1	94	100	100
BUFT11	E. coli	Monthly	2.5	96	100	100
BUFT11	E. coli	Monthly	5	94	100	100
BUFT11	E. coli	Quarterly	1	23	35	62
BUFT11	E. coli	Quarterly	2.5	21	45	87
BUFT11	E. coli	Quarterly	5	29	63	100
BUFT11	E. coli	Triannual	1	16	28	47
BUFT11	E. coli	Triannual	2.5	16	33	73
BUFT11	E. coli	Triannual	5	16	49	99
BUFT11	FCB	Monthly	1	65	95	100
BUFT11	FCB	Monthly	2.5	68	96	100
BUFT11	FCB	Monthly	5	70	100	100
BUFT11	FCB	Quarterly	1	22	27	50
BUFT11	FCB	Quarterly	2.5	23	39	80
BUFT11	FCB	Quarterly	5	25	57	100
BUFT11	FCB	Triannual	1	13	26	35
BUFT11	FCB	Triannual	2.5	14	27	65
BUFT11	FCB	Triannual	5	17	40	96

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFT11	NOx-N	Monthly	1	75	99	100
BUFT11	NOx-N	Monthly	2.5	84	100	100
BUFT11	NOx-N	Monthly	5	96	100	100
BUFT11	NOx-N	Quarterly	1	21	38	85
BUFT11	NOx-N	Quarterly	2.5	29	73	100
BUFT11	NOx-N	Quarterly	5	48	100	100
BUFT11	NOx-N	Triannual	1	15	32	75
BUFT11	NOx-N	Triannual	2.5	18	58	100
BUFT11	NOx-N	Triannual	5	31	96	100
BUFT11	pH	Monthly	1	100	100	100
BUFT11	pH	Monthly	2.5	100	100	100
BUFT11	pH	Monthly	5	100	100	100
BUFT11	pH	Quarterly	1	91	100	100
BUFT11	pH	Quarterly	2.5	100	100	100
BUFT11	pH	Quarterly	5	100	100	100
BUFT11	pH	Triannual	1	76	100	100
BUFT11	pH	Triannual	2.5	100	100	100
BUFT11	pH	Triannual	5	100	100	100
BUFT11	Turb	Monthly	1	64	97	100
BUFT11	Turb	Monthly	2.5	72	100	100
BUFT11	Turb	Monthly	5	85	100	100
BUFT11	Turb	Quarterly	1	20	33	67
BUFT11	Turb	Quarterly	2.5	24	55	99
BUFT11	Turb	Quarterly	5	33	85	100
BUFT11	Turb	Triannual	1	13	23	51
BUFT11	Turb	Triannual	2.5	17	37	93
BUFT11	Turb	Triannual	5	19	70	100
BUFT11	W Temp	Monthly	1	86	100	100
BUFT11	W Temp	Monthly	2.5	100	100	100
BUFT11	W Temp	Monthly	5	100	100	100
BUFT11	W Temp	Quarterly	1	26	56	99
BUFT11	W Temp	Quarterly	2.5	40	95	100
BUFT11	W Temp	Quarterly	5	71	100	100
BUFT11	W Temp	Triannual	1	16	38	94
BUFT11	W Temp	Triannual	2.5	25	85	100
BUFT11	W Temp	Triannual	5	48	100	100
BUFT12	Cond	Monthly	1	84	100	100
BUFT12	Cond	Monthly	2.5	97	100	100
BUFT12	Cond	Monthly	5	100	100	100
BUFT12	Cond	Quarterly	1	21	49	98
BUFT12	Cond	Quarterly	2.5	35	94	100
BUFT12	Cond	Quarterly	5	68	100	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFT12	Cond	Triannual	1	15	41	95
BUFT12	Cond	Triannual	2.5	22	88	100
BUFT12	Cond	Triannual	5	56	100	100
BUFT12	DO sat	Monthly	1	91	100	100
BUFT12	DO sat	Monthly	2.5	99	100	100
BUFT12	DO sat	Monthly	5	100	100	100
BUFT12	DO sat	Quarterly	1	30	69	100
BUFT12	DO sat	Quarterly	2.5	49	99	100
BUFT12	DO sat	Quarterly	5	83	100	100
BUFT12	DO sat	Triannual	1	18	51	99
BUFT12	DO sat	Triannual	2.5	32	97	100
BUFT12	DO sat	Triannual	5	68	100	100
BUFT12	E. coli	Monthly	1	96	100	100
BUFT12	E. coli	Monthly	2.5	98	100	100
BUFT12	E. coli	Monthly	5	100	100	100
BUFT12	E. coli	Quarterly	1	24	37	76
BUFT12	E. coli	Quarterly	2.5	26	56	97
BUFT12	E. coli	Quarterly	5	35	79	100
BUFT12	E. coli	Triannual	1	14	28	50
BUFT12	E. coli	Triannual	2.5	14	34	84
BUFT12	E. coli	Triannual	5	17	56	100
BUFT12	FCB	Monthly	1	76	98	100
BUFT12	FCB	Monthly	2.5	80	99	100
BUFT12	FCB	Monthly	5	85	100	100
BUFT12	FCB	Quarterly	1	16	30	50
BUFT12	FCB	Quarterly	2.5	21	33	79
BUFT12	FCB	Quarterly	5	24	55	100
BUFT12	FCB	Triannual	1	14	23	34
BUFT12	FCB	Triannual	2.5	13	27	66
BUFT12	FCB	Triannual	5	15	42	96
BUFT12	pH	Monthly	1	100	100	100
BUFT12	pH	Monthly	2.5	100	100	100
BUFT12	pH	Monthly	5	100	100	100
BUFT12	pH	Quarterly	1	62	100	100
BUFT12	pH	Quarterly	2.5	98	100	100
BUFT12	pH	Quarterly	5	100	100	100
BUFT12	pH	Triannual	1	47	100	100
BUFT12	pH	Triannual	2.5	91	100	100
BUFT12	pH	Triannual	5	100	100	100
BUFT12	Turb	Monthly	1	73	98	100
BUFT12	Turb	Monthly	2.5	78	100	100
BUFT12	Turb	Monthly	5	85	100	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFT12	Turb	Quarterly	1	20	26	52
BUFT12	Turb	Quarterly	2.5	24	44	97
BUFT12	Turb	Quarterly	5	26	80	100
BUFT12	Turb	Triannual	1	12	28	44
BUFT12	Turb	Triannual	2.5	13	35	92
BUFT12	Turb	Triannual	5	18	65	100
BUFT12	W Temp	Monthly	1	88	100	100
BUFT12	W Temp	Monthly	2.5	99	100	100
BUFT12	W Temp	Monthly	5	100	100	100
BUFT12	W Temp	Quarterly	1	21	46	93
BUFT12	W Temp	Quarterly	2.5	34	85	100
BUFT12	W Temp	Quarterly	5	54	100	100
BUFT12	W Temp	Triannual	1	15	29	80
BUFT12	W Temp	Triannual	2.5	20	67	100
BUFT12	W Temp	Triannual	5	34	99	100
BUFT13	Cond	Monthly	1	97	100	100
BUFT13	Cond	Monthly	2.5	100	100	100
BUFT13	Cond	Monthly	5	100	100	100
BUFT13	Cond	Quarterly	1	29	71	100
BUFT13	Cond	Quarterly	2.5	54	99	100
BUFT13	Cond	Quarterly	5	87	100	100
BUFT13	Cond	Triannual	1	18	56	100
BUFT13	Cond	Triannual	2.5	34	97	100
BUFT13	Cond	Triannual	5	69	100	100
BUFT13	DO sat	Monthly	1	96	100	100
BUFT13	DO sat	Monthly	2.5	100	100	100
BUFT13	DO sat	Monthly	5	100	100	100
BUFT13	DO sat	Quarterly	1	28	75	100
BUFT13	DO sat	Quarterly	2.5	52	100	100
BUFT13	DO sat	Quarterly	5	89	100	100
BUFT13	DO sat	Triannual	1	20	58	100
BUFT13	DO sat	Triannual	2.5	36	99	100
BUFT13	DO sat	Triannual	5	74	100	100
BUFT13	E. coli	Monthly	1	99	100	100
BUFT13	E. coli	Monthly	2.5	99	100	100
BUFT13	E. coli	Monthly	5	100	100	100
BUFT13	E. coli	Quarterly	1	28	45	78
BUFT13	E. coli	Quarterly	2.5	29	53	95
BUFT13	E. coli	Quarterly	5	38	70	100
BUFT13	E. coli	Triannual	1	15	33	62
BUFT13	E. coli	Triannual	2.5	17	40	87
BUFT13	E. coli	Triannual	5	19	61	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFT13	FCB	Monthly	1	89	100	100
BUFT13	FCB	Monthly	2.5	90	100	100
BUFT13	FCB	Monthly	5	97	100	100
BUFT13	FCB	Quarterly	1	27	30	51
BUFT13	FCB	Quarterly	2.5	21	38	81
BUFT13	FCB	Quarterly	5	27	59	100
BUFT13	FCB	Triannual	1	15	24	36
BUFT13	FCB	Triannual	2.5	15	27	70
BUFT13	FCB	Triannual	5	15	46	99
BUFT13	NOx-N	Monthly	1	80	100	100
BUFT13	NOx-N	Monthly	2.5	95	100	100
BUFT13	NOx-N	Monthly	5	100	100	100
BUFT13	NOx-N	Quarterly	1	27	56	98
BUFT13	NOx-N	Quarterly	2.5	38	91	100
BUFT13	NOx-N	Quarterly	5	61	100	100
BUFT13	NOx-N	Triannual	1	17	42	92
BUFT13	NOx-N	Triannual	2.5	24	76	100
BUFT13	NOx-N	Triannual	5	42	99	100
BUFT13	pH	Monthly	1	100	100	100
BUFT13	pH	Monthly	2.5	100	100	100
BUFT13	pH	Monthly	5	100	100	100
BUFT13	pH	Quarterly	1	87	100	100
BUFT13	pH	Quarterly	2.5	100	100	100
BUFT13	pH	Quarterly	5	100	100	100
BUFT13	pH	Triannual	1	68	100	100
BUFT13	pH	Triannual	2.5	100	100	100
BUFT13	pH	Triannual	5	100	100	100
BUFT13	Turb	Monthly	1	89	100	100
BUFT13	Turb	Monthly	2.5	94	100	100
BUFT13	Turb	Monthly	5	97	100	100
BUFT13	Turb	Quarterly	1	20	32	63
BUFT13	Turb	Quarterly	2.5	27	47	95
BUFT13	Turb	Quarterly	5	30	76	100
BUFT13	Turb	Triannual	1	15	26	49
BUFT13	Turb	Triannual	2.5	15	33	82
BUFT13	Turb	Triannual	5	19	53	100
BUFT13	W Temp	Monthly	1	97	100	100
BUFT13	W Temp	Monthly	2.5	100	100	100
BUFT13	W Temp	Monthly	5	100	100	100
BUFT13	W Temp	Quarterly	1	26	54	99
BUFT13	W Temp	Quarterly	2.5	39	96	100
BUFT13	W Temp	Quarterly	5	73	100	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFT13	W Temp	Triannual	1	16	34	85
BUFT13	W Temp	Triannual	2.5	20	71	100
BUFT13	W Temp	Triannual	5	36	99	100
BUFT14	Cond	Monthly	1	85	100	100
BUFT14	Cond	Monthly	2.5	99	100	100
BUFT14	Cond	Monthly	5	100	100	100
BUFT14	Cond	Quarterly	1	25	75	100
BUFT14	Cond	Quarterly	2.5	59	100	100
BUFT14	Cond	Quarterly	5	89	100	100
BUFT14	Cond	Triannual	1	19	66	100
BUFT14	Cond	Triannual	2.5	42	98	100
BUFT14	Cond	Triannual	5	77	100	100
BUFT14	DO sat	Monthly	1	82	100	100
BUFT14	DO sat	Monthly	2.5	98	100	100
BUFT14	DO sat	Monthly	5	100	100	100
BUFT14	DO sat	Quarterly	1	31	75	100
BUFT14	DO sat	Quarterly	2.5	58	100	100
BUFT14	DO sat	Quarterly	5	95	100	100
BUFT14	DO sat	Triannual	1	18	61	100
BUFT14	DO sat	Triannual	2.5	36	100	100
BUFT14	DO sat	Triannual	5	81	100	100
BUFT14	E. coli	Monthly	1	94	100	100
BUFT14	E. coli	Monthly	2.5	94	100	100
BUFT14	E. coli	Monthly	5	95	100	100
BUFT14	E. coli	Quarterly	1	24	36	61
BUFT14	E. coli	Quarterly	2.5	25	44	89
BUFT14	E. coli	Quarterly	5	27	66	100
BUFT14	E. coli	Triannual	1	14	26	45
BUFT14	E. coli	Triannual	2.5	14	31	76
BUFT14	E. coli	Triannual	5	15	47	99
BUFT14	FCB	Monthly	1	64	94	100
BUFT14	FCB	Monthly	2.5	69	97	100
BUFT14	FCB	Monthly	5	74	100	100
BUFT14	FCB	Quarterly	1	22	29	48
BUFT14	FCB	Quarterly	2.5	22	39	81
BUFT14	FCB	Quarterly	5	25	59	100
BUFT14	FCB	Triannual	1	13	25	35
BUFT14	FCB	Triannual	2.5	13	25	66
BUFT14	FCB	Triannual	5	14	41	97
BUFT14	NOx-N	Monthly	1	69	98	100
BUFT14	NOx-N	Monthly	2.5	79	100	100
BUFT14	NOx-N	Monthly	5	92	100	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFT14	NOx-N	Quarterly	1	21	34	70
BUFT14	NOx-N	Quarterly	2.5	26	55	99
BUFT14	NOx-N	Quarterly	5	34	93	100
BUFT14	NOx-N	Triannual	1	15	28	57
BUFT14	NOx-N	Triannual	2.5	15	45	98
BUFT14	NOx-N	Triannual	5	22	84	100
BUFT14	pH	Monthly	1	100	100	100
BUFT14	pH	Monthly	2.5	100	100	100
BUFT14	pH	Monthly	5	100	100	100
BUFT14	pH	Quarterly	1	91	100	100
BUFT14	pH	Quarterly	2.5	100	100	100
BUFT14	pH	Quarterly	5	100	100	100
BUFT14	pH	Triannual	1	84	100	100
BUFT14	pH	Triannual	2.5	100	100	100
BUFT14	pH	Triannual	5	100	100	100
BUFT14	Turb	Monthly	1	67	97	100
BUFT14	Turb	Monthly	2.5	76	100	100
BUFT14	Turb	Monthly	5	89	100	100
BUFT14	Turb	Quarterly	1	22	30	56
BUFT14	Turb	Quarterly	2.5	22	46	97
BUFT14	Turb	Quarterly	5	28	78	100
BUFT14	Turb	Triannual	1	13	26	50
BUFT14	Turb	Triannual	2.5	14	40	94
BUFT14	Turb	Triannual	5	21	72	100
BUFT14	W Temp	Monthly	1	75	100	100
BUFT14	W Temp	Monthly	2.5	92	100	100
BUFT14	W Temp	Monthly	5	100	100	100
BUFT14	W Temp	Quarterly	1	22	40	91
BUFT14	W Temp	Quarterly	2.5	30	81	100
BUFT14	W Temp	Quarterly	5	54	100	100
BUFT14	W Temp	Triannual	1	15	37	84
BUFT14	W Temp	Triannual	2.5	19	70	100
BUFT14	W Temp	Triannual	5	34	100	100
BUFT15	Cond	Monthly	1	85	100	100
BUFT15	Cond	Monthly	2.5	99	100	100
BUFT15	Cond	Monthly	5	100	100	100
BUFT15	Cond	Quarterly	1	32	81	100
BUFT15	Cond	Quarterly	2.5	61	99	100
BUFT15	Cond	Quarterly	5	91	100	100
BUFT15	Cond	Triannual	1	18	59	100
BUFT15	Cond	Triannual	2.5	36	97	100
BUFT15	Cond	Triannual	5	70	100	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFT15	DO sat	Monthly	1	80	100	100
BUFT15	DO sat	Monthly	2.5	99	100	100
BUFT15	DO sat	Monthly	5	100	100	100
BUFT15	DO sat	Quarterly	1	35	89	100
BUFT15	DO sat	Quarterly	2.5	74	100	100
BUFT15	DO sat	Quarterly	5	99	100	100
BUFT15	DO sat	Triannual	1	23	81	100
BUFT15	DO sat	Triannual	2.5	54	100	100
BUFT15	DO sat	Triannual	5	93	100	100
BUFT15	E. coli	Monthly	1	88	100	100
BUFT15	E. coli	Monthly	2.5	90	100	100
BUFT15	E. coli	Monthly	5	94	100	100
BUFT15	E. coli	Quarterly	1	27	47	84
BUFT15	E. coli	Quarterly	2.5	30	67	99
BUFT15	E. coli	Quarterly	5	39	87	100
BUFT15	E. coli	Triannual	1	16	34	68
BUFT15	E. coli	Triannual	2.5	19	49	89
BUFT15	E. coli	Triannual	5	22	60	100
BUFT15	FCB	Monthly	1	51	82	99
BUFT15	FCB	Monthly	2.5	50	90	100
BUFT15	FCB	Monthly	5	62	98	100
BUFT15	FCB	Quarterly	1	25	36	65
BUFT15	FCB	Quarterly	2.5	26	51	88
BUFT15	FCB	Quarterly	5	31	68	100
BUFT15	FCB	Triannual	1	17	30	46
BUFT15	FCB	Triannual	2.5	19	35	75
BUFT15	FCB	Triannual	5	17	54	99
BUFT15	NOx-N	Monthly	1	81	100	100
BUFT15	NOx-N	Monthly	2.5	89	100	100
BUFT15	NOx-N	Monthly	5	95	100	100
BUFT15	NOx-N	Quarterly	1	23	35	68
BUFT15	NOx-N	Quarterly	2.5	26	51	99
BUFT15	NOx-N	Quarterly	5	30	87	100
BUFT15	NOx-N	Triannual	1	15	27	49
BUFT15	NOx-N	Triannual	2.5	16	37	93
BUFT15	NOx-N	Triannual	5	18	72	100
BUFT15	pH	Monthly	1	100	100	100
BUFT15	pH	Monthly	2.5	100	100	100
BUFT15	pH	Monthly	5	100	100	100
BUFT15	pH	Quarterly	1	76	100	100
BUFT15	pH	Quarterly	2.5	100	100	100
BUFT15	pH	Quarterly	5	100	100	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFT15	pH	Triannual	1	56	100	100
BUFT15	pH	Triannual	2.5	99	100	100
BUFT15	pH	Triannual	5	100	100	100
BUFT15	Turb	Monthly	1	54	91	100
BUFT15	Turb	Monthly	2.5	65	98	100
BUFT15	Turb	Monthly	5	79	100	100
BUFT15	Turb	Quarterly	1	18	32	63
BUFT15	Turb	Quarterly	2.5	25	47	99
BUFT15	Turb	Quarterly	5	32	81	100
BUFT15	Turb	Triannual	1	13	28	49
BUFT15	Turb	Triannual	2.5	17	39	94
BUFT15	Turb	Triannual	5	22	68	100
BUFT15	W Temp	Monthly	1	73	100	100
BUFT15	W Temp	Monthly	2.5	93	100	100
BUFT15	W Temp	Monthly	5	100	100	100
BUFT15	W Temp	Quarterly	1	29	60	99
BUFT15	W Temp	Quarterly	2.5	40	94	100
BUFT15	W Temp	Quarterly	5	66	100	100
BUFT15	W Temp	Triannual	1	16	33	75
BUFT15	W Temp	Triannual	2.5	18	58	100
BUFT15	W Temp	Triannual	5	28	95	100
BUFT16	Cond	Monthly	1	90	100	100
BUFT16	Cond	Monthly	2.5	100	100	100
BUFT16	Cond	Monthly	5	100	100	100
BUFT16	Cond	Quarterly	1	31	80	100
BUFT16	Cond	Quarterly	2.5	64	100	100
BUFT16	Cond	Quarterly	5	95	100	100
BUFT16	Cond	Triannual	1	20	70	100
BUFT16	Cond	Triannual	2.5	46	100	100
BUFT16	Cond	Triannual	5	83	100	100
BUFT16	DO sat	Monthly	1	91	100	100
BUFT16	DO sat	Monthly	2.5	100	100	100
BUFT16	DO sat	Monthly	5	100	100	100
BUFT16	DO sat	Quarterly	1	35	79	100
BUFT16	DO sat	Quarterly	2.5	65	100	100
BUFT16	DO sat	Quarterly	5	97	100	100
BUFT16	DO sat	Triannual	1	19	67	100
BUFT16	DO sat	Triannual	2.5	43	100	100
BUFT16	DO sat	Triannual	5	86	100	100
BUFT16	E. coli	Monthly	1	93	100	100
BUFT16	E. coli	Monthly	2.5	94	100	100
BUFT16	E. coli	Monthly	5	95	100	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFT16	E. coli	Quarterly	1	27	39	68
BUFT16	E. coli	Quarterly	2.5	27	47	91
BUFT16	E. coli	Quarterly	5	29	67	99
BUFT16	E. coli	Triannual	1	14	28	41
BUFT16	E. coli	Triannual	2.5	14	31	70
BUFT16	E. coli	Triannual	5	16	44	98
BUFT16	FCB	Monthly	1	80	99	100
BUFT16	FCB	Monthly	2.5	80	99	100
BUFT16	FCB	Monthly	5	85	100	100
BUFT16	FCB	Quarterly	1	23	32	51
BUFT16	FCB	Quarterly	2.5	23	38	78
BUFT16	FCB	Quarterly	5	27	55	100
BUFT16	FCB	Triannual	1	14	27	43
BUFT16	FCB	Triannual	2.5	15	30	69
BUFT16	FCB	Triannual	5	16	47	98
BUFT16	NOx-N	Monthly	1	80	100	100
BUFT16	NOx-N	Monthly	2.5	87	100	100
BUFT16	NOx-N	Monthly	5	96	100	100
BUFT16	NOx-N	Quarterly	1	22	39	83
BUFT16	NOx-N	Quarterly	2.5	30	68	100
BUFT16	NOx-N	Quarterly	5	41	97	100
BUFT16	NOx-N	Triannual	1	15	31	75
BUFT16	NOx-N	Triannual	2.5	18	58	100
BUFT16	NOx-N	Triannual	5	28	91	100
BUFT16	pH	Monthly	1	100	100	100
BUFT16	pH	Monthly	2.5	100	100	100
BUFT16	pH	Monthly	5	100	100	100
BUFT16	pH	Quarterly	1	88	100	100
BUFT16	pH	Quarterly	2.5	100	100	100
BUFT16	pH	Quarterly	5	100	100	100
BUFT16	pH	Triannual	1	72	100	100
BUFT16	pH	Triannual	2.5	100	100	100
BUFT16	pH	Triannual	5	100	100	100
BUFT16	Turb	Monthly	1	76	99	100
BUFT16	Turb	Monthly	2.5	80	100	100
BUFT16	Turb	Monthly	5	91	100	100
BUFT16	Turb	Quarterly	1	22	34	65
BUFT16	Turb	Quarterly	2.5	23	52	99
BUFT16	Turb	Quarterly	5	34	85	100
BUFT16	Turb	Triannual	1	14	24	57
BUFT16	Turb	Triannual	2.5	16	42	97
BUFT16	Turb	Triannual	5	19	75	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFT16	W Temp	Monthly	1	84	100	100
BUFT16	W Temp	Monthly	2.5	99	100	100
BUFT16	W Temp	Monthly	5	100	100	100
BUFT16	W Temp	Quarterly	1	23	54	99
BUFT16	W Temp	Quarterly	2.5	36	95	100
BUFT16	W Temp	Quarterly	5	70	100	100
BUFT16	W Temp	Triannual	1	14	37	93
BUFT16	W Temp	Triannual	2.5	23	83	100
BUFT16	W Temp	Triannual	5	43	100	100
BUFT17	Cond	Monthly	1	91	100	100
BUFT17	Cond	Monthly	2.5	100	100	100
BUFT17	Cond	Monthly	5	100	100	100
BUFT17	Cond	Quarterly	1	38	90	100
BUFT17	Cond	Quarterly	2.5	72	100	100
BUFT17	Cond	Quarterly	5	97	100	100
BUFT17	Cond	Triannual	1	25	77	100
BUFT17	Cond	Triannual	2.5	52	100	100
BUFT17	Cond	Triannual	5	88	100	100
BUFT17	DO sat	Monthly	1	94	100	100
BUFT17	DO sat	Monthly	2.5	100	100	100
BUFT17	DO sat	Monthly	5	100	100	100
BUFT17	DO sat	Quarterly	1	32	80	100
BUFT17	DO sat	Quarterly	2.5	64	100	100
BUFT17	DO sat	Quarterly	5	96	100	100
BUFT17	DO sat	Triannual	1	17	63	100
BUFT17	DO sat	Triannual	2.5	38	100	100
BUFT17	DO sat	Triannual	5	82	100	100
BUFT17	E. coli	Monthly	1	91	100	100
BUFT17	E. coli	Monthly	2.5	93	100	100
BUFT17	E. coli	Monthly	5	95	100	100
BUFT17	E. coli	Quarterly	1	23	40	59
BUFT17	E. coli	Quarterly	2.5	27	44	91
BUFT17	E. coli	Quarterly	5	27	69	100
BUFT17	E. coli	Triannual	1	15	25	43
BUFT17	E. coli	Triannual	2.5	15	31	72
BUFT17	E. coli	Triannual	5	16	47	100
BUFT17	FCB	Monthly	1	72	98	100
BUFT17	FCB	Monthly	2.5	76	100	100
BUFT17	FCB	Monthly	5	81	100	100
BUFT17	FCB	Quarterly	1	21	31	49
BUFT17	FCB	Quarterly	2.5	22	36	81
BUFT17	FCB	Quarterly	5	26	58	99

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFT17	FCB	Triannual	1	12	22	39
BUFT17	FCB	Triannual	2.5	15	31	67
BUFT17	FCB	Triannual	5	17	45	95
BUFT17	pH	Monthly	1	100	100	100
BUFT17	pH	Monthly	2.5	100	100	100
BUFT17	pH	Monthly	5	100	100	100
BUFT17	pH	Quarterly	1	95	100	100
BUFT17	pH	Quarterly	2.5	100	100	100
BUFT17	pH	Quarterly	5	100	100	100
BUFT17	pH	Triannual	1	89	100	100
BUFT17	pH	Triannual	2.5	100	100	100
BUFT17	pH	Triannual	5	100	100	100
BUFT17	Turb	Monthly	1	86	100	100
BUFT17	Turb	Monthly	2.5	90	100	100
BUFT17	Turb	Monthly	5	95	100	100
BUFT17	Turb	Quarterly	1	21	31	62
BUFT17	Turb	Quarterly	2.5	24	51	98
BUFT17	Turb	Quarterly	5	33	82	100
BUFT17	Turb	Triannual	1	15	25	47
BUFT17	Turb	Triannual	2.5	15	36	92
BUFT17	Turb	Triannual	5	18	71	100
BUFT17	W Temp	Monthly	1	81	100	100
BUFT17	W Temp	Monthly	2.5	91	100	100
BUFT17	W Temp	Monthly	5	99	100	100
BUFT17	W Temp	Quarterly	1	22	38	87
BUFT17	W Temp	Quarterly	2.5	28	76	100
BUFT17	W Temp	Quarterly	5	47	99	100
BUFT17	W Temp	Triannual	1	12	31	78
BUFT17	W Temp	Triannual	2.5	19	64	100
BUFT17	W Temp	Triannual	5	32	97	100
BUFT18	Cond	Monthly	1	96	100	100
BUFT18	Cond	Monthly	2.5	100	100	100
BUFT18	Cond	Monthly	5	100	100	100
BUFT18	Cond	Quarterly	1	29	74	100
BUFT18	Cond	Quarterly	2.5	57	100	100
BUFT18	Cond	Quarterly	5	93	100	100
BUFT18	Cond	Triannual	1	19	56	100
BUFT18	Cond	Triannual	2.5	37	99	100
BUFT18	Cond	Triannual	5	76	100	100
BUFT18	DO sat	Monthly	1	98	100	100
BUFT18	DO sat	Monthly	2.5	100	100	100
BUFT18	DO sat	Monthly	5	100	100	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFT18	DO sat	Quarterly	1	29	61	100
BUFT18	DO sat	Quarterly	2.5	48	99	100
BUFT18	DO sat	Quarterly	5	83	100	100
BUFT18	DO sat	Triannual	1	17	52	99
BUFT18	DO sat	Triannual	2.5	30	94	100
BUFT18	DO sat	Triannual	5	63	100	100
BUFT18	E. coli	Monthly	1	99	100	100
BUFT18	E. coli	Monthly	2.5	100	100	100
BUFT18	E. coli	Monthly	5	100	100	100
BUFT18	E. coli	Quarterly	1	25	41	64
BUFT18	E. coli	Quarterly	2.5	27	46	90
BUFT18	E. coli	Quarterly	5	31	66	100
BUFT18	E. coli	Triannual	1	16	28	52
BUFT18	E. coli	Triannual	2.5	15	38	80
BUFT18	E. coli	Triannual	5	19	55	99
BUFT18	FCB	Monthly	1	91	100	100
BUFT18	FCB	Monthly	2.5	90	100	100
BUFT18	FCB	Monthly	5	95	100	100
BUFT18	FCB	Quarterly	1	22	30	45
BUFT18	FCB	Quarterly	2.5	19	36	82
BUFT18	FCB	Quarterly	5	24	59	100
BUFT18	FCB	Triannual	1	13	23	39
BUFT18	FCB	Triannual	2.5	14	29	68
BUFT18	FCB	Triannual	5	17	42	97
BUFT18	pH	Monthly	1	100	100	100
BUFT18	pH	Monthly	2.5	100	100	100
BUFT18	pH	Monthly	5	100	100	100
BUFT18	pH	Quarterly	1	82	100	100
BUFT18	pH	Quarterly	2.5	100	100	100
BUFT18	pH	Quarterly	5	100	100	100
BUFT18	pH	Triannual	1	64	100	100
BUFT18	pH	Triannual	2.5	99	100	100
BUFT18	pH	Triannual	5	100	100	100
BUFT18	Turb	Monthly	1	90	100	100
BUFT18	Turb	Monthly	2.5	93	100	100
BUFT18	Turb	Monthly	5	97	100	100
BUFT18	Turb	Quarterly	1	22	33	62
BUFT18	Turb	Quarterly	2.5	24	47	97
BUFT18	Turb	Quarterly	5	31	78	100
BUFT18	Turb	Triannual	1	13	28	48
BUFT18	Turb	Triannual	2.5	14	35	88
BUFT18	Turb	Triannual	5	18	65	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFT18	W Temp	Monthly	1	94	100	100
BUFT18	W Temp	Monthly	2.5	99	100	100
BUFT18	W Temp	Monthly	5	100	100	100
BUFT18	W Temp	Quarterly	1	24	59	99
BUFT18	W Temp	Quarterly	2.5	43	95	100
BUFT18	W Temp	Quarterly	5	66	100	100
BUFT18	W Temp	Triannual	1	13	37	81
BUFT18	W Temp	Triannual	2.5	20	69	100
BUFT18	W Temp	Triannual	5	34	99	100
BUFT23	Cond	Monthly	1	99	100	100
BUFT23	Cond	Monthly	2.5	100	100	100
BUFT23	Cond	Monthly	5	100	100	100
BUFT23	Cond	Quarterly	1	34	82	100
BUFT23	Cond	Quarterly	2.5	62	100	100
BUFT23	Cond	Quarterly	5	93	100	100
BUFT23	Cond	Triannual	1	19	68	100
BUFT23	Cond	Triannual	2.5	43	99	100
BUFT23	Cond	Triannual	5	76	100	100
BUFT23	DO sat	Monthly	1	97	100	100
BUFT23	DO sat	Monthly	2.5	100	100	100
BUFT23	DO sat	Monthly	5	100	100	100
BUFT23	DO sat	Quarterly	1	30	70	100
BUFT23	DO sat	Quarterly	2.5	51	100	100
BUFT23	DO sat	Quarterly	5	93	100	100
BUFT23	DO sat	Triannual	1	16	59	100
BUFT23	DO sat	Triannual	2.5	35	98	100
BUFT23	DO sat	Triannual	5	78	100	100
BUFT23	E. coli	Monthly	1	100	100	100
BUFT23	E. coli	Monthly	2.5	99	100	100
BUFT23	E. coli	Monthly	5	100	100	100
BUFT23	E. coli	Quarterly	1	24	39	65
BUFT23	E. coli	Quarterly	2.5	25	46	90
BUFT23	E. coli	Quarterly	5	29	70	100
BUFT23	E. coli	Triannual	1	14	28	52
BUFT23	E. coli	Triannual	2.5	16	38	82
BUFT23	E. coli	Triannual	5	17	57	99
BUFT23	FCB	Monthly	1	91	100	100
BUFT23	FCB	Monthly	2.5	92	100	100
BUFT23	FCB	Monthly	5	94	100	100
BUFT23	FCB	Quarterly	1	24	31	53
BUFT23	FCB	Quarterly	2.5	22	38	82
BUFT23	FCB	Quarterly	5	26	56	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFT23	FCB	Triannual	1	13	27	40
BUFT23	FCB	Triannual	2.5	14	31	65
BUFT23	FCB	Triannual	5	16	41	98
BUFT23	pH	Monthly	1	100	100	100
BUFT23	pH	Monthly	2.5	100	100	100
BUFT23	pH	Monthly	5	100	100	100
BUFT23	pH	Quarterly	1	86	100	100
BUFT23	pH	Quarterly	2.5	100	100	100
BUFT23	pH	Quarterly	5	100	100	100
BUFT23	pH	Triannual	1	62	100	100
BUFT23	pH	Triannual	2.5	99	100	100
BUFT23	pH	Triannual	5	100	100	100
BUFT23	Turb	Monthly	1	90	100	100
BUFT23	Turb	Monthly	2.5	92	100	100
BUFT23	Turb	Monthly	5	96	100	100
BUFT23	Turb	Quarterly	1	21	33	61
BUFT23	Turb	Quarterly	2.5	24	50	96
BUFT23	Turb	Quarterly	5	29	75	100
BUFT23	Turb	Triannual	1	14	26	51
BUFT23	Turb	Triannual	2.5	14	35	87
BUFT23	Turb	Triannual	5	20	60	100
BUFT23	W Temp	Monthly	1	95	100	100
BUFT23	W Temp	Monthly	2.5	99	100	100
BUFT23	W Temp	Monthly	5	100	100	100
BUFT23	W Temp	Quarterly	1	28	54	99
BUFT23	W Temp	Quarterly	2.5	42	95	100
BUFT23	W Temp	Quarterly	5	72	100	100
BUFT23	W Temp	Triannual	1	16	35	84
BUFT23	W Temp	Triannual	2.5	20	70	100
BUFT23	W Temp	Triannual	5	39	99	100
BUFT24	Cond	Monthly	1	97	100	100
BUFT24	Cond	Monthly	2.5	100	100	100
BUFT24	Cond	Monthly	5	100	100	100
BUFT24	Cond	Quarterly	1	29	71	100
BUFT24	Cond	Quarterly	2.5	54	100	100
BUFT24	Cond	Quarterly	5	88	100	100
BUFT24	Cond	Triannual	1	19	62	100
BUFT24	Cond	Triannual	2.5	40	99	100
BUFT24	Cond	Triannual	5	76	100	100
BUFT24	DO sat	Monthly	1	97	100	100
BUFT24	DO sat	Monthly	2.5	100	100	100
BUFT24	DO sat	Monthly	5	100	100	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFT24	DO sat	Quarterly	1	32	72	100
BUFT24	DO sat	Quarterly	2.5	53	100	100
BUFT24	DO sat	Quarterly	5	92	100	100
BUFT24	DO sat	Triannual	1	18	61	100
BUFT24	DO sat	Triannual	2.5	36	99	100
BUFT24	DO sat	Triannual	5	77	100	100
BUFT24	E. coli	Monthly	1	100	100	100
BUFT24	E. coli	Monthly	2.5	100	100	100
BUFT24	E. coli	Monthly	5	100	100	100
BUFT24	E. coli	Quarterly	1	25	42	73
BUFT24	E. coli	Quarterly	2.5	26	52	91
BUFT24	E. coli	Quarterly	5	32	72	100
BUFT24	E. coli	Triannual	1	16	32	55
BUFT24	E. coli	Triannual	2.5	17	39	81
BUFT24	E. coli	Triannual	5	21	55	100
BUFT24	FCB	Monthly	1	90	100	100
BUFT24	FCB	Monthly	2.5	90	100	100
BUFT24	FCB	Monthly	5	94	100	100
BUFT24	FCB	Quarterly	1	22	29	49
BUFT24	FCB	Quarterly	2.5	23	38	77
BUFT24	FCB	Quarterly	5	25	51	100
BUFT24	FCB	Triannual	1	13	24	39
BUFT24	FCB	Triannual	2.5	13	29	64
BUFT24	FCB	Triannual	5	17	41	96
BUFT24	pH	Monthly	1	100	100	100
BUFT24	pH	Monthly	2.5	100	100	100
BUFT24	pH	Monthly	5	100	100	100
BUFT24	pH	Quarterly	1	79	100	100
BUFT24	pH	Quarterly	2.5	100	100	100
BUFT24	pH	Quarterly	5	100	100	100
BUFT24	pH	Triannual	1	62	100	100
BUFT24	pH	Triannual	2.5	100	100	100
BUFT24	pH	Triannual	5	100	100	100
BUFT24	Turb	Monthly	1	90	100	100
BUFT24	Turb	Monthly	2.5	91	100	100
BUFT24	Turb	Monthly	5	96	100	100
BUFT24	Turb	Quarterly	1	22	34	62
BUFT24	Turb	Quarterly	2.5	24	48	94
BUFT24	Turb	Quarterly	5	31	71	100
BUFT24	Turb	Triannual	1	12	27	51
BUFT24	Turb	Triannual	2.5	15	37	87
BUFT24	Turb	Triannual	5	19	60	100

Site	Variable	Sampling Interval	Annual Change (%)	Monitoring Period 5 YR	10 YR	20 YR
				Estimated Statistical Power (%)		
BUFT24	W Temp	Monthly	1	93	100	100
BUFT24	W Temp	Monthly	2.5	99	100	100
BUFT24	W Temp	Monthly	5	100	100	100
BUFT24	W Temp	Quarterly	1	22	55	99
BUFT24	W Temp	Quarterly	2.5	40	93	100
BUFT24	W Temp	Quarterly	5	67	100	100
BUFT24	W Temp	Triannual	1	18	36	82
BUFT24	W Temp	Triannual	2.5	19	67	100
BUFT24	W Temp	Triannual	5	32	99	100

A3 Supplementary information for individual sites

A3.1 BUFR01 - Buffalo River at Wilderness Boundary

A3.1.1 Site and available data description

Buffalo River at the Wilderness Boundary (BUFR01; 35.9431, -93.4056) is a long-term BUFF water quality monitoring site on the river mainstem. BUFF staff have measured streamflow and in situ physiochemistry and collected water samples for analysis of bacteriological indicators and nutrient concentrations at the site since 1985 (**Figure A3.1.1-2**). In the mid-2010's, sampling intensity increased substantially for a number of variables. The USGS also collected samples for nutrient analysis from 1993 – 2019 at this site, and these data were combined with nutrient data from BUFF samples for all compatible analytes. Beginning April 17, 1993, estimates of average daily streamflow were available for this location from the USGS gage #07055646. Instantaneous streamflow estimates collected by BUFF staff were also available to combine with USGS data in the flow-adjustment procedure to generate FAVs of water quality variables as inputs to trend analysis.

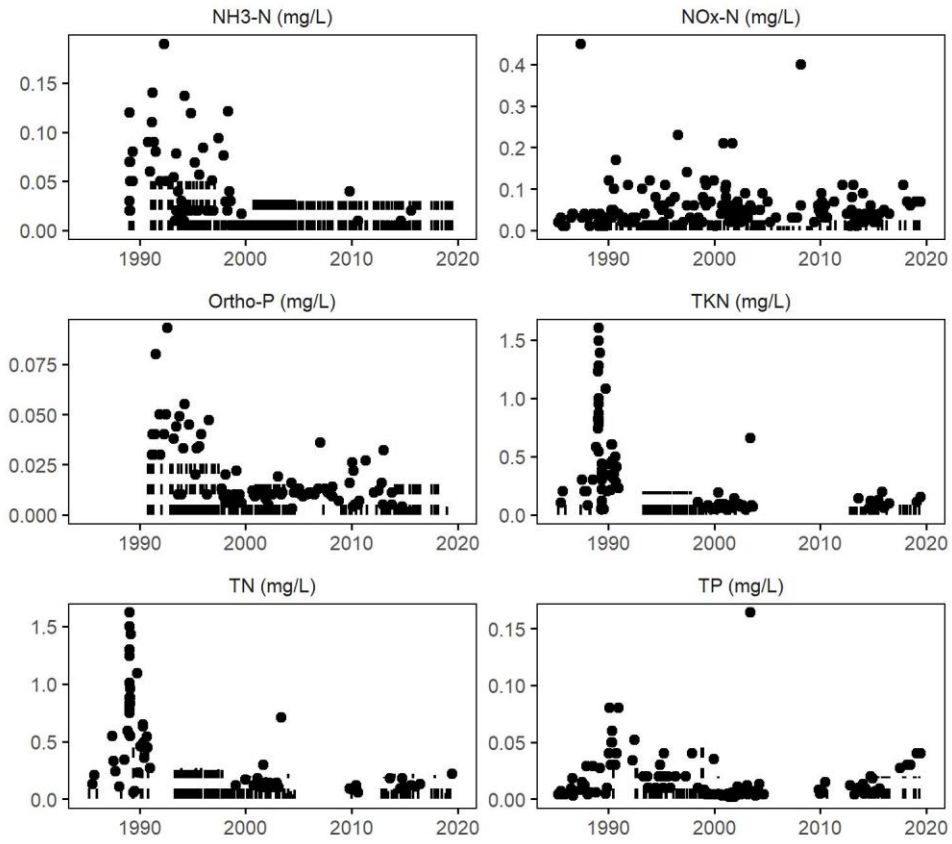


Figure A3.1.1 Nutrient variables (1985-2019) at BUFR01. Dashed lines indicate a non-detection, or that concentration could only be estimated within a range (i.e., between 0 and the relevant reporting limit).

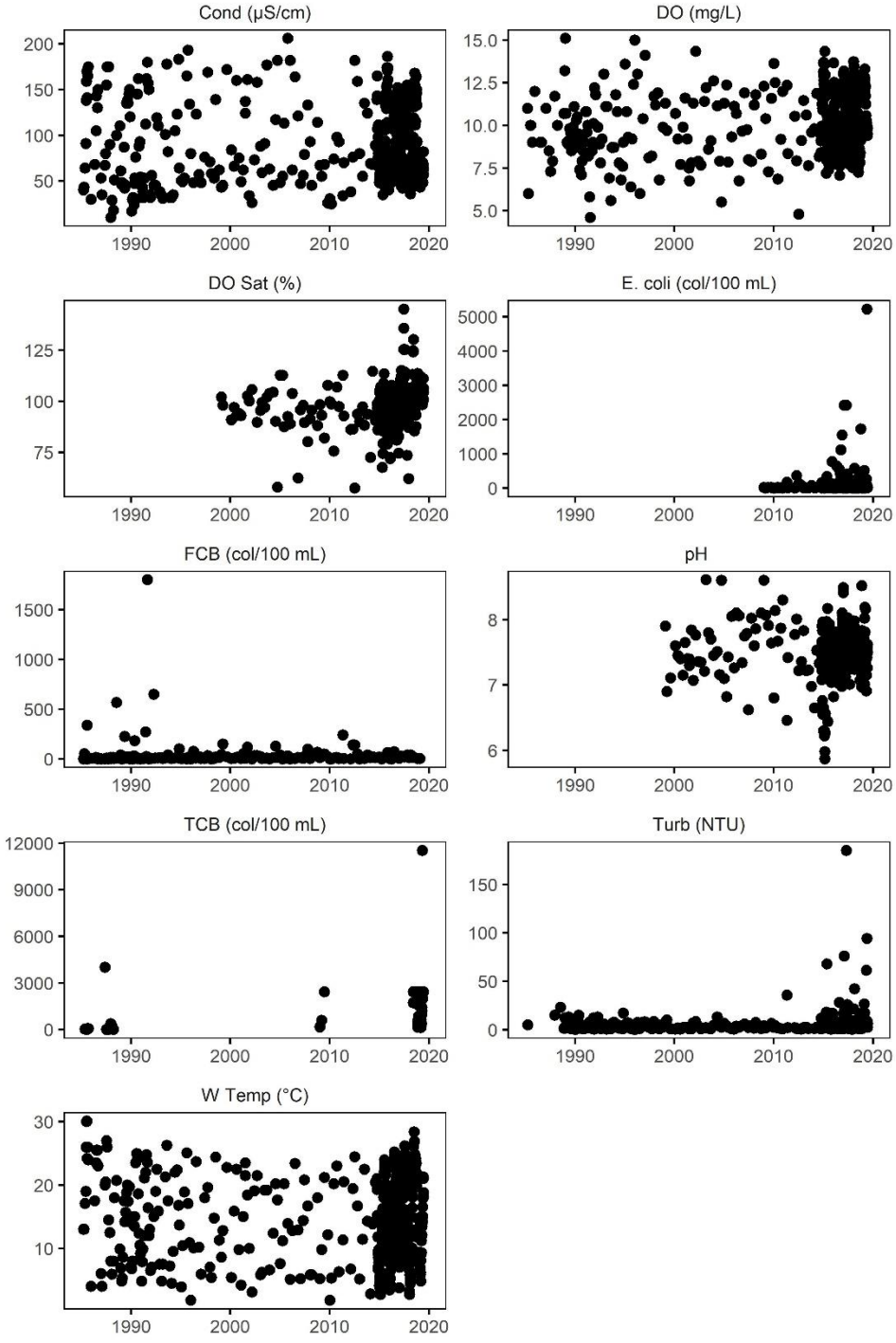


Figure A3.1.2 Bacterial indicator and physicochemical variables (1985-2019) at BUFR01.

A3.1.2 Trend analysis results (2000 - 2019): Narrative summaries

- NOx-N concentrations could not be analyzed for trend at this site due to non-detection frequency greater than 30% (**Figure A3.1.3-5A**).
- E. coli concentrations are likely not changing (**Figure A3.1.3-5B**).
- FCB concentrations are likely not changing (**Figure A3.1.3-5C**).
- Conductivity is very likely increasing by ~1% annually (**Figure A3.1.3-5D**).
- DO trend analysis results were not in agreement. Weight of evidence interpretation suggested that DO levels are likely increasing by 0.4 – 0.8% annually (**Figure A3.1.3-5E**). All analyses suggested that DO % saturation is very likely increasing and that concentrations were likely (MK) to very likely increasing (LR and SKT). Increased trend likelihood between MK and SKT likely reflects the known sizeable seasonal differences in DO due to temperature-dependent gas solubility. Therefore, SKT analysis of DO concentration and all analyses of DO % saturation, a metric that corrects for seasonal variability, can be considered the most reliable results.
- Stream pH trend analysis results were not in agreement. Weight of evidence interpretation suggested that pH is likely not changing (**Figure A3.1.3-5F**).While MK results suggested a very likely increase, decreased trend probability between MK and SKT suggests that seasonality is a factor for pH and that sampling may not have occurred evenly across seasons.
- Turbidity is very likely increasing by approximately 2% annually (**Figure A3.1.3-5G**)
- Water temperature trend analysis results were not in agreement. Weight of evidence interpretation suggested that water temperature is likely not changing (**Figure A3.1.3-5H**). While results of LR and MK suggested a likely to very likely increase, decreased trend probability in SKT results likely reflects the effects of known sizeable seasonal differences in temperature on LR and MK results.

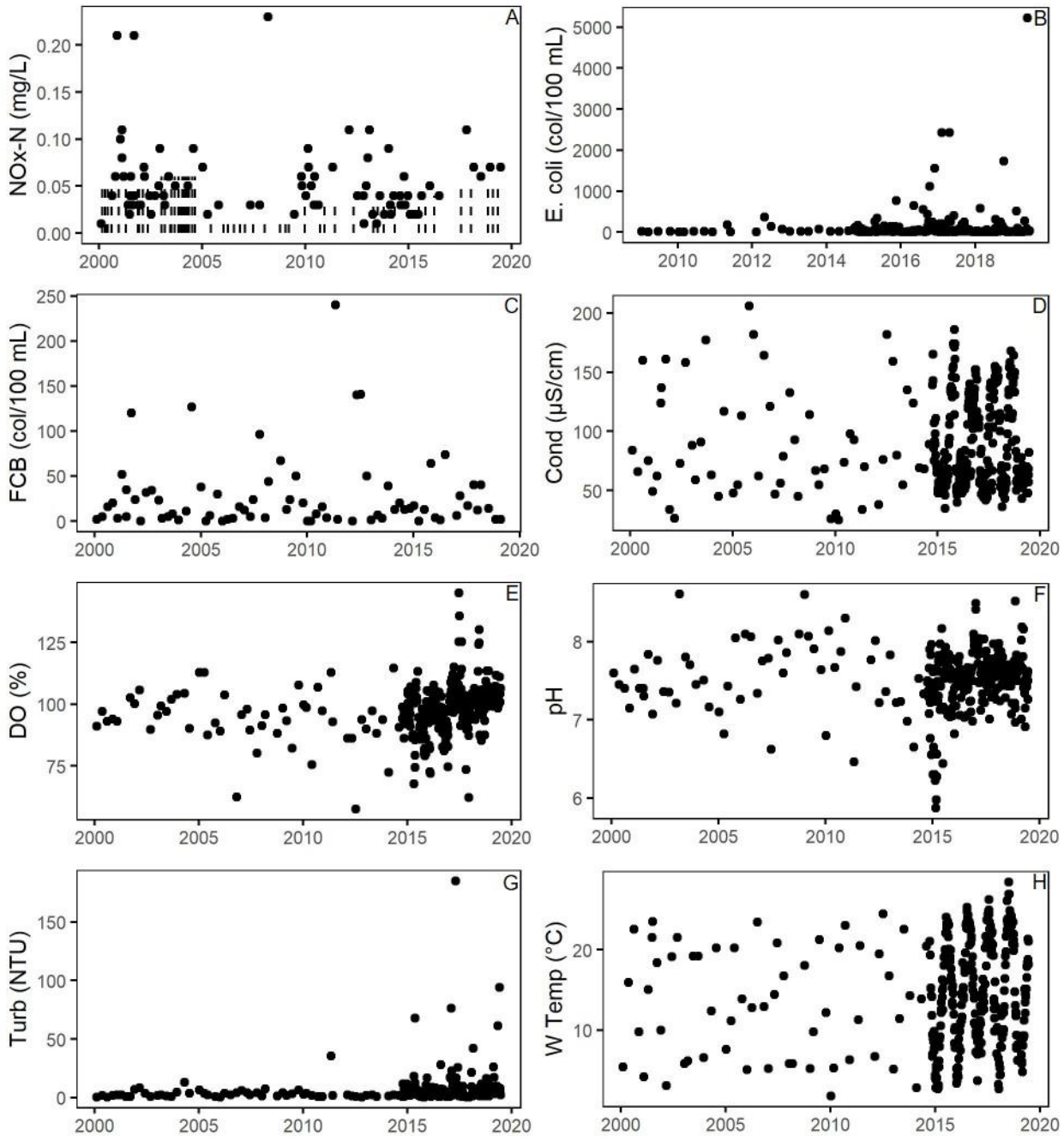


Figure A3.1.3 Water quality variable values shown through time (2000 – 2019) at BUFR01. A) nitrate+nitrite-nitrogen (NOx-N), B) Escherichia coli (E. coli), C) fecal coliform bacteria (FCB), D) conductivity (Cond), E) dissolved oxygen (DO), F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections.

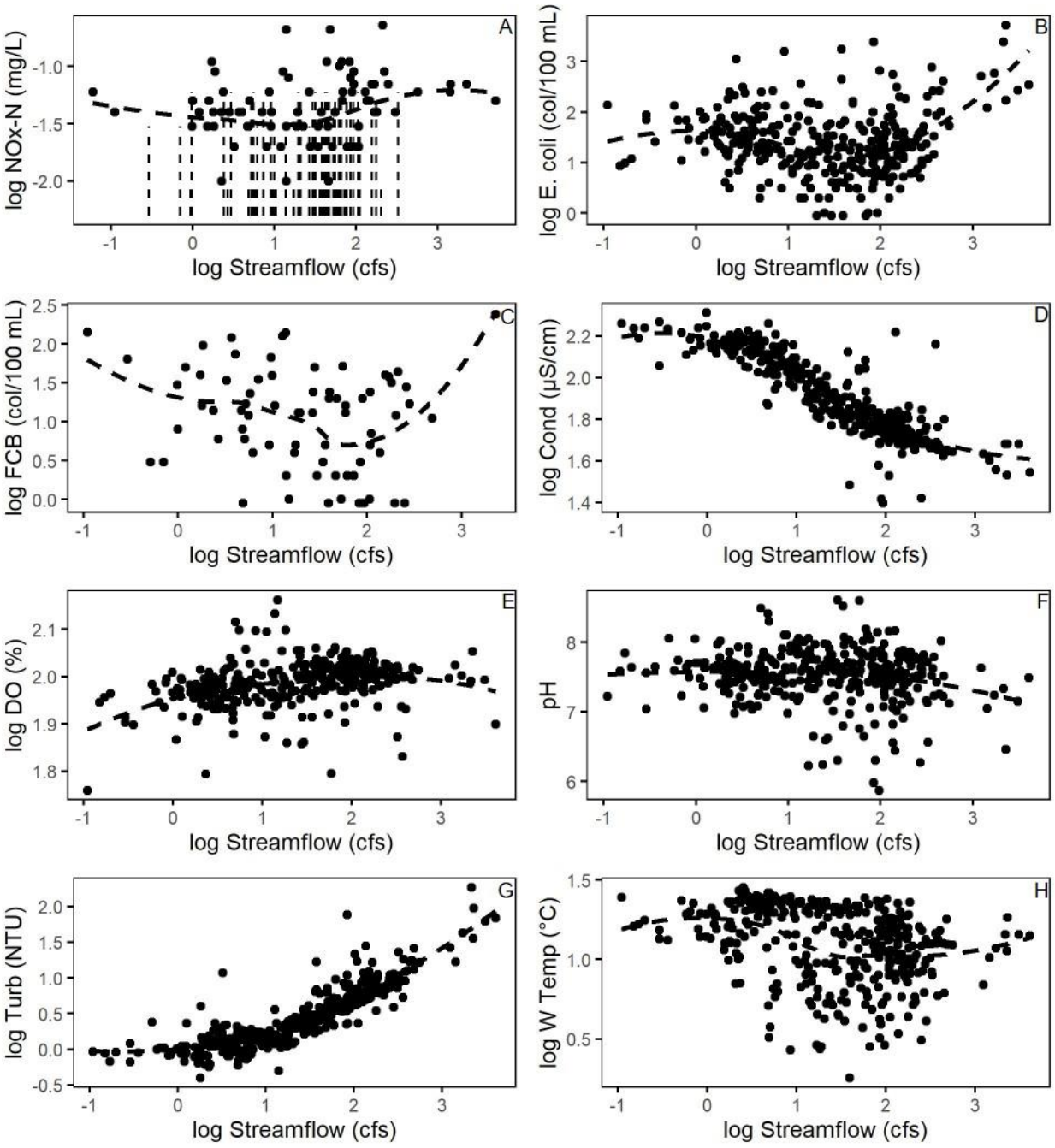


Figure A3.1.4 Water quality variable values (2000 – 2019) shown in relation to streamflow at BUFR01. A) nitrate+ nitrite-nitrogen (NOx-N), B) Escherichia coli (E. coli), C) fecal coliform bacteria (FCB), D) conductivity (Cond), E) dissolved oxygen (DO), F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation between each variable and streamflow.

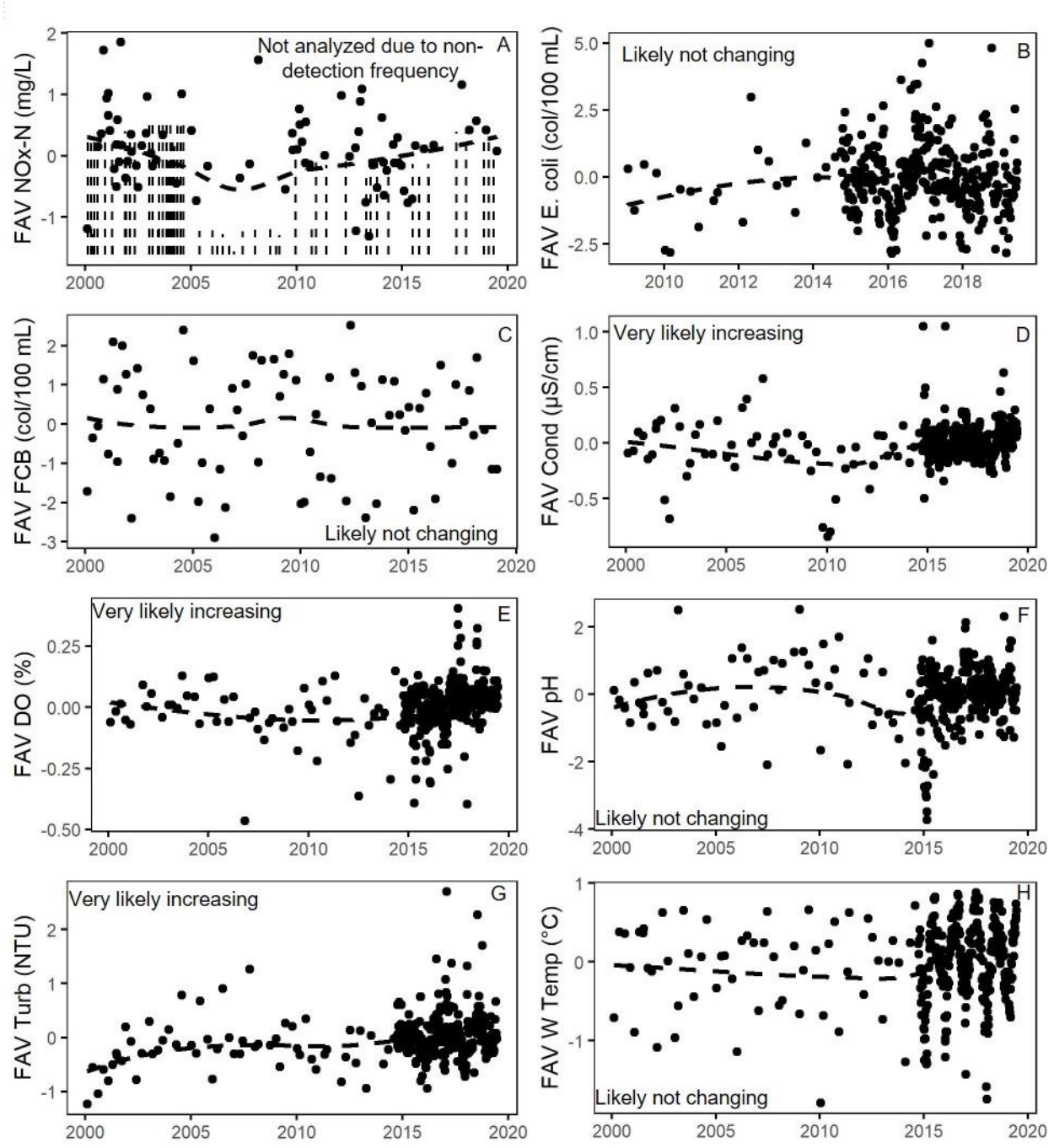


Figure A3.1.5 Flow-adjusted values (FAV) of water quality variables shown through time (2000 – 2019) for BUFR01. A) nitrate+nitrite-nitrogen (NOx_N), B) Escherichia coli (E. coli), C) fecal coliform bacteria (FCB), D) conductivity (Cond), E) dissolved oxygen (DO), F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation with time. Narrative results summarize statistical significance and trend direction across trend analyses. See **Table A2.2.1** for full results.

A3.2 BUFR02 - Buffalo River at Ponca Access Above Ponca Bridge

A3.2.1 Site and available data description

Buffalo River at Ponca Access Above Ponca Bridge (BUFR02; 36.0208; -93.1375) is a long-term water quality monitoring site on the river mainstem. BUFF staff have measured streamflow and in situ physiochemistry and collected water samples for analysis of bacteriological indicators and nutrient concentrations at the site since 1985 (**Figure A3.2.1-2**). In the late 2010's, sampling intensity increased substantially for many variables. From May 1, 2008, estimates of average daily streamflow are available for BUFR02 from the USGS gage #07055660. Before this date, instantaneous streamflow estimates collected by BUFF staff were available to combine with USGS data in the flow-adjustment procedure for generating FAVs of water quality variables as inputs to trend analysis.

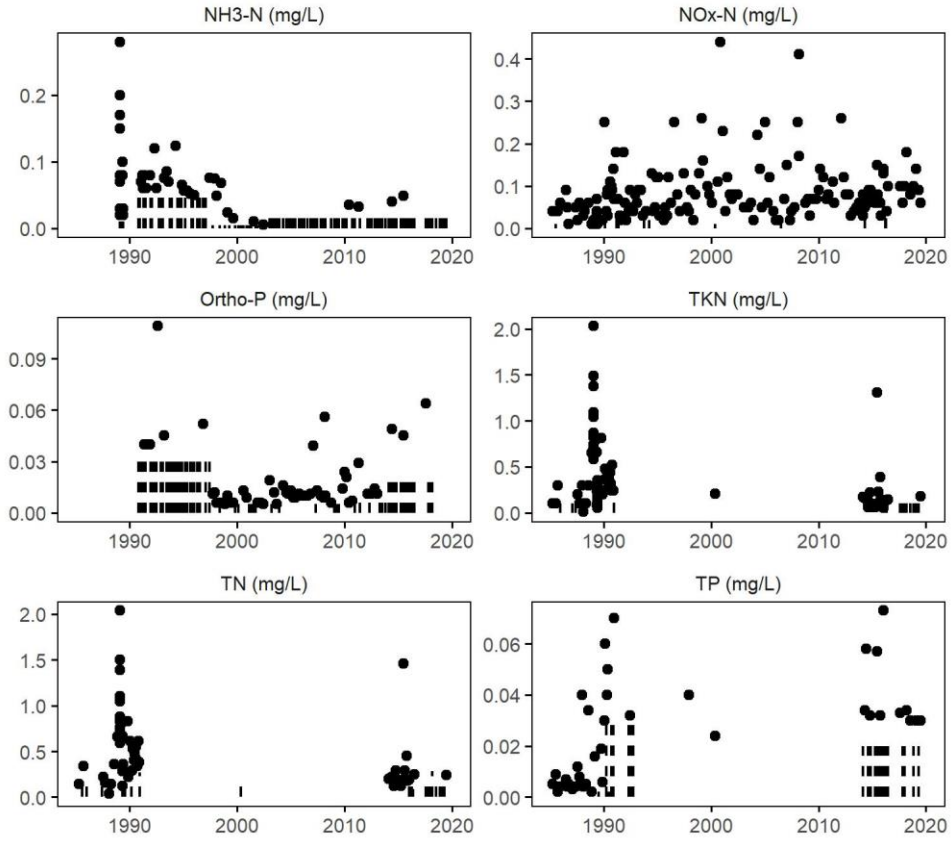


Figure A3.2.1 Nutrient variables (1985-2019) at BUFR02. Dashed lines indicate a non-detection, or that concentration could only be estimated within a range (i.e., between 0 and the relevant reporting limit).

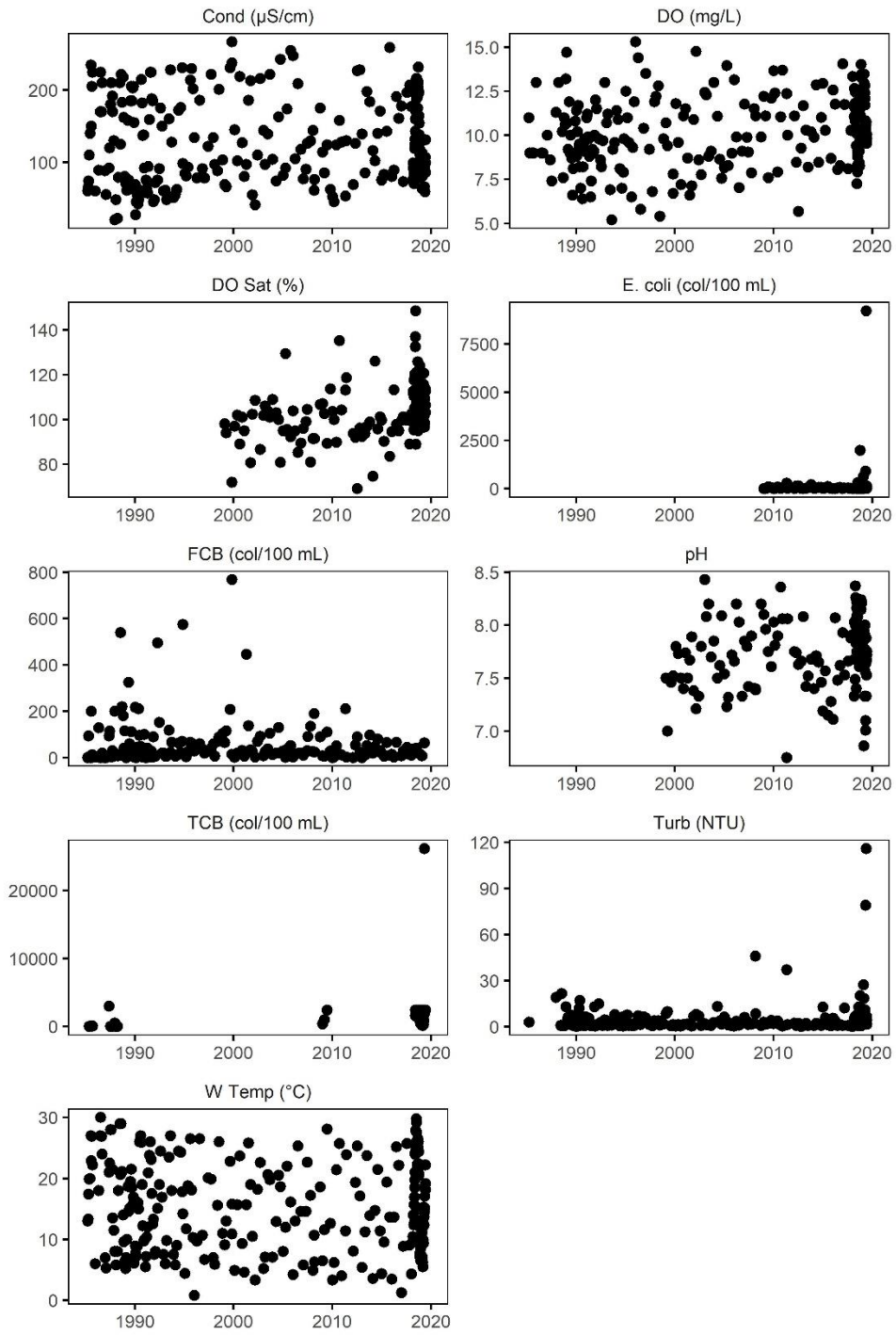


Figure A3.2.2 Bacterial indicator and physicochemical variables (1985-2019) at BUFR02.

A3.2.2 Trend analysis results (2000 - 2019): Narrative summaries

- NOx-N concentrations are likely not changing (**Figure A3.2.3-5A**).
- E. coli concentrations are likely not changing (**Figure A3.2.3-5B**).
- FCB concentrations are likely not changing (**Figure A3.2.3-5C**).
- Conductivity is very likely increasing by ~1% annually (**Figure A3.2.3-5D**).
- DO trend analysis results were not in agreement. Weight of evidence interpretation suggested that DO levels may be increasing by 0.5% annually (**Figure A3.2.3-5E**). All analyses suggested that DO % saturation is very likely increasing, but only SKT results suggested increasing concentration. Increased trend likelihood between MK and SKT likely reflects the known sizeable seasonal differences in DO due to temperature-dependent gas solubility. Therefore, SKT analysis of DO concentration and all analyses of DO % saturation, a metric that corrects for seasonal variability, can be considered the most reliable results.
- Stream pH is likely (SKT) to very likely (LR and MK) increasing by 2% annually (**Figure A3.2.3-5F**).
- Turbidity is likely not changing (**Figure A3.2.3-5G**).
- Water temperature is very likely increasing (**Figure A3.2.3-5H**).

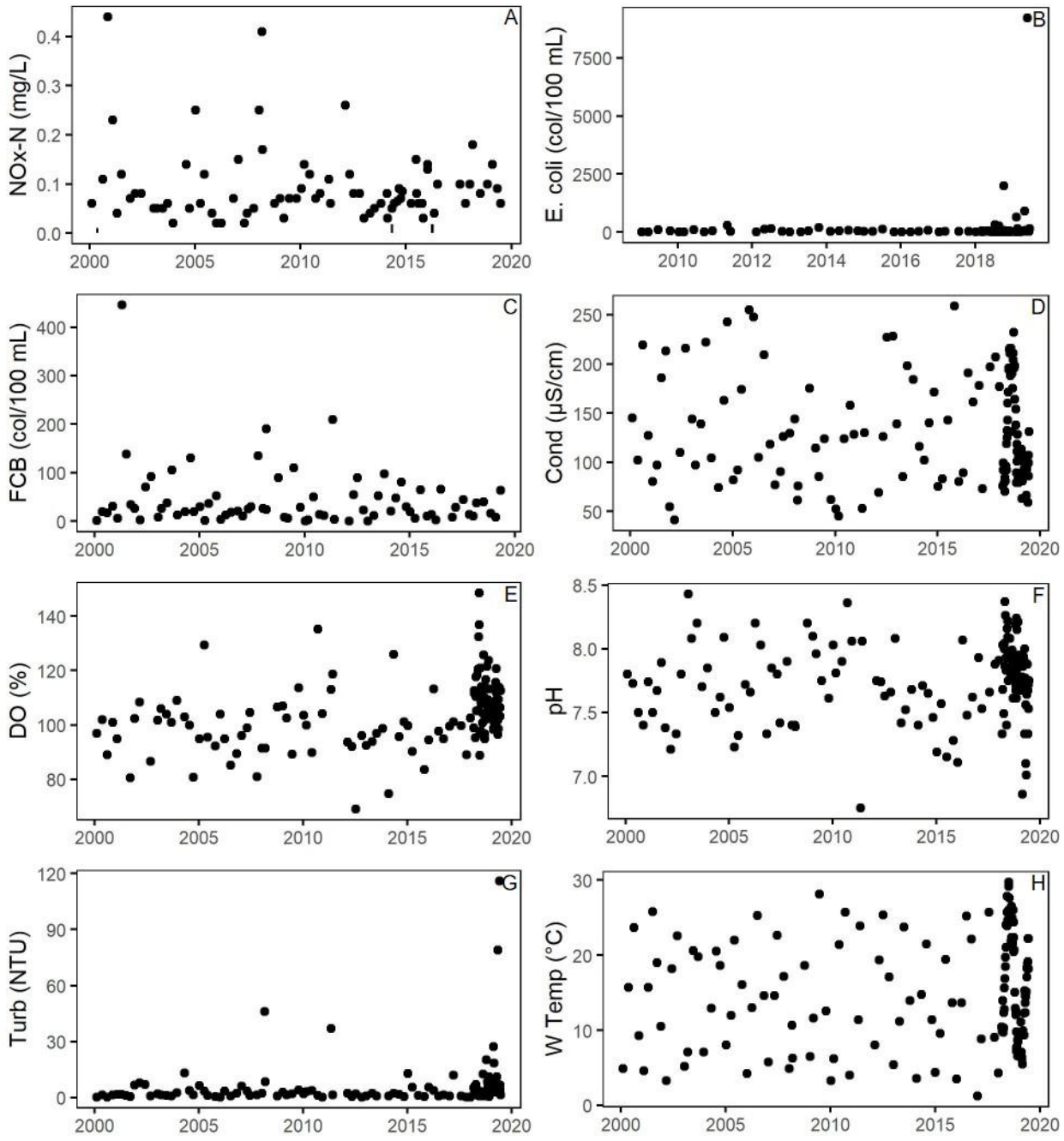


Figure A3.2.3 Water quality variable values shown through time (2000 – 2019) at BUFR02. A) nitrate+nitrite-nitrogen (NOx-N), B) Escherichia coli (E. coli), C) fecal coliform bacteria (FCB), D) conductivity (Cond), E) dissolved oxygen (DO), F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections.

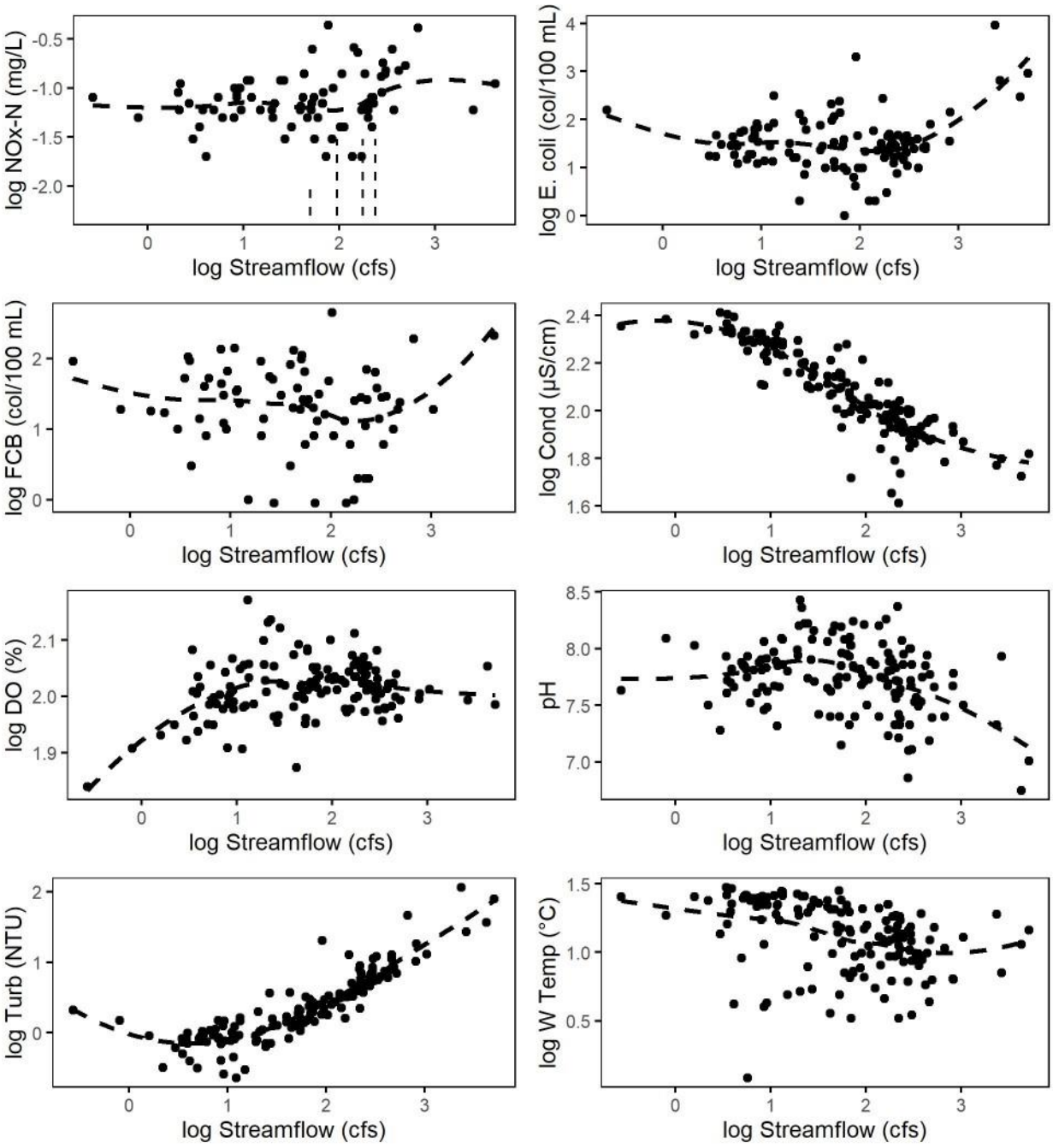


Figure A3.2.4 Water quality variable values (2000 – 2019) shown in relation to streamflow at BUFR02. A) nitrate+ nitrite-nitrogen (NOx-N), B) Escherichia coli (E. coli), C) fecal coliform bacteria (FCB), D) conductivity (Cond), E) dissolved oxygen (DO), F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation between each variable and streamflow.

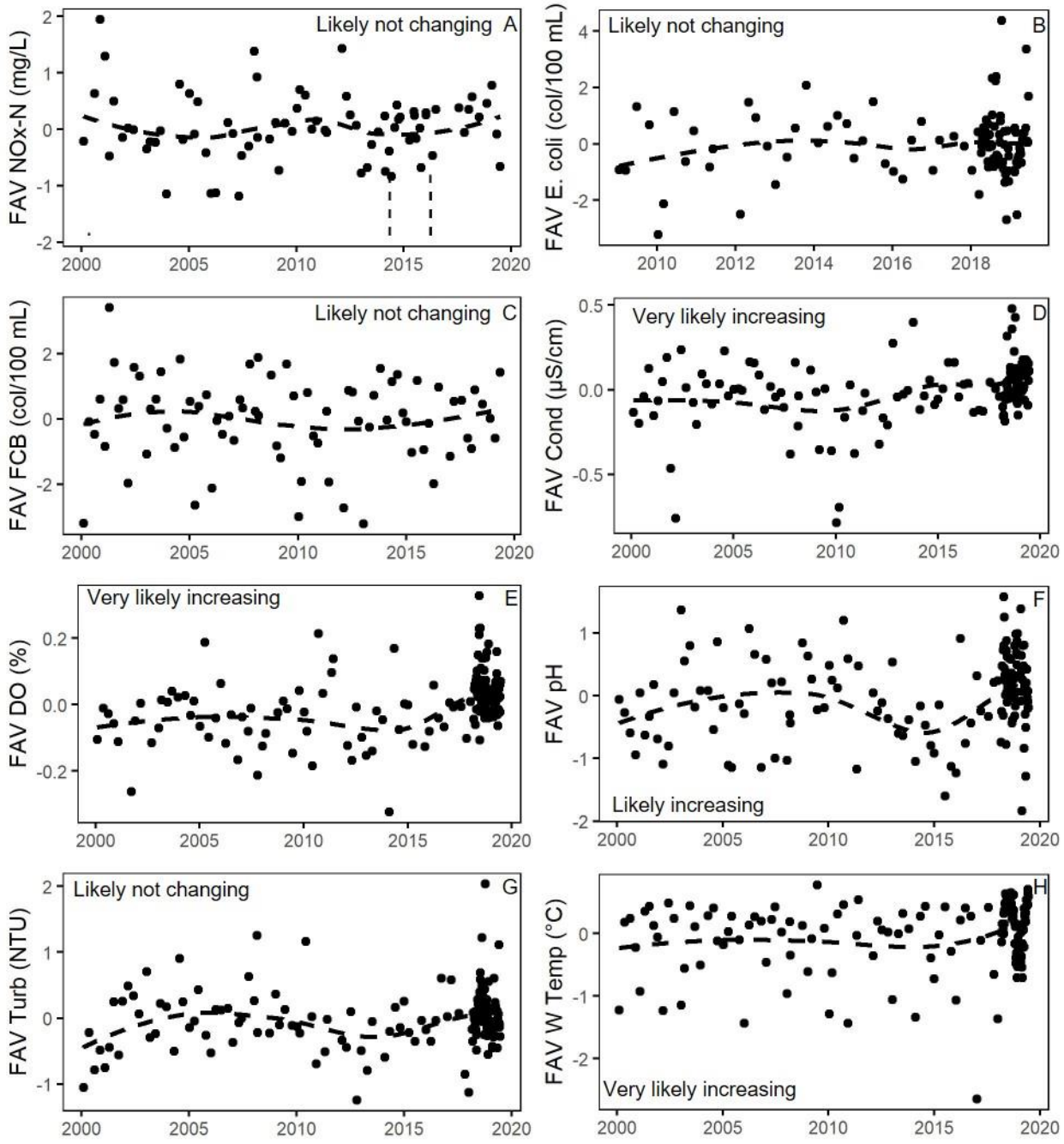


Figure A3.2.5 Flow-adjusted values (FAV) of water quality variables shown through time (2000 – 2019) for BUFR02. A) nitrate+nitrite-nitrogen (NOx_N), B) Escherischi coli (E. coli), C) fecal coliform bacteria (FCB), D) conductivity (Cond), E) dissolved oxygen (DO), F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation with time. Narrative results summarize statistical significance and trend direction across trend analyses. See **Table A2.2.1** for full results.

A3.3 BUFR03 - Buffalo River at Pruitt Access

A3.3.1 Site and available data description

Buffalo River at Pruitt Access (BUFR03; 36.0589, -93.3542) is a long-term water quality monitoring site on the river mainstem. BUFF staff have measured streamflow and in situ physiochemistry and collected water samples for analysis of bacteriological indicators and nutrient concentrations at the site since 1985 (**Figure A3.3.1-2**). From June 14, 2008, estimates of average daily streamflow are available for this location from the USGS gage # 07055680 for use in the flow-adjustment procedure prior to trend analysis. Before this date, instantaneous streamflow estimates collected by BUFF staff were available and used in the flow-adjustment procedure to generate FAVs of water quality variables as inputs for trend analysis.

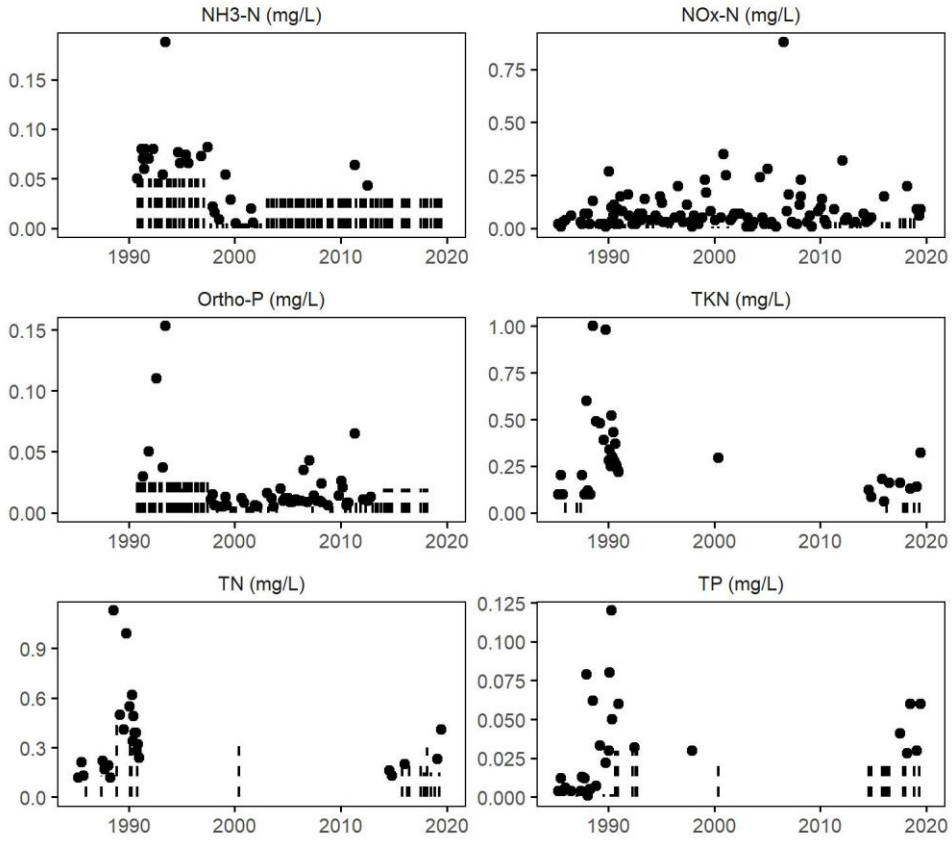


Figure A3.3.1 Nutrient variables (1985-2019) at BUFR03. Dashed lines indicate a non-detection, or that concentration could only be estimated within a range (i.e., between 0 and the relevant reporting limit).

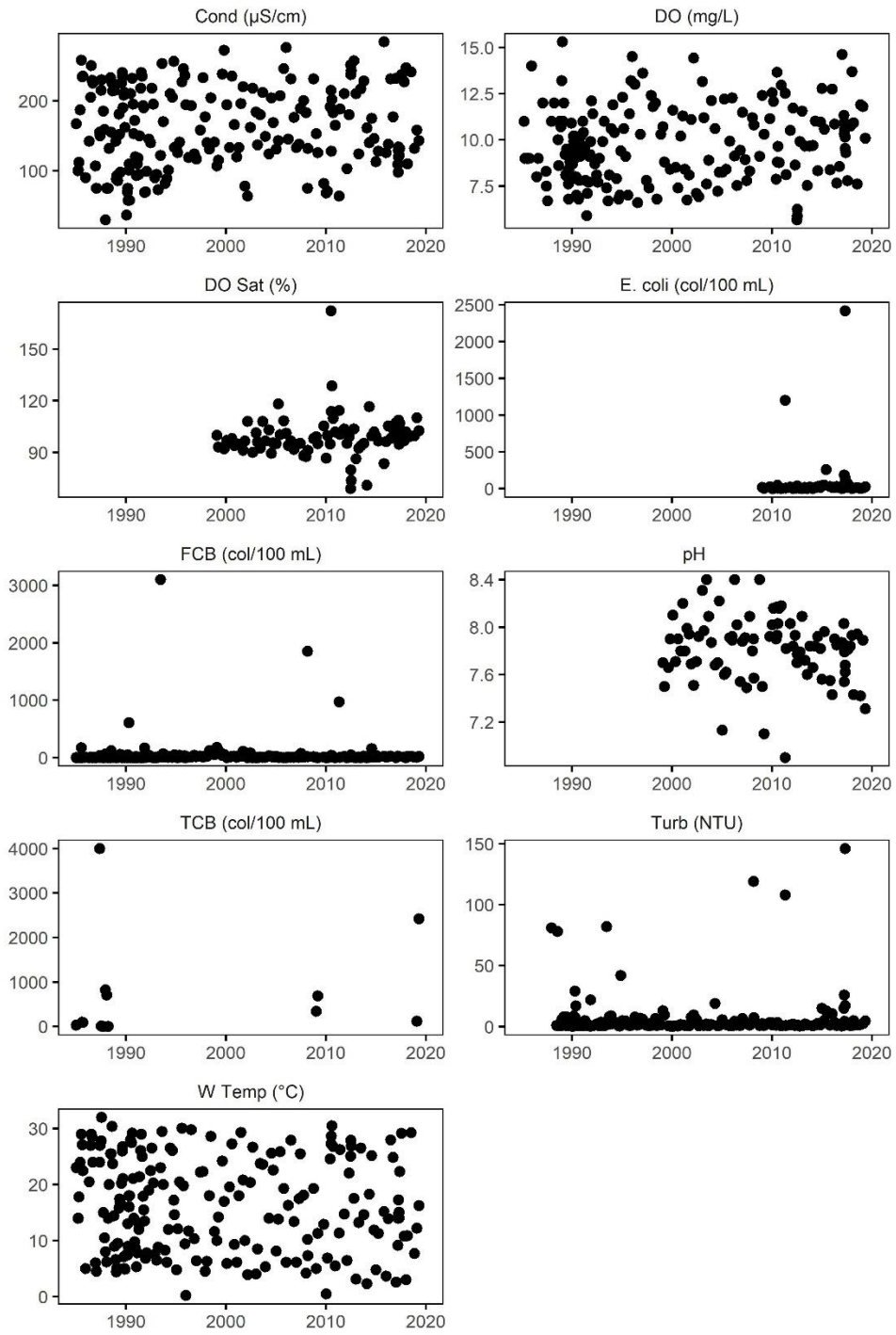


Figure A3.3.2 Bacterial indicator and physicochemical variables (1985-2019) at BUFR03.

A3.3.2 Trend analysis results (2000 - 2019): Narrative summaries

- NOx-N concentrations could not be analyzed at this site due non-detection frequency greater than 30% (**Figure A3.3.3-5A**).
- E. coli concentrations are likely not changing (**Figure A3.3.3-5B**).
- FCB concentrations are likely not changing (**Figure A3.3.3-5C**).
- Conductivity is likely not changing (**Figure A3.3.3-5D**).
- DO levels are likely not changing (**Figure A3.3.3-5E**).
- Turbidity is very likely increasing by 2% annually (**Figure A3.3.3-5G**).
- Water temperature is likely not changing (**Figure A3.3.3-5H**)

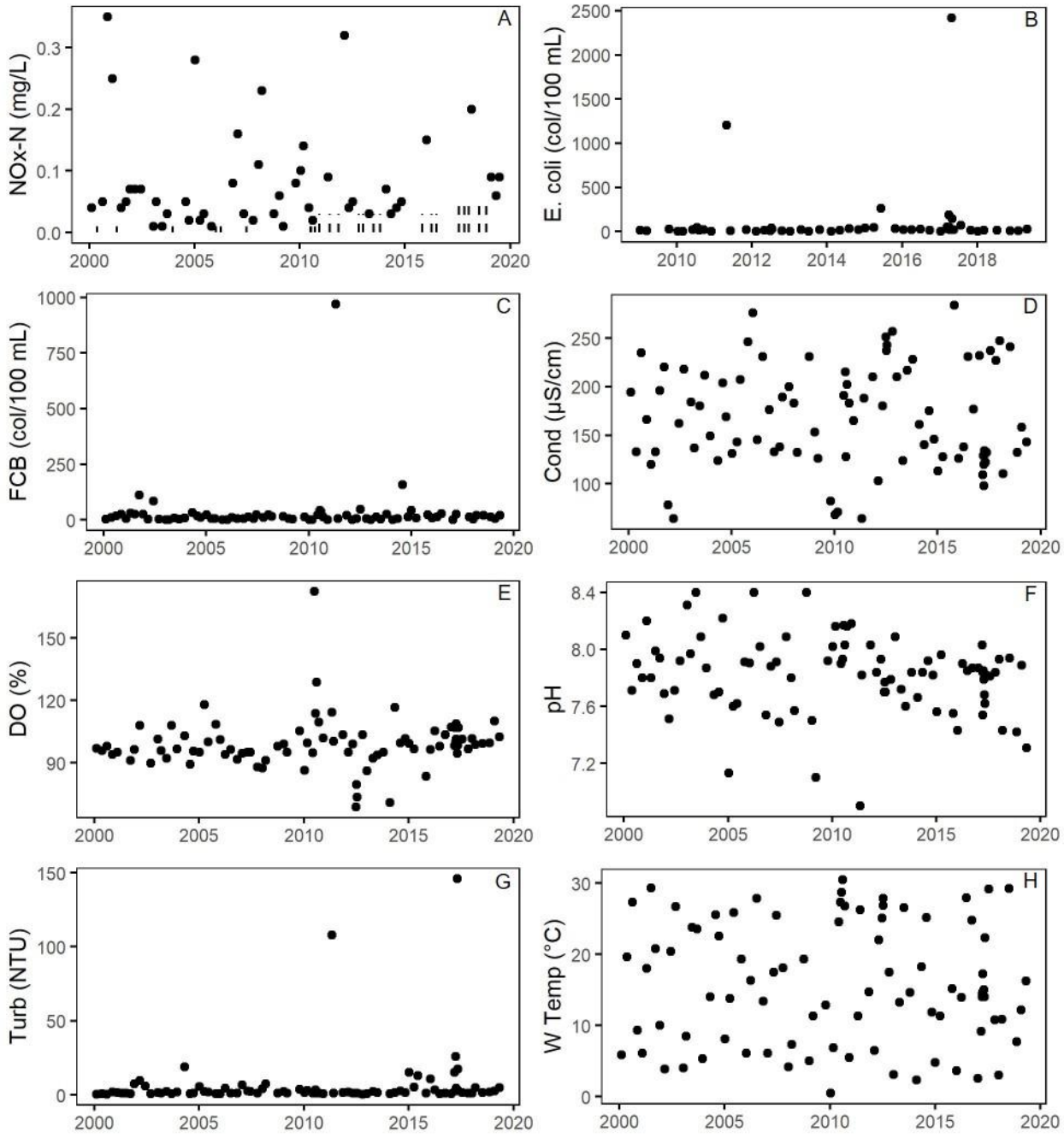


Figure A3.3.3 Water quality variable values shown through time (2000 – 2019) at BUFR03. A) nitrate+nitrite-nitrogen (NOx-N), B) Escherichia coli (E. coli), C) fecal coliform bacteria (FCB), D) conductivity (Cond), E) dissolved oxygen (DO), F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections.

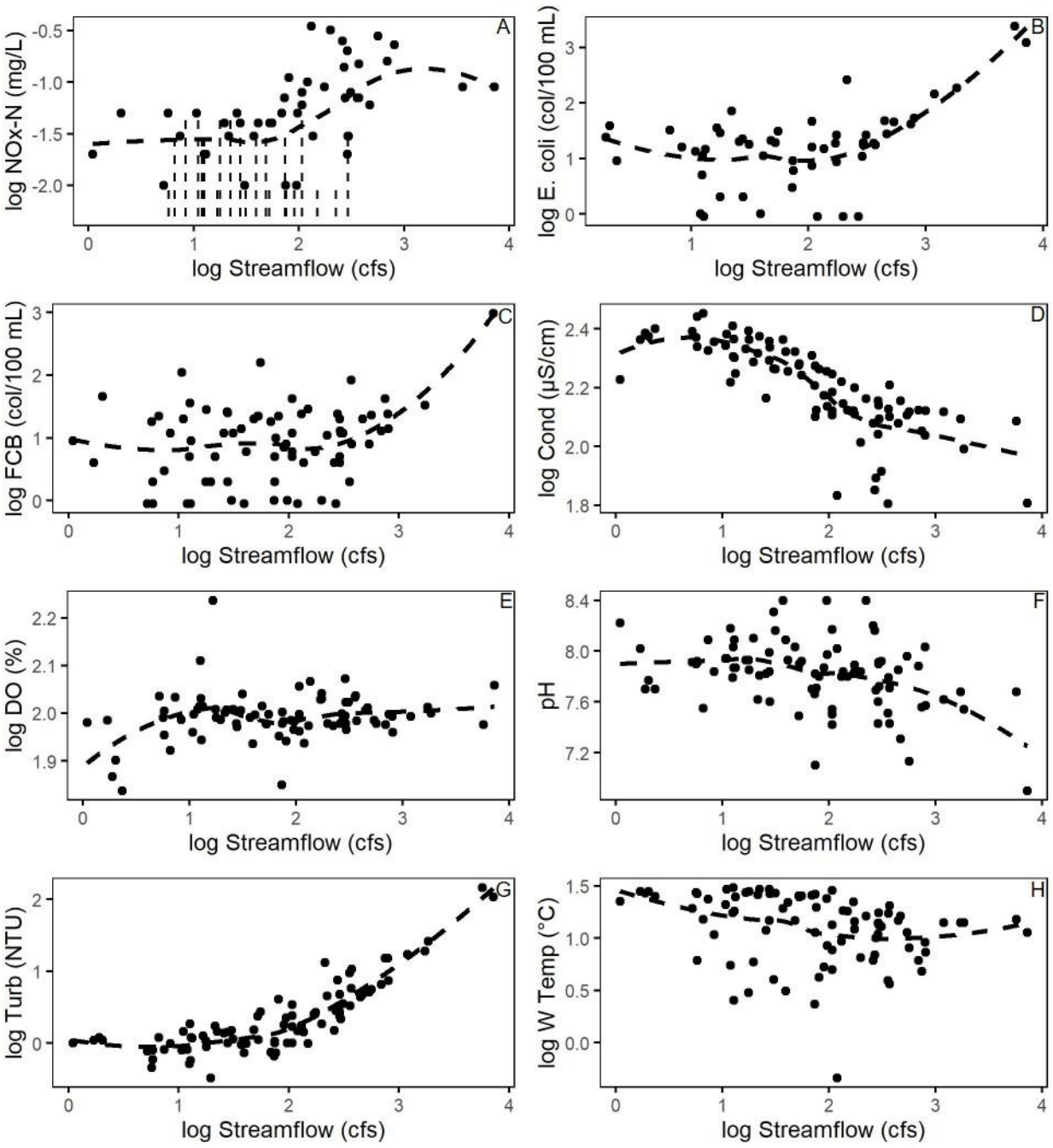


Figure A3.3.4 Water quality variable values (2000 – 2019) shown in relation to streamflow at BUFR03. A) nitrate+ nitrite-nitrogen (NOx-N), B) Escherichia coli (E. coli), C) fecal coliform bacteria (FCB), D) conductivity (Cond), E) dissolved oxygen (DO), F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation between each variable and streamflow.

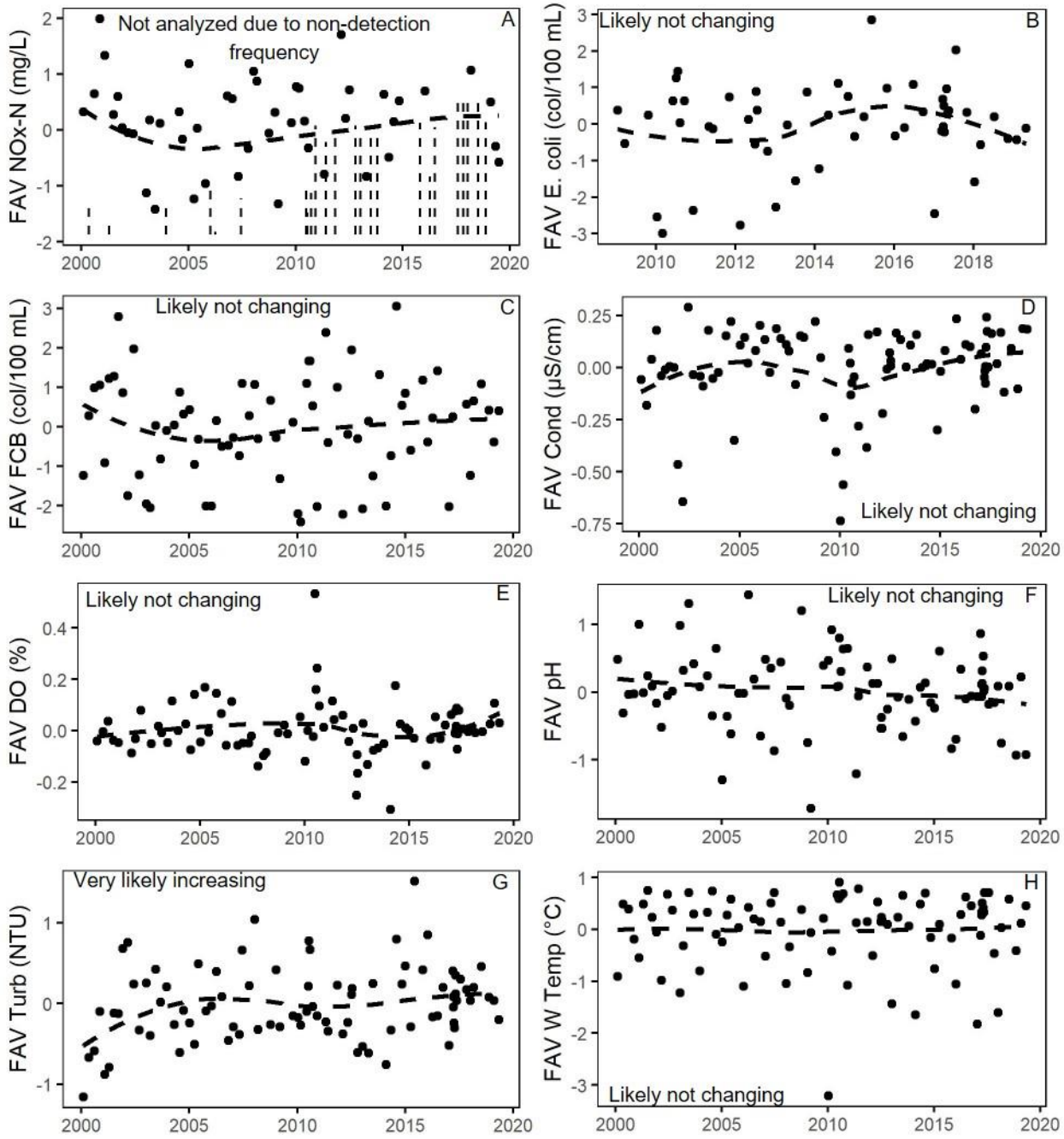


Figure A3.3.5 Flow-adjusted values (FAV) of water quality variables shown through time (2000 – 2019) for BUFR03. A) nitrate+nitrite-nitrogen (NOx-N), B) Escherischia coli (E. coli), C) fecal coliform bacteria (FCB), D) conductivity (Cond), E) dissolved oxygen (DO), F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation with time. Narrative results summarize statistical significance and trend direction across trend analyses. See **Table A2.2.1** for full results.

A3.4 BUFR04 - Buffalo River near Hasty, AR

A3.4.1 Site and available data description

Buffalo River near Hasty, AR (BUFR04; 36.005, -93.0814) is a long-term water quality monitoring site on the river mainstem. BUFF staff have measured streamflow and in situ physiochemistry and collected water samples for analysis of bacteriological indicators and nutrient concentrations at the site since 1985 (**Figure A3.4.1-2**). In the late 2010's sampling intensity increased substantially at this site. Instantaneous streamflow estimates collected by BUFF staff were available to use in the flow-adjustment procedure to generate FAVs of water quality variables for trend analysis.

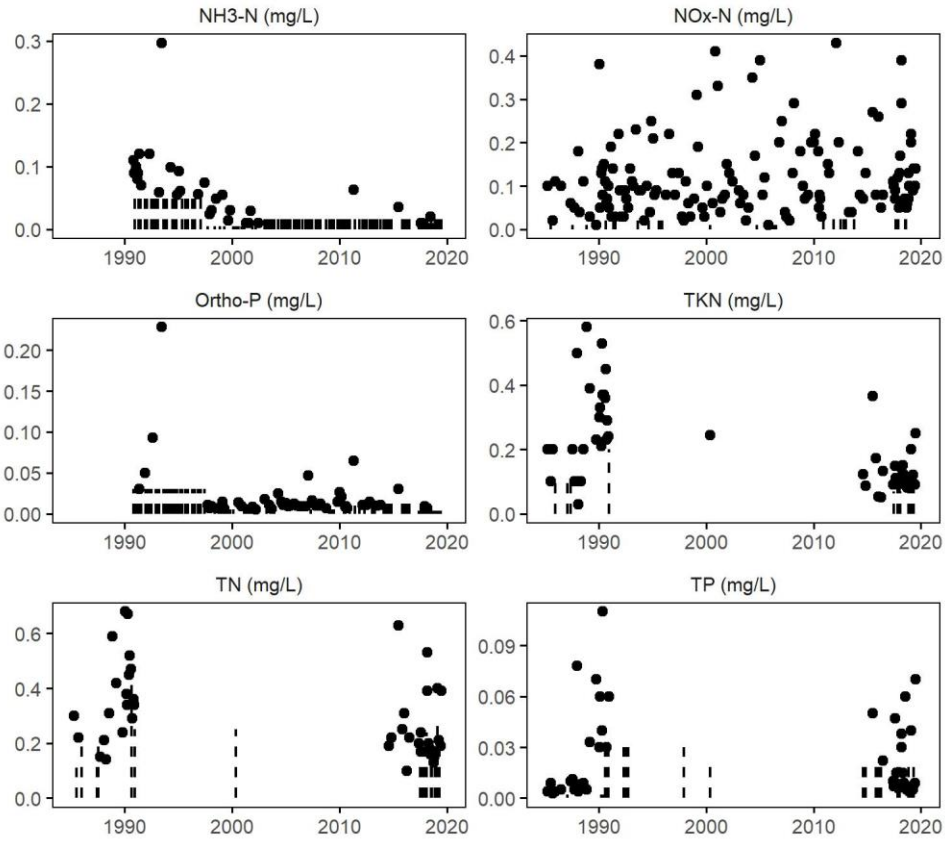


Figure A3.4.1 Nutrient variables (1985-2019) at BUFR04. Dashed lines indicate a non-detection, or that concentration could only be estimated within a range (i.e., between 0 and the relevant reporting limit).

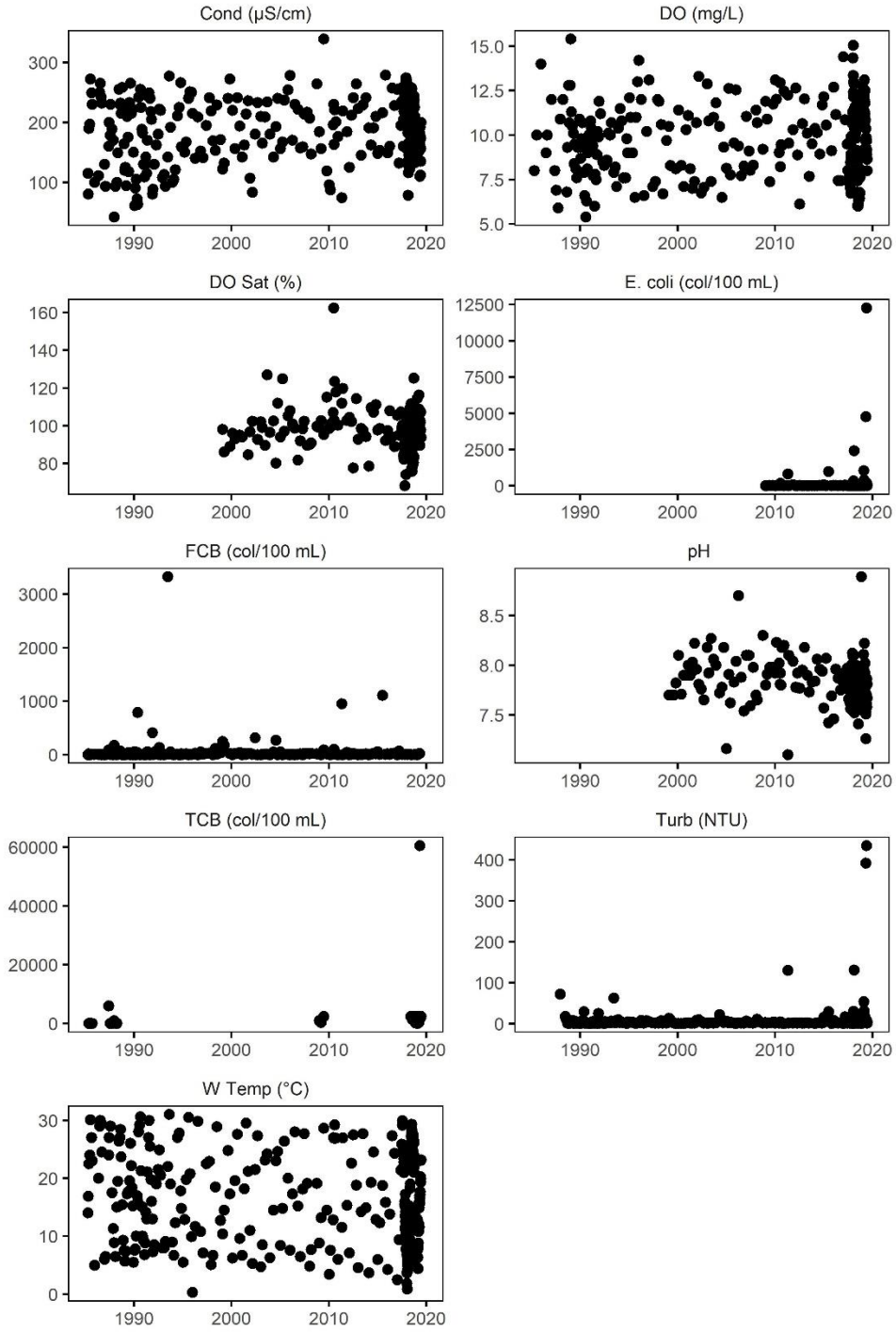


Figure A3.4.2 Bacterial indicator and physicochemical variables (1985-2019) at BUFR04.

A3.4.2 Trend analysis results (2000 - 2019): Narrative summaries

- NO_x-N concentrations are likely not changing at this site (**Figure A3.4.3-5A**).
- E. coli concentrations are likely not changing at this site (**Figure A3.4.3-5B**).
- FCB concentrations are likely not changing at this site (**Figure A3.4.3-5C**).
- Conductivity is likely (LR and SKT) to very likely (MK) increasing by 0.3 – 0.5 % annually (**Figure A3.4.3-5D**).
- DO levels are likely not changing (**Figure A3.4.3-5E**), though results of linear regression on DO saturation suggested a very likely increase.
- Stream pH is very likely decreasing by 2 – 3% annually at this site (**Figure A3.4.3-5F**).
- Turbidity is very likely increasing by 2% annually at this site (**Figure A3.4.3-5G**).
- Water temperature is likely not changing at this site (**Figure A3.4.3-5H**).

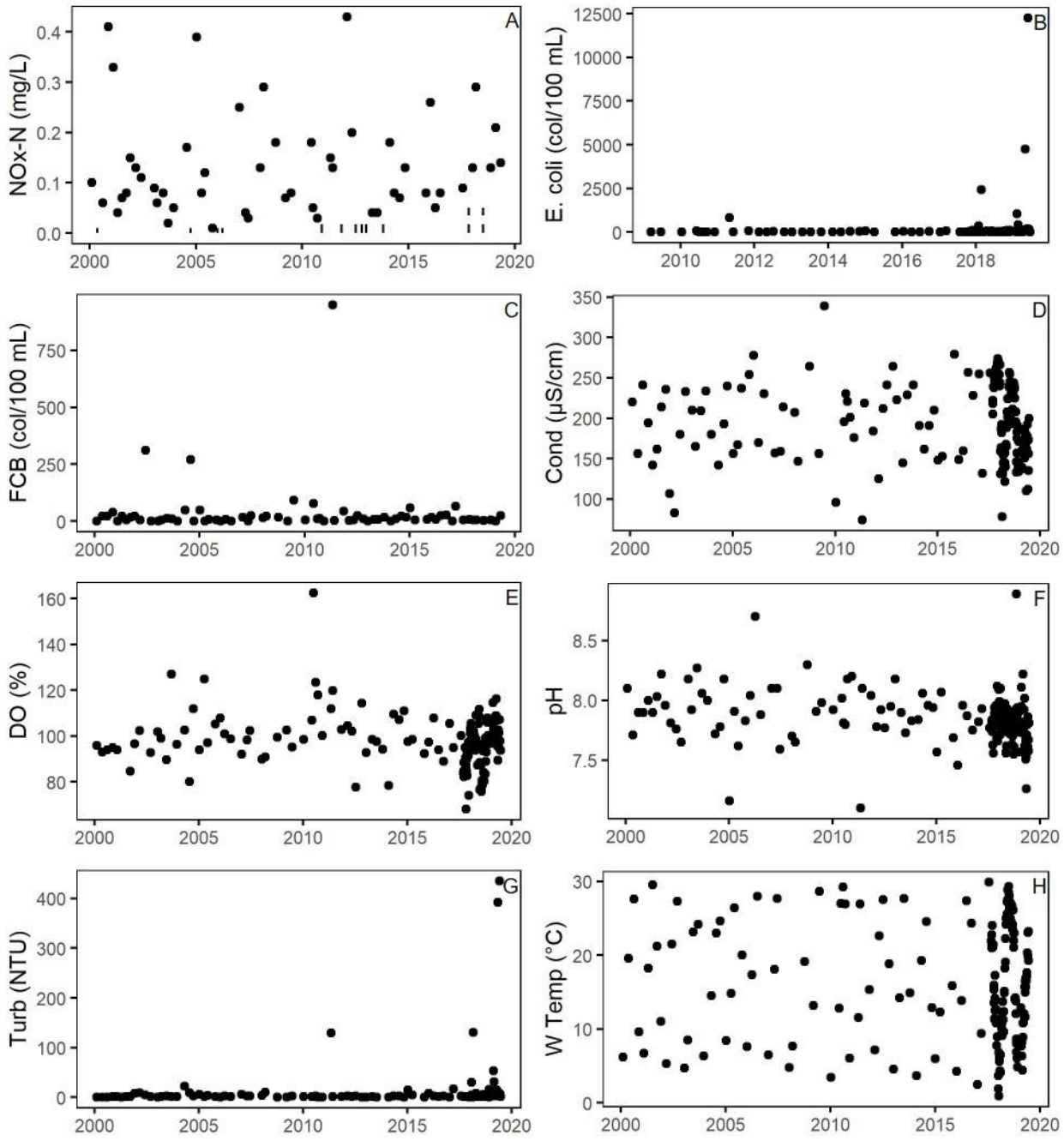


Figure A3.4.3 Water quality variable values shown through time (2000 – 2019) at BUFR04. A) nitrate+nitrite-nitrogen (NOx-N), B) Escherichia coli (E. coli), C) fecal coliform bacteria (FCB), D) conductivity (Cond), E) dissolved oxygen (DO), F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections.

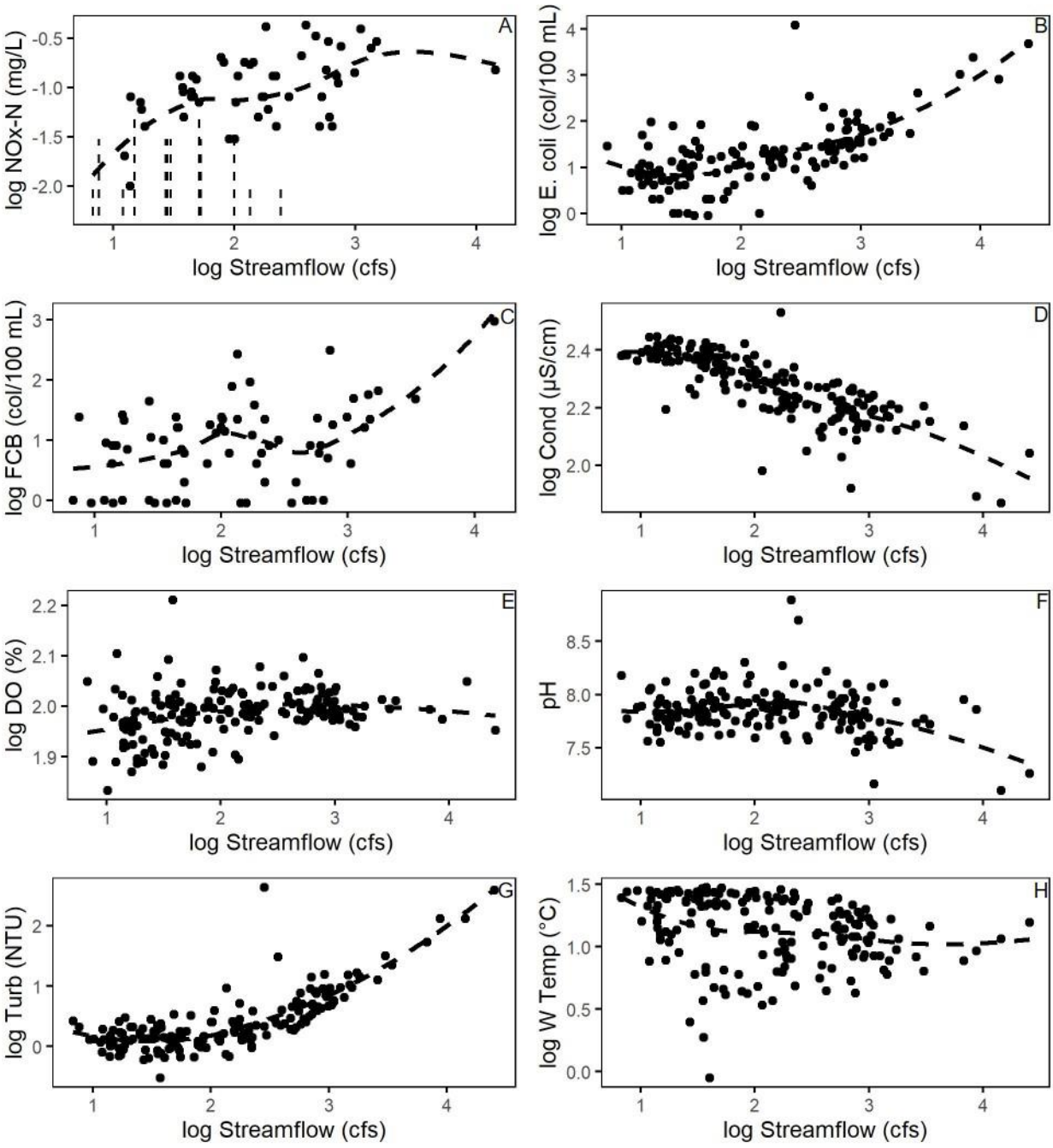


Figure A3.4.4 Water quality variable values (2000 – 2019) shown in relation to streamflow at BUFR04. A) nitrate+ nitrite-nitrogen (NOx-N), B) Escherichia coli (E. coli), C) fecal coliform bacteria (FCB), D) conductivity (Cond), E) dissolved oxygen (DO), F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation between each variable and streamflow.

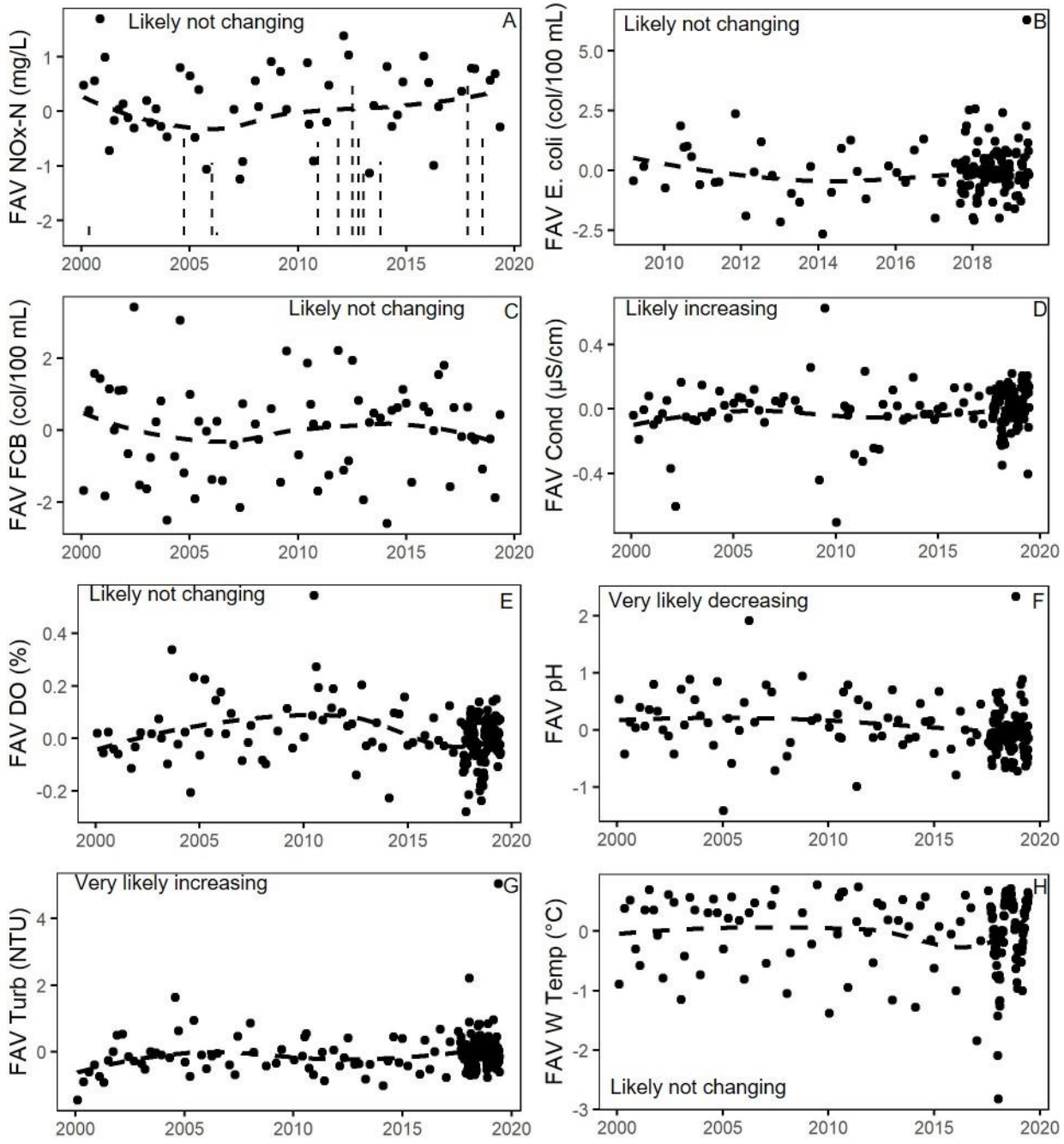


Figure A3.4.5 Flow-adjusted values (FAV) of water quality variables shown through time (2000 – 2019) for BUFR04. A) nitrate+nitrite-nitrogen (NOx-N), B) Escherichia coli (E. coli), C) fecal coliform bacteria (FCB), D) conductivity (Cond), E) dissolved oxygen (DO), F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation with time. Narrative results summarize statistical significance and trend direction across trend analyses. See **Table A2.2.1** for full results.

A3.5 BUFR05 - Buffalo River at Woolum Access above Richland Creek Confluence

A3.5.1 Site and available data description

Buffalo River near Hasty, AR (BUFR04; 36.005, -93.0814) is a long-term water quality monitoring site on the river mainstem. BUFF staff have measured streamflow and in situ physiochemistry and collected water samples for analysis of bacteriological indicators and nutrient concentrations at the site since 1985 (**Figure A3.5.1-2**). In the late 2010's sampling intensity increased substantially at this site. Instantaneous streamflow estimates collected by BUFF staff were available to use in the flow-adjustment procedure to generate FAVs of water quality variables for trend analysis.

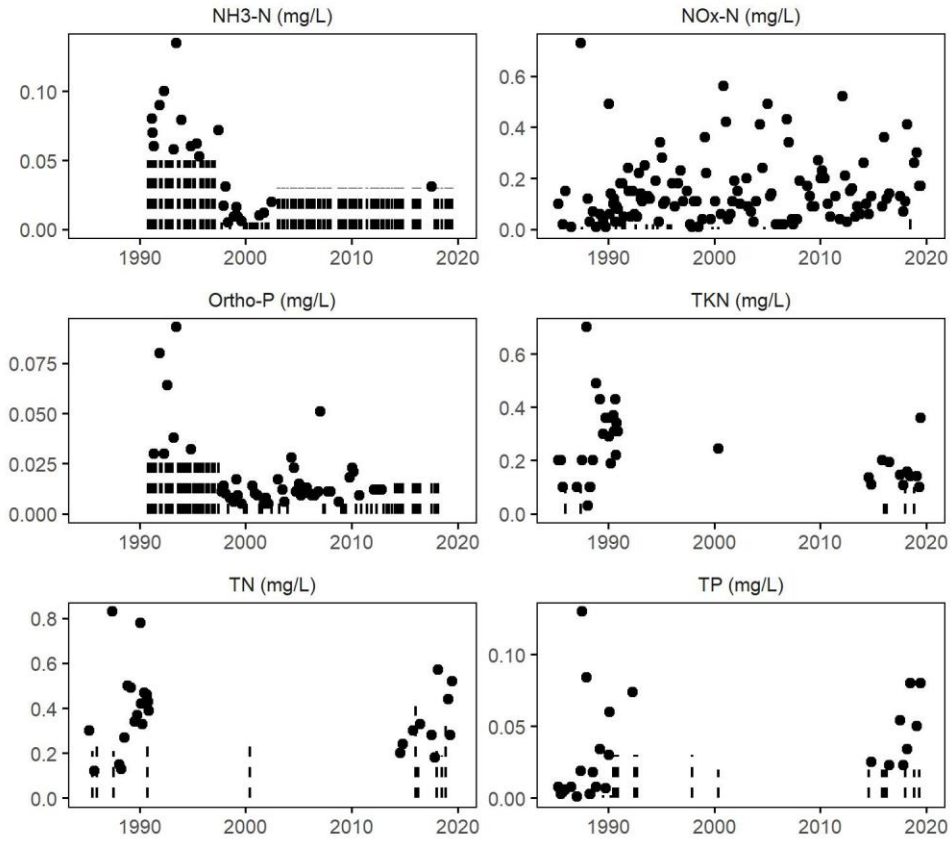


Figure A3.5.1 Nutrient variables (1985-2019) at BUFR05. Dashed lines indicate a non-detection, or that concentration could only be estimated within a range (i.e., between 0 and the relevant reporting limit).

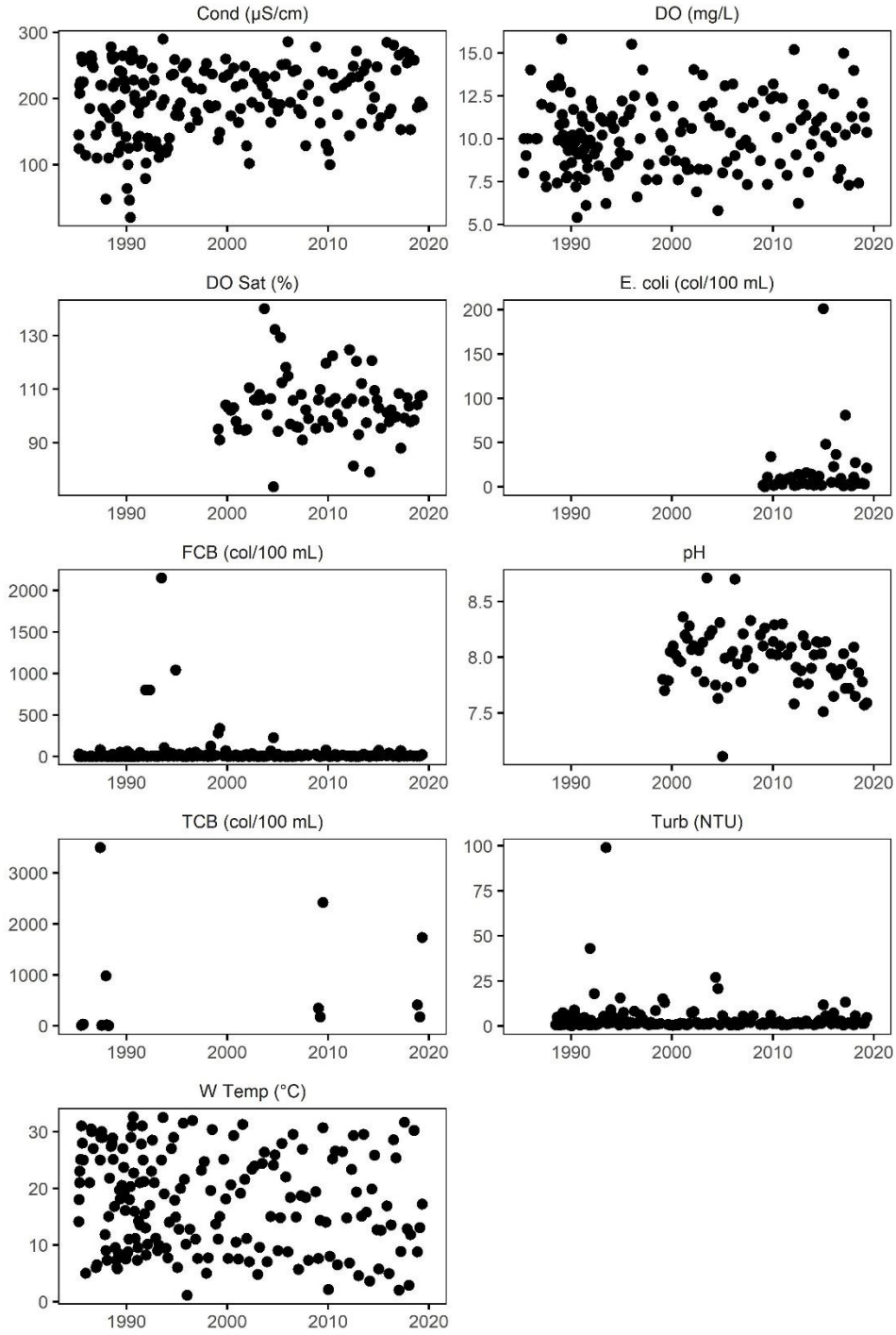


Figure A3.5.2 Bacterial indicator and physicochemical variables (1985-2019) at BUFR05.

A3.5.2 Trend analysis results (2000 - 2019): Narrative summaries

- NOx-N concentrations are likely not changing (**Figure A3.5.3-5A**).
- FCB concentration trend analysis results were not in agreement. Weight of evidence interpretation suggested that FCB concentration is very likely increasing by 4 – 5% annually (MK and SKT; **Figure A3.5.1-3B**). Linear regression analysis results suggested no change, but were near significant.
- Conductivity is likely (LR and SKT) to very likely (MK) increasing by 0.4 – 0.6% annually (**Figure A3.5.3-5C**).
- DO levels are likely not changing (**Figure A3.5.3-5D&E**).
- Stream pH trend analysis results were not in agreement. Weight of evidence interpretation suggested that pH is likely not changing (**Figure A3.5.3-5F**). Results of LR and MK suggested a very likely decrease, but SKT results suggested no change. Reduced trend likelihood between MK and SKT suggests that seasonality is an important source of variability for pH and that sampling was potentially not even across seasons.
- Turbidity trend analysis results were not in agreement. Weight of evidence interpretation suggested that turbidity is likely not changing (**Figure A3.5.3-5G**). Results of MK suggested a very likely increase, but SKT results suggest no change. Reduced trend likelihood between Mk and SKT suggests that seasonality is an important source of variability for turbidity and sampling was potentially not even across seasons.
- Water temperature is very likely increasing (**Figure A3.5.3-5H**).

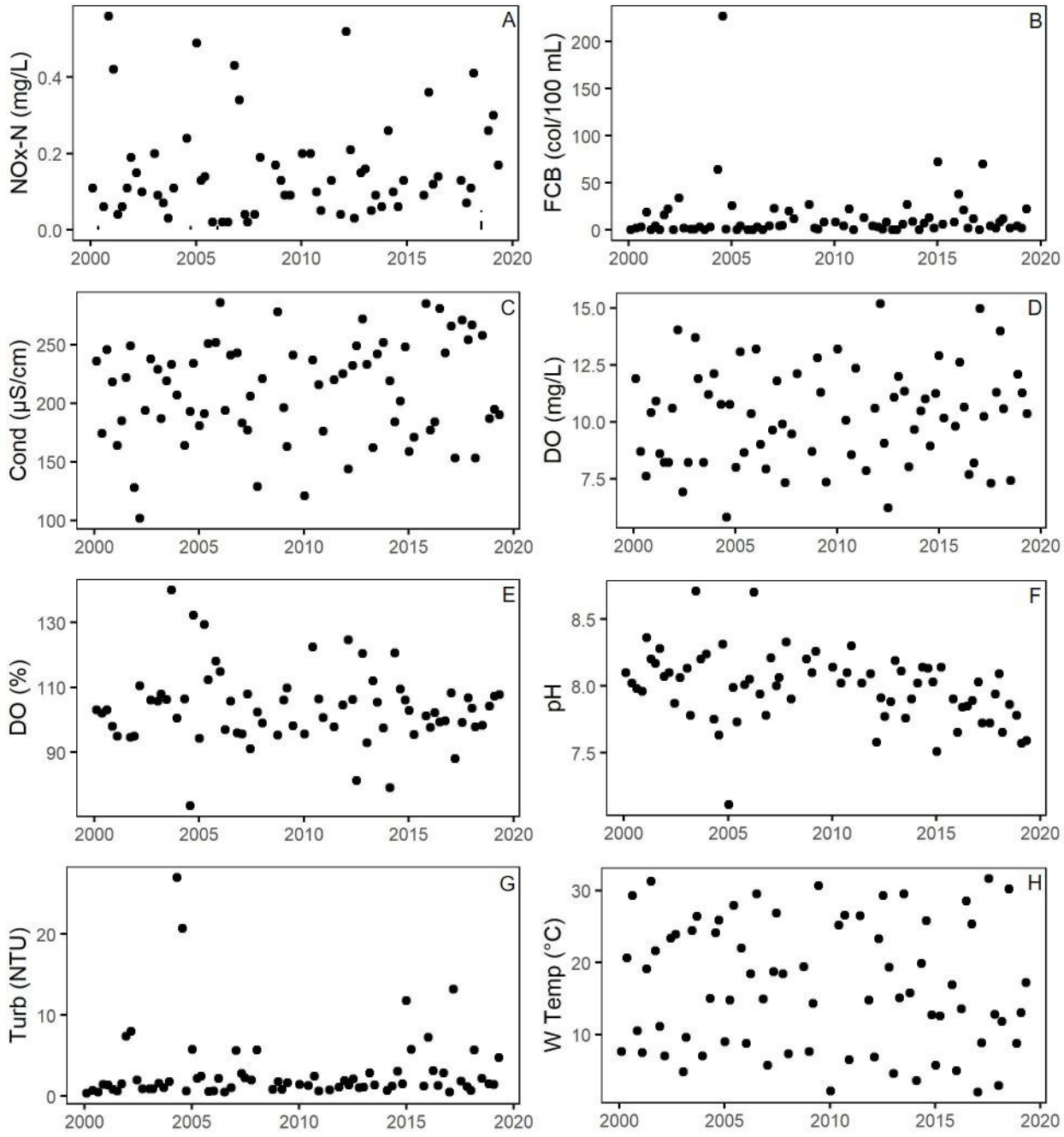


Figure A3.5.3 Water quality variable values shown through time (2000 – 2019) at BUFR05. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections.

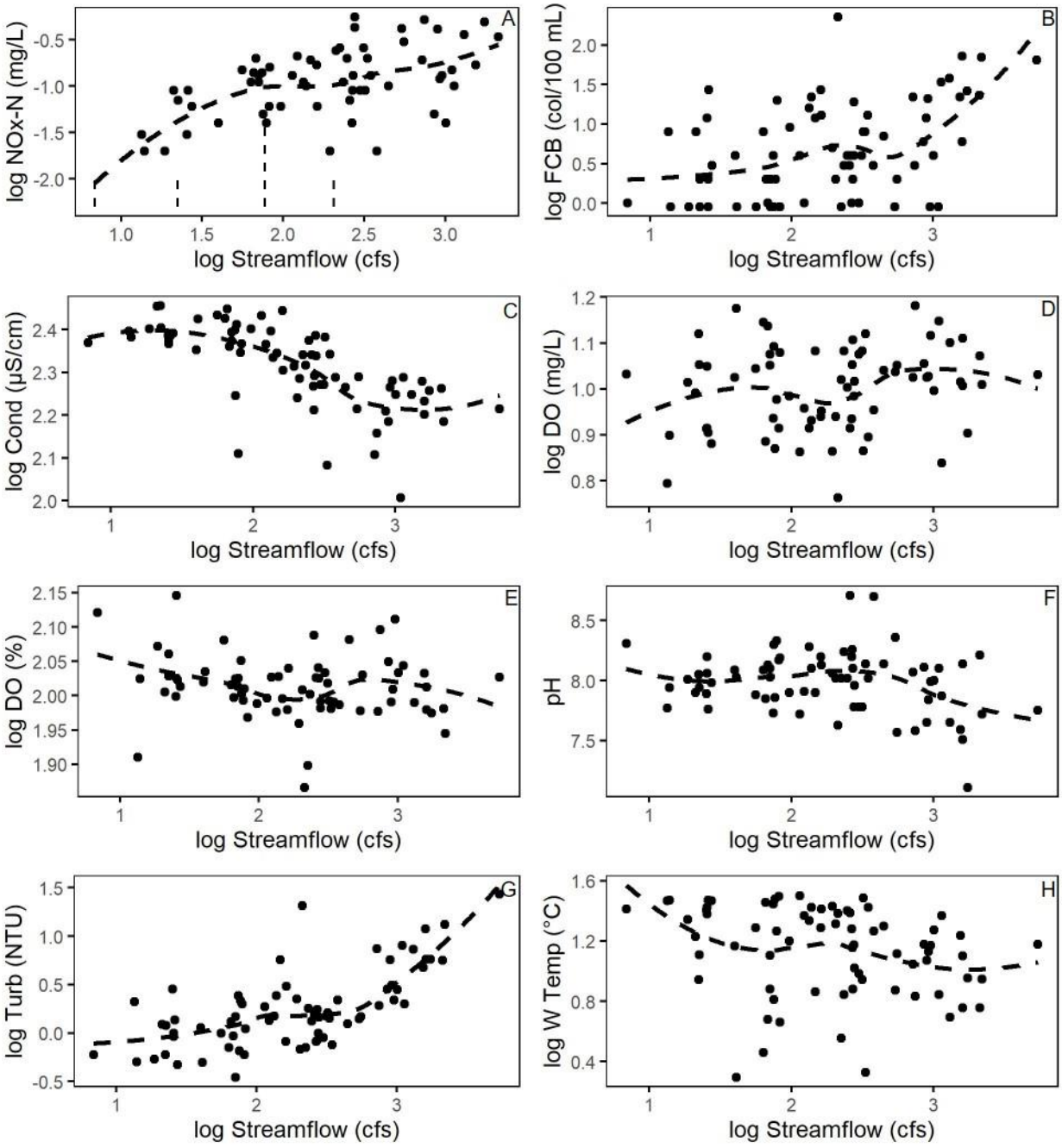


Figure A3.5.4 Water quality variable values (2000 – 2019) shown in relation to streamflow at BUFR05. A) nitrate+ nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation between each variable and streamflow.

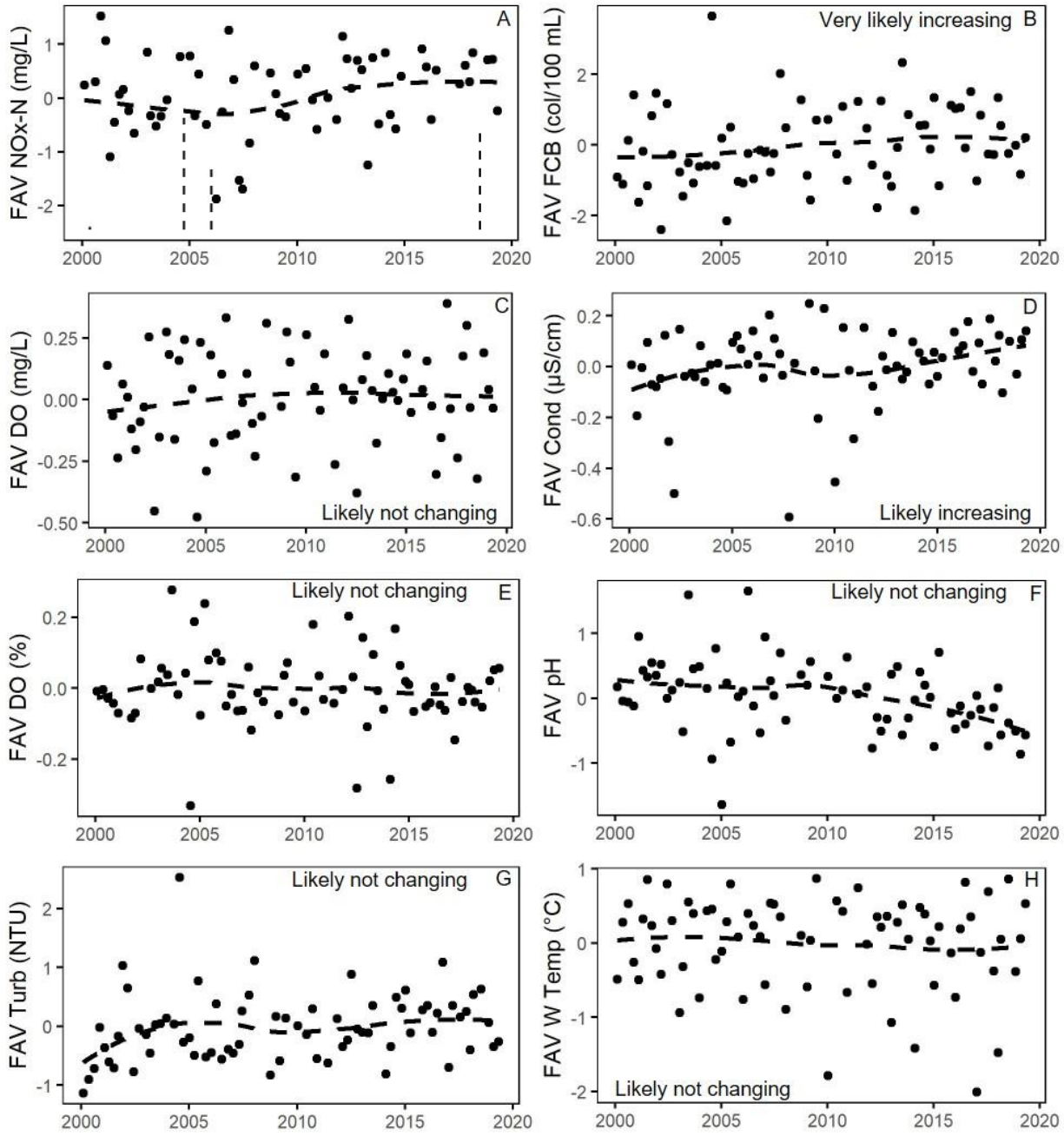


Figure A3.5.5 Flow-adjusted values (FAV) of water quality variables shown through time (2000 – 2019) for BUFR05. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation with time. Narrative results summarize statistical significance and trend direction across trend analyses. See **Table A2.2.1** for full results.

A3.6 BUFR06 - Buffalo River at Gilbert, Arkansas

A3.6.1 Site and available data description

Buffalo River at Gilbert, Arkansas (BUFR06; 35.9847, -92.7167) is a long-term water quality monitoring site on the river mainstem. BUFF staff have measured streamflow and in situ physiochemistry and collected water samples for analysis of bacteriological indicators and nutrient concentrations at the site since 1985 (**Figure A3.6.1-2**). Instantaneous streamflow estimates collected by BUFF staff were used in the flow-adjustment procedure to generate FAVs of water quality variables for trend analysis.

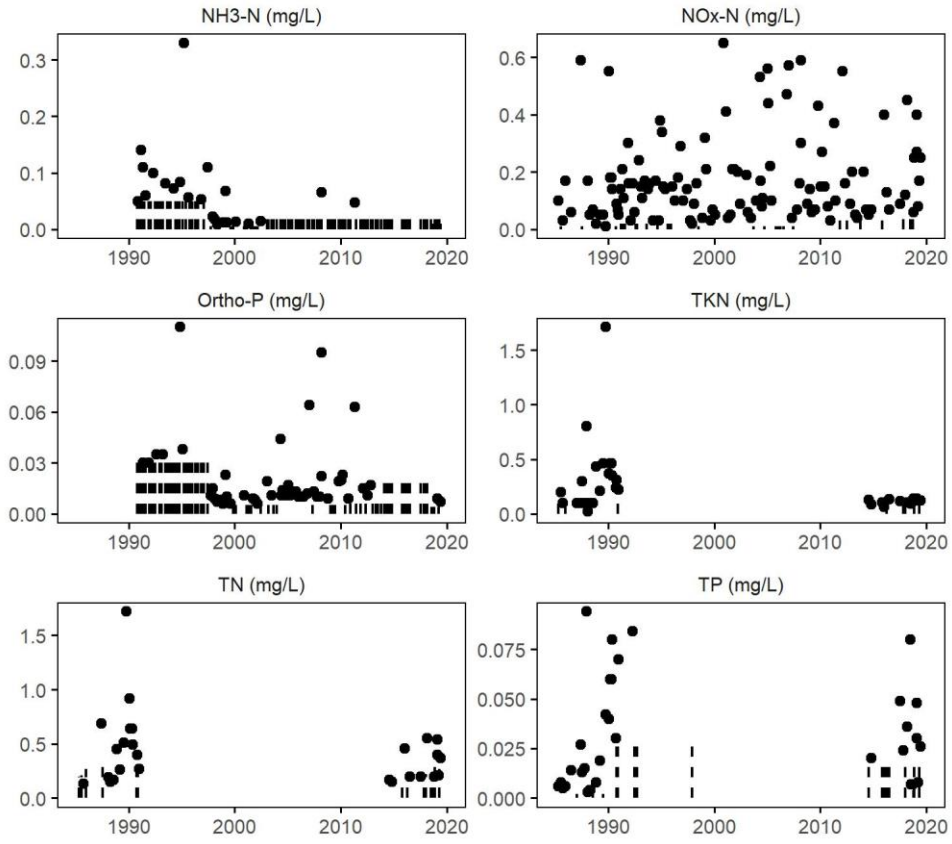


Figure A3.6.1 Nutrient variables (1985-2019) at BUFR06. Dashed lines indicate a non-detection, or that concentration could only be estimated within a range (i.e., between 0 and the relevant reporting limit).

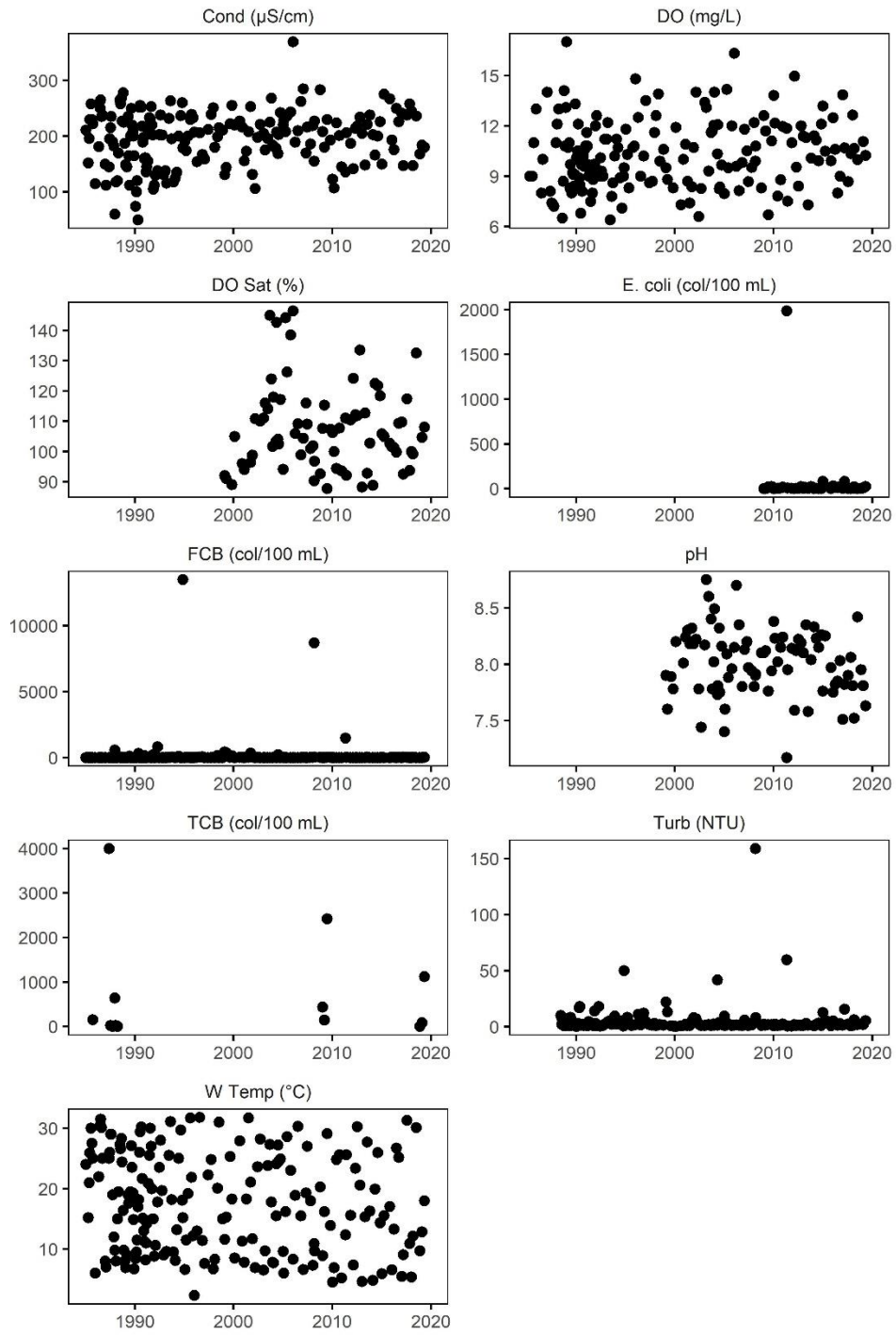


Figure A3.6.2 Bacterial indicator and physicochemical variables (1985-2019) at BUFR06.

A3.6.2 Trend analysis results (2000 - 2019): Narrative summaries

- NO_x-N concentration trend analysis results were not in agreement and required weight of evidence interpretation, suggesting that NO_x-N concentrations are likely increasing by 2 – 4% annually (SKT $p<0.10$; **Figure A3.6.3-5A**). Results of LR and MK suggested no change ($p\geq0.10$), but significant SKT results likely reflect known seasonal NO_x-N variability.
- FCB concentrations are likely not changing ($p\geq0.10$; **Figure A3.6.3-5B**).
- Conductivity is likely not changing ($p\geq0.10$; **Figure A3.6.3-5C**).
- DO levels are likely not changing ($p\geq0.10$; **Figure A3.6.3-5D&E**).
- Stream pH is very likely decreasing by ~3 – 4% annually ($p<0.05$; **Figure A3.6.3-5F**).
- Turbidity was likely not changing ($p\geq0.10$; **Figure A3.6.3-5G**).
- Water temperature is likely not changing ($p\geq0.10$; **Figure A3.6.3-5H**).

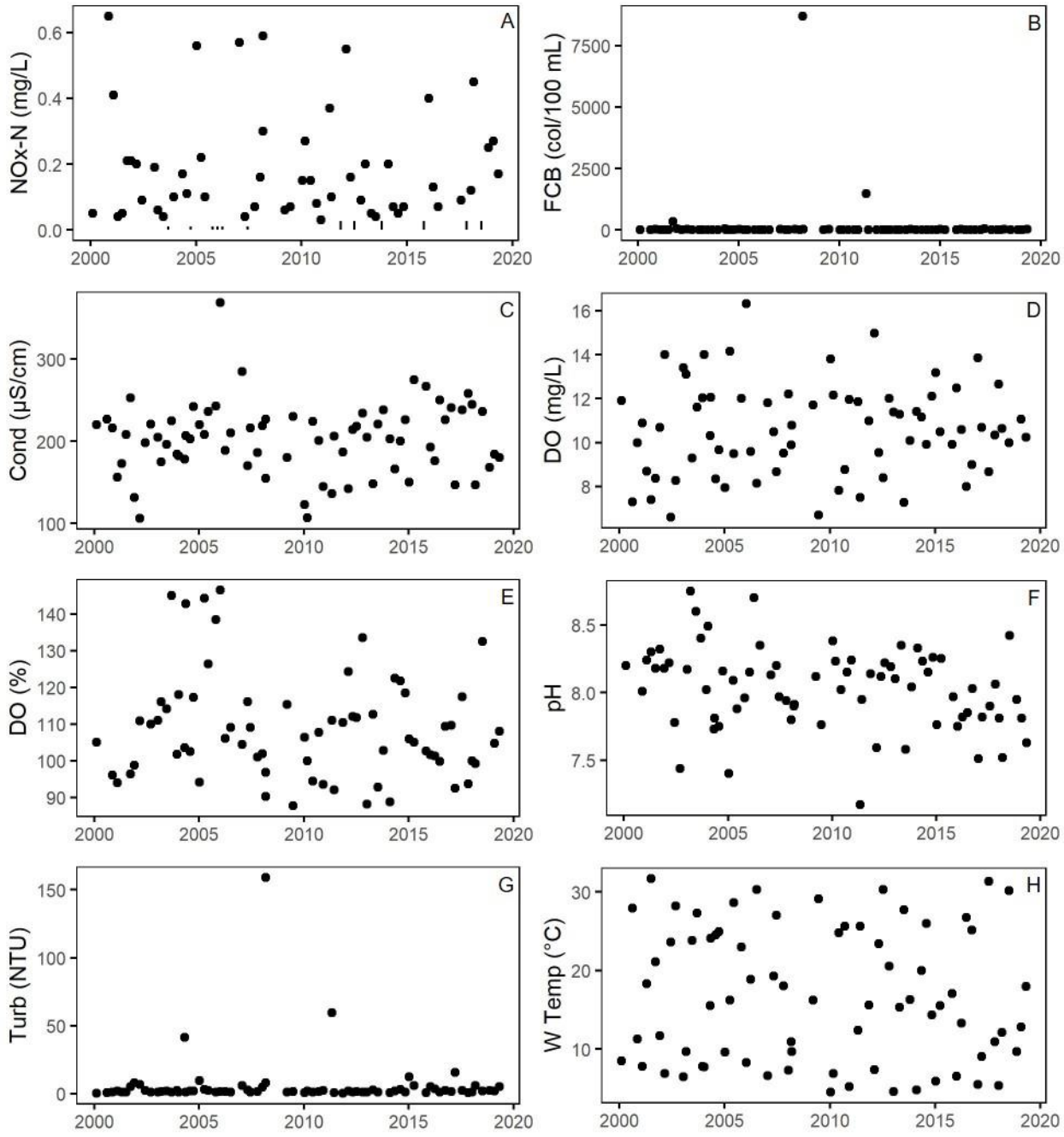


Figure A3.6.3 Water quality variable values shown through time (2000 – 2019) at BUFR06. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections.

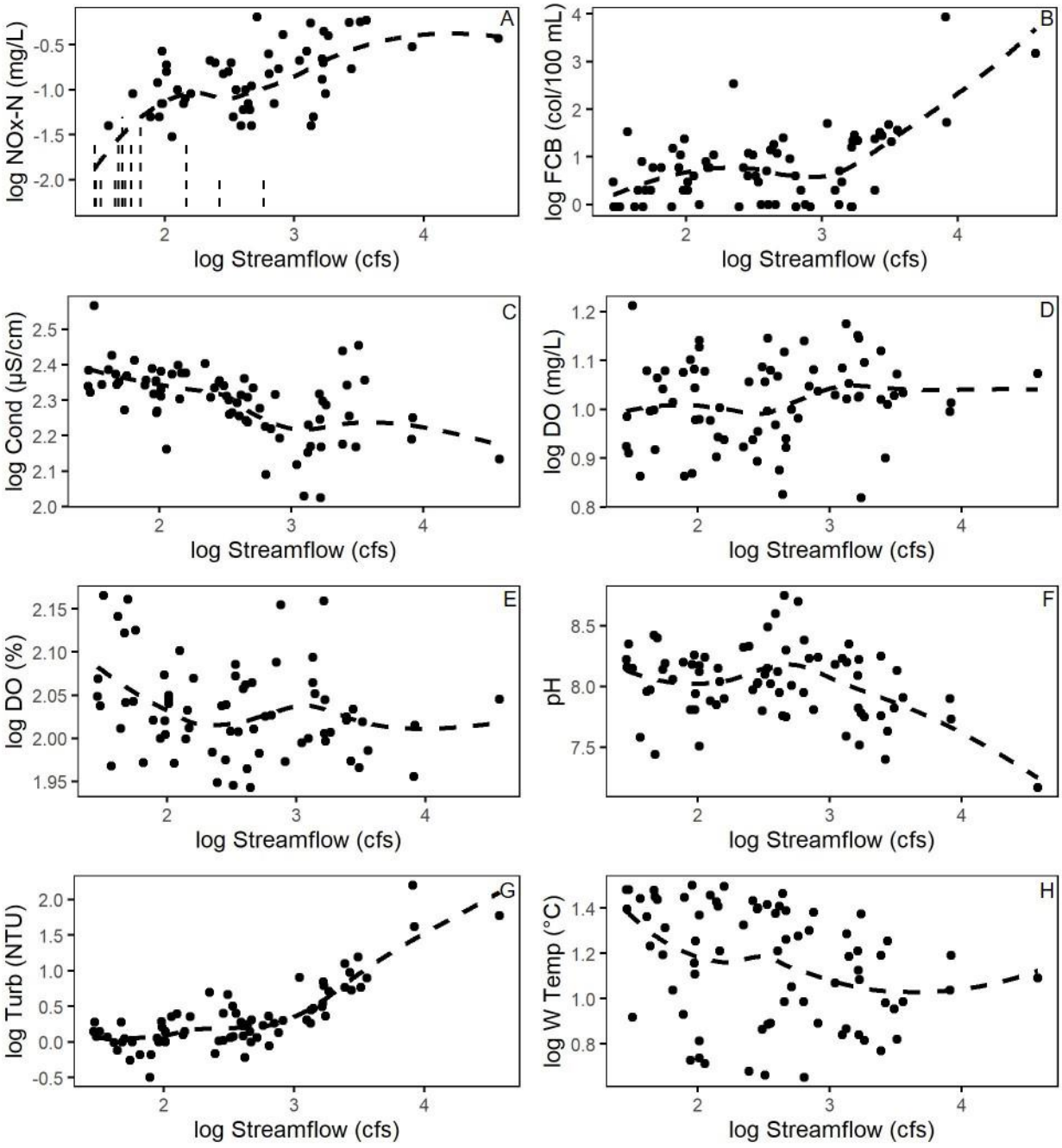


Figure A3.6.4 Water quality variable values (2000 – 2019) shown in relation to streamflow at BUFR06. A) nitrate+ nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation between each variable and streamflow.

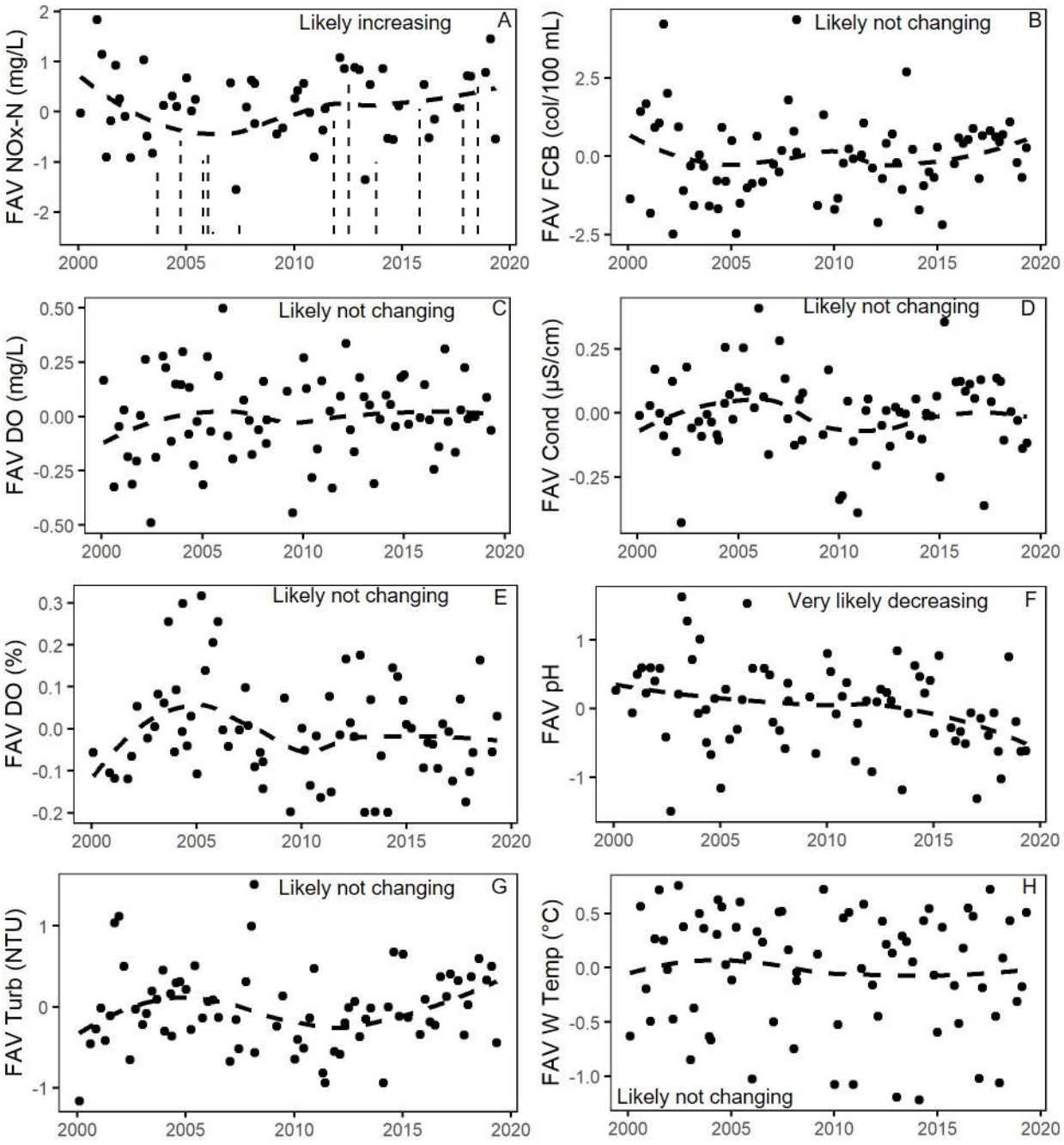


Figure A3.6.5 Flow-adjusted values (FAV) of water quality variables shown through time (2000 – 2019) for BUFR06. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation with time. Narrative results summarize statistical significance and trend direction across trend analyses. See **Table A2.2.1** for full results.

A3.7 BUFR07 - Buffalo River at Hwy 14

A3.7.1 Site and available data description

Buffalo River at Hwy 14 (BUFR07; 36.0675, -92.5772) is a long-term water quality monitoring site on the river mainstem. BUFF staff have measured streamflow and in situ physiochemistry and collected water samples for analysis of bacteriological indicators and nutrient concentrations at the site since 1985 (**Figure A3.7.1-2**). See Figures A3.1.7.3-4 for plots showing data for the full period of record for all monitored water quality variables. From October 1, 2002, estimates of average daily streamflow are available for BUFR07 from the USGS gage #07056700. Prior to that date, instantaneous streamflow estimates collected by BUFF staff were available to use in the flow-adjustment procedure to generate FAVs of water quality variables for trend analysis.

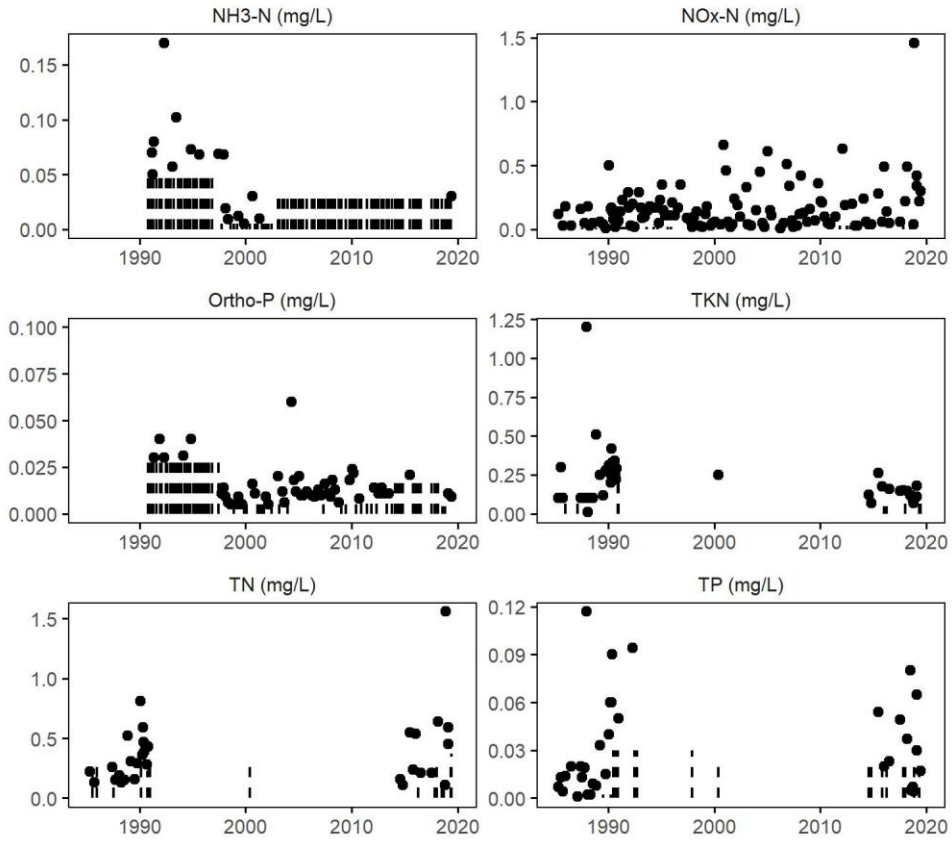


Figure A3.7.1 Nutrient variables (1985-2019) at BUFR07. Dashed lines indicate a non-detection, or that concentration could only be estimated within a range (i.e., between 0 and the relevant reporting limit).

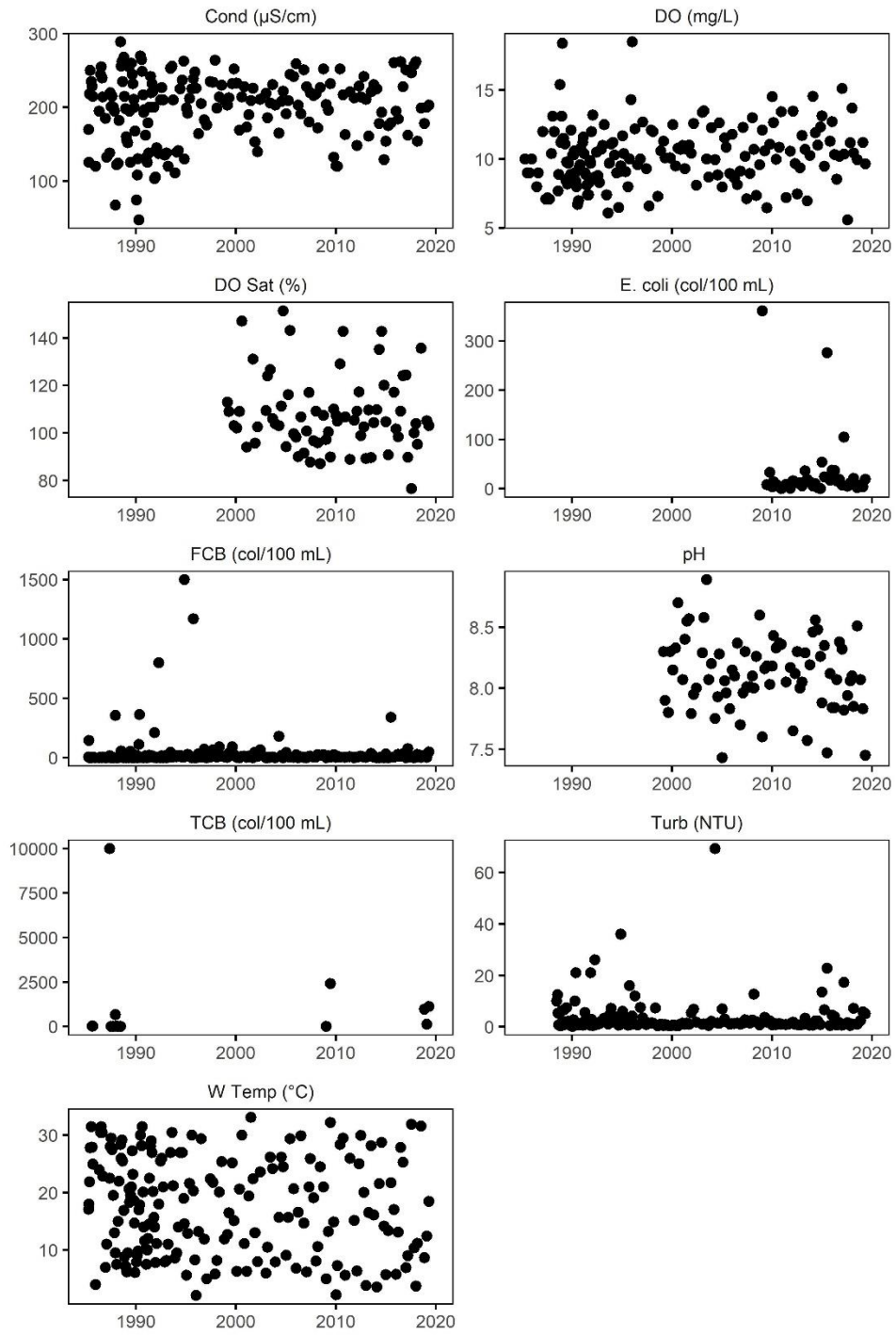


Figure A3.7.2 Bacterial indicator and physicochemical variables (1985-2019) at BUFR07.

A3.7.2 Trend analysis results (2000 - 2019): Narrative summaries

- NO_x-N concentration trend analysis results were not in agreement and required weight of evidence interpretation, suggesting that NO_x-N concentrations are likely increasing by approximately 3% annually (SKT $p<0.10$; **Figure A3.7.3-5A**). Results of LR and MK were not significant ($p\geq0.10$), but significant SKT results likely reflect known seasonal NO_x-N variability.
- FCB concentrations are likely not changing ($p\geq0.10$; **Figure A3.7.3-5B**).
- Conductivity is likely not changing ($p\geq0.10$; **Figure A3.7.3-5C**).
- DO levels are likely not changing ($p\geq0.10$; **Figure A3.7.3-5D&E**).
- Stream pH trend analysis results were not in agreement and required weight of evidence interpretation, suggesting that pH is likely not changing (SKT $p\geq0.10$; **Figure A3.7.3-5F**). Results of LR and MK indicated a likely decrease ($p<0.10$), but non-significant SKT results suggest that seasonality is a factor for pH at BUFR07 and that sampling has potentially not occurred evenly across seasons.
- Turbidity is likely not changing ($p\geq0.10$; **Figure A3.7.3-5G**).
- Water temperature are likely not changing ($p\geq0.10$; **Figure A3.7.3-5H**).

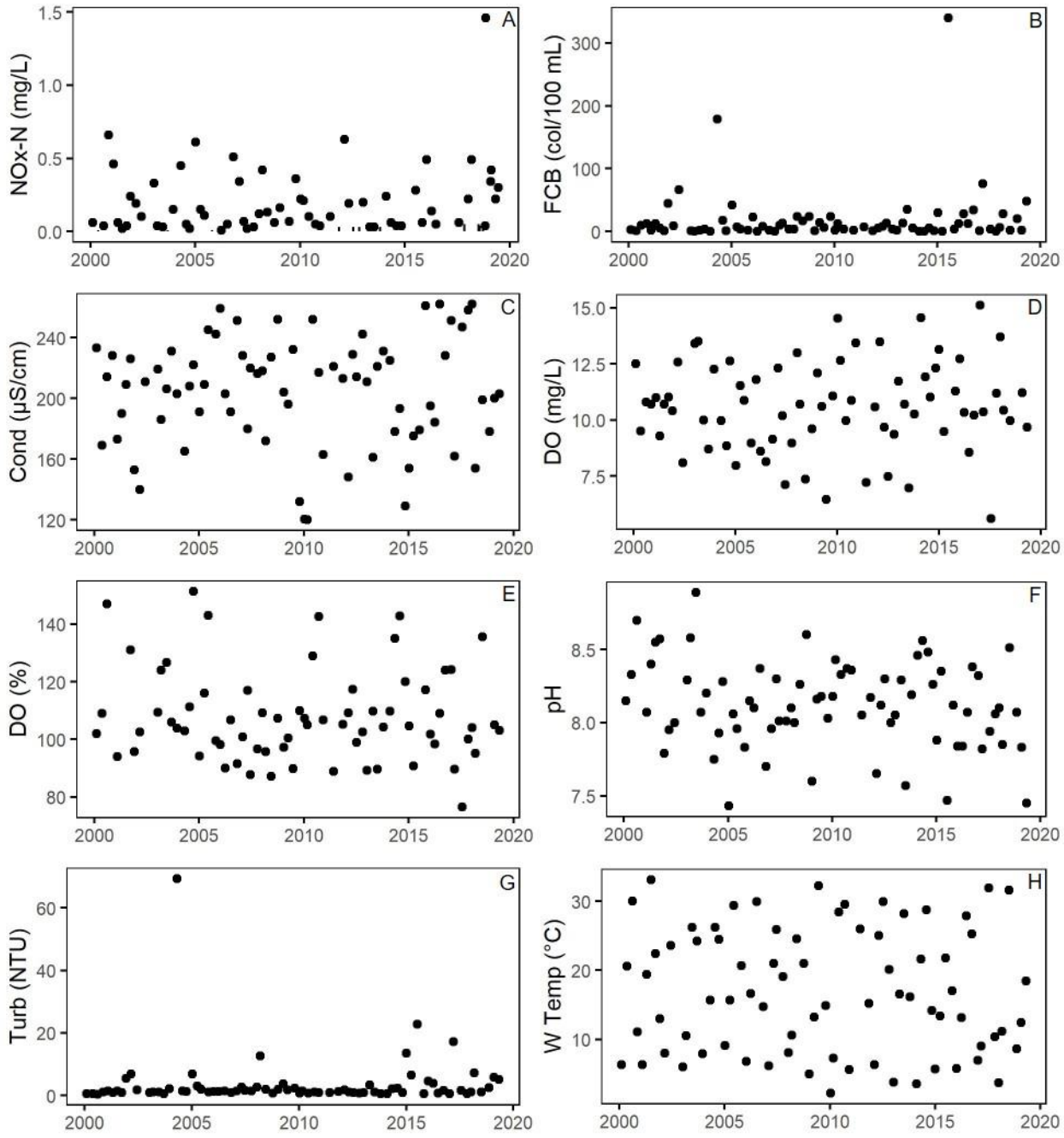


Figure A3.7.3 Water quality variable values shown through time (2000 – 2019) at BUFR07. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections.

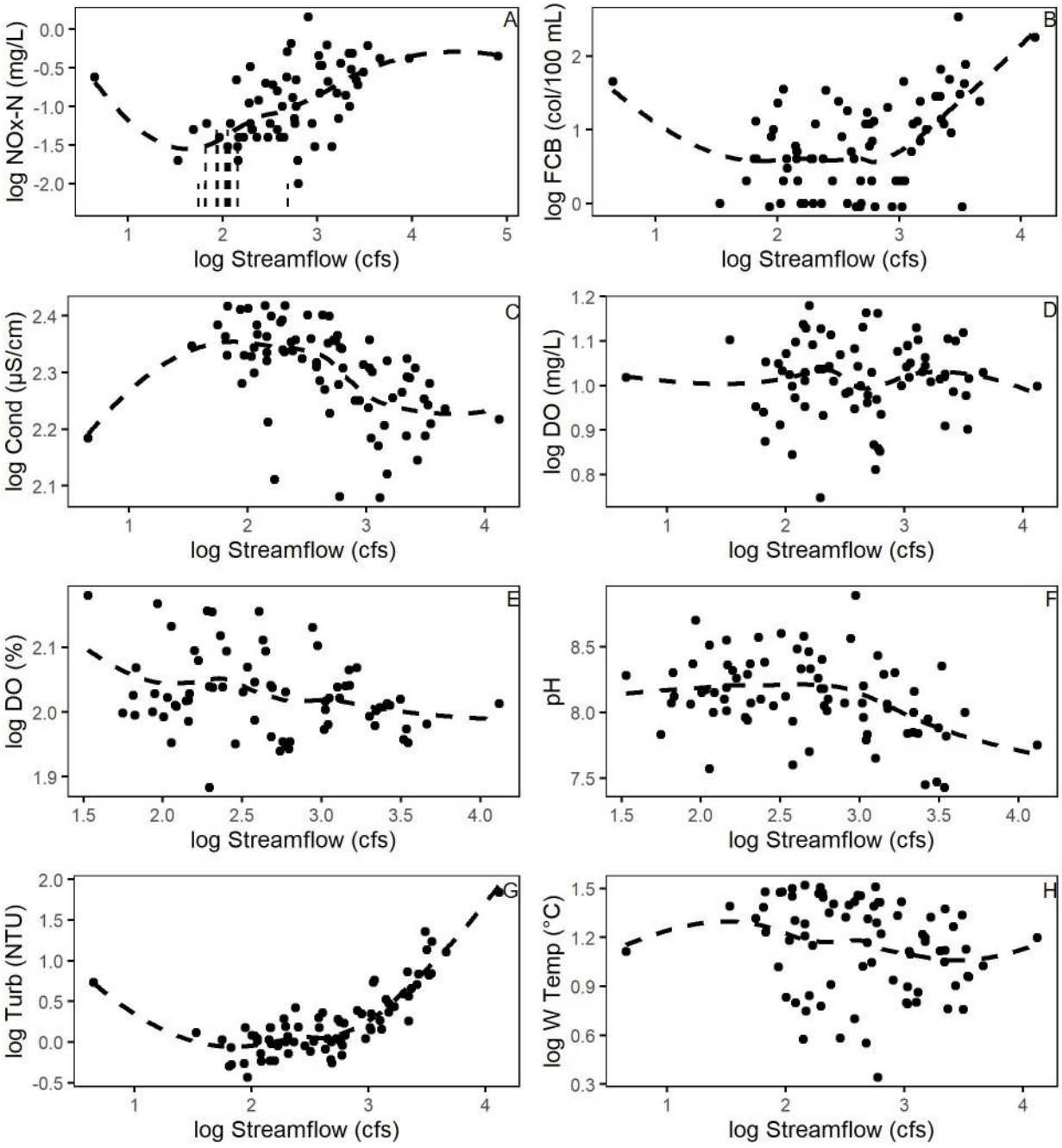


Figure A3.7.4 Water quality variable values (2000 – 2019) shown in relation to streamflow at BUFR07. A) nitrate+ nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation between each variable and streamflow.

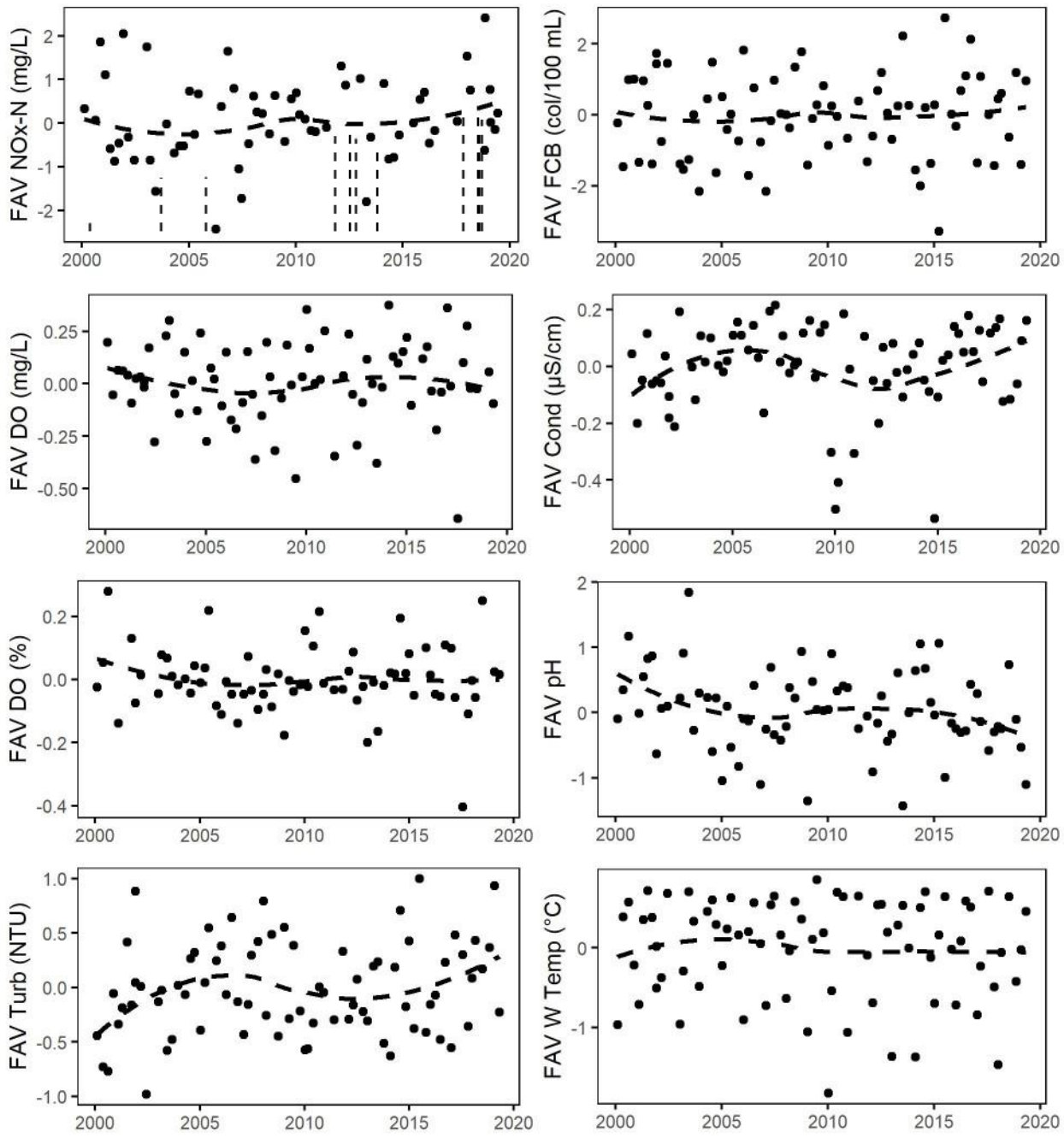


Figure A3.7.5 Flow-adjusted values FAVs of water quality variables shown through time (2000 – 2019) for BUFR07. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation with time. Narrative results summarize statistical significance and trend direction across trend analyses. See **Table A2.2.1** for full results.

A3.8 BUFR08 - Buffalo River, Rush

A3.8.1 Site and available data description

Buffalo River Rush (BUFR08; 36.1236, -92.5497) is a long-term water quality monitoring site on the river mainstem. BUFF staff have measured streamflow and in situ physiochemistry and collected water samples for analysis of bacteriological indicators and nutrient concentrations at the site since 1985 (**Figure A3.8.1-2**). Instantaneous streamflow estimates collected by BUFF staff were available to use in the flow-adjustment procedure to generate FAVs of water quality variables for trend analysis.

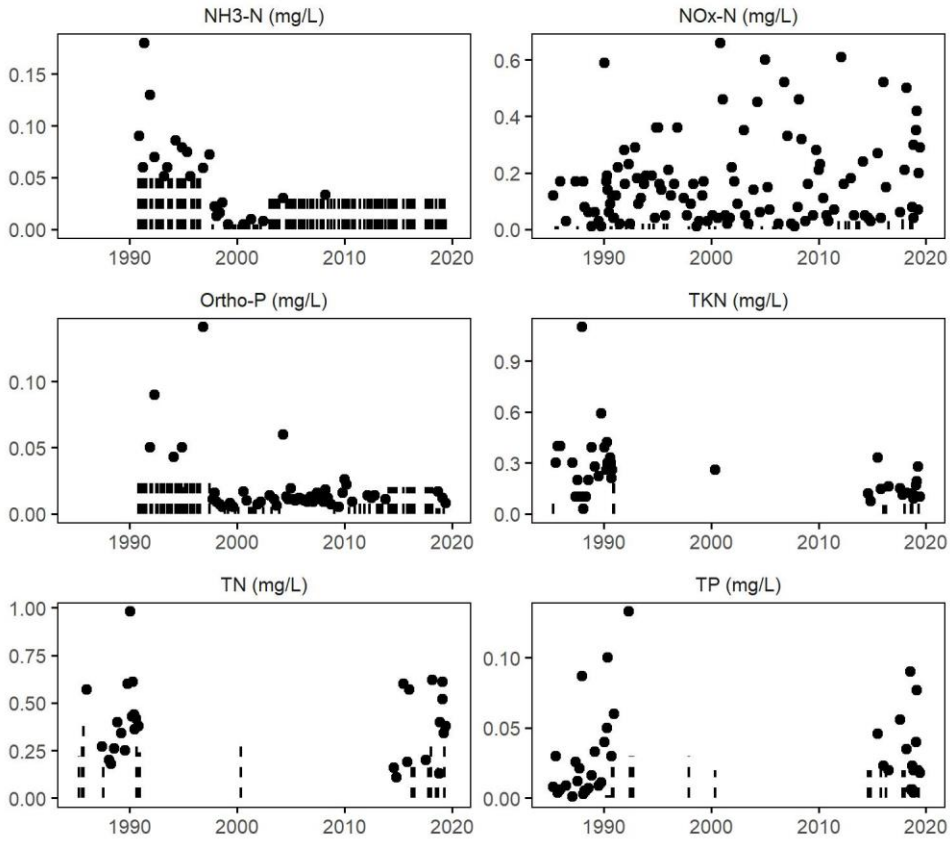


Figure A3.8.1 Nutrient variables (1985-2019) at BUFR08. Dashed lines indicate a non-detection, or that concentration could only be estimated within a range (i.e., between 0 and the relevant reporting limit).

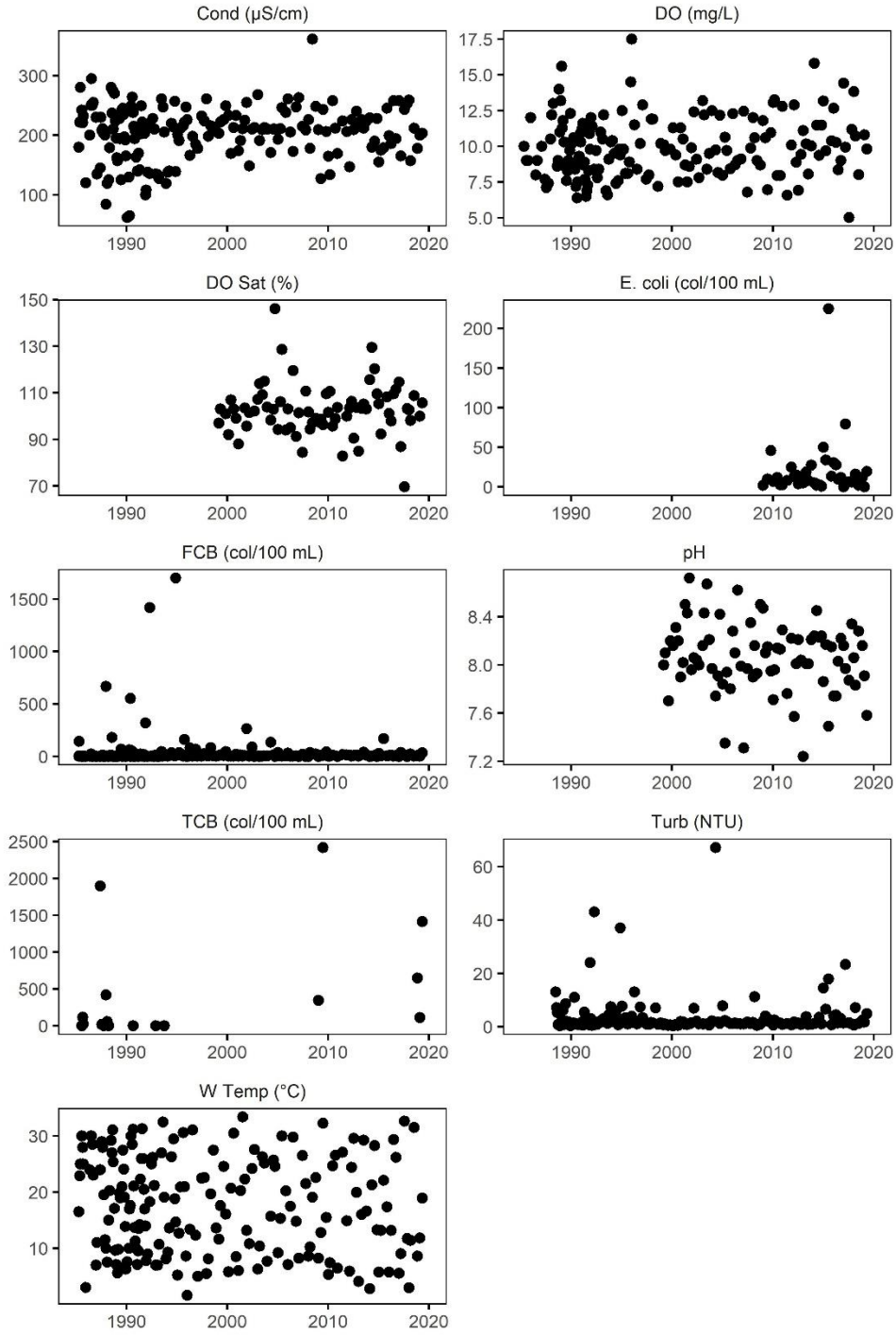


Figure A3.8.2 Bacterial indicator and physicochemical variables (1985-2019) at BUFR08.

A3.8.2 Trend analysis results (2000 - 2019): Narrative summaries

- NO_x-N concentration trend analysis results were not in agreement and required weight of evidence interpretation, suggesting that NO_x-N concentrations are likely increasing by 3 – 4% annually (SKT $p<0.10$; **Figure A3.8.3-5A**). Results of LR and MK suggested no change ($p\geq0.10$), but significant SKT results likely reflect known seasonal NO_x-N variability.
- FCB concentrations are likely not changing ($p\geq0.10$; **Figure A3.8.3-5B**).
- Conductivity is likely not changing ($p\geq0.10$; **Figure A3.8.3-5C**).
- DO levels are likely not changing ($p\geq0.10$; **Figure A3.8.3-5D & E**).
- Stream pH is likely not changing ($p\geq0.05$; **Figure A3.8.3-5F**).
- Turbidity trend analysis results required weight of evidence interpretation, suggesting that turbidity is likely not changing (SKT $p\geq0.10$; **Figure A3.8.3-5G**). Results of LR and MK suggested a very likely increase ($p<0.05$), but non-significant SKT results suggest that seasonality is a factor for turbidity and that sampling was potentially not even across seasons.
- Water temperature is very likely increasing ($p<0.05$; **Figure A3.8.3-5H**).

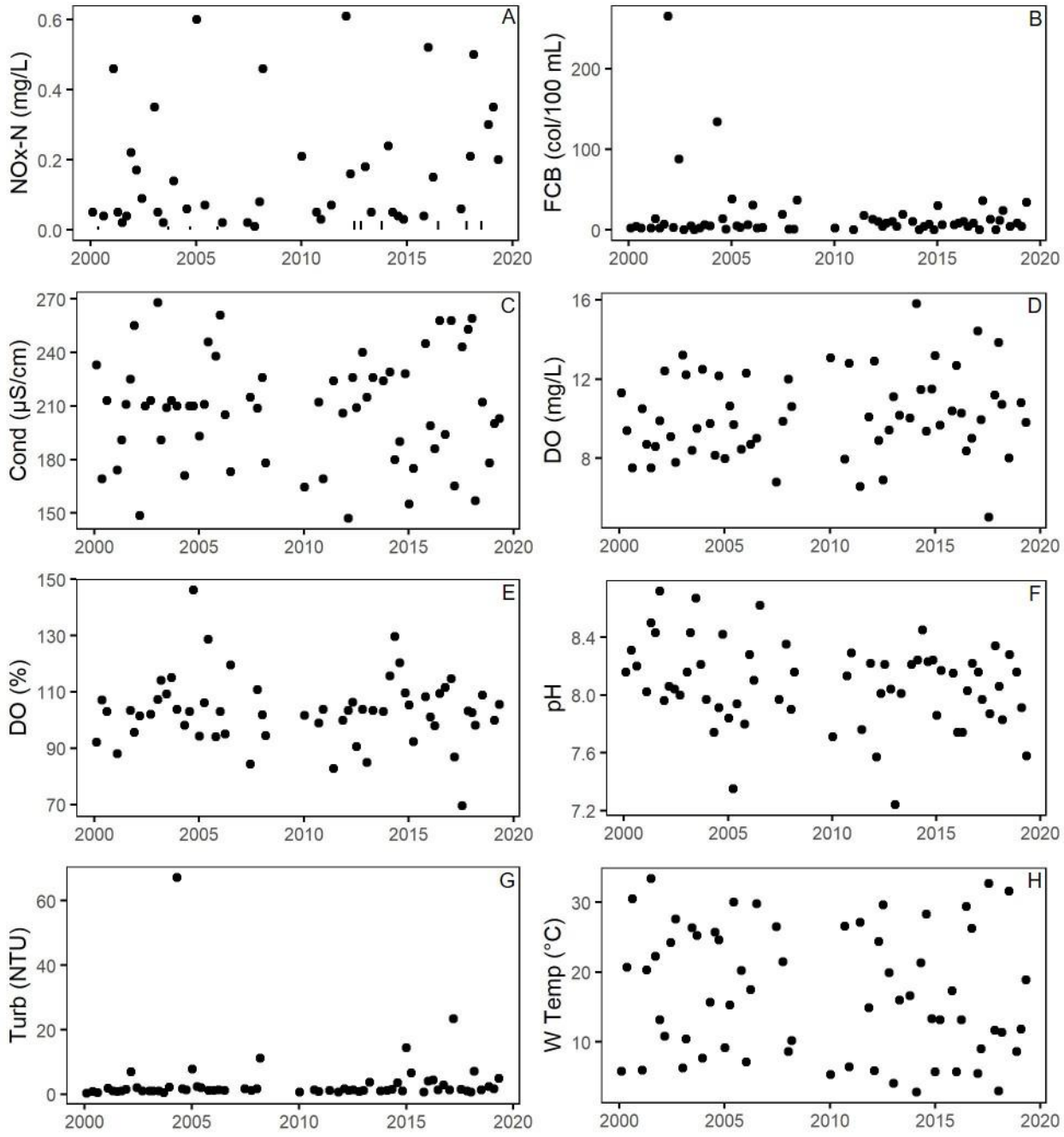


Figure A3.8.3 Water quality variable values shown through time (2000 – 2019) at BUFR08. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections.

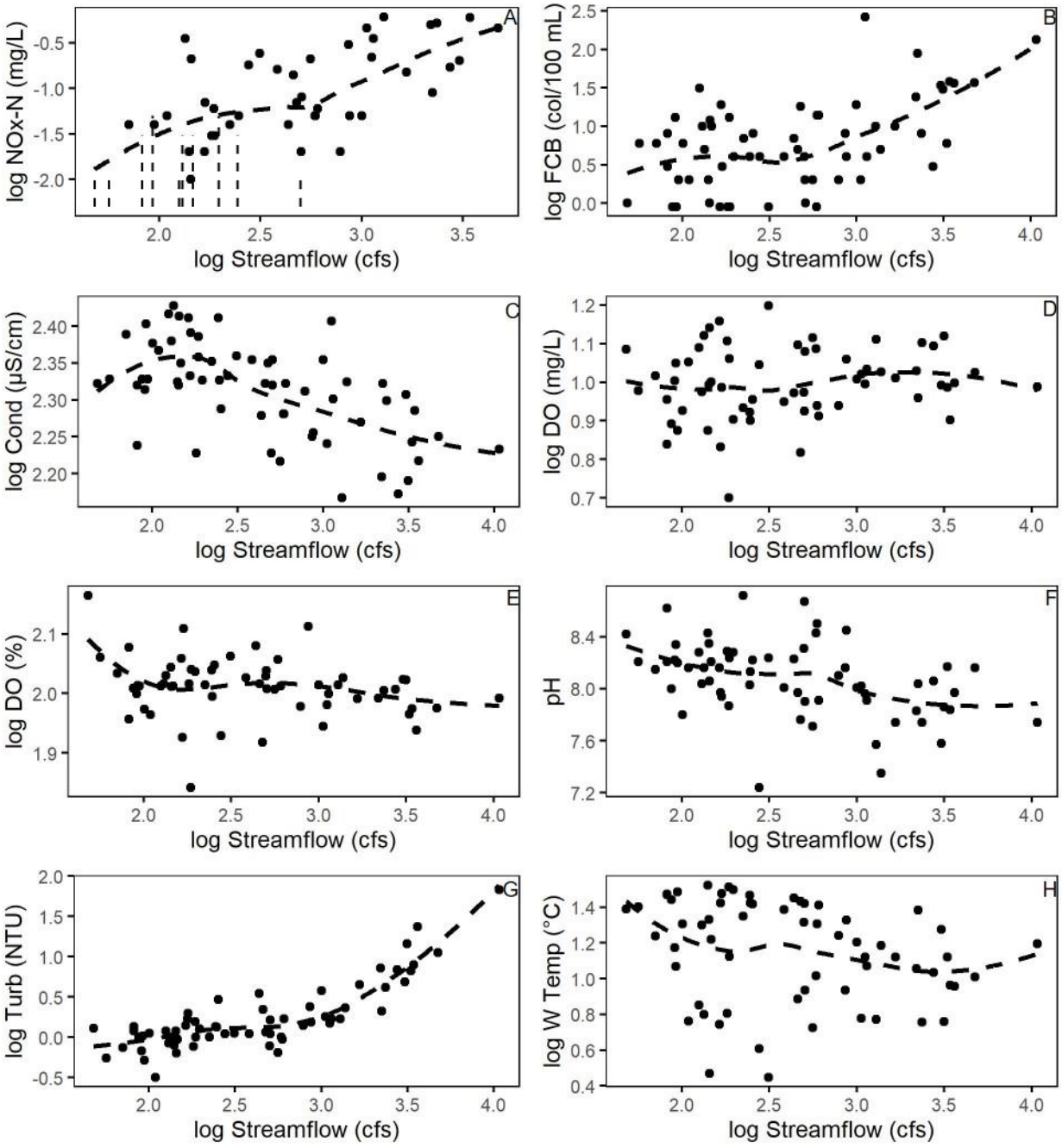


Figure A3.8.4 Water quality variable values (2000 – 2019) shown in relation to streamflow at BUFR08. A) nitrate+ nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation between each variable and streamflow.

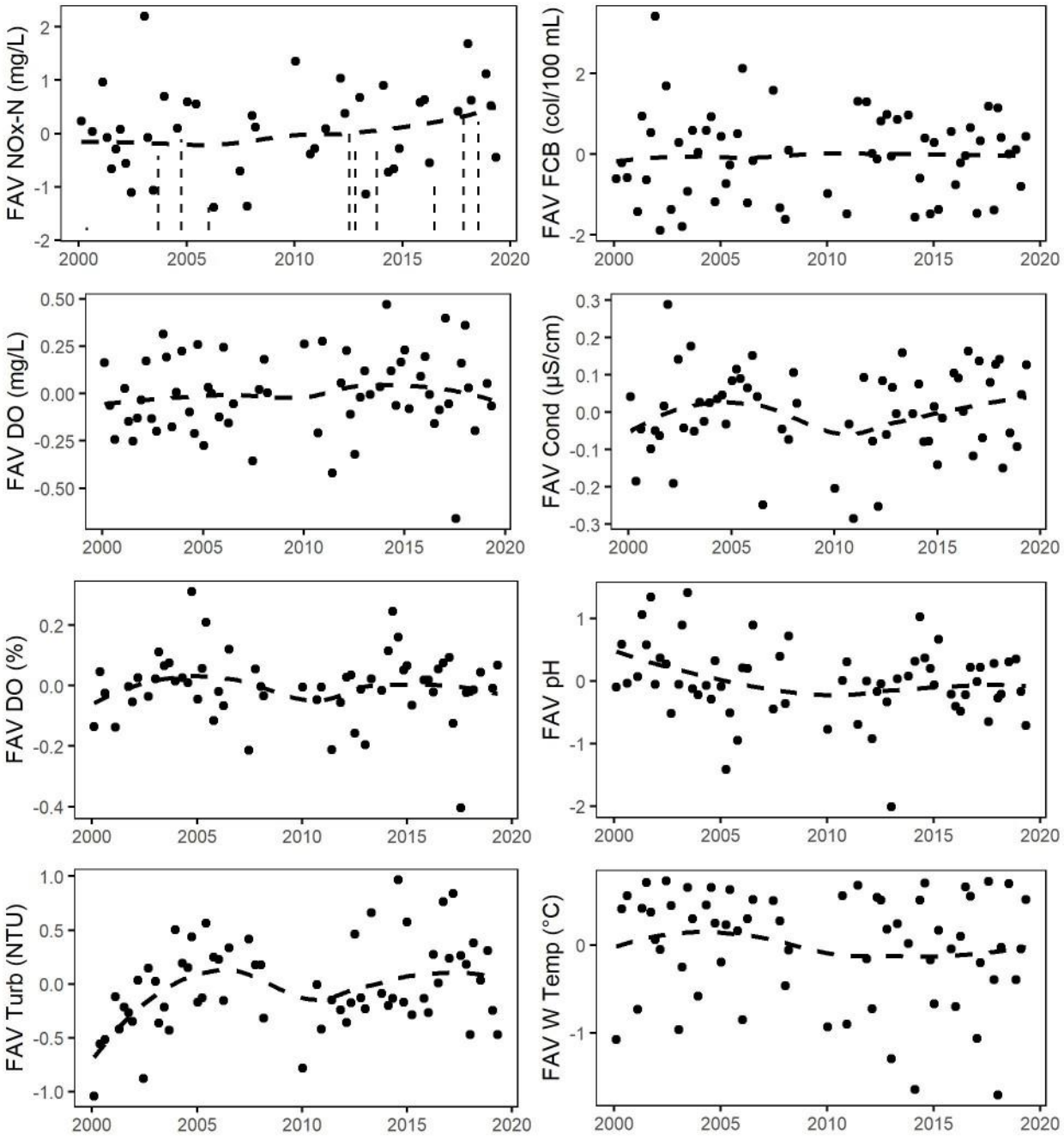


Figure A3.8.5 Flow-adjusted values FAVs of water quality variables shown through time (2000 – 2019) for BUFR08. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation with time. Narrative results summarize statistical significance and trend direction across trend analyses. See **Table A2.2.1** for full results.

A3.9 BUFR09 – Buffalo River Above Confluence with White River near Buffalo City

A3.9.1 Site and available data description

The long-term water quality monitoring site BUFR09 is located on the Buffalo River mainstem. BUFF staff have measured streamflow and in situ physiochemistry and collected water samples for analysis of bacteriological indicators and nutrient concentrations at the site since 1985 (**Figure A3.9.1-2**). Streamflow records were not sufficient for TAFA for BUFR09; trend analysis results are on raw water quality variable values.

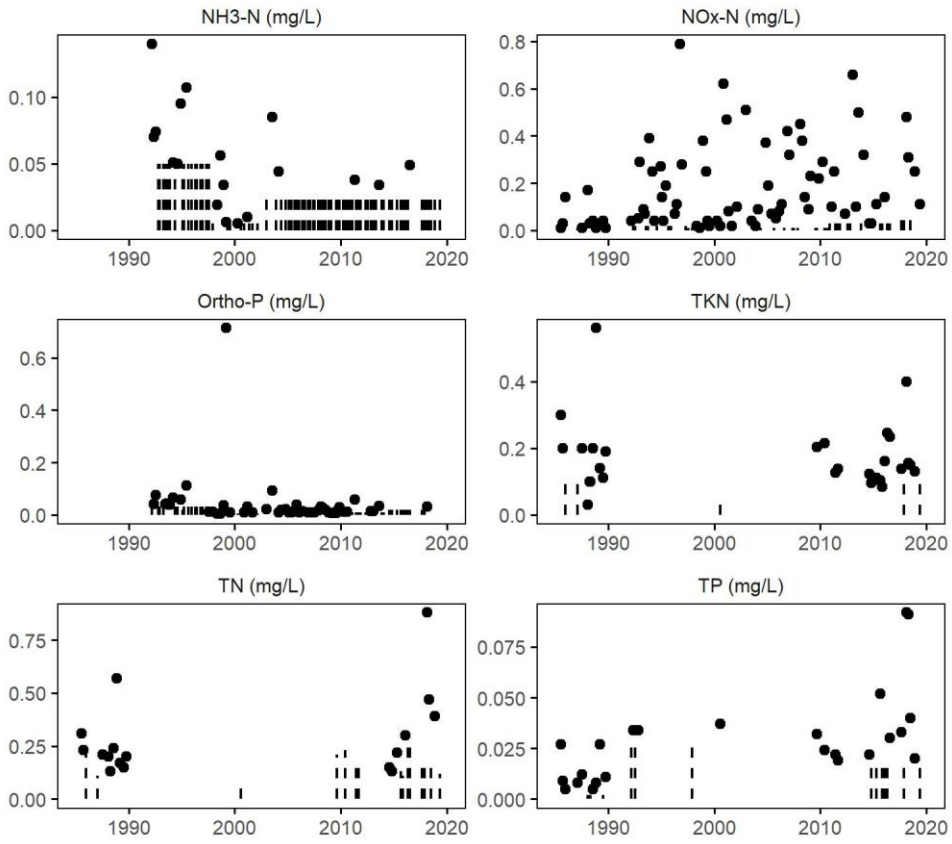


Figure A3.9.1 Nutrient variables (1985-2019) at BUFR09. Dashed lines indicate a non-detection, or that concentration could only be estimated within a range (i.e., between 0 and the relevant reporting limit).

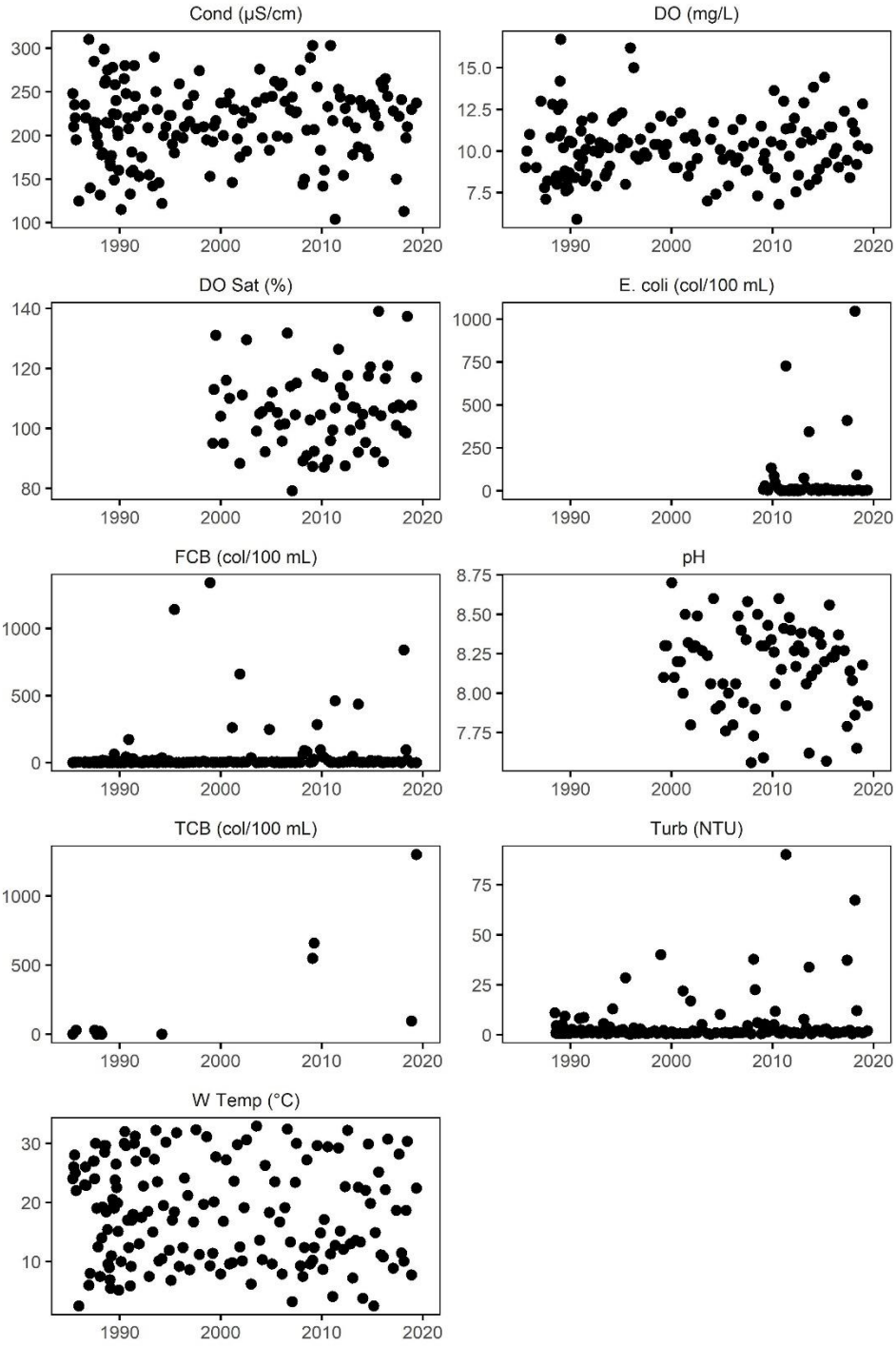


Figure A3.9.2 Bacterial indicator and physicochemical variables (1985-2019) at BUFR09.

A3.9.2 Trend analysis results (2000 - 2019): Narrative summaries

- NOx-N concentrations could not be analyzed at this site due non-detection frequency greater than 30% (**Figure A3.9.3A**).
- FCB concentrations are likely not changing ($p \geq 0.10$; **Figure A3.9.3B**).
- Conductivity is likely not changing ($p \geq 0.10$; **Figure A3.9.3C**).
- DO trend analysis results required weight of evidence interpretation and suggested that DO levels are likely not changing (**Figure A3.9.3D & E**). While SKT results for DO concentration suggested a likely increase ($p < 0.10$), the remaining test results suggested no change in concentration or saturation (p $p \geq 0.10$).
- Stream pH is likely not changing ($p \geq 0.10$; **Figure A3.9.3F**).
- Turbidity trend analysis results required weight of evidence interpretation and suggested that turbidity is very likely increasing by 3% annually (SKT $p < 0.05$ and MK $p < 0.10$; **Figure A3.9.3G**). Results of LR suggested no change ($p \geq 0.10$), but differing results between LR and MK/SKT suggest that high-range outliers may have influenced LR analysis. Linear regression is more sensitive to highly variable data than the non-parametric tests.
- Water temperature is likely not changing ($p \geq 0.10$; **Figure A3.9.3H**).

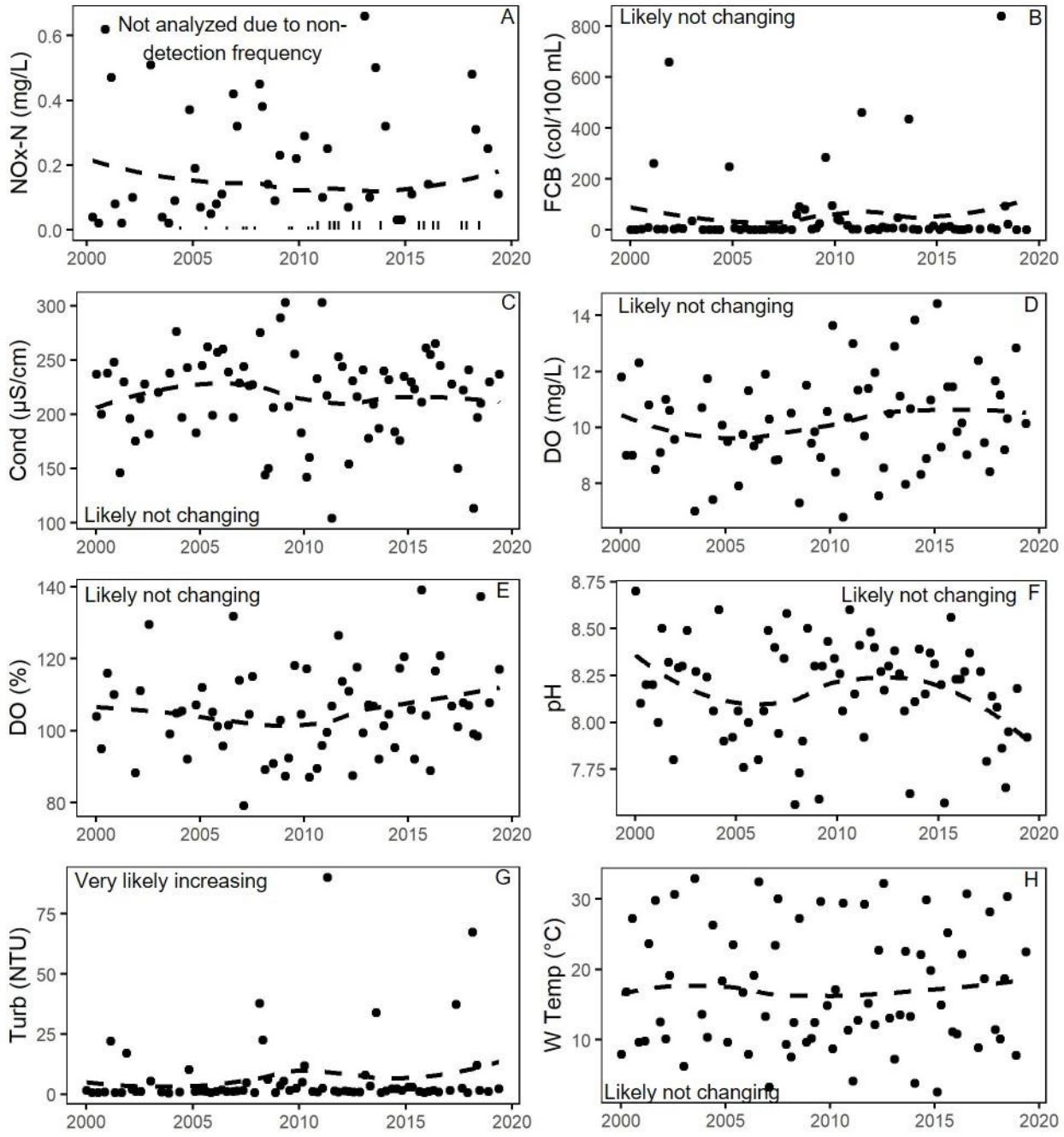


Figure A3.9.3 Water quality variable values shown through time (2000 – 2019) for BUFR09. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation with time. Narrative results summarize statistical significance and trend direction across trend analyses. See **Table A2.3.1** for full results.

A3.10 BUFS02 – Luallen Spring at Source

A3.10.1 Site and available data description

Luallen Spring at the Source (BUFS02; 35.9444, -93.3994) is a long-term spring water quality monitoring site at BUFF. BUFF staff have measured flow and in situ physiochemistry and collected water samples for analysis of bacteriological indicators and nutrient concentrations at the site since 1985 (**Figure A3.10.1-2**). Instantaneous streamflow estimates collected by BUFF staff were available and used in the flow-adjustment procedure to generate FAVs of water quality variables as inputs to trend analysis.

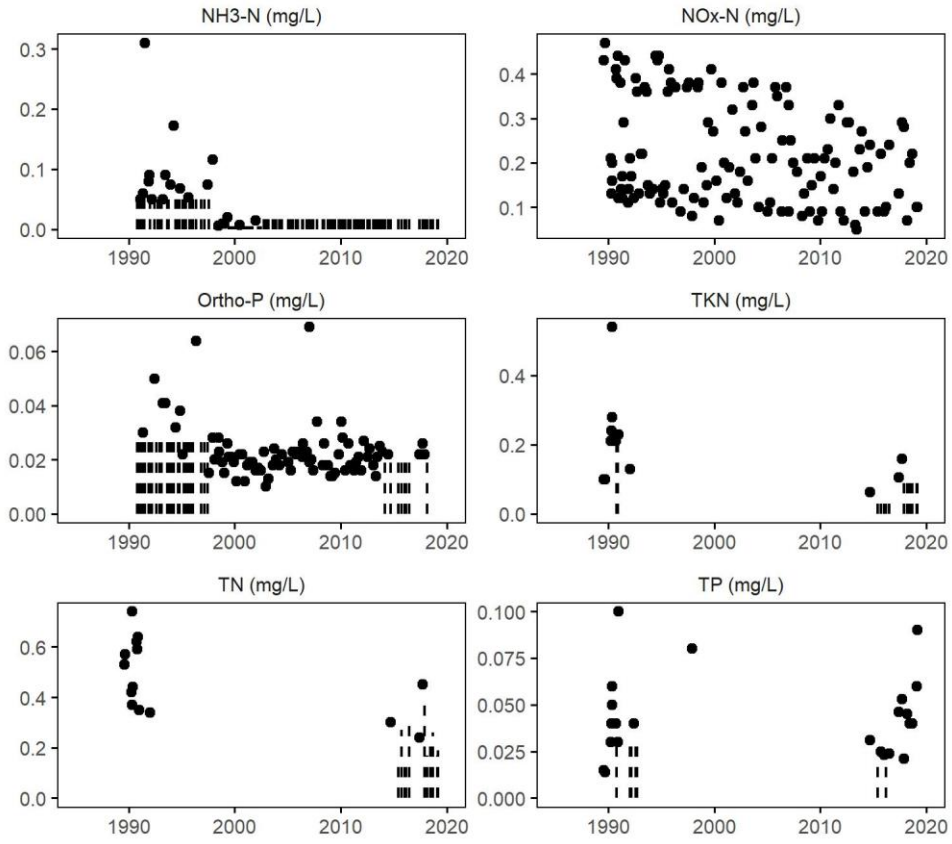


Figure A3.10.1 Nutrient variables (1985-2019) at BUFS02. Dashed lines indicate a non-detection, or that concentration could only be estimated within a range (i.e., between 0 and the relevant reporting limit).

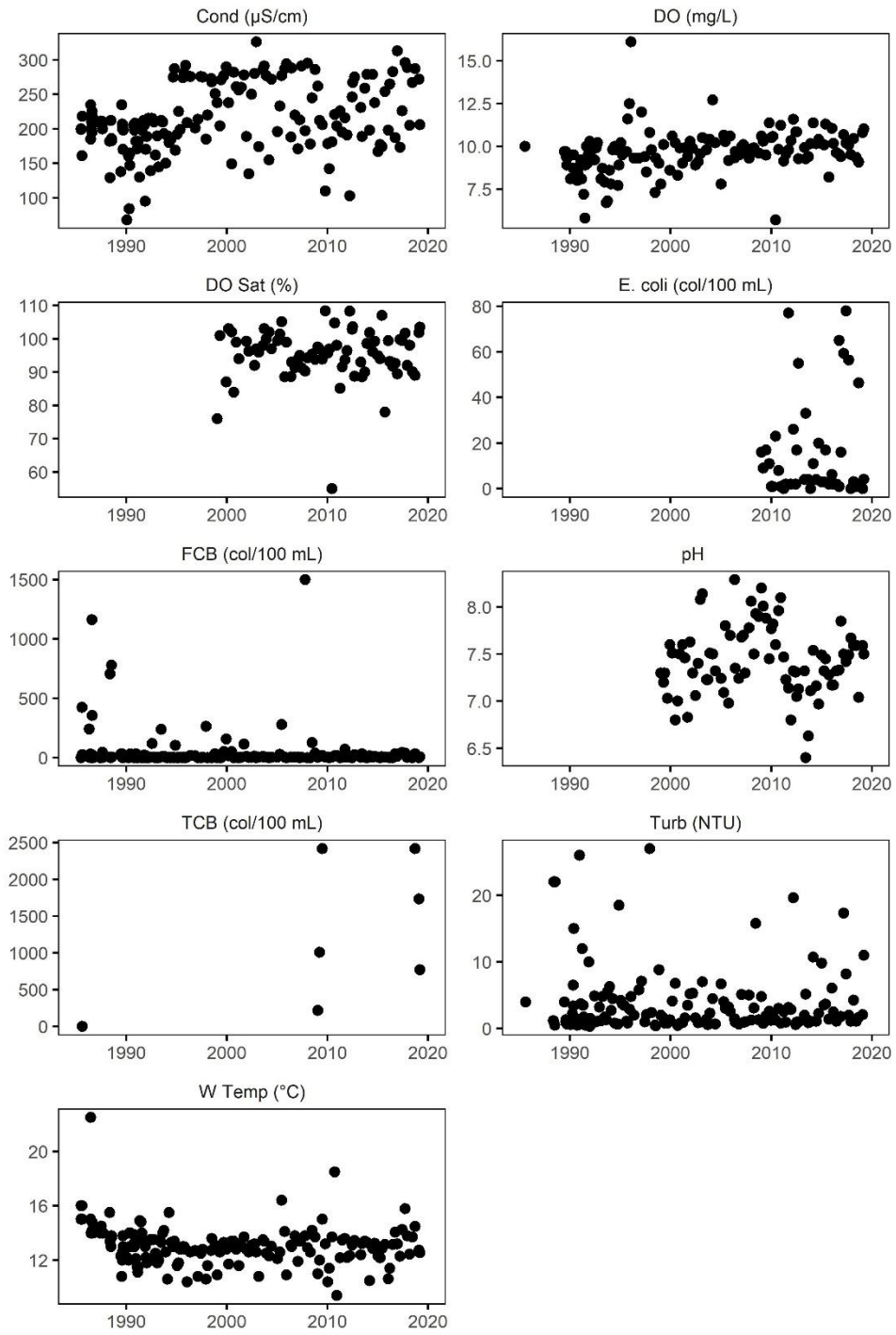


Figure A3.10.2 Bacterial indicator and physicochemical variables (1985-2019) at BUFS02.

A3.10.2 Trend analysis results (2000 - 2019): Narrative summaries

- NO_x-N concentrations are very likely decreasing by 2 – 3% annually ($p<0.05$; **Figure A3.10.3-5A**).
- FCB concentrations are likely not changing ($p\geq0.10$; **Figure A3.10.3-5B**).
- Conductivity is likely not changing ($p\geq0.10$; **Figure A3.10.3-5C**).
- DO levels are likely not changing ($p\geq0.10$; **Figure A3.10.3-5D & E**)
- Stream pH is likely not changing ($p\geq0.10$; **Figure A3.10.3-5C**).
- Turbidity trend analysis results required weight of evidence interpretation, suggesting that turbidity is likely not changing (SKT $p\geq0.10$; **Figure A3.10.3-5G**). Results of LR and MK suggested a likely to very likely increase ($p<0.10$), but non-significant SKT results suggest that seasonality is a factor for turbidity and that sampling has potentially not occurred evenly across seasons.
- Water temperature trend analysis results were not in agreement and required weight of evidence interpretation, suggesting that water temperature is likely increasing by 0.1 – 0.2% annually (SKT $p<0.10$; **Figure A3.10.3-5H**). Results of LR and MK suggested no change ($p\geq0.10$), but differing results between MK and SKT likely reflect known sizeable seasonal variability in water temperature.

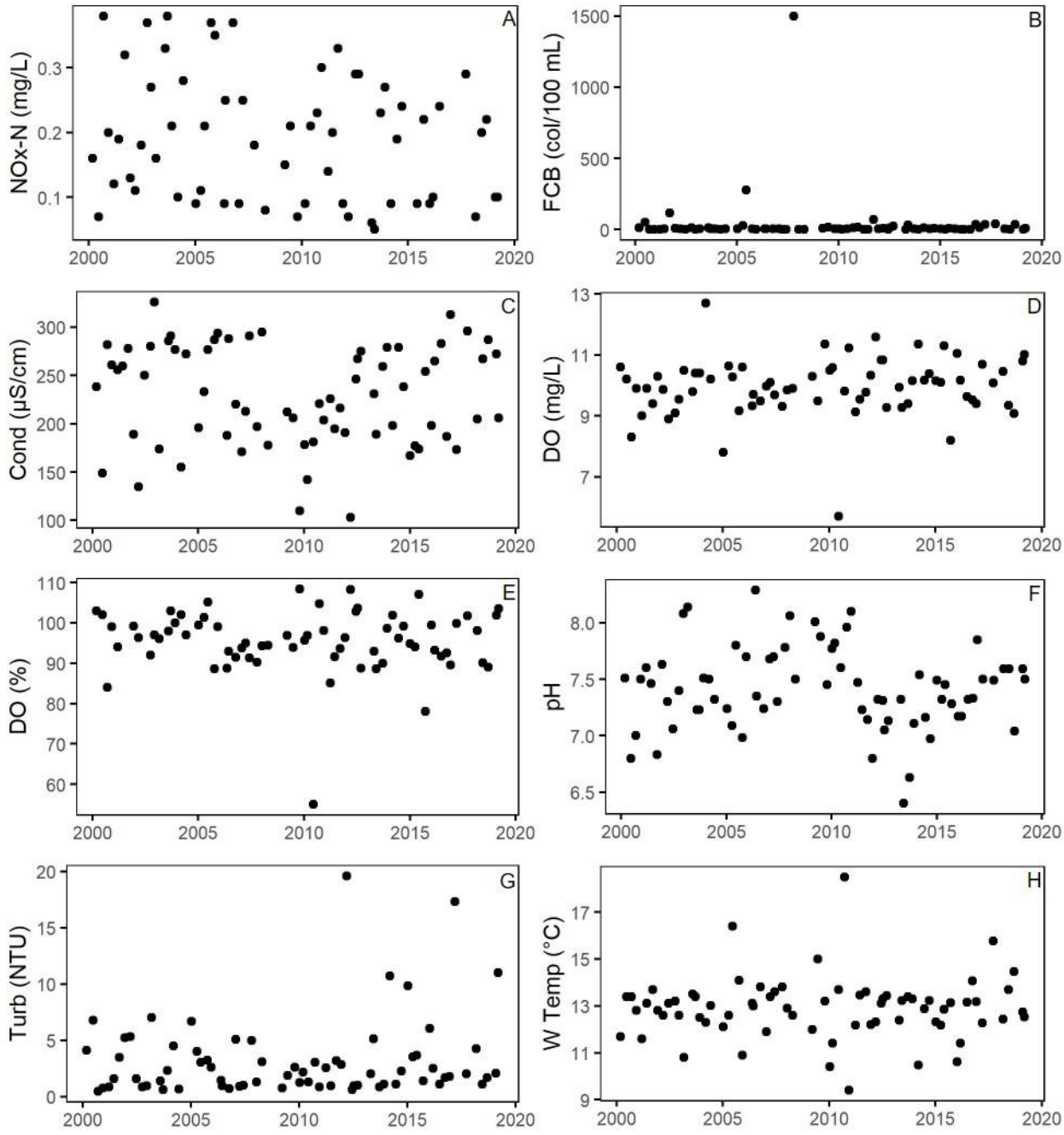


Figure A3.10.3 Water quality variable values shown through time (2000 – 2019) at BUFS02. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections.

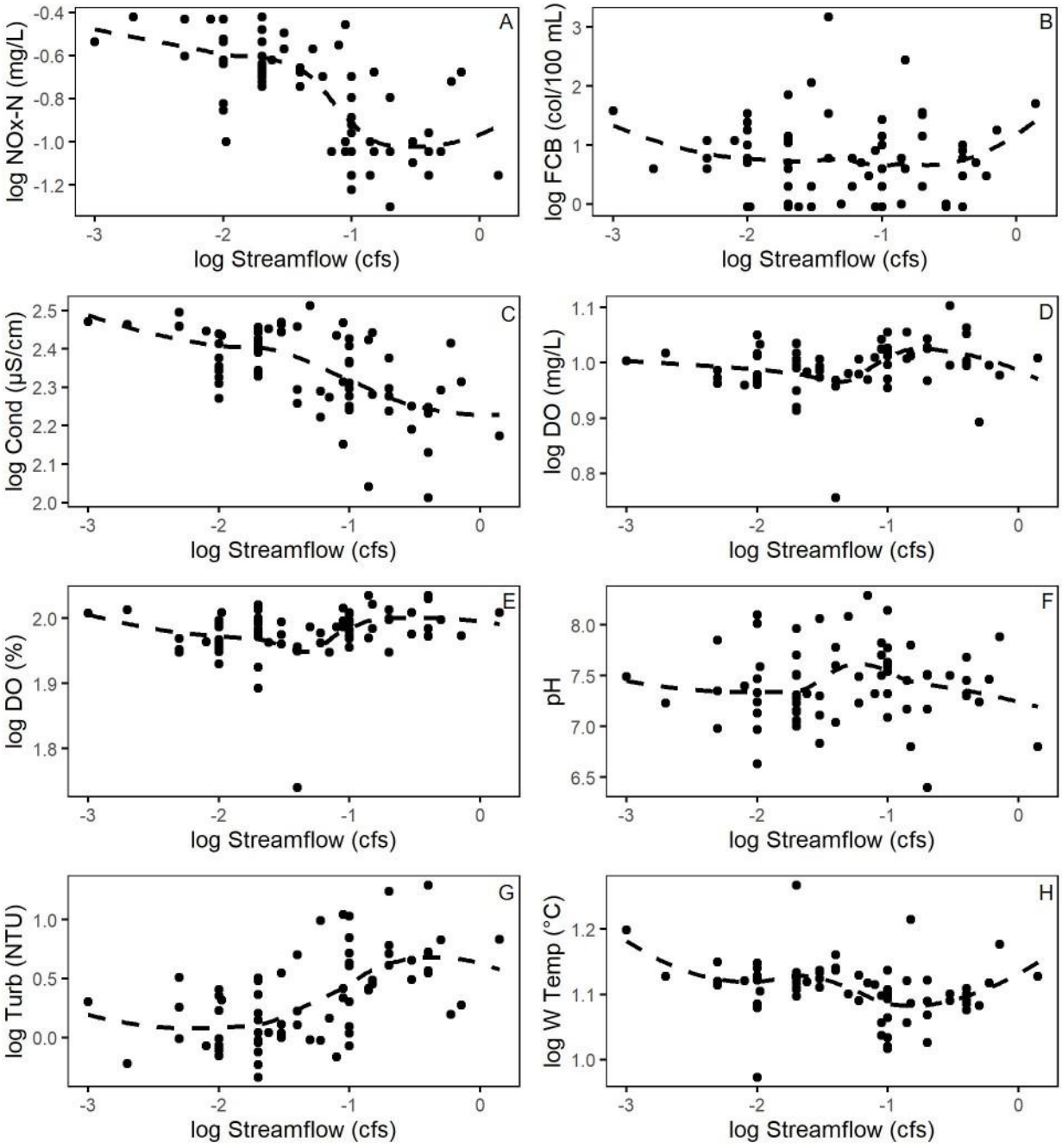


Figure A3.10.4 Water quality variable values (2000 – 2019) shown in relation to streamflow at BUFS02. A) nitrate+ nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation between each variable and streamflow.

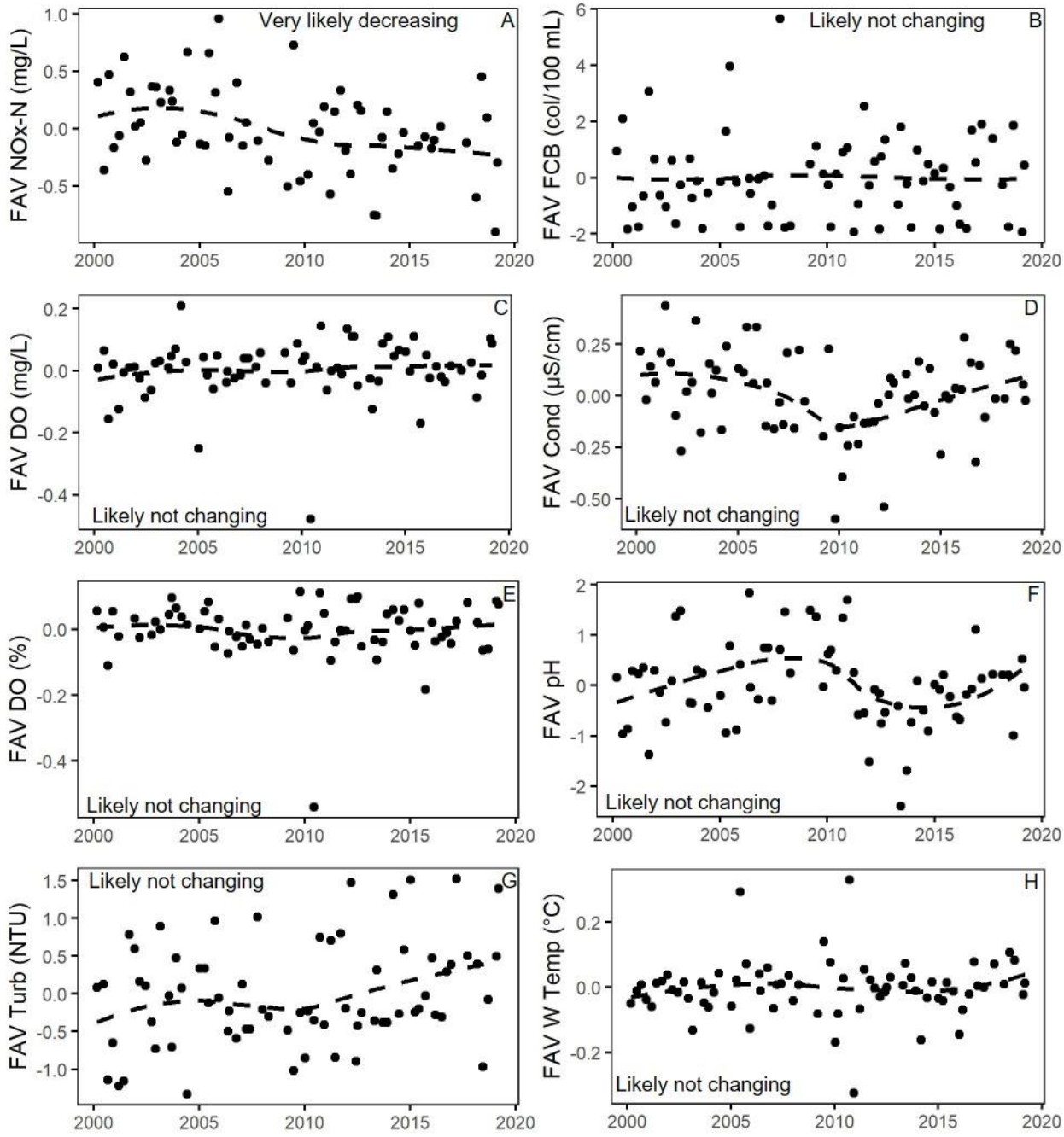


Figure A3.10.5 Flow-adjusted values (FAV) of water quality variables shown through time (2000 – 2019) for BUFS02. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation with time. Narrative results summarize statistical significance and trend direction across trend analyses. See **Table A2.2.1** for full results.

A3.11 BUFS33 – Mitch Hill Spring at the Source

A3.11.1 Site and available data description

Mitch Hill Spring at the Source (BUFS33; 36.0144, -92.9506) is a long-term spring water quality monitoring site at BUFF. BUFF staff have measured flow and in situ physiochemistry and collected water samples for analysis of bacteriological indicators and nutrient concentrations at the site since 1985 (**Figure A3.11.1-2**). Instantaneous streamflow estimates collected by BUFF staff were used in the flow-adjustment procedure for generating FAVs of water quality variables as inputs to trend analysis.

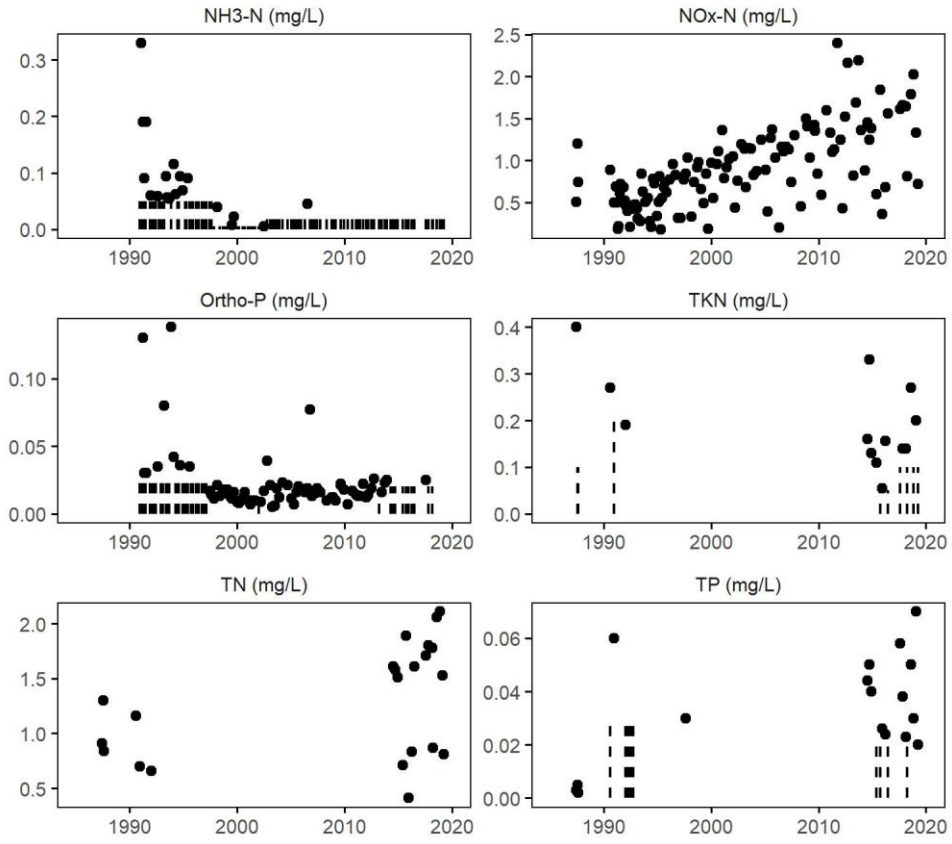


Figure A3.11.1 Nutrient variables (1985-2019) at BUFS33. Dashed lines indicate a non-detection, or that concentration could only be estimated within a range (i.e., between 0 and the relevant reporting limit).

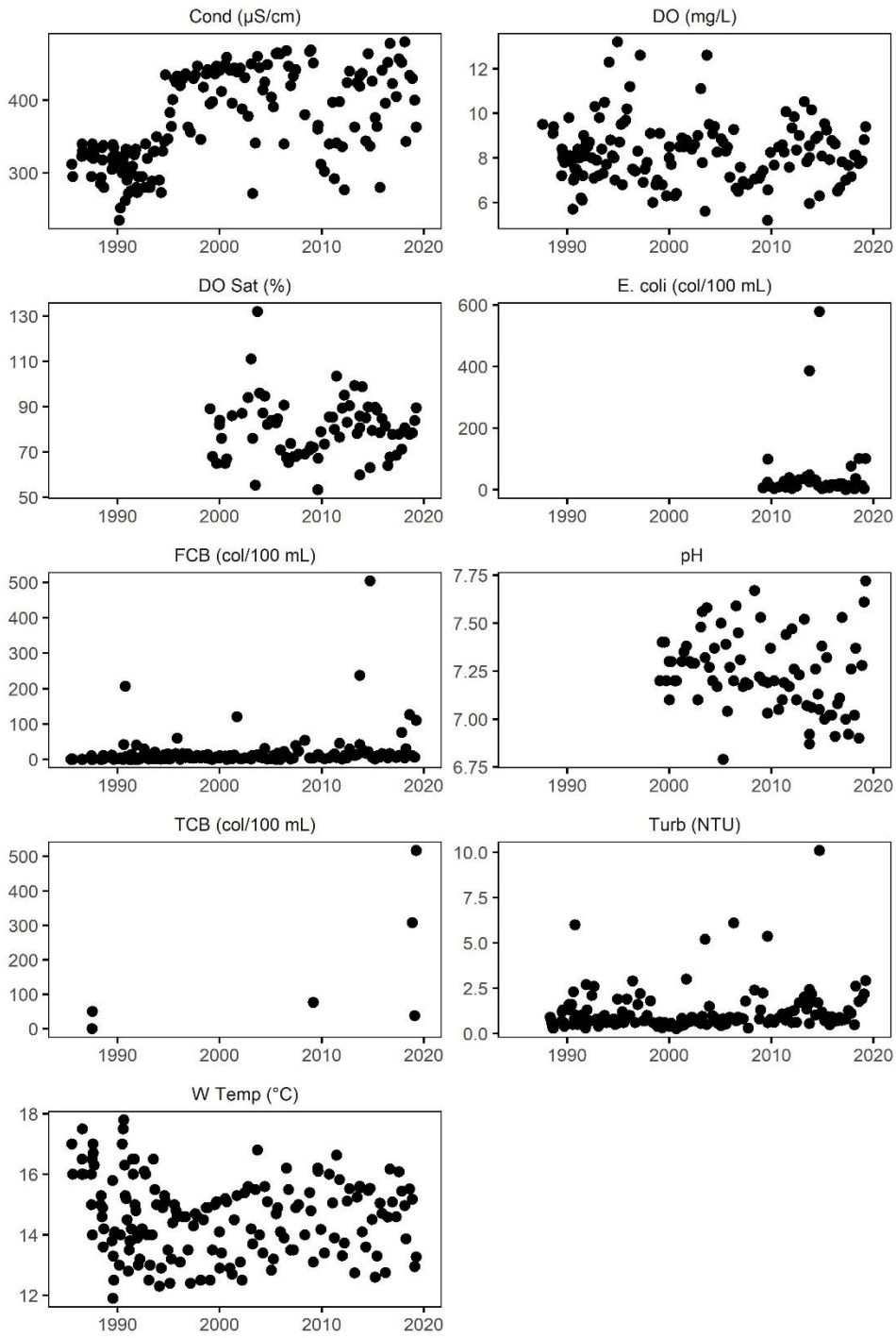


Figure A3.11.2 Bacterial indicator and physicochemical variables (1985-2019) at BUFS33.

A3.11.2 Trend analysis results (2000 - 2019): Narrative summaries

- NO_x-N concentrations are very likely increasing by 2 – 3% annually ($p<0.05$; **Figure A3.11.3-5A**).
- FCB concentrations are very likely increasing by 6 – 7 % annually ($p<0.05$; **Figure A3.11.3-5B**).
- Conductivity is likely not changing ($p\geq0.10$; **Figure A3.11.3-5C**).
- DO levels are likely not changing ($p\geq0.10$; **Figure A3.11.3-5D & E)**
- Stream pH is very likely decreasing by 2 – 3% annually ($p<0.05$; **Figure A3.11.3-5C**).
- Turbidity is very likely increasing by 3 -5 % annually ($p<0.05$; **Figure A3.11.3-5G**).
- Water temperature is very likely increasing by 0.2 – 0.3% annually ($p<0.05$; **Figure A3.11.3-5H**).

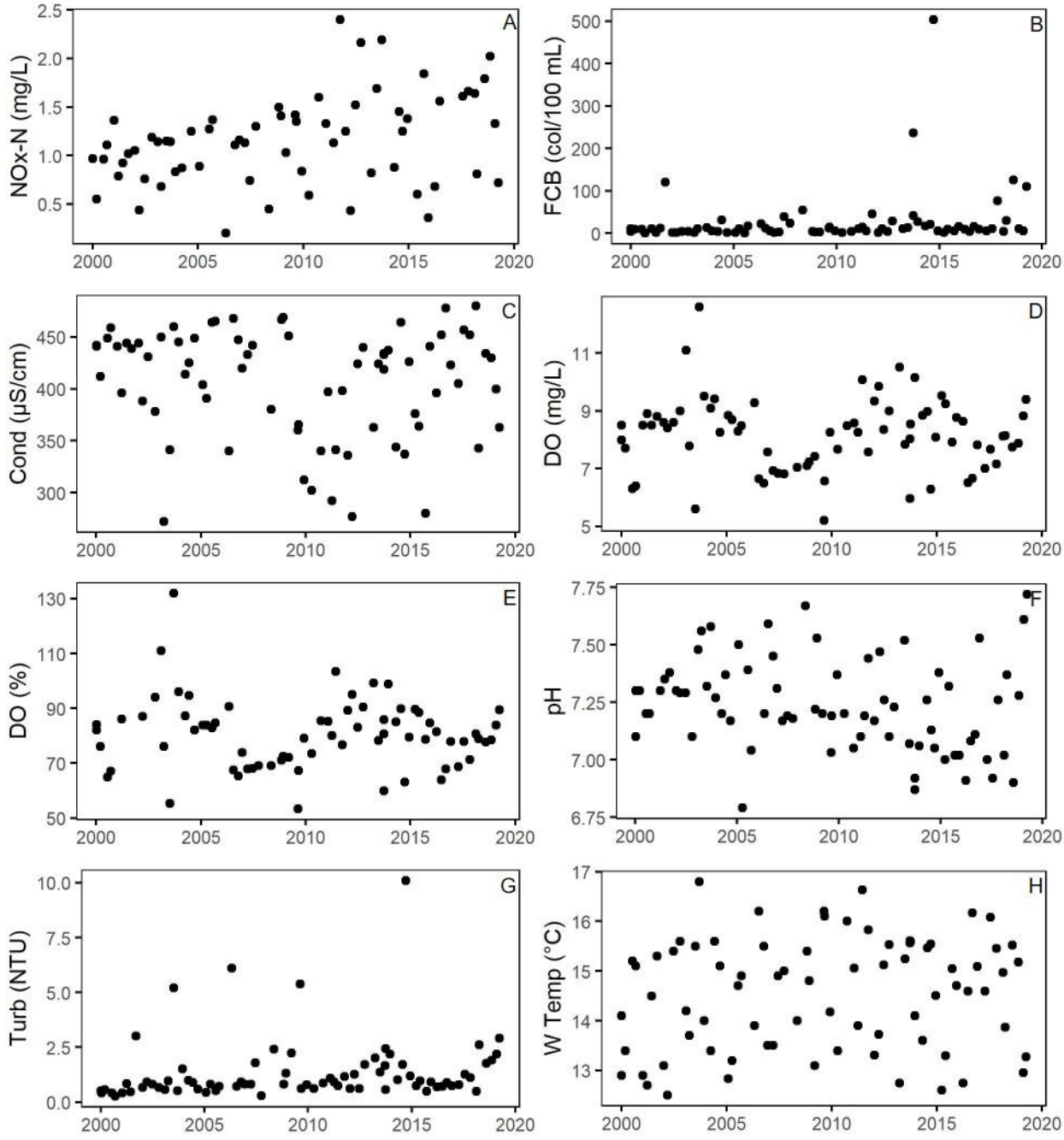


Figure A3.11.3 Water quality variable values shown through time (2000 – 2019) at BUFS33. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections.

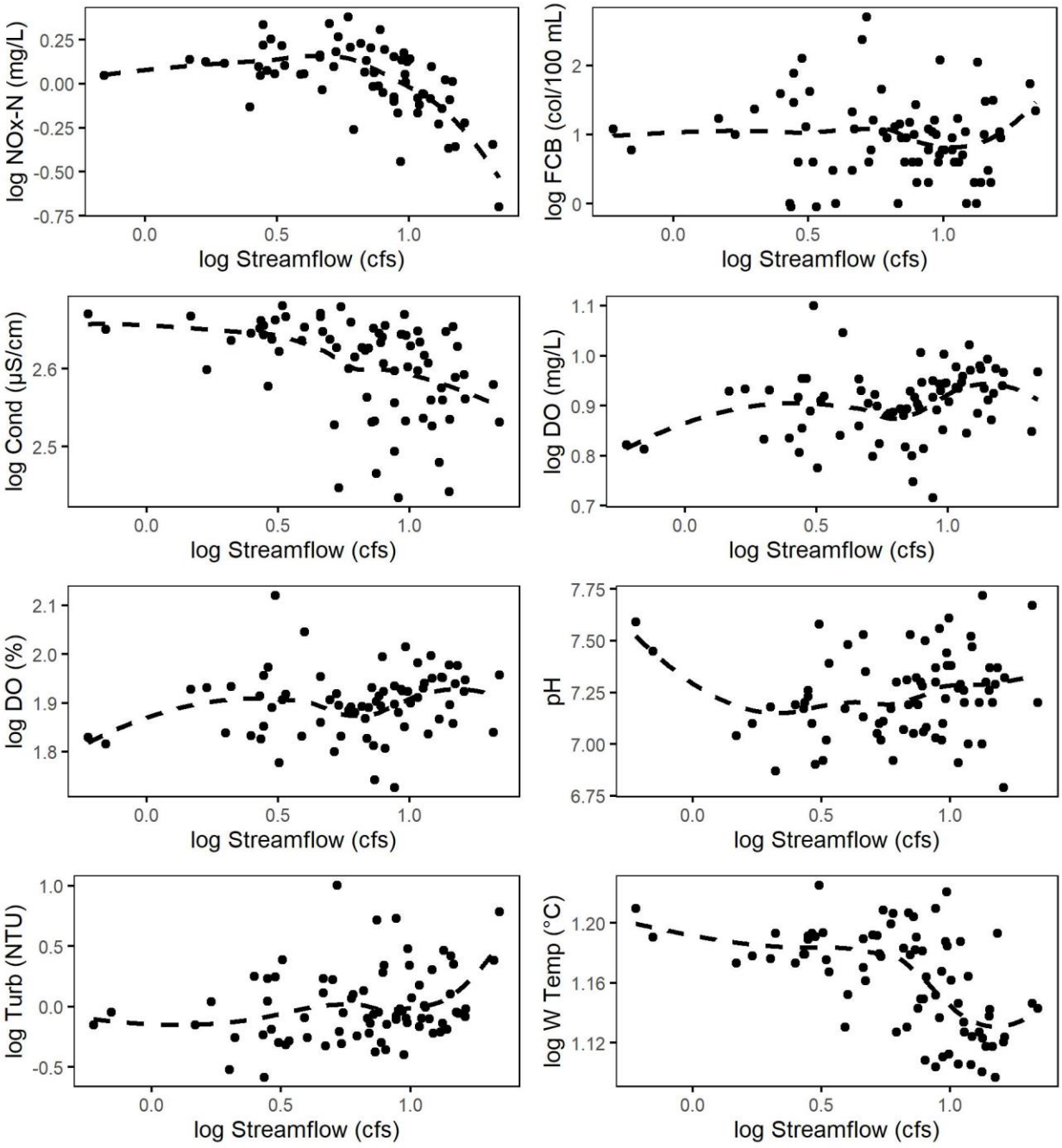


Figure A3.11.4 Water quality variable values (2000 – 2019) shown in relation to streamflow at BUFS33. A) nitrate+ nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation between each variable and streamflow.

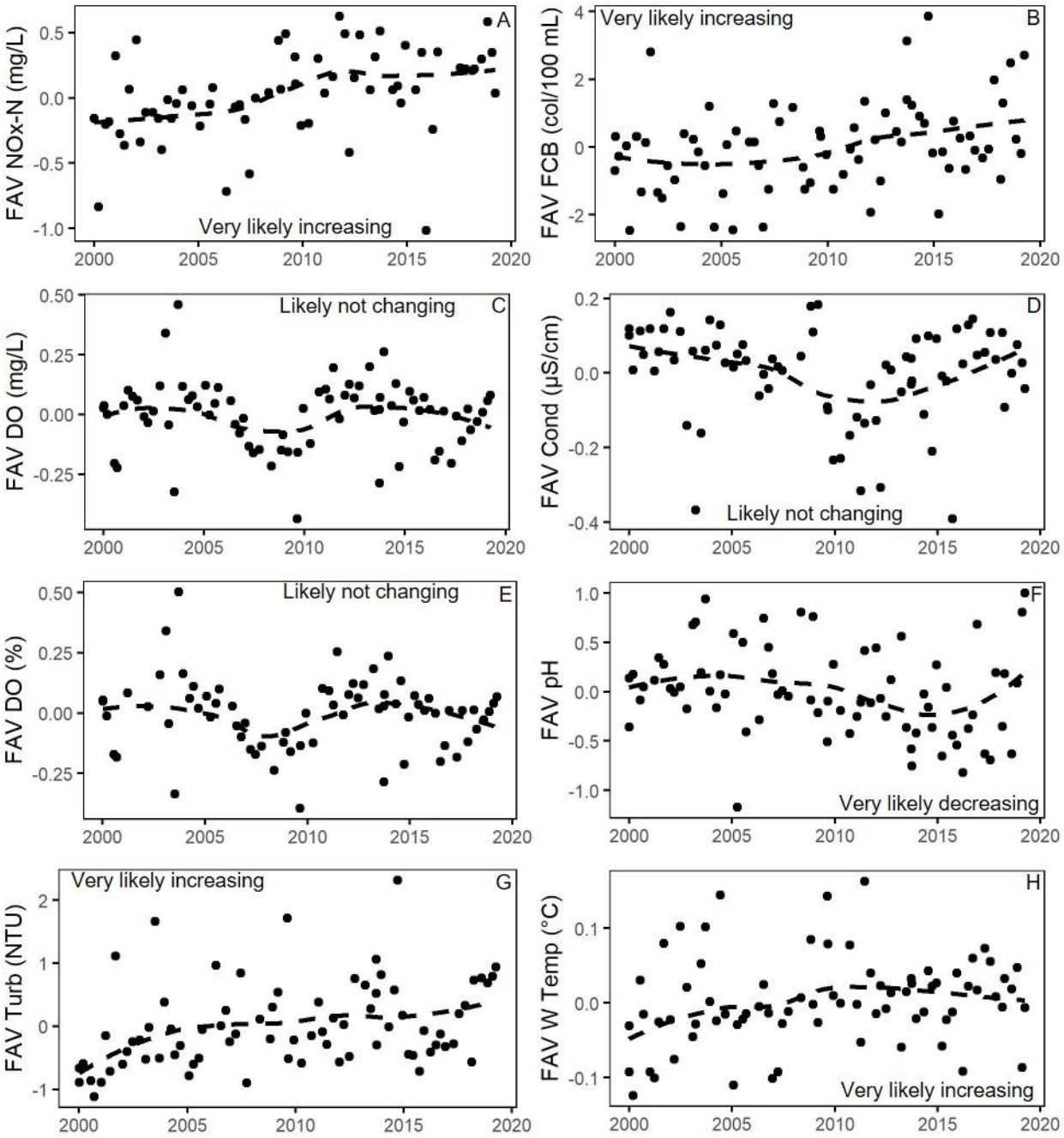


Figure A3.11.5 Flow-adjusted values (FAV) of water quality variables shown through time (2000 – 2019) for BUFS33. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation with time. Narrative results summarize statistical significance and trend direction across trend analyses. See **Table A2.2.1** for full results.

A3.12 Gilbert Spring at the Source

A3.12.1 Site and available data description

Gilbert Spring at the Source (BUFS44; 35.9889, -92.7139) is a long-term spring water quality monitoring site at BUFF. BUFF staff have measured flow and in situ physiochemistry and collected water samples for analysis of bacteriological indicators and nutrient concentrations at the site since 1985 (**Figure A3.12.1-2**). Instantaneous streamflow estimates collected by BUFF staff were available for the flow-adjustment procedure for generating FAVs of water quality variables as inputs to trend analysis.

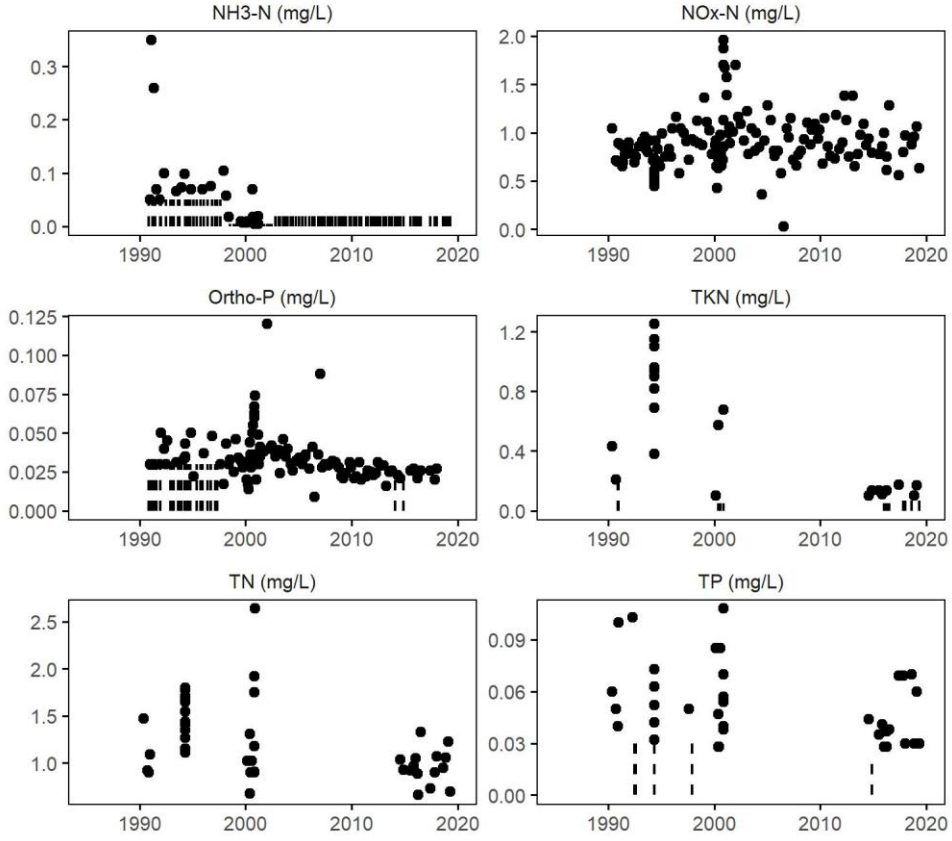


Figure A3.12.1 Nutrient variables (1985-2019) at BUFS41. Dashed lines indicate a non-detection, or that concentration could only be estimated within a range (i.e., between 0 and the relevant reporting limit).

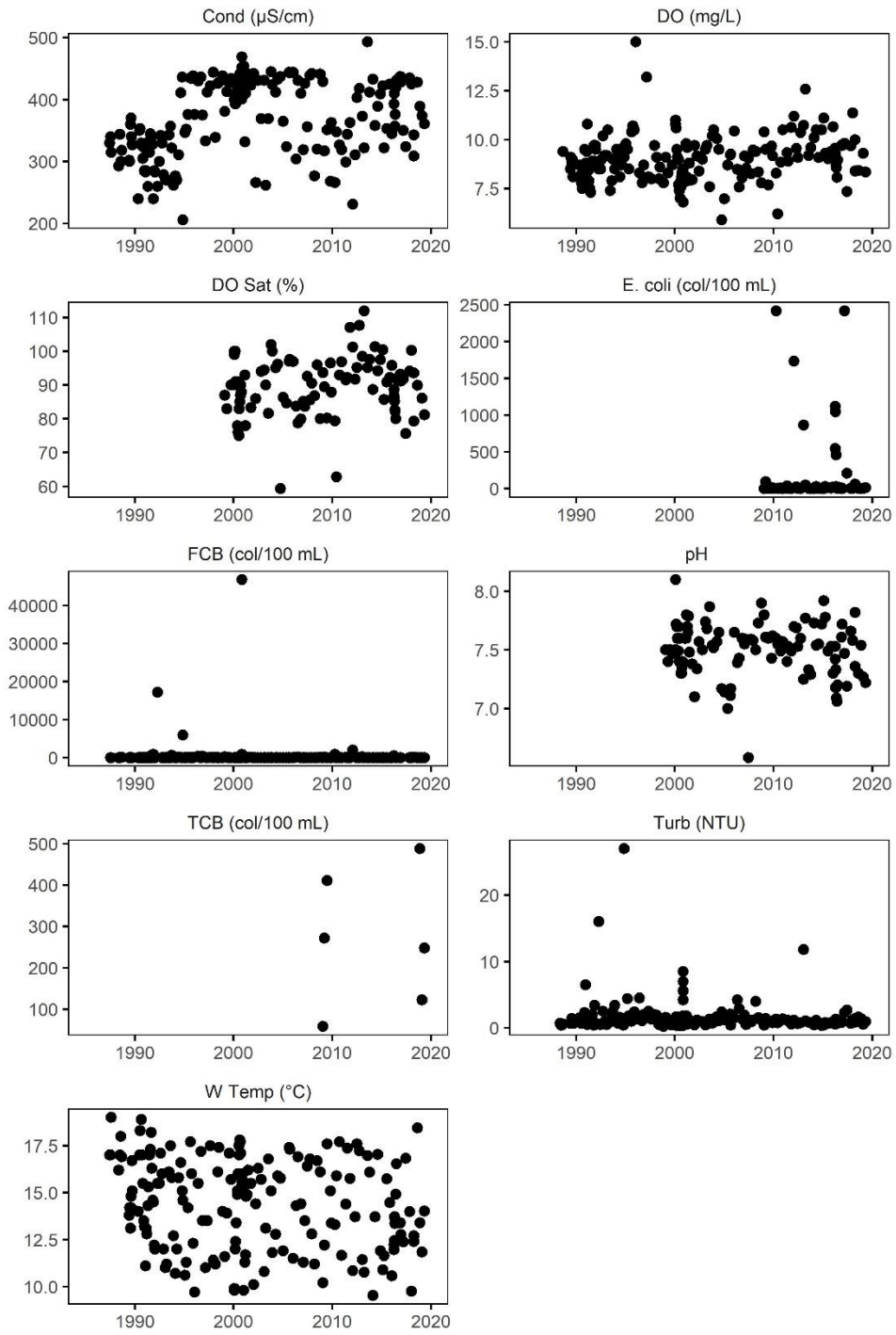


Figure A3.12.2 Bacterial indicator and physicochemical variables (1985-2019) at BUFS41.

A3.12.2 Trend analysis results (2000 - 2019): Narrative summaries

- NO_x-N concentrations are likely not changing ($p \geq 0.10$; **Figure A3.12.3-5A**).
- FCB concentrations are very likely decreasing by 6 – 8 % annually ($p < 0.05$; **Figure A3.12.3-5B**).
- Conductivity is likely not changing ($p \geq 0.10$; **Figure A3.12.3-5C**).
- DO trend analysis results required weight of evidence interpretation, suggesting that DO levels are likely not changing (**Figure A3.12.3-5D & E**). While results for DO concentration suggested a likely increase across tests ($p < 0.10$), results for DO % saturation suggested no change ($p \geq 0.10$). Differences between the variables, likely reflect known sizeable seasonal variability in DO concentration due to temperature-dependent gas solubility. Therefore, results of analysis on DO % saturation, a metric that corrects for seasonal differences, can be considered the most reliable information.
- Stream pH is likely not changing ($p \geq 0.10$; **Figure A3.12.3-5C**).
- Turbidity is likely not changing ($p \geq 0.10$; **Figure A3.12.3-5G**).
- Water temperature required weight of evidence interpretation, suggesting that water temperature is likely increasing by 0.3% annually (SKT $p < 0.10$; **Figure A3.12.3-5H**). Results of LR and MK suggested no change ($p \geq 0.10$), but SKT results can be considered the most reliable, due to considerable known seasonal variability in water temperature.

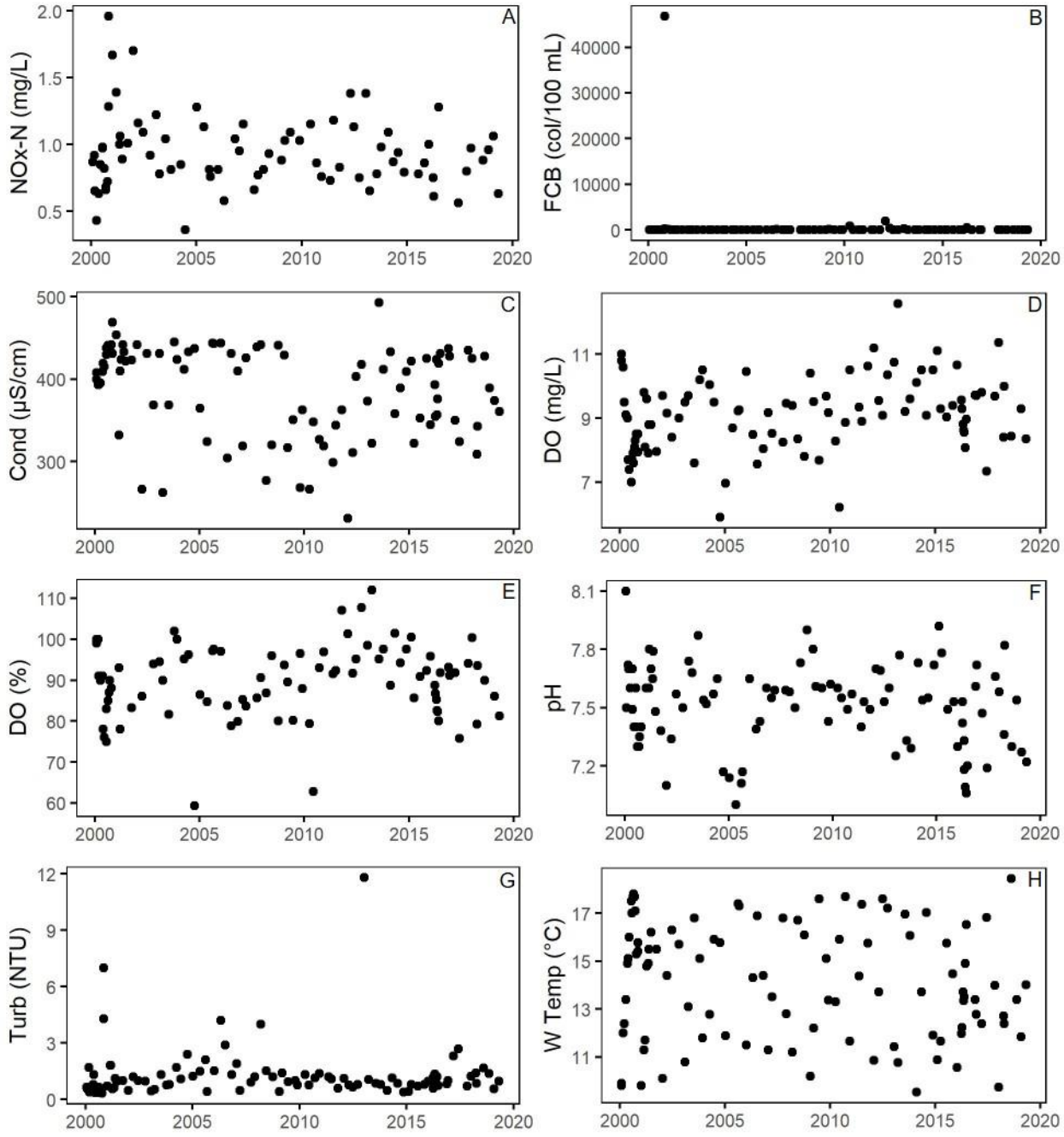


Figure A3.12.3 Water quality variable values shown through time (2000 – 2019) at BUFS41. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections.

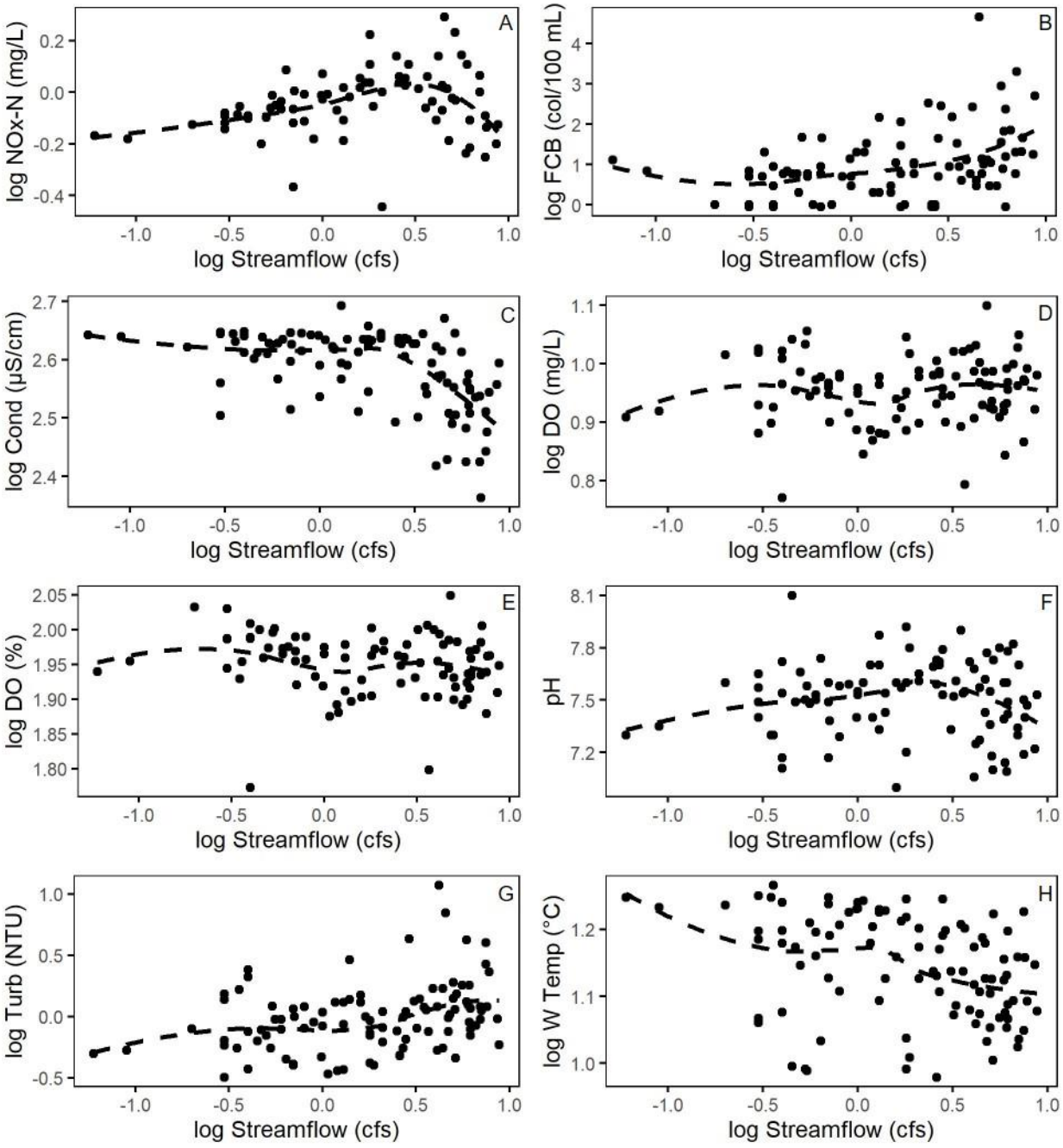


Figure A3.12.4 Water quality variable values (2000 – 2019) shown in relation to streamflow at BUFS41. A) nitrate+ nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation between each variable and streamflow.

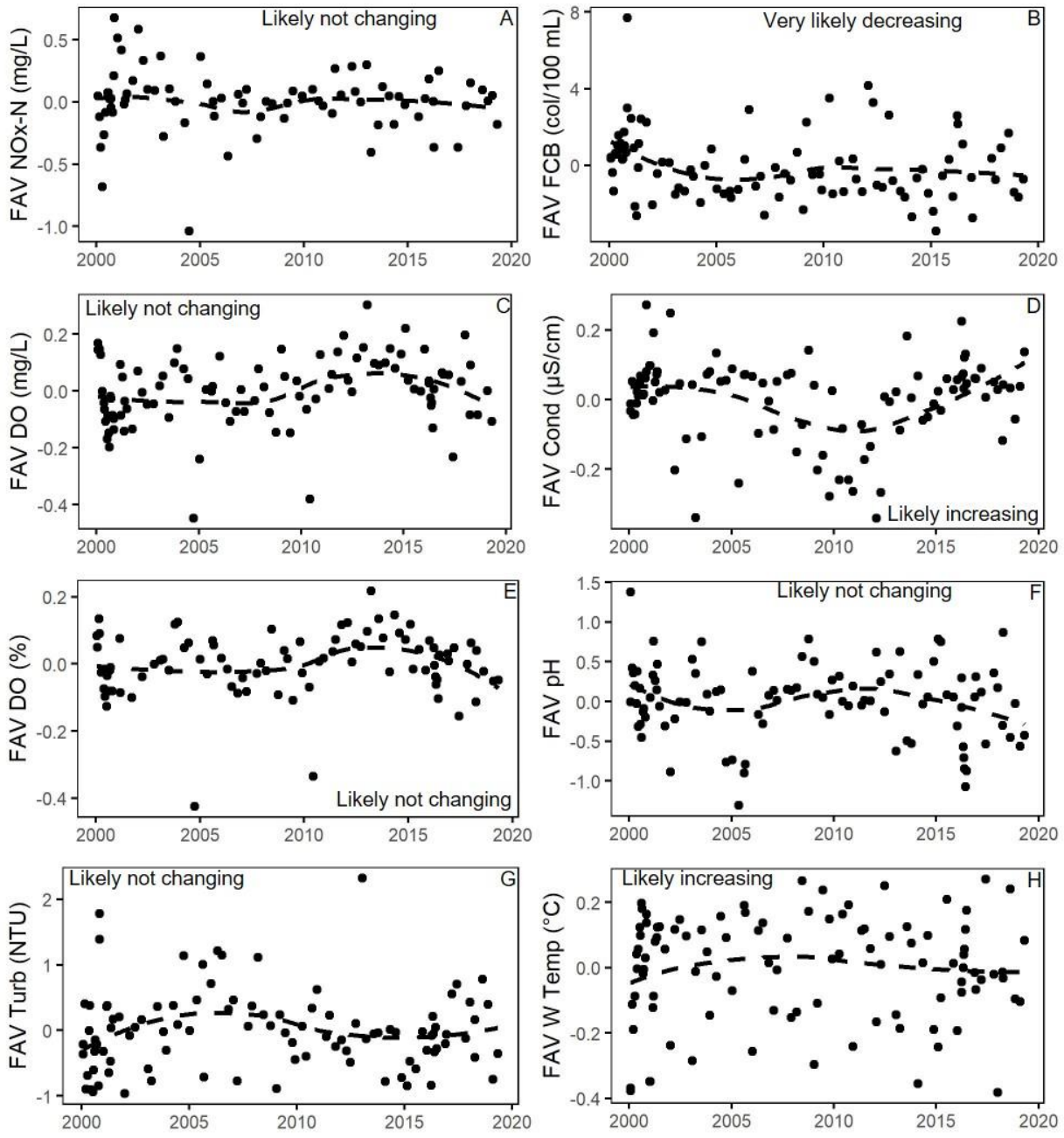


Figure A3.12.5 Flow-adjusted values FAVs of water quality variables shown through time (2000 – 2019) for BUFS41. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation with time. Narrative results summarize statistical significance and trend direction across trend analyses. See **Table A2.2.1** for full results.

A3.13 BUFT01 – Beech Creek at Highway 21 Crossing

A3.13.1 Site and available data description

Beech Creek at Highway 21 Crossing (BUFT01; 35.9667, -93.4056) is a long-term water quality monitoring site at BUFF. BUFF staff have measured streamflow and in situ physiochemistry and collected water samples for analysis of bacteriological indicators and nutrient concentrations at the site since 1985 (**Figure A3.13.1-2**). This site did not meet data availability requirements for trend analysis because none of the water quality variables had 50 observations or more.

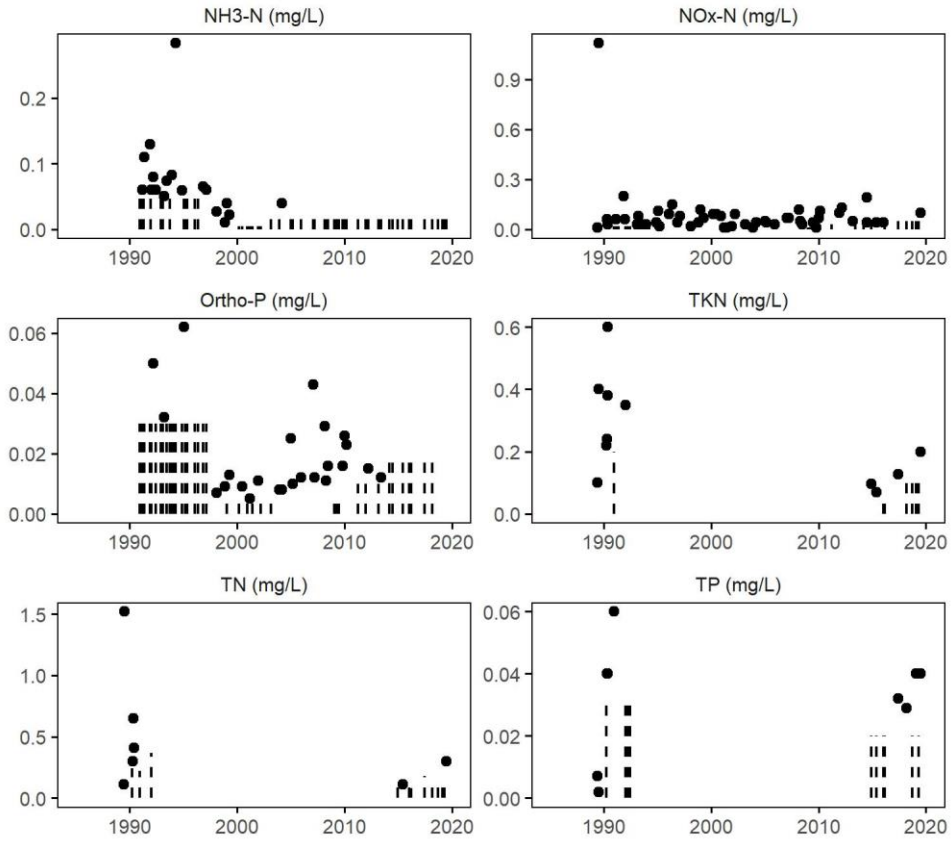


Figure A3.13.1 Nutrient variables (1985-2019) at BUFT01. Dashed lines indicate a non-detection, or that concentration could only be estimated within a range (i.e., between 0 and the relevant reporting limit).

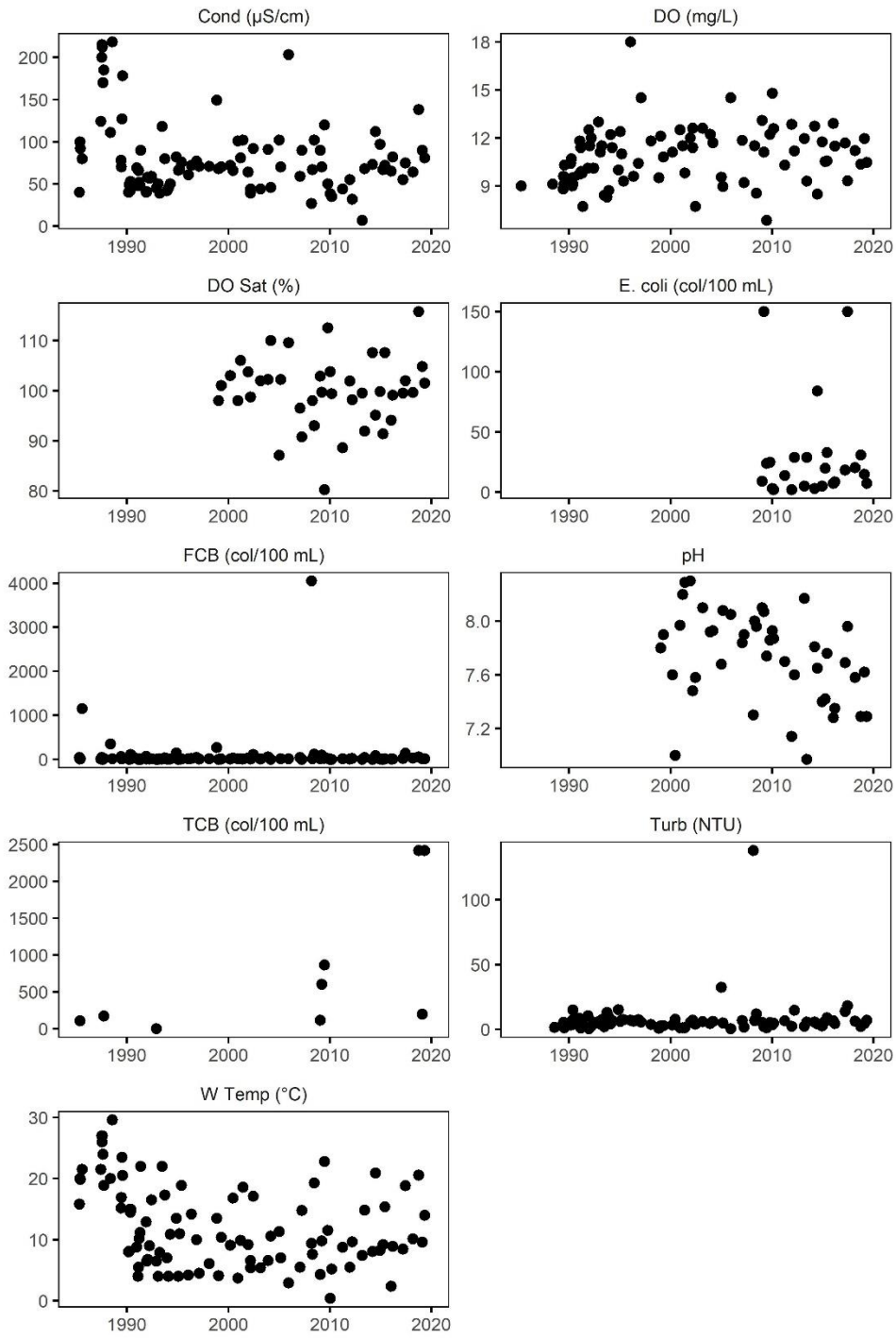


Figure A3.13.2 Bacterial indicator and physicochemical variables (1985-2019) at BUFT01.

A3.14 BUFT02 – Ponca Creek at Hwy 74 Bridge above Confluence with Buffalo River

A3.14.1 Site and available data description

Ponca Creek at Hwy 74 Bridge above Confluence with Buffalo River (BUFT02; 36.0211, -93.3544) is a long-term water quality monitoring site at BUFF. BUFF staff have measured streamflow and in situ physiochemistry and collected water samples for analysis of bacteriological indicators and nutrient concentrations at the site since 1985 (**Figure A3.14.1-2**). Instantaneous streamflow estimates collected by BUFF staff were used in the flow-adjustment procedure to generate FAVs of water quality variables for trend analysis.

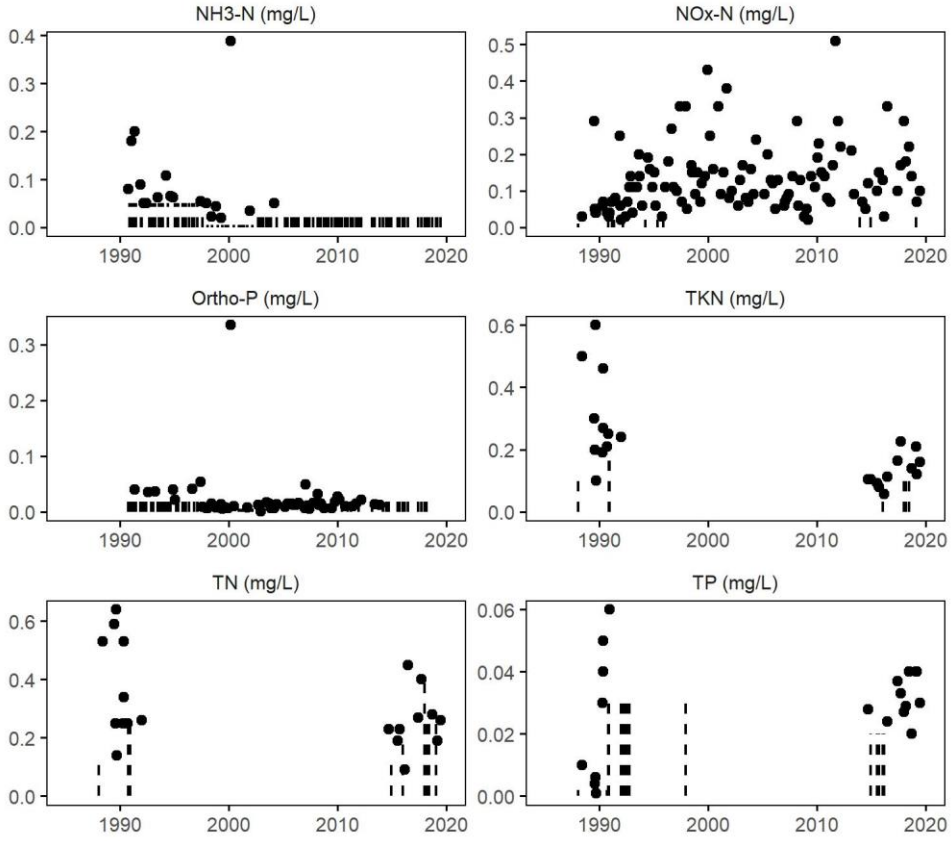


Figure A3.14.1 Nutrient variables (1985-2019) at BUFT02. Dashed lines indicate a non-detection, or that concentration could only be estimated within a range (i.e., between 0 and the relevant reporting limit).

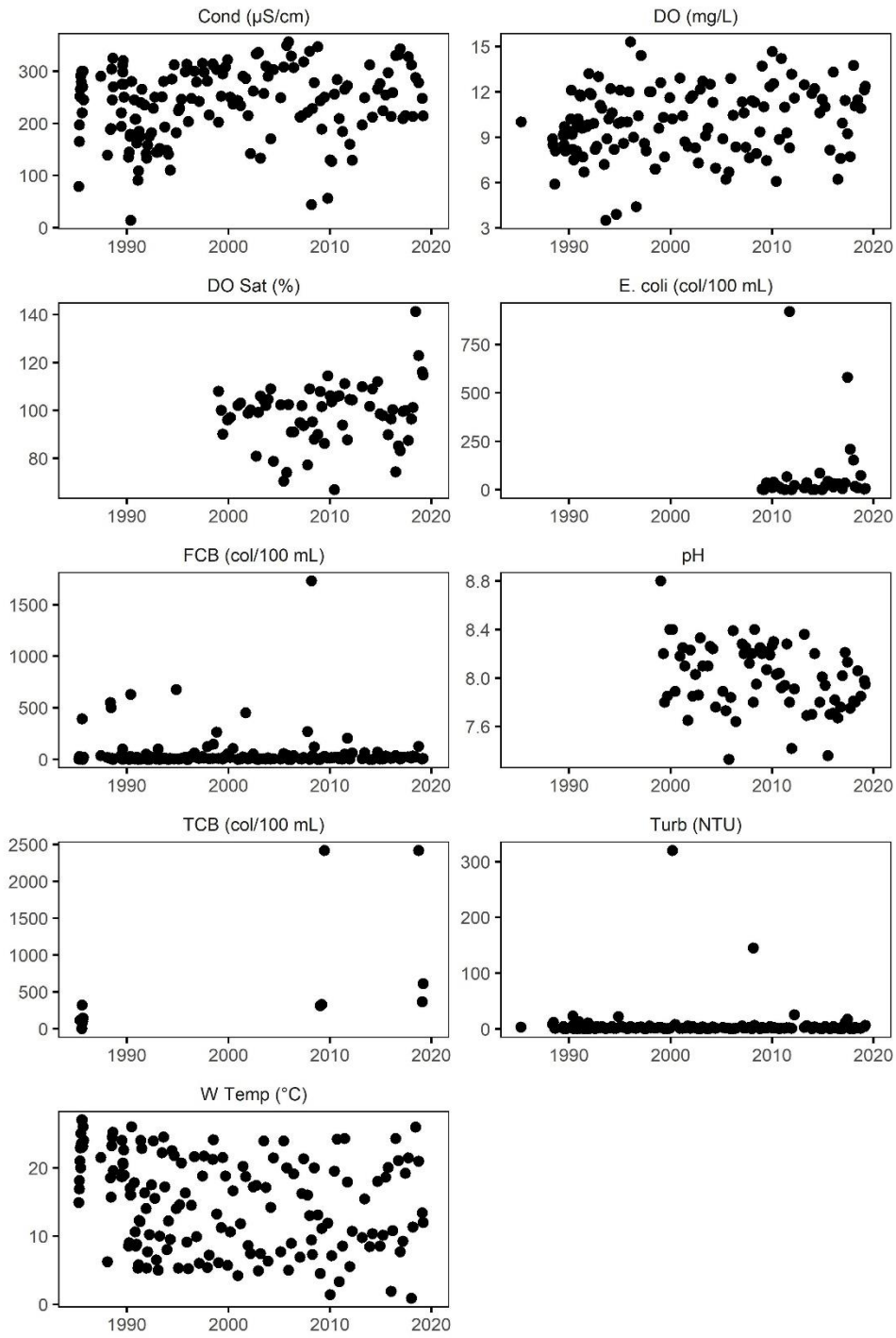


Figure A3.14.2 Bacterial indicator and physicochemical variables (1985-2019) at BUFT02.

A3.14.2 Trend analysis results (2000 - 2019): Narrative summaries

- NO_x-N concentrations are likely not changing ($p \geq 0.10$; **Figure A3.14.3-5A**).
- FCB concentrations are likely not changing ($p \geq 0.10$; **Figure A3.14.3-5B**).
- Conductivity is likely not changing ($p \geq 0.10$; **Figure A3.14.3-5C**).
- DO trend analysis results required weight of evidence interpretation, suggesting that DO levels are likely not changing (**Figure A3.14.3-5D & E**). While LR and MK results for DO % saturation suggested a likely increase ($p < 0.10$), results of SKT on % saturation and of all tests on concentration suggested no change ($p \geq 0.10$). Differences between results of MK and SKT likely reflect known sizeable seasonal differences in DO concentration, due to temperature-dependent gas solubility. Therefore, SKT results on % saturation can be considered most reliable.
- Stream pH trend analysis results required weight of evidence interpretation, suggesting that pH is likely not changing (SKT $p \geq 0.10$; **Figure A3.14.3-5F**). Results of LR and MK suggested a very likely decrease ($p < 0.05$), but non-significant SKT results suggest that seasonality is a factor for pH and that sampling has potentially not occurred evenly across seasons.
- Turbidity is likely not changing ($p \geq 0.10$; **Figure A3.14.3-5G**).
- Water temperature is likely not changing ($p \geq 0.10$; **Figure A3.14.3-5H**).

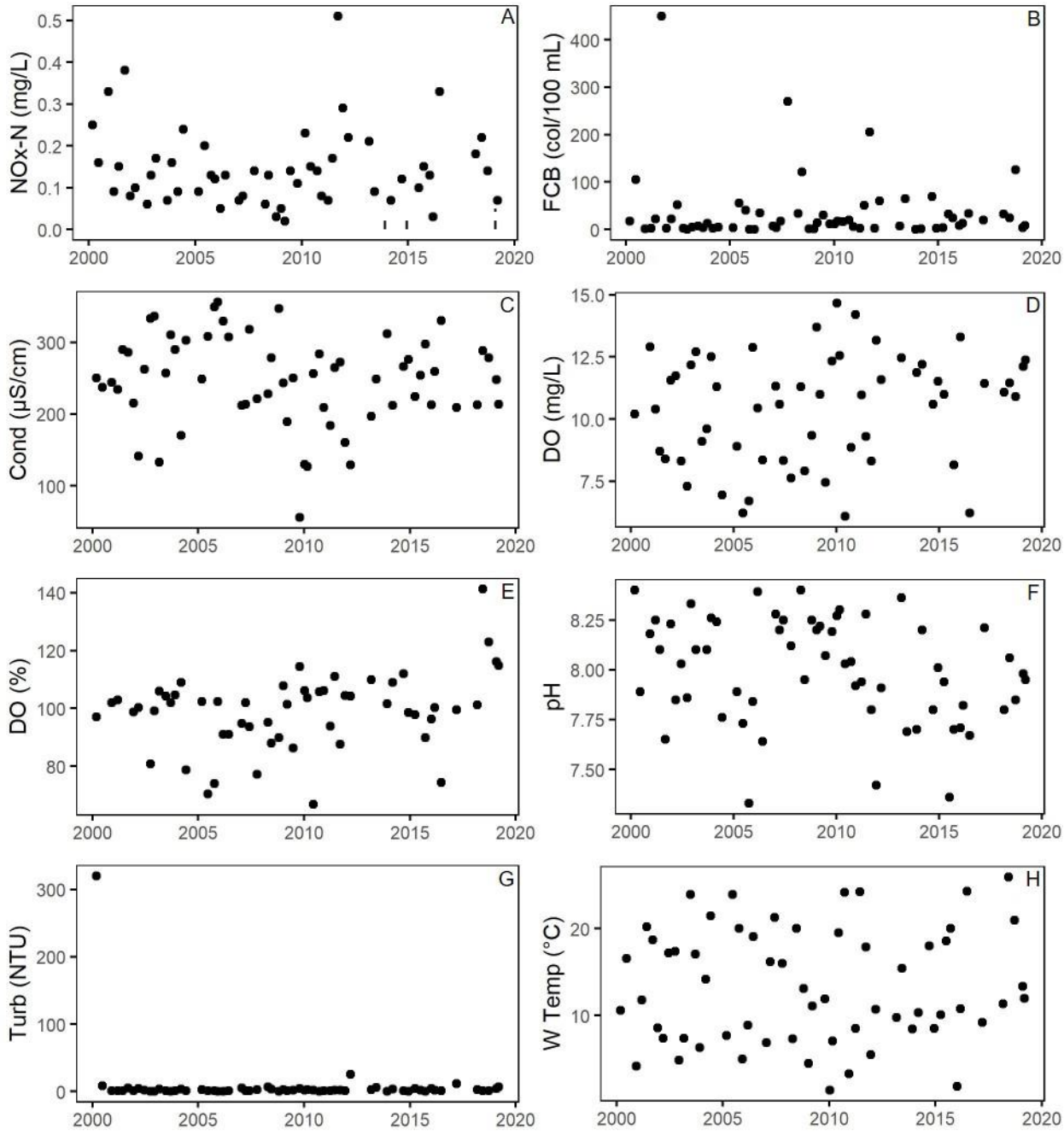


Figure A3.14.3 Water quality variable values shown through time (2000 – 2019) at BUFT02. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections.

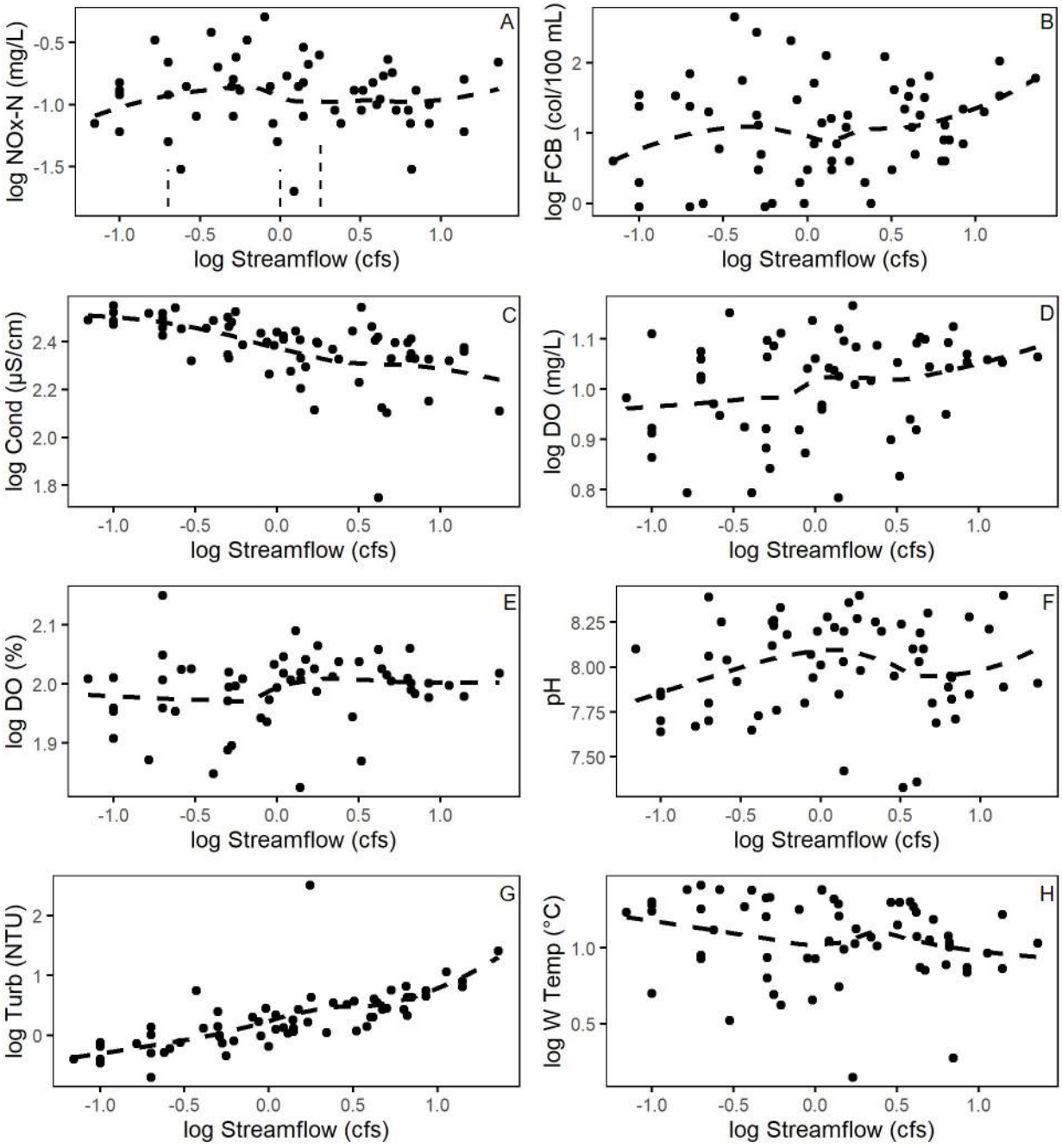


Figure A3.14.4 Water quality variable values (2000 – 2019) shown in relation to streamflow at BUFT02. A) nitrate+ nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation between each variable and streamflow.

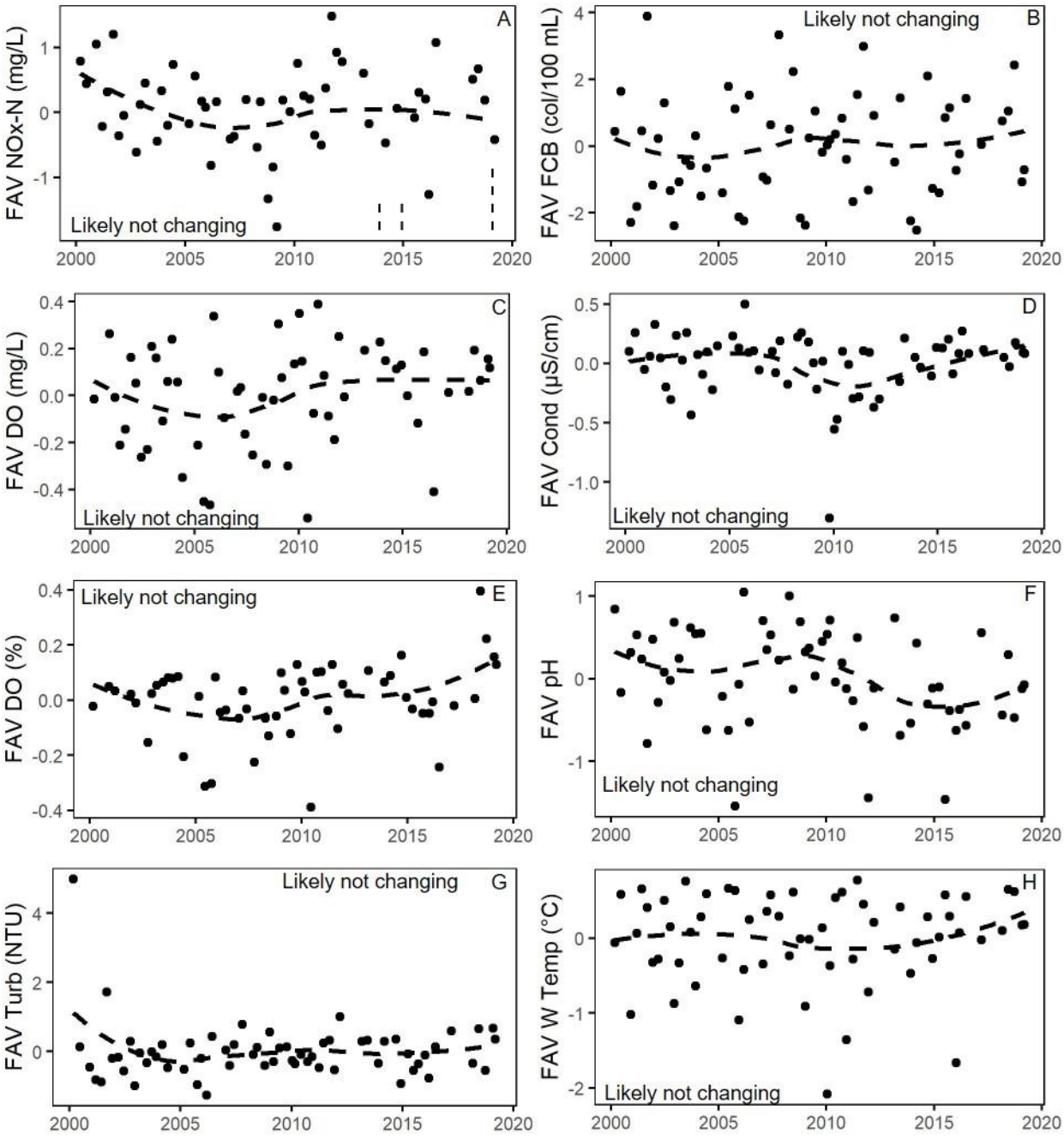


Figure A3.14.5 Flow-adjusted values (FAV) of water quality variables shown through time (2000 – 2019) for BUFT02. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation with time. Narrative results summarize statistical significance and trend direction across trend analyses. See **Table A2.2.1** for full results.

A3.15 BUFT03– Cecil Creek above Confluence with Buffalo River

A3.15.1 Site and available data description

Cecil Creek above Confluence with Buffalo River (BUFT03; 36.0772, -93.2414) is a long-term water quality monitoring site at BUFF. BUFF staff have measured streamflow and in situ physiochemistry and collected water samples for analysis of bacteriological indicators and nutrient concentrations at the site since 1985 (**Figure A3.15.1-2**). Instantaneous streamflow estimates collected by BUFF staff were used in the flow-adjustment procedure to generate FAVs of water quality variables for trend analysis.

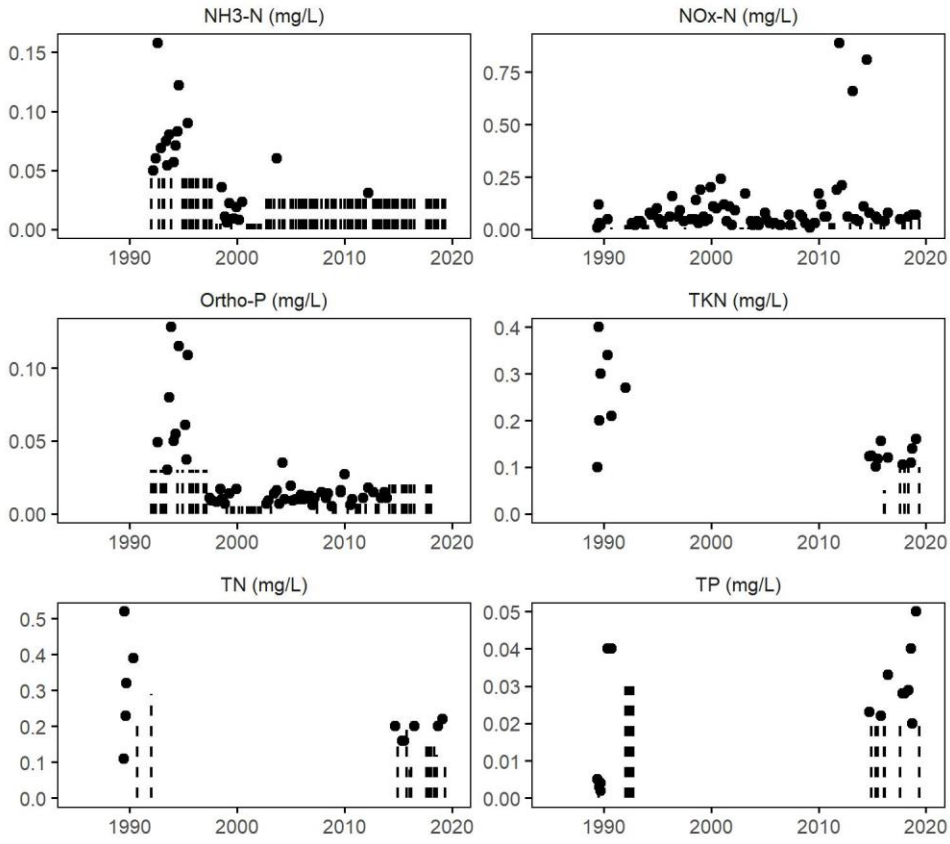


Figure A3.15.1 Nutrient variables (1985-2019) at BUFT03. Dashed lines indicate a non-detection, or that concentration could only be estimated within a range (i.e., between 0 and the relevant reporting limit).

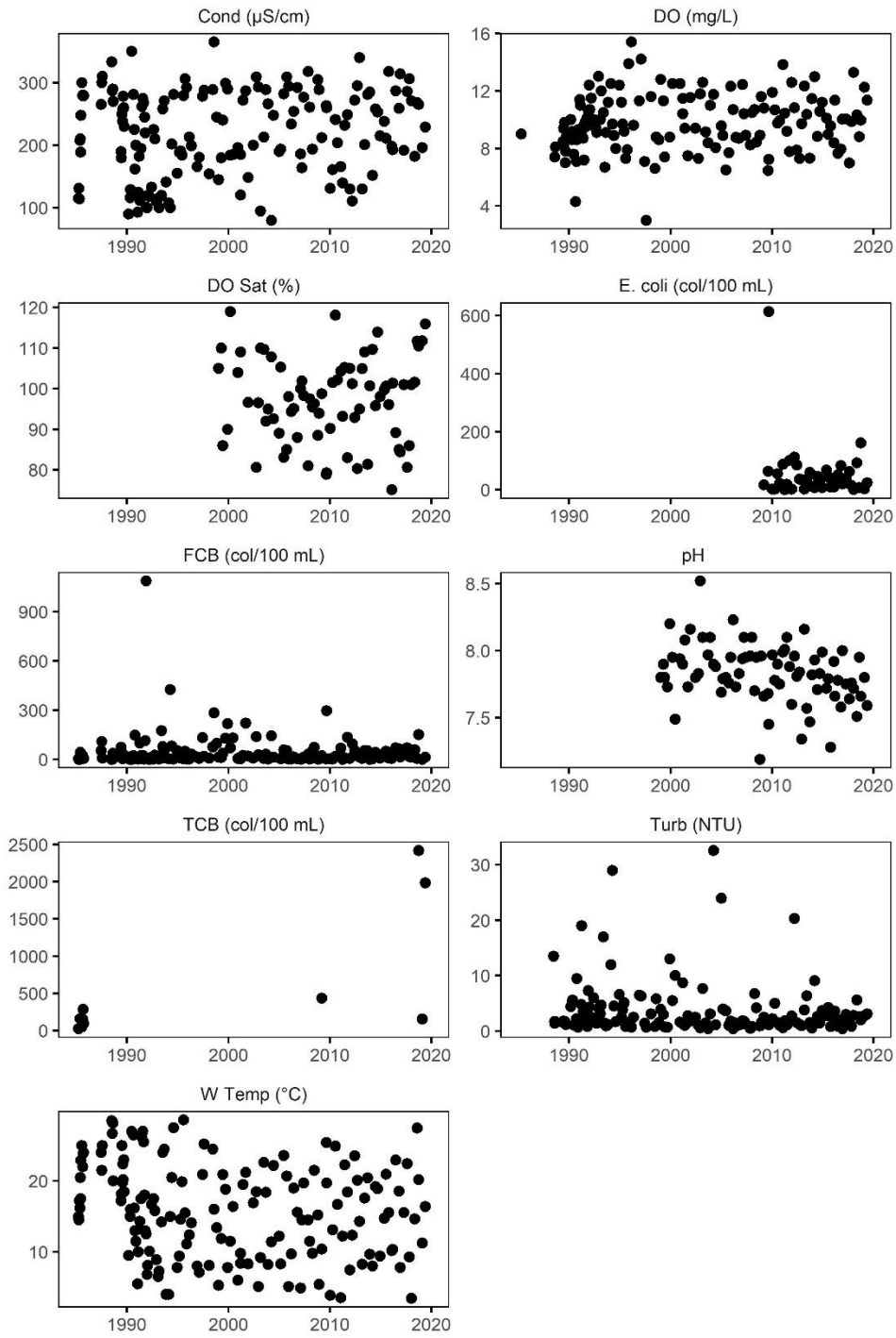


Figure A3.15.2 Bacterial indicator and physicochemical variables (1985-2019) at BUFT03.

A3.15.2 Trend analysis results (2000 - 2019): Narrative summaries

- NOx-N concentrations could not be analyzed at this site due non-detection frequency greater than 30% (**Figure A3.15.3-5A**).
- FCB concentrations are likely not changing ($p \geq 0.10$; **Figure A3.15.3-5B**).
- Conductivity is likely not changing ($p \geq 0.10$; **Figure A3.15.3-5C**).
- DO levels are likely not changing ($p \geq 0.10$; **Figure A3.15.3-5D & E**).
- Stream pH were required weight of evidence interpretation, suggesting pH is likely not changing (SKT $p \geq 0.10$; **Figure A3.15.3-5F**). Results of LR and MK suggested a very likely decrease ($p < 0.05$), but non-significant SKT results suggest that seasonality is a factor for pH and that sampling has potentially not occurred evenly across seasons.
- Turbidity turbidity is likely not changing (SKT $p \geq 0.10$; **Figure A3.15.3-5G**).
- Water temperature is likely not changing ($p \geq 0.10$; **Figure A3.15.3-5H**).

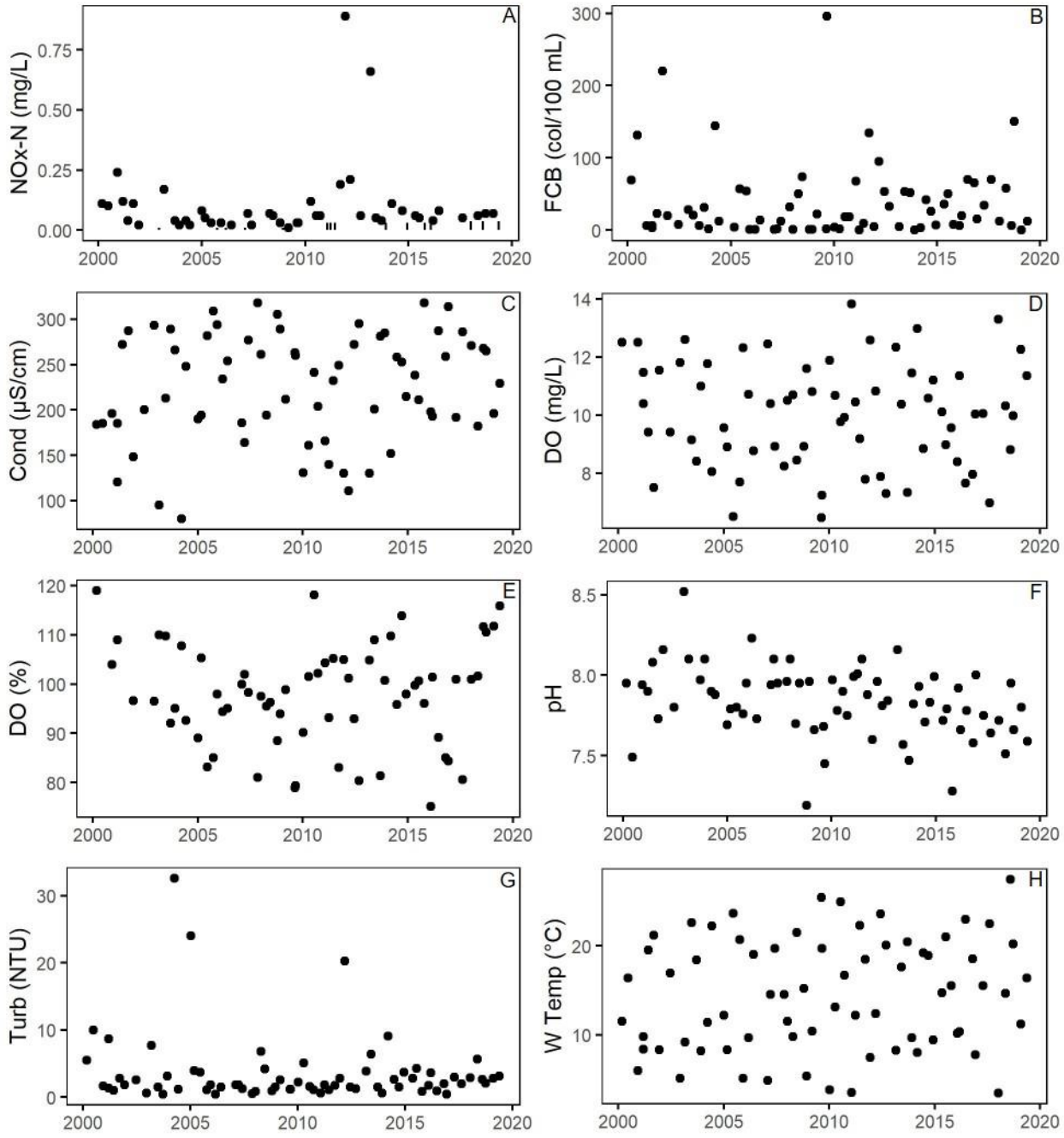


Figure A3.15.3 Water quality variable values shown through time (2000 – 2019) at BUFT03. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections.

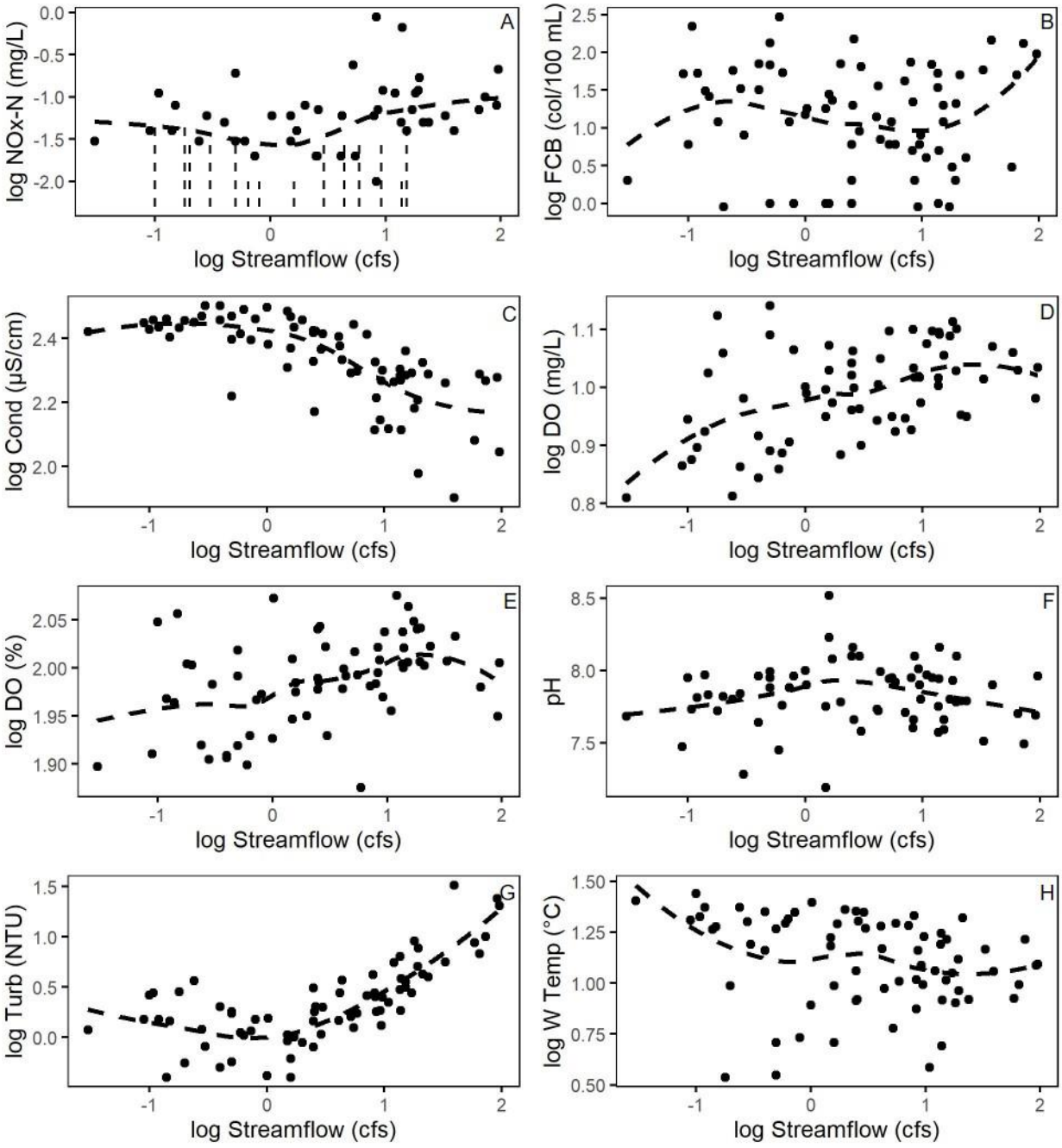


Figure A3.15.4 Water quality variable values (2000 – 2019) shown in relation to streamflow at BUFT03. A) nitrate+ nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation between each variable and streamflow.

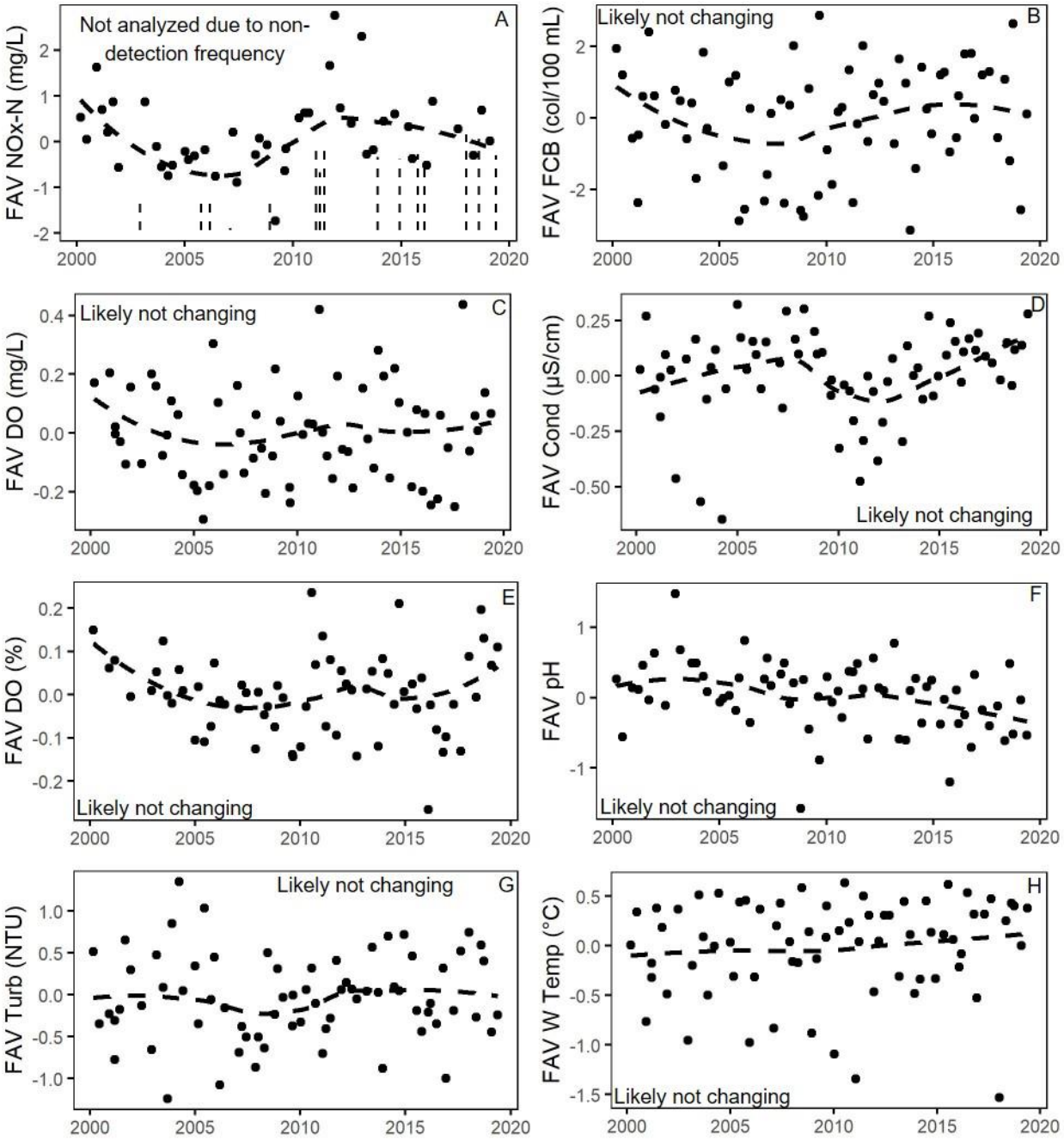


Figure A3.15.5 Flow-adjusted values (FAV) of water quality variables shown through time (2000 – 2019) for BUFT03. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation with time. Narrative results summarize statistical significance and trend direction across trend analyses. See **Table A2.2.1** for full results.

A3.16 BUFT04 – Mill Creek at County Road Crossing near Pruitt Access

A3.16.1 Site and available data description

Mill Creek at County Road Crossing near Pruitt Access (BUFT04; 36.0578, -93.1319) is a long-term water quality monitoring site at BUFF. BUFF staff have measured streamflow and in situ physiochemistry and collected water samples for analysis of bacteriological indicators and nutrient concentrations at the site since 1985 (**Figure A3.16.1-2**). In the mid-2010's sampling intensity increased substantially for some variables. Instantaneous streamflow estimates collected by BUFF staff were used in the flow-adjustment procedure to generate FAVs of water quality variables for trend analysis.

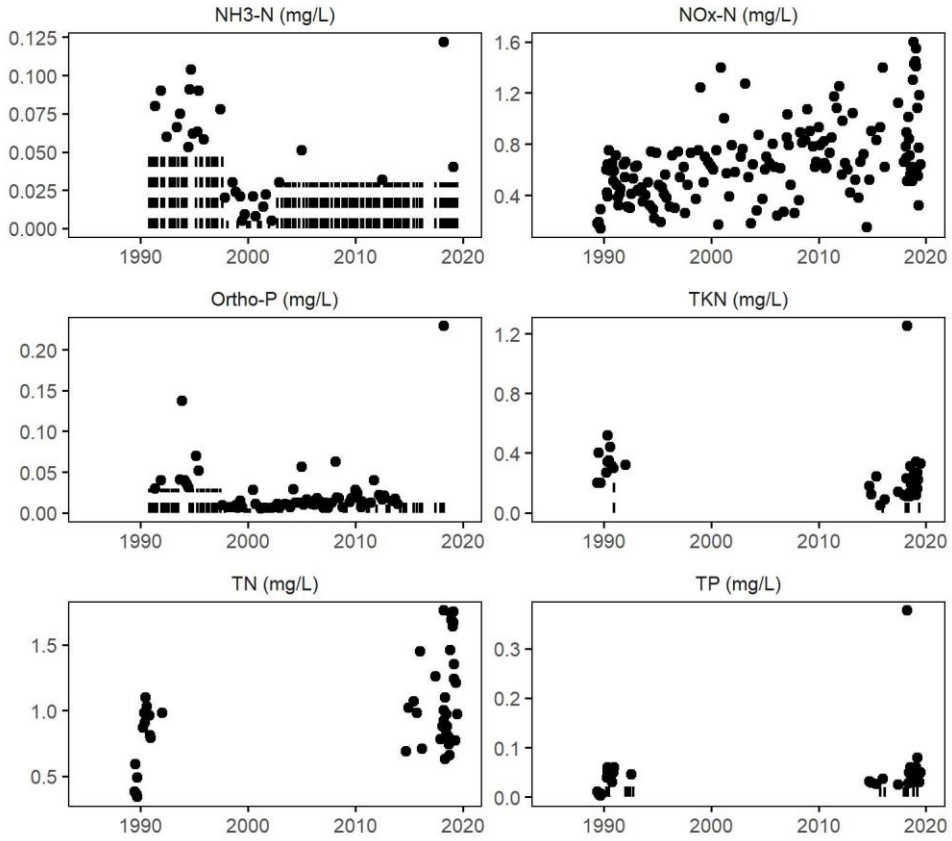


Figure A3.16.1 Nutrient variables (1985-2019) at BUFT04. Dashed lines indicate a non-detection, or that concentration could only be estimated within a range (i.e., between 0 and the relevant reporting limit).

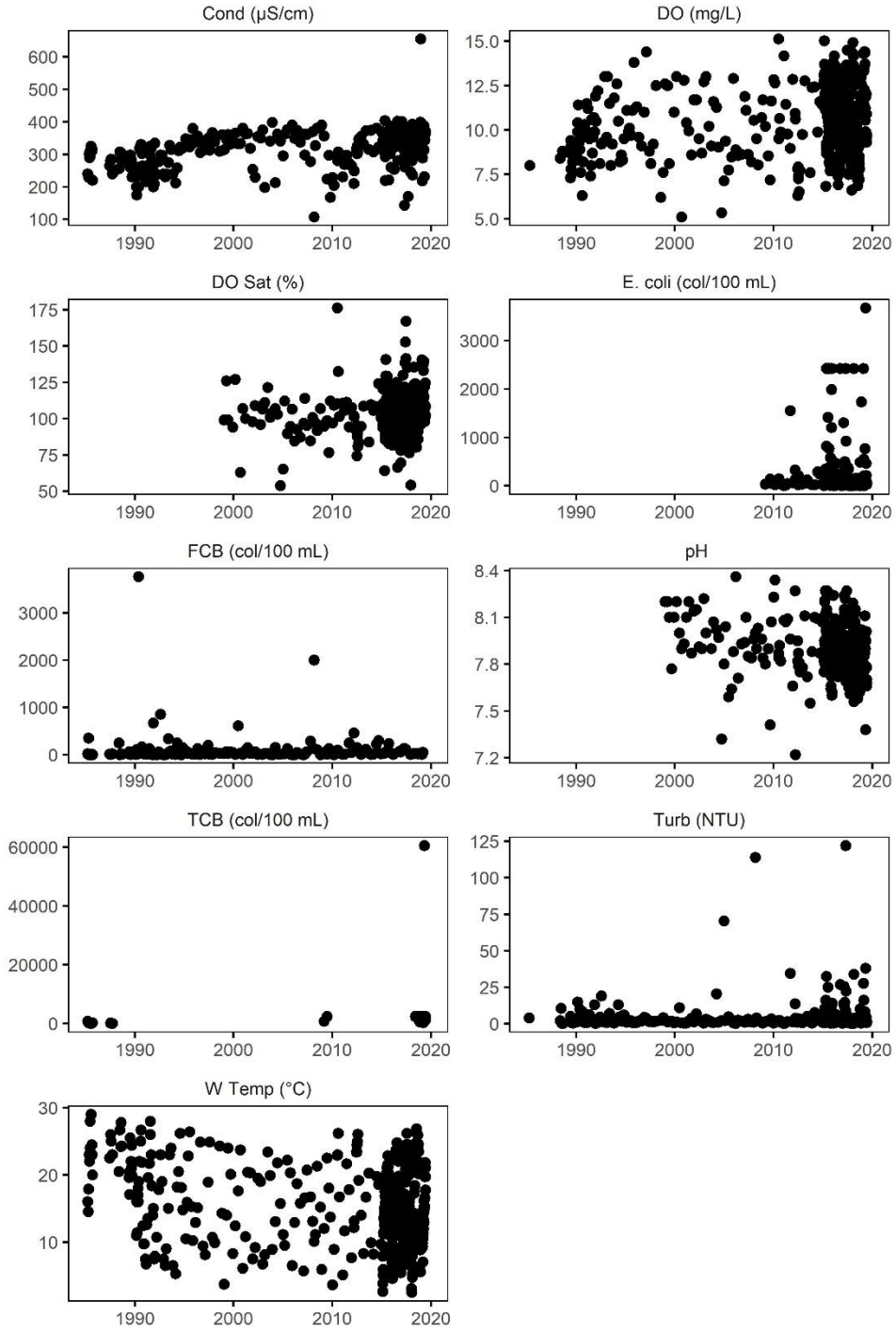


Figure A3.16.2 Bacterial indicator and physicochemical variables (1985-2019) at BUFT04.

A3.16.2 Trend analysis results (2000 - 2019): Narrative summaries

- NO_x-N concentrations are very likely increasing by 2% annually ($p<0.05$; **Figure A3.16.3-5A**).
- E. coli concentrations are likely (LR $p<0.01$) to very likely (MK and SKT $p<0.05$) decreasing by 7 – 10% annually (**Figure A3.16.3-5B**).
- FCB concentrations are likely not changing ($p\geq0.10$; **Figure A3.16.3-5C**).
- Conductivity is very likely increasing by 0.4 – 0.7% annually ($p<0.05$; **Figure A3.16.3-5D**).
- DO levels are very likely increasing by 0.6 – 1% annually ($p<0.05$; **Figure A3.16.3-5E**).
- Stream pH is very likely decreasing by 1 – 2% annually ($p<0.05$; Figure A3.1.16.3-5F).
- Turbidity is likely not changing ($p\geq0.10$; **Figure A3.16.3-5G**).
- Water temperature trend analysis results required weight of evidence interpretation, suggesting that water temperature is very likely increasing by 0.2 – 0.6% annually (SKT $p<0.05$; **Figure A3.16.3-5H**). Results of LR and MK suggested no change ($p\geq0.10$), but significant SKT results

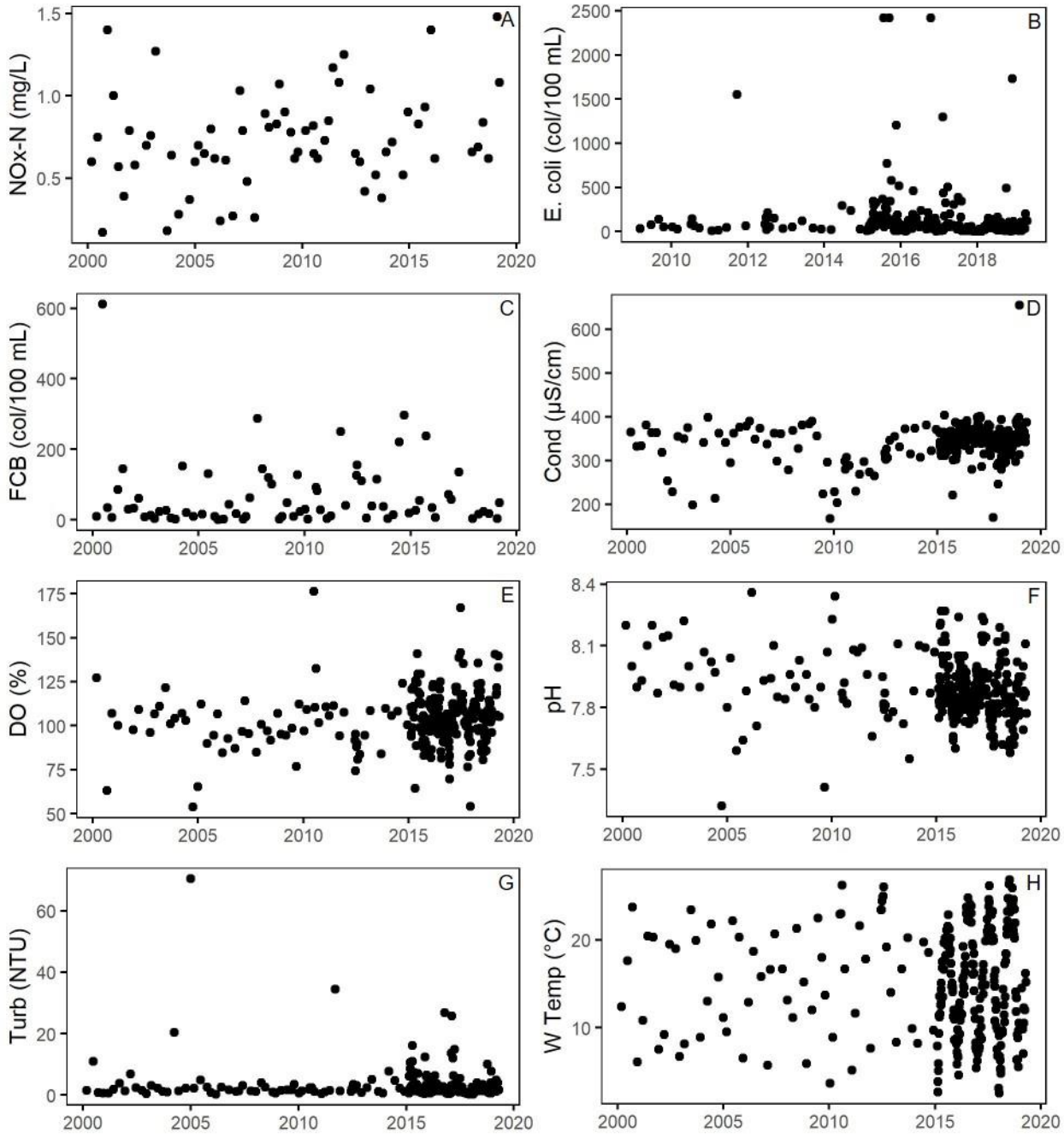


Figure A3.16.3 Water quality variable values shown through time (2000 – 2019) at BUFT04. A) nitrate+nitrite-nitrogen (NOx-N), B) Escherichia coli (E. coli), C) fecal coliform bacteria (FCB), D) conductivity (Cond), E) dissolved oxygen (DO), F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections.

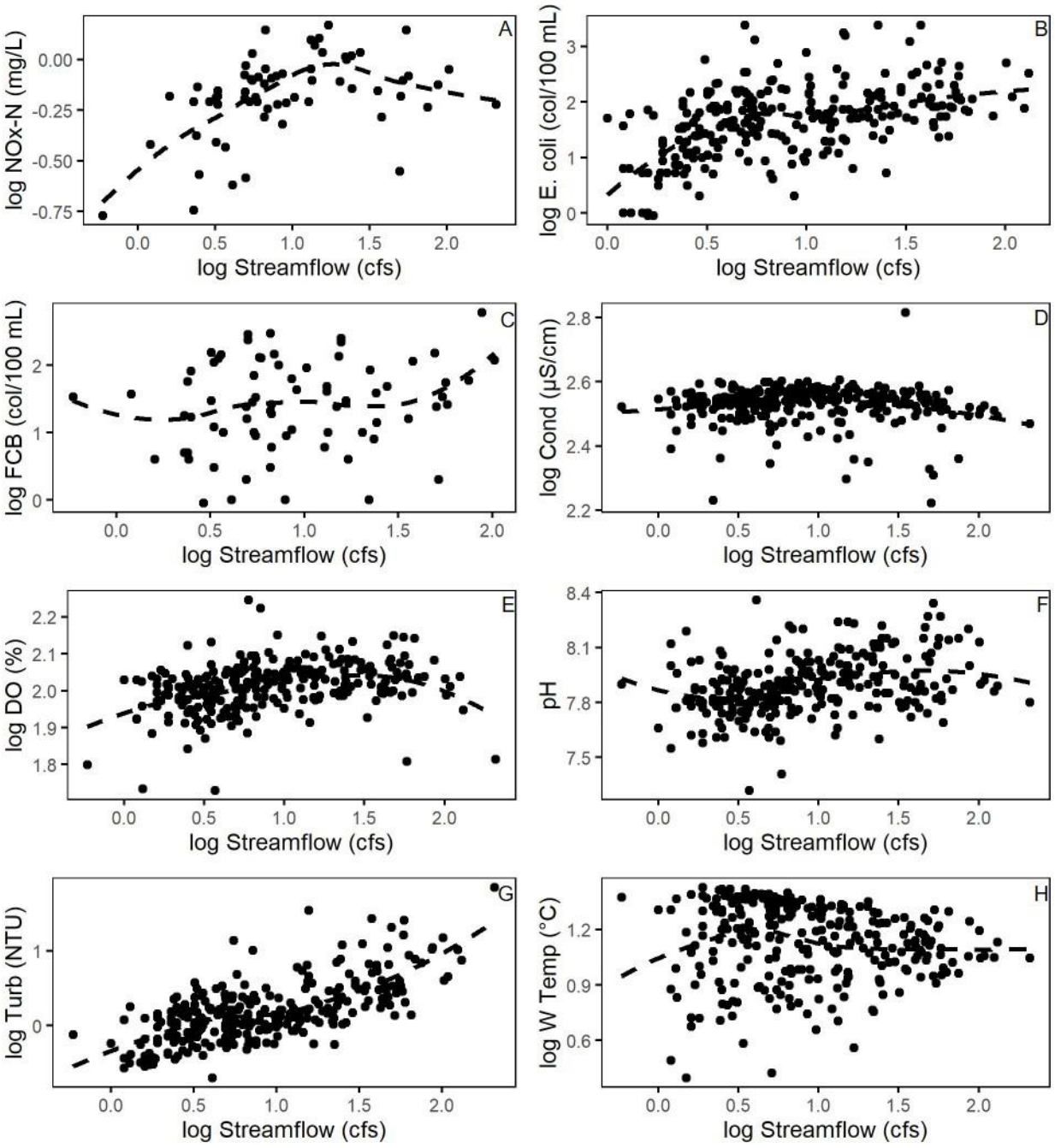


Figure A3.16.4 Water quality variable values (2000 – 2019) shown in relation to streamflow at BUFT04. A) nitrate+nitrite-nitrogen (NOx-N), B) Escherichia coli (E. coli), C) fecal coliform bacteria (FCB), D) conductivity (Cond), E) dissolved oxygen (DO), F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation between each variable and streamflow.

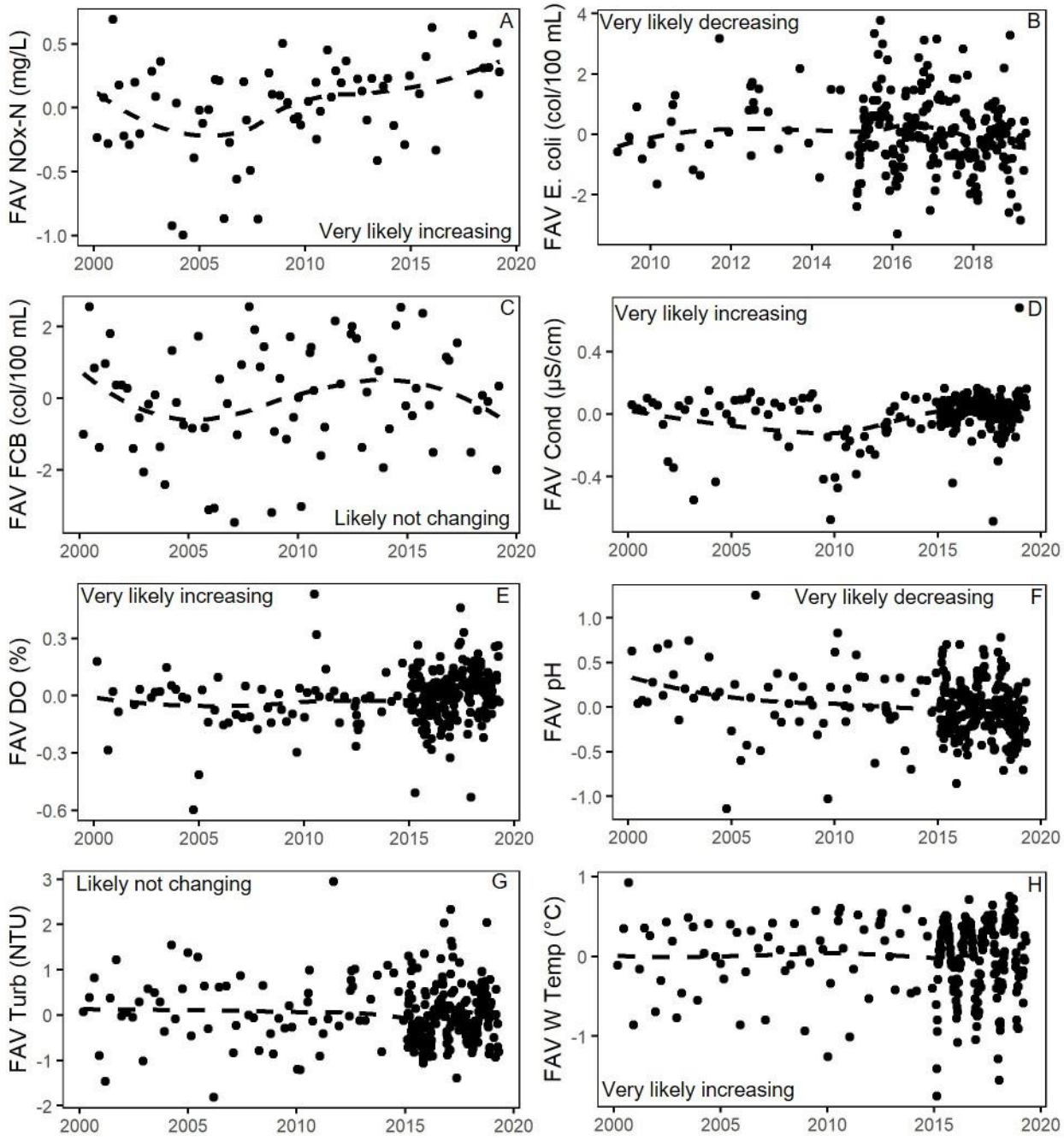


Figure A3.16.5 Flow-adjusted values (FAV) of water quality variables shown through time (2000 – 2019) for BUFT04. A) nitrate+nitrite-nitrogen (NOx-N), B) Escherichia coli (E. coli), C) fecal coliform bacteria (FCB), D) conductivity (Cond), E) dissolved oxygen (DO), F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation with time. Narrative results summarize statistical significance and trend direction across trend analyses. See **Table A2.2.1** for full results.

A3.17 BUFT05 – Little Buffalo River above Confluence with Buffalo River

A3.17.1 Site and available data description

Little Buffalo River above Confluence with Buffalo River (BUFT05; 36.0339, -93.1097) is a long-term water quality monitoring site at BUFF. BUFF staff have measured streamflow and in situ physiochemistry and collected water samples for analysis of bacteriological indicators and nutrient concentrations at the site since 1985 (**Figure A3.17.1-2**). In the mid-2010's, sampling intensity increased substantially for several variables at this site. Instantaneous streamflow estimates collected by BUFF staff were used in the flow-adjustment procedure to generate FAVs of water quality variables for trend analysis.

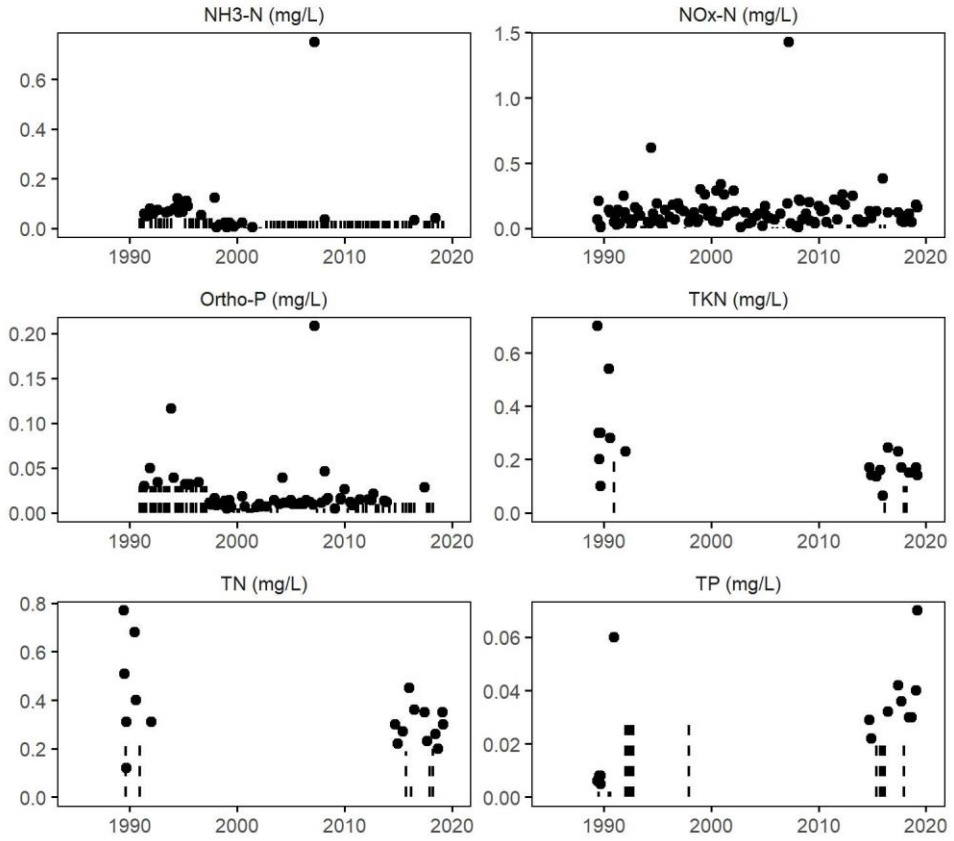


Figure A3.17.1 Nutrient variables (1985-2019) at BUFT05. Dashed lines indicate a non-detection, or that concentration could only be estimated within a range (i.e., between 0 and the relevant reporting limit).

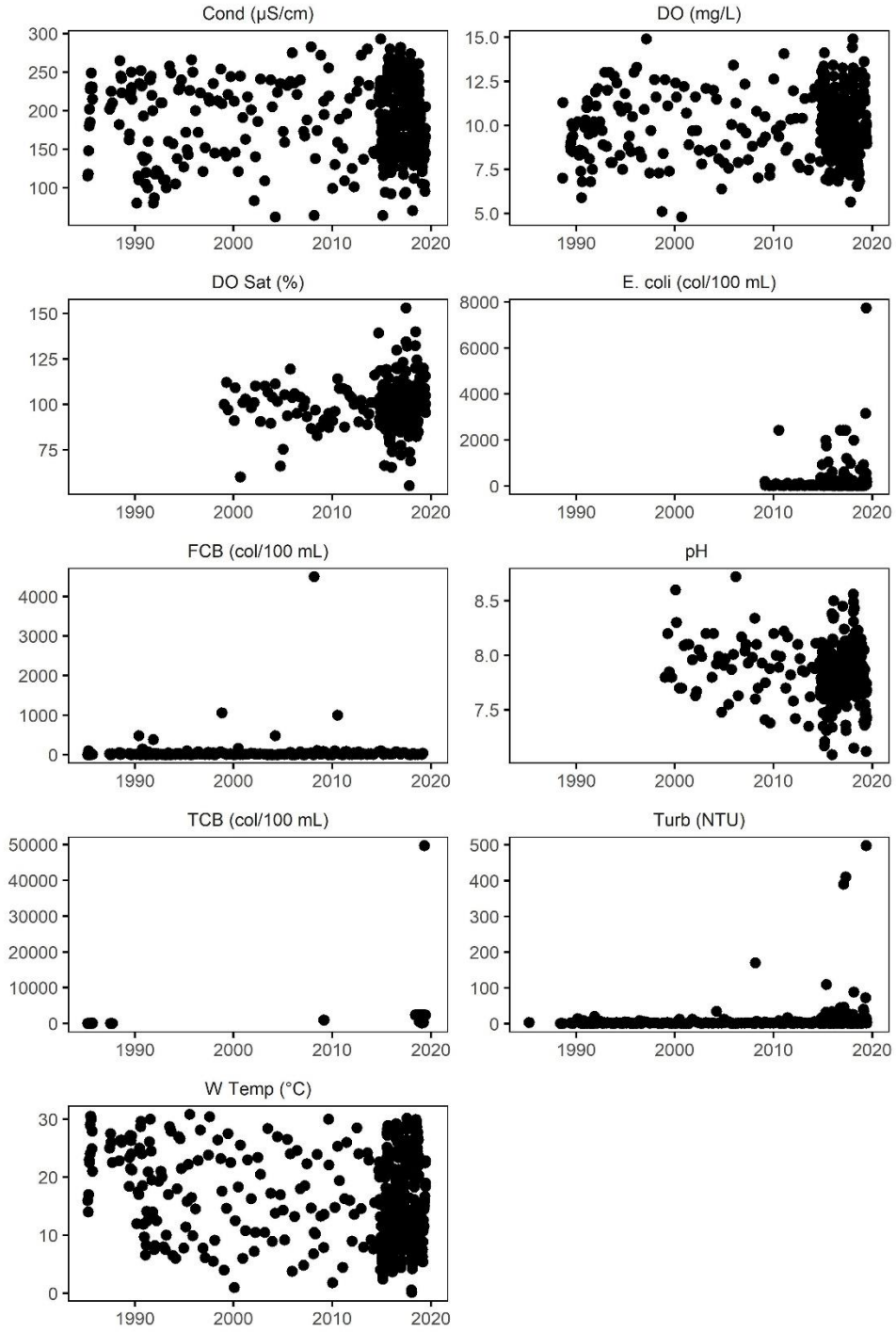


Figure A3.17.2 Bacterial indicator and physicochemical variables (1985-2019) at BUFT05.

A3.17.2 Trend analysis results (2000 - 2019): Narrative summaries

- NO_x-N concentrations are likely not changing ($p \geq 0.10$; **Figure A3.17.3-5A**).
- E. coli concentration are very likely decreasing by 8 – 18% annually ($p < 0.05$; **Figure A3.17.3-5B).**
- FCB concentrations were likely increasing by 5% annually ($p < 0.10$; **Figure A3.17.3-5C**).
- Conductivity trend analysis results required weight of evidence interpretation, suggesting that conductivity is likely not changing (SKT $p \geq 0.10$; **Figure A3.17.3-5D**). Results of LR and MK suggested a very likely increase, but non-significant SKT results suggest that seasonality is a factor for conductivity that sampling may have occurred unevenly across seasons.
- DO trend analysis results required weight of evidence interpretation, suggesting that DO levels are likely not changing (**Figure A3.17.3-5E**). Though SKT results for DO concentration suggested a likely increase ($p < 0.10$), all DO saturation results, which corrects for known sizeable seasonal differences due to temperature-dependent gas solubility, suggested no change ($p \geq 0.10$).
- Stream pH required weight of evidence interpretation of trend analysis results, suggesting that pH is likely not changing (SKT and MK $p \geq 0.10$; **Figure A3.17.3-5F**). Though LR results suggested a significant decrease, LR is more sensitive to data anomalies and outliers that may have been introduced by the sampling change in 2015.
- Turbidity is very likely increasing by 2% annually ($p < 0.05$; **Figure A3.17.3-5G**).
- Water temperature is likely not changing ($p \geq 0.10$; **Figure A3.17.3-5H**).

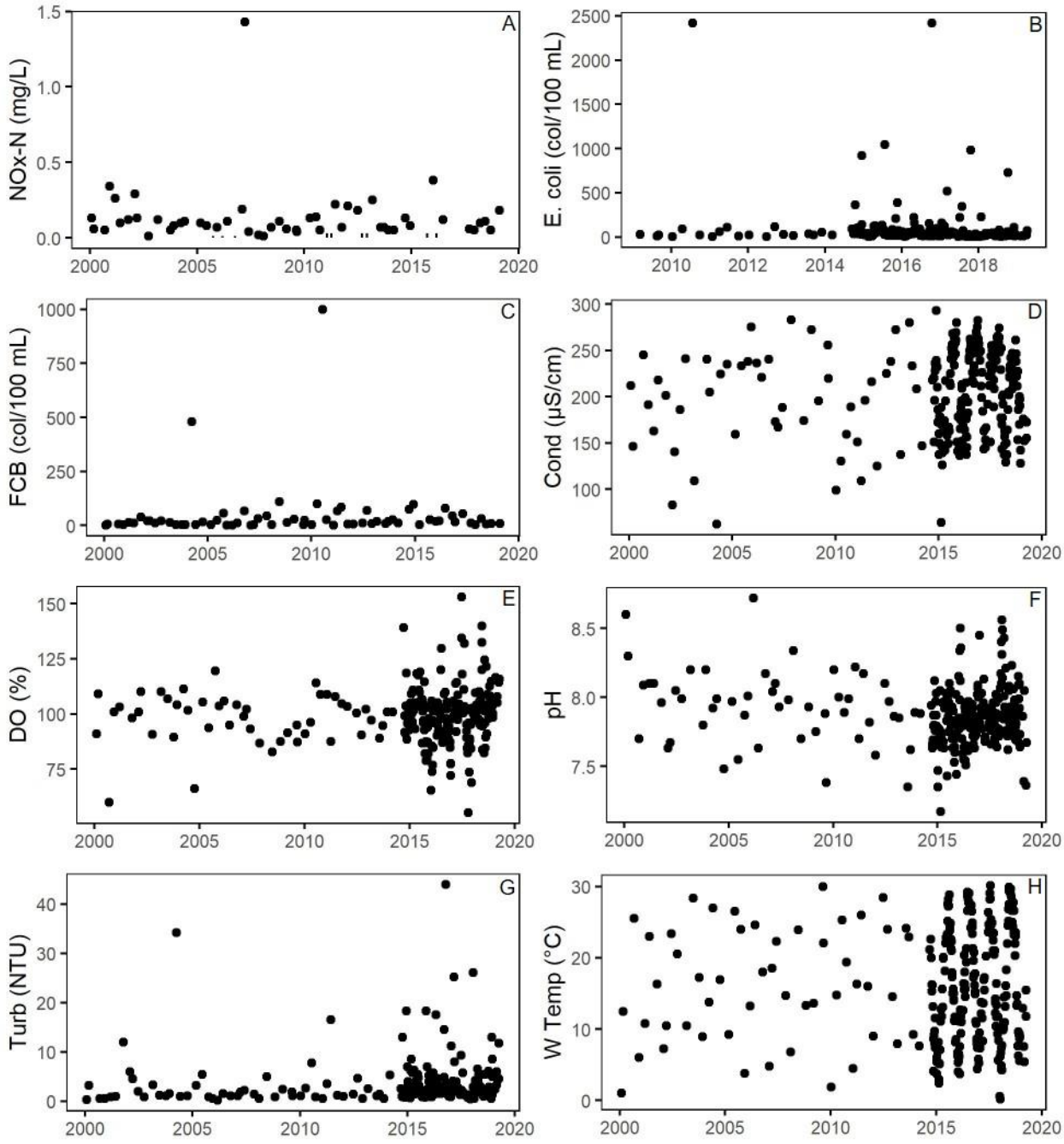


Figure A3.17.3 Water quality variable values shown through time (2000 – 2019) at BUFT05. A) nitrate+nitrite-nitrogen (NOx-N), B) Escherichia coli (E. coli), C) fecal coliform bacteria (FCB), D) conductivity (Cond), E) dissolved oxygen (DO), F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections.

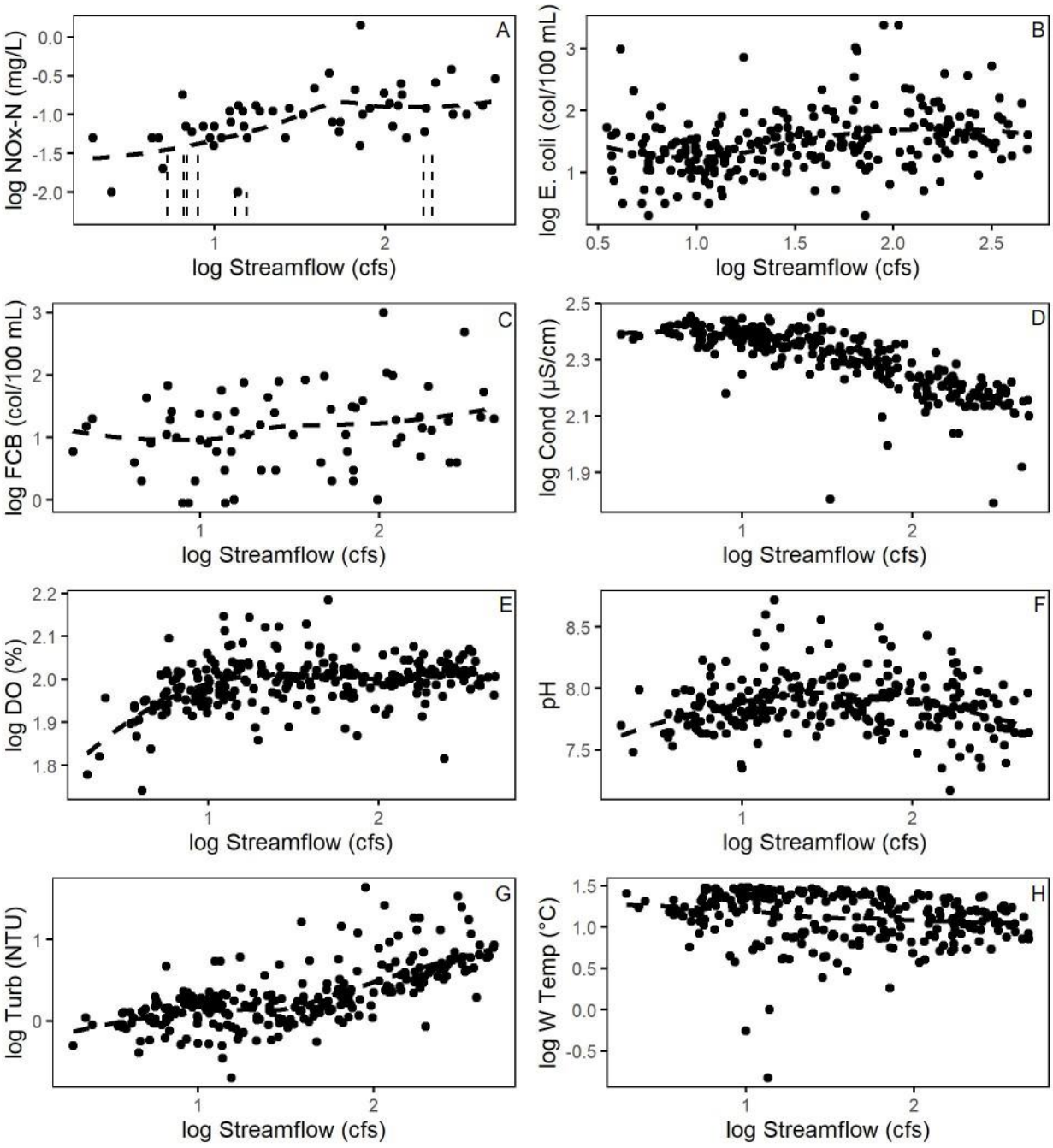


Figure A3.17.4 Water quality variable values (2000 – 2019) shown in relation to streamflow at BUFT05. A) nitrate+ nitrite-nitrogen (NOx-N), B) Escherichia coli (E. coli), C) fecal coliform bacteria (FCB), D) conductivity (Cond), E) dissolved oxygen (DO), F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation between each variable and streamflow.

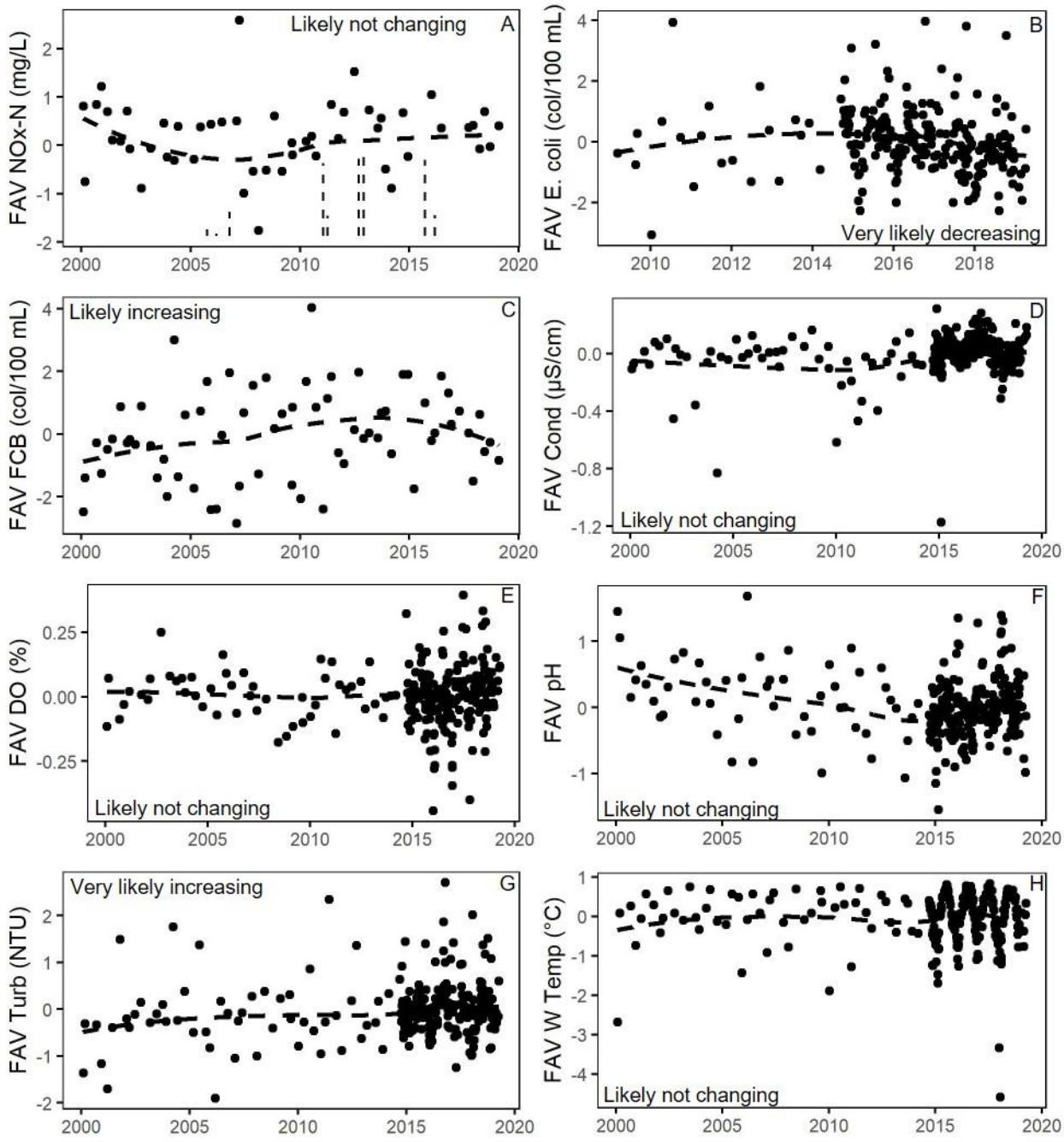


Figure A3.17.5 Flow-adjusted values (FAV) of water quality variables shown through time (2000 – 2019) for BUFT05. A) nitrate+nitrite-nitrogen (NOx-N), B) Escherichia coli (E. coli), C) fecal coliform bacteria (FCB), D) conductivity (Cond), E) dissolved oxygen (DO), F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation with time. Narrative results summarize statistical significance and trend direction across trend analyses. See **Table A2.2.1** for full results.

A3.18 BUFT06 – Big Creek near Carver at Gene Rush Road Crossing

A3.18.1 Site and available data description

Big Creek near Carver at Gene Rush Road Crossing (BUFT06; 35.9778, -93.0431) is a long-term water quality monitoring site at BUFF. BUFF staff have measured streamflow and in situ physiochemistry and collected water samples for analysis of bacteriological indicators and nutrient concentrations at the site since 1985 (**Figure A3.18.1-4**). In the mid-2010's sampling intensity increased substantially at this site for several variables. Instantaneous streamflow estimates collected by BUFF staff were used in the flow-adjustment procedure to generate FAVs of water quality variables for trend analysis.

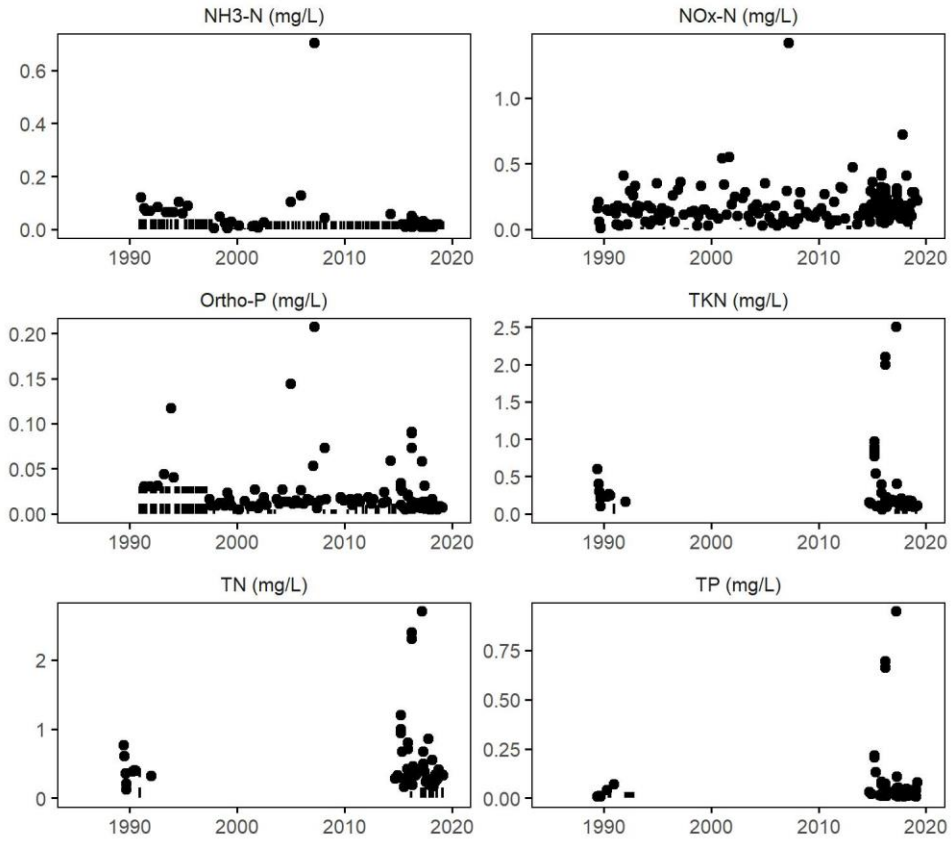


Figure A3.18.1 Nutrient variables (1985-2019) at BUFT06. Dashed lines indicate a non-detection, or that concentration could only be estimated within a range (i.e., between 0 and the relevant reporting limit).

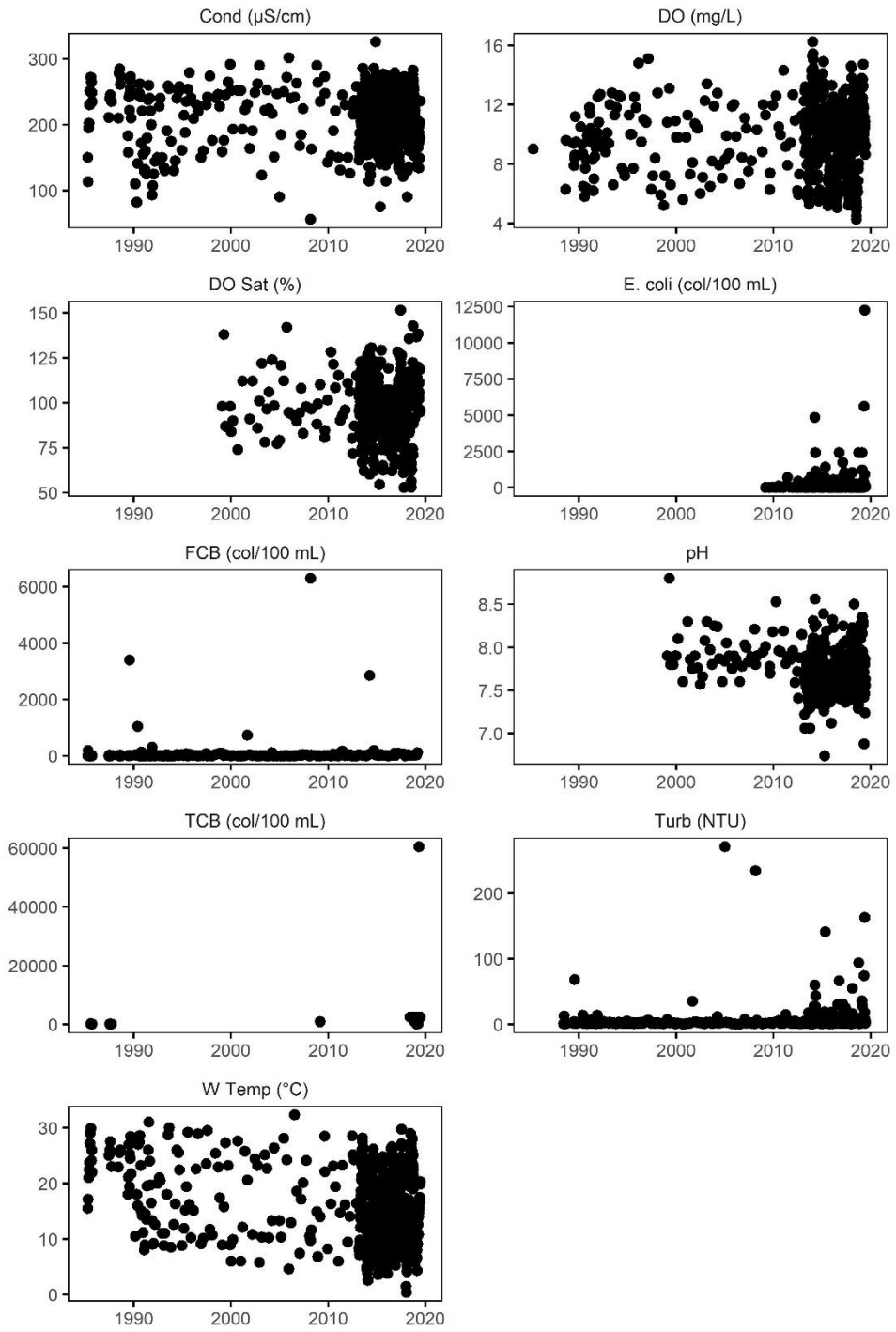


Figure A3.18.2 Bacterial indicator and physicochemical variables (1985-2019) at BUFT06.

A3.18.2 Trend analysis results (2000 - 2019): Narrative summaries

- NO_x-N concentrations are likely not changing ($p \geq 0.10$; **Figure A3.18.3-5A**).
- E. coli concentrations are likely not changing ($p \geq 0.10$; **Figure A3.18.3-5B**).
- FCB concentrations are very likely increasing by 10 - 12% annually ($p < 0.05$; **Figure A3.18.3-5C**).
- Conductivity trend analysis results required weight of evidence interpretation, suggesting that conductivity is very likely increasing by 0.4 – 0.5% annually (MK and SKT $p < 0.05$; **Figure A3.18.3-5D**). Results of LR suggested no change, likely reflecting that conductivity at this site may have had a period of decline in the 2000's followed by a period of increase in the 2010's (**Figure A3.18.3D**).
- DO trend analysis results required weight of evidence interpretation, suggesting that DO levels are very likely decreasing by approximately 1% annually (**Figure A3.18.3-5E**) Results of all analyses on DO % saturation suggested a very likely decrease ($p < 0.05$), as well as MK and SKT results on DO concentration. Only LR results on DO concentration suggested no change, which likely reflects known sizeable seasonal variability in DO concentration due to temperature-dependent gas solubility.
- Stream pH is very likely decreasing by 2 – 4% annually ($p < 0.05$; **Figure A3.18.3-5F**).
- Turbidity is very likely increasing by approximately 3 – 5% annually ($p < 0.05$; **Figure A3.18.3-5G**).
- Water temperature trend analysis results required weight of evidence interpretation, suggesting that water temperature is very likely increasing by 1% annually (SKT $p < 0.05$; **Figure A3.18.3-5H**). Results of LR and MK suggested no change, but differences with SKT results likely reflect known sizeable seasonal differences in temperature.

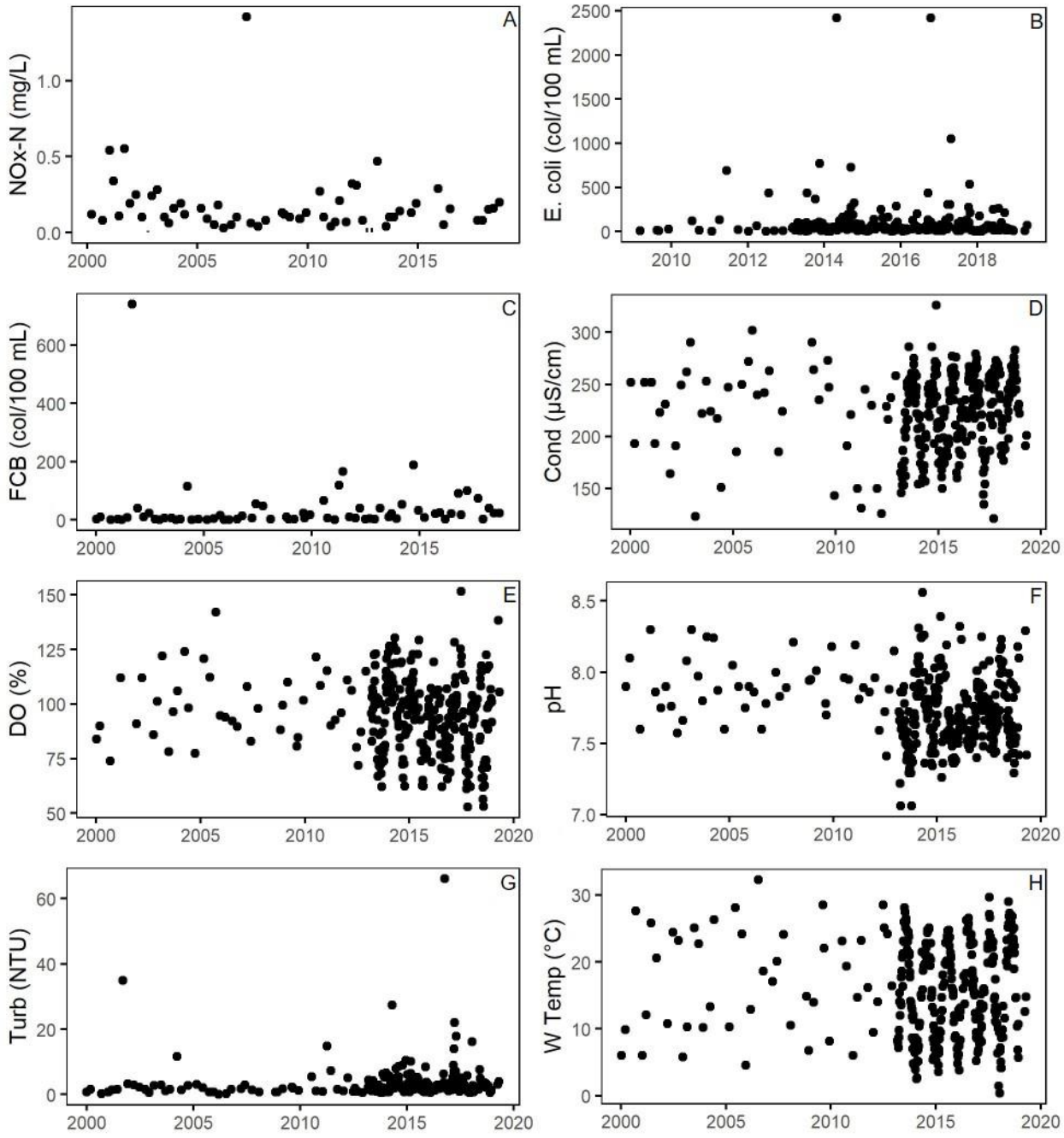


Figure A3.18.3 Water quality variable values shown through time (2000 – 2019) at BUFT06. A) nitrate+nitrite-nitrogen (NOx-N), B) Escherichia coli (E. coli), C) fecal coliform bacteria (FCB), D) conductivity (Cond), E) dissolved oxygen (DO), F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections.

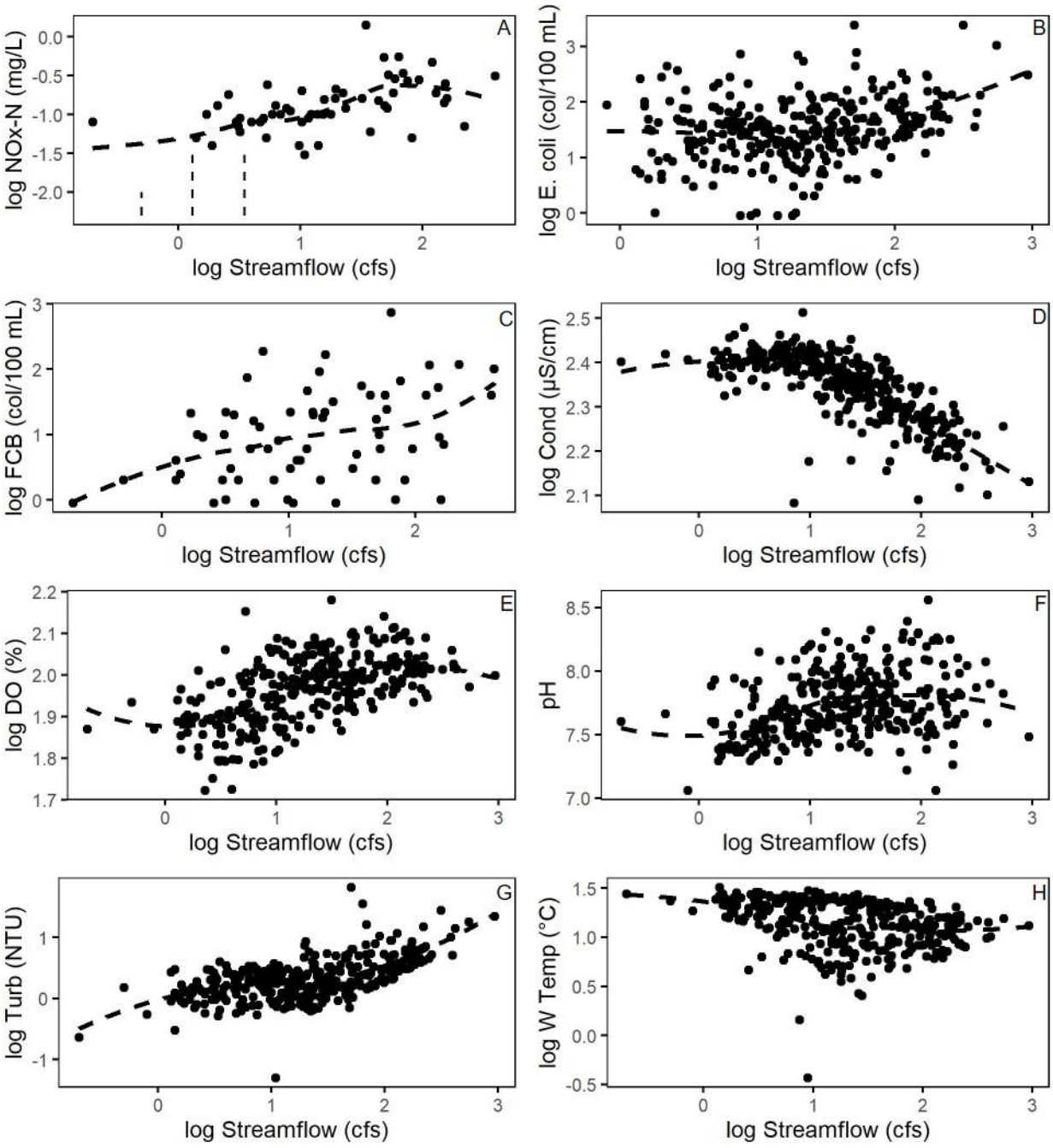


Figure A3.18.4 Water quality variable values (2000 – 2019) shown in relation to streamflow at BUFT06. A) nitrate+nitrite-nitrogen (NOx-N), B) Escherichia coli (E. coli), C) fecal coliform bacteria (FCB), D) conductivity (Cond), E) dissolved oxygen (DO), F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation between each variable and streamflow.

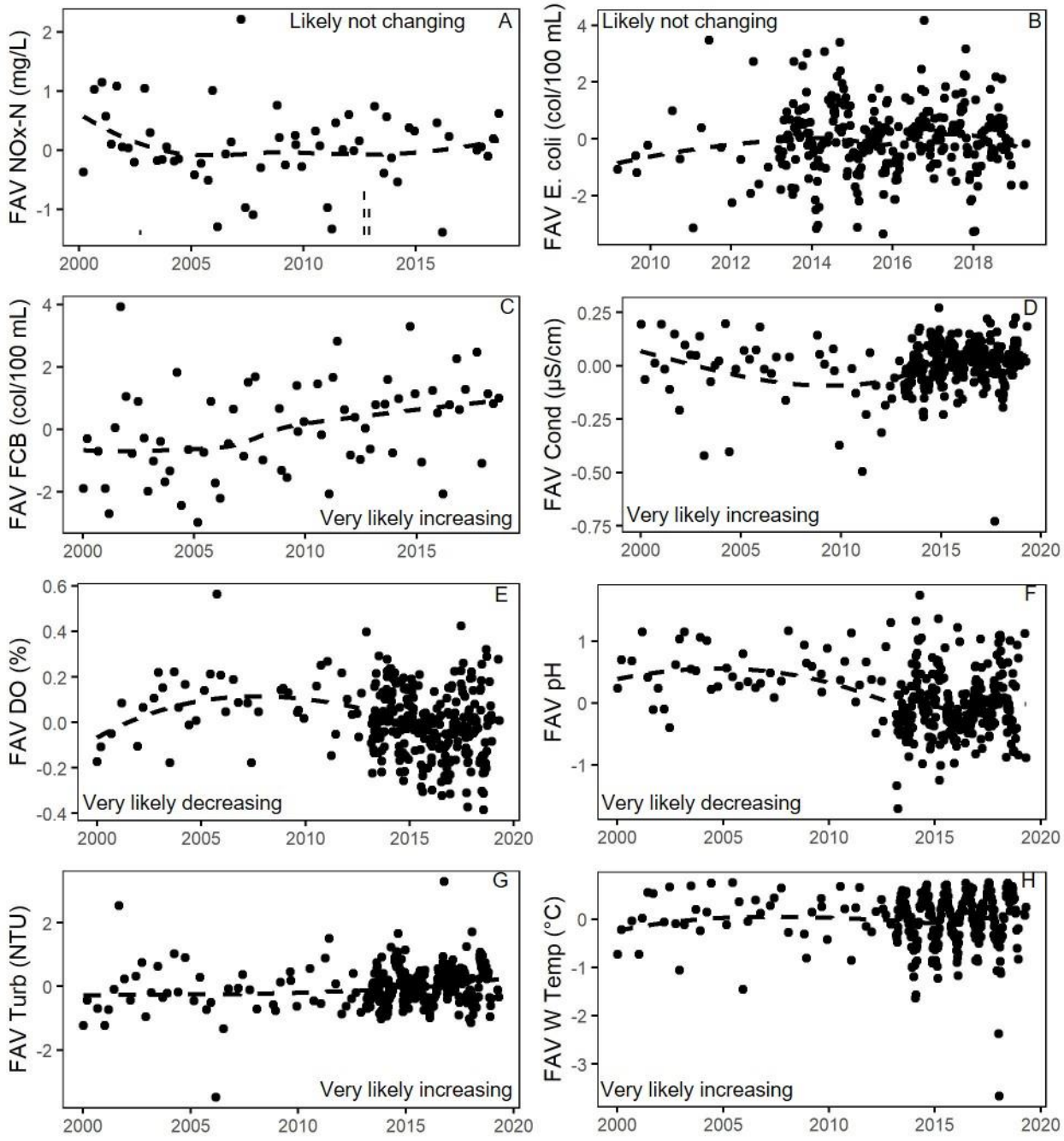


Figure A3.18.5 Flow-adjusted values (FAV) of water quality variables shown through time (2000 – 2019) for BUFT06. A) nitrate+nitrite-nitrogen (NOx-N), B) Escherichia coli (E. coli), C) fecal coliform bacteria (FCB), D) conductivity (Cond), E) dissolved oxygen (DO), F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation with time. Narrative results summarize statistical significance and trend direction across trend analyses. See **Table A2.2.1** for full results.

A3.19 BUFT07 – Davis Creek at Mt. Hershey above Confluence with Buffalo River

A3.19.1 Site and available data description

Davis Creek at Mt. Hershey above Confluence with Buffalo River (BUFT07; 36.0089, -93.0431) is a long-term water quality monitoring site at BUFF. BUFF staff have measured streamflow and in situ physiochemistry and collected water samples for analysis of bacteriological indicators and nutrient concentrations at the site since 1985 (**Figure A3.19.1-2**). Instantaneous streamflow estimates collected by BUFF staff were used in the flow-adjustment procedure to generate FAVs of water quality variables for trend analysis.

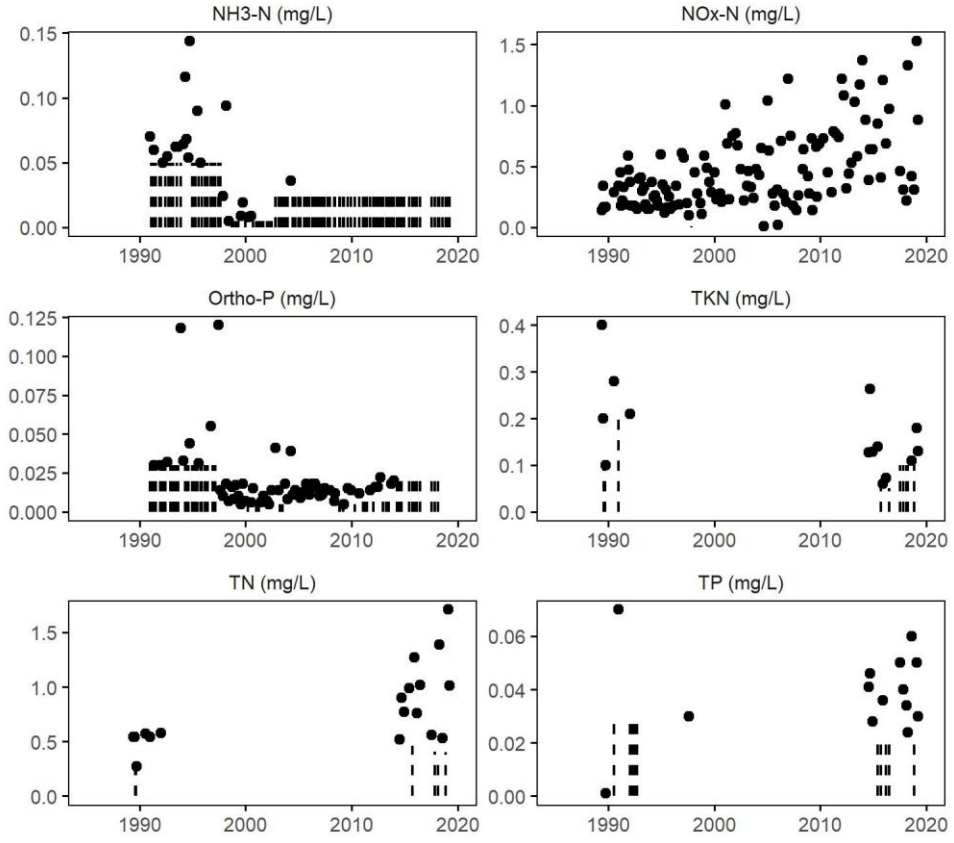


Figure A3.19.1 Nutrient variables (1985-2019) at BUFT07. Dashed lines indicate a non-detection, or that concentration could only be estimated within a range (i.e., between 0 and the relevant reporting limit).

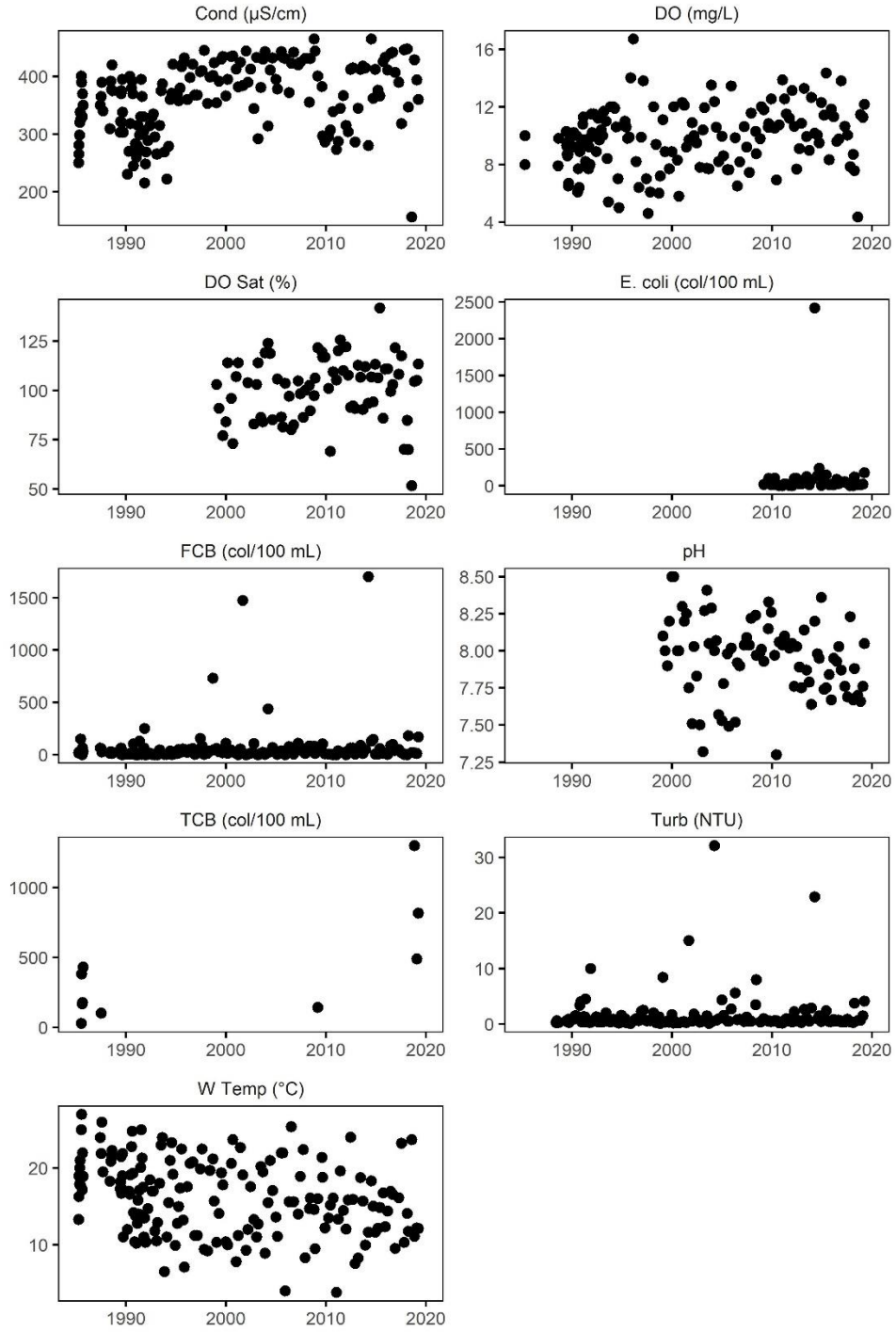


Figure A3.19.2 Bacterial indicator and physicochemical variables (1985-2019) at BUFT07.

A3.19.2 Trend analysis results (2000 - 2019): Narrative summaries

- NO_x-N concentrations are very likely increasing by 3 – 4% annually ($p<0.05$; **Figure A3.19.3-5A**).
- FCB concentrations are likely not changing ($p\geq0.10$; **Figure A3.19.3-5B**).
- Conductivity is likely not changing ($p\geq0.10$; **Figure A3.19.3-5C**).
- DO levels are likely not changing ($p\geq0.10$; **Figure A3.19.3-5D & E**).
- Stream pH is very likely decreasing by 2 – 3% annually ($p<0.05$; **Figure A3.19.3-5F**).
- Turbidity is likely not changing ($p\geq0.10$; **Figure A3.19.3-5G**).
- Water temperature is likely not changing ($p\geq0.10$; **Figure A3.19.3-5H**).

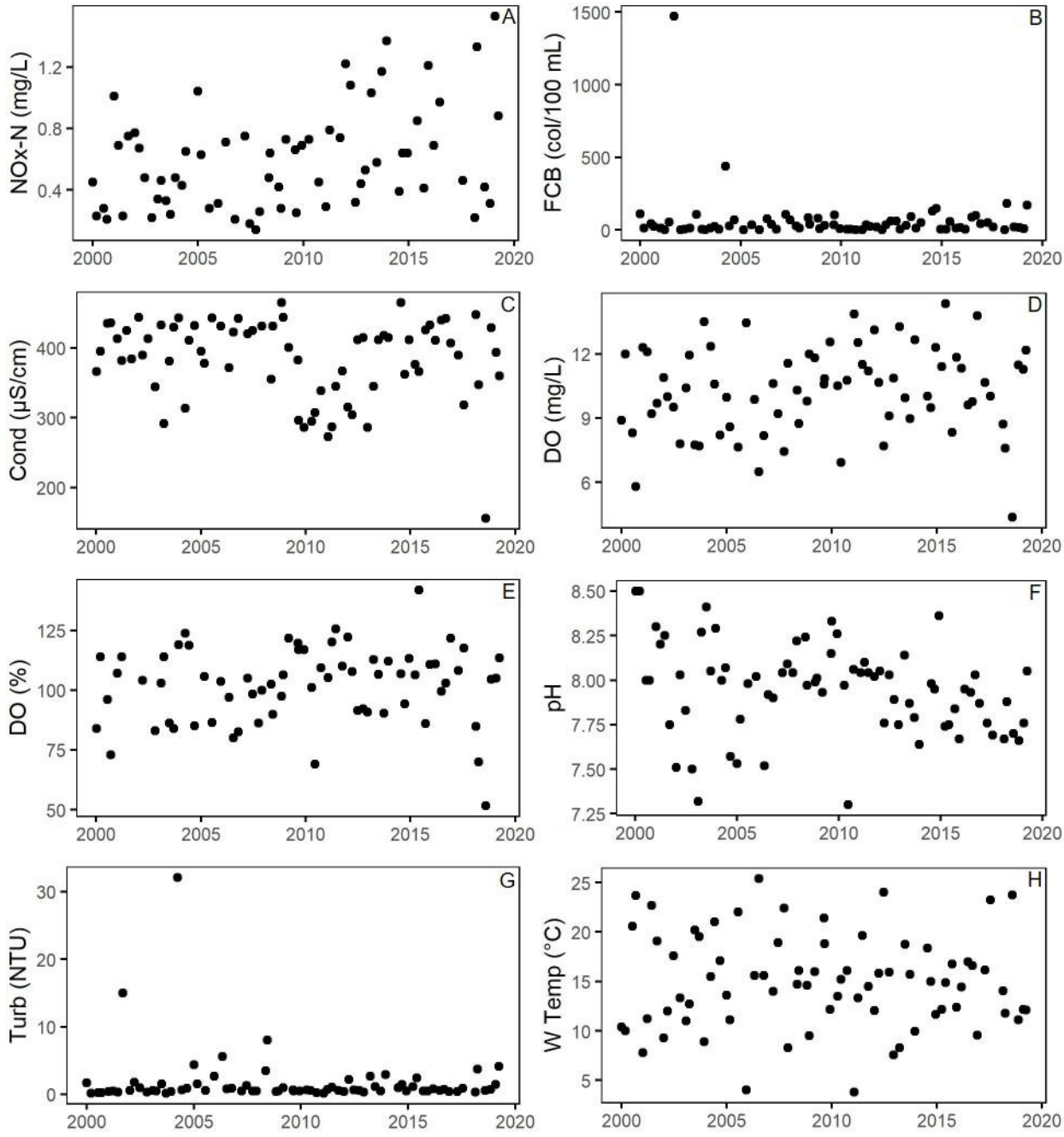


Figure A3.19.3 Water quality variable values shown through time (2000 – 2019) at BUFT07. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections.

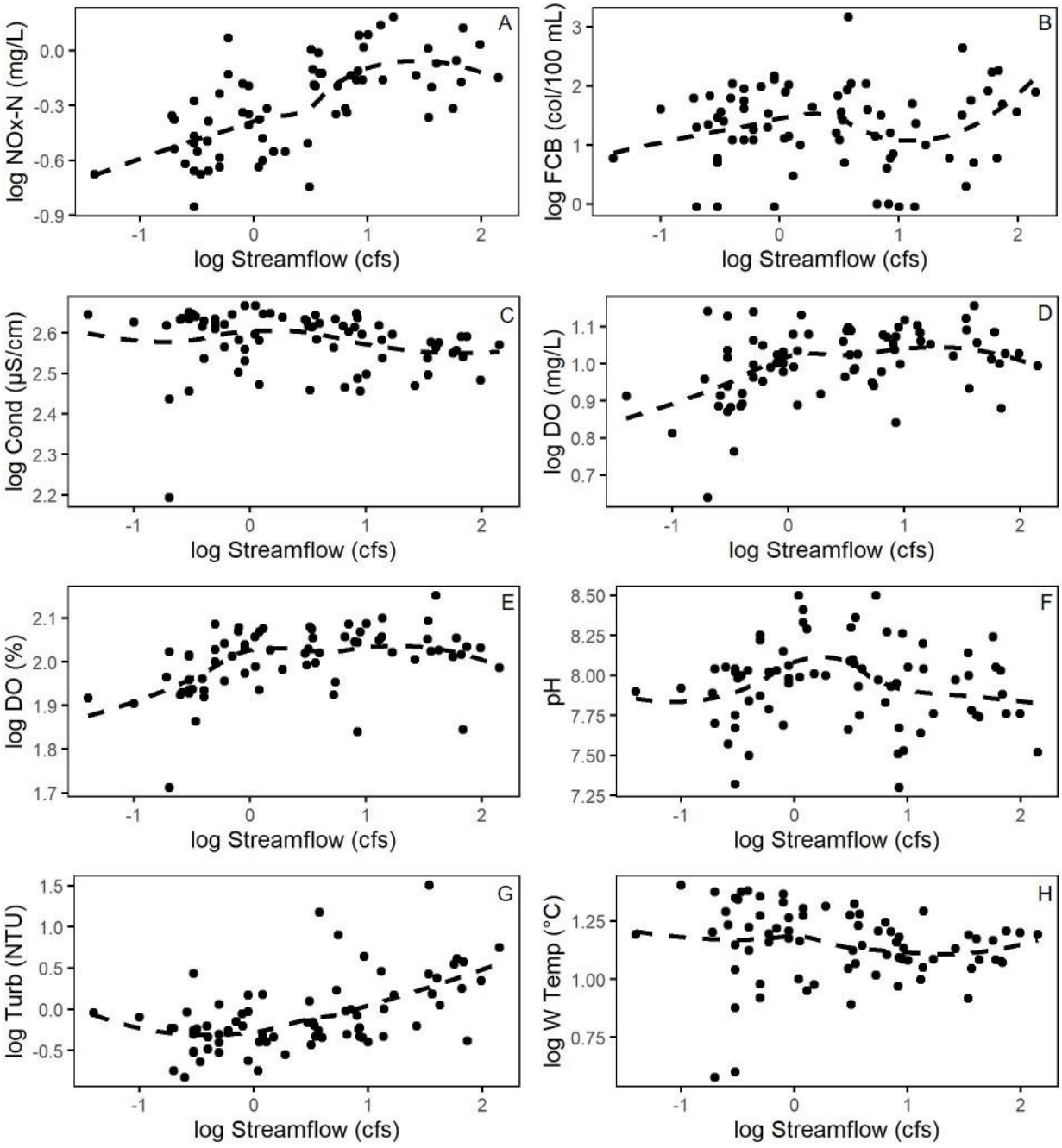


Figure A3.19.4 Water quality variable values (2000 – 2019) shown in relation to streamflow at BUFT07. A) nitrate+ nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation between each variable and streamflow.

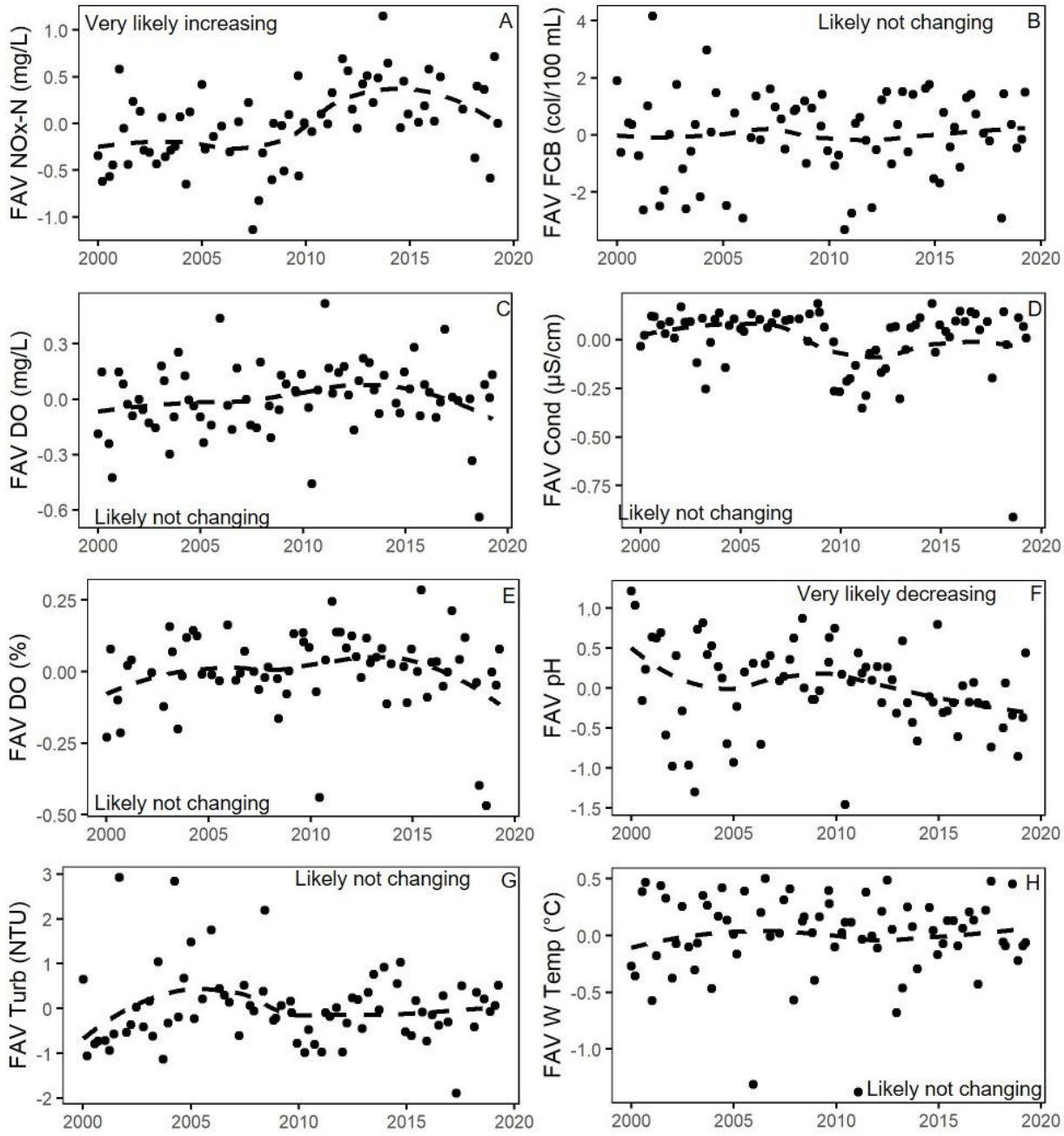


Figure A3.19.5 Flow-adjusted values FAVs of water quality variables shown through time (2000 – 2019) for BUFT07. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation with time. Narrative results summarize statistical significance and trend direction across trend analyses. See **Table A2.2.1** for full results.

A3.20 BUFT08 – Cave Creek above Confluence with Buffalo River

A3.20.1 Site and available data description

Cave Creek above Confluence with Buffalo River (BUFT08; 35.9819, -92.9514) is a long-term water quality monitoring site at BUFF. BUFF staff have measured streamflow and in situ physiochemistry and collected water samples for analysis of bacteriological indicators and nutrient concentrations at the site since 1985 (**Figure A3.20.1-2**). Instantaneous streamflow estimates collected by BUFF staff were used in the flow-adjustment procedure to generate FAVs of water quality variables for trend analysis.

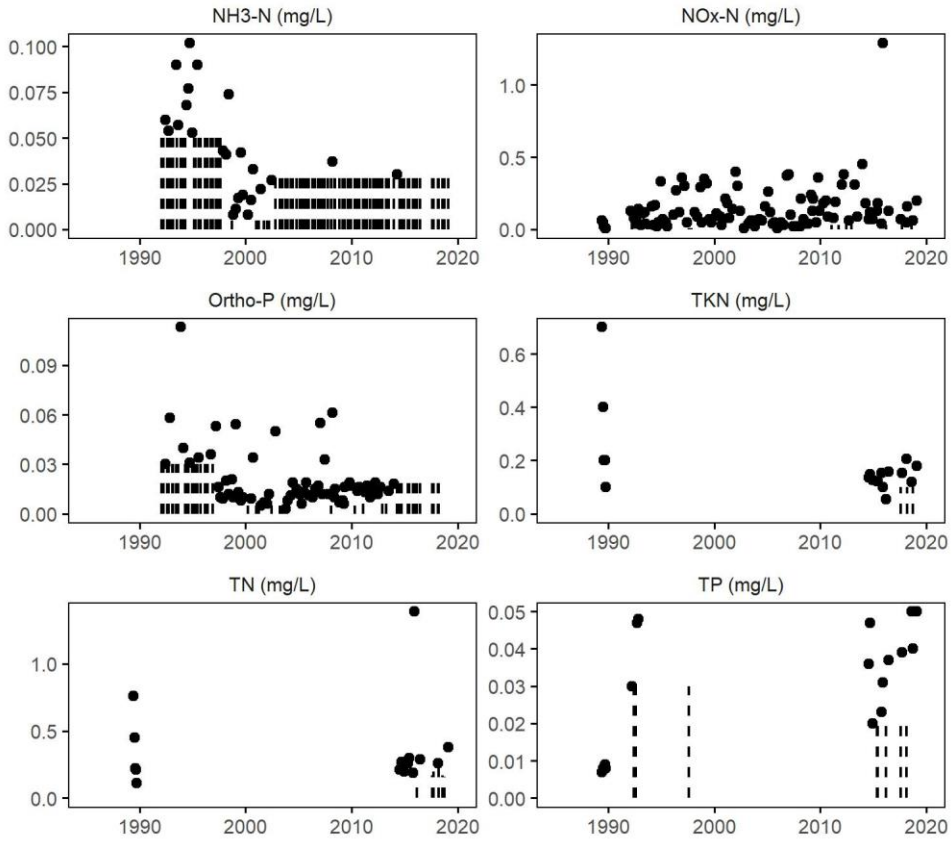


Figure A3.20.1 Nutrient variables (1985-2019) at BUFT08. Dashed lines indicate a non-detection, or that concentration could only be estimated within a range (i.e., between 0 and the relevant reporting limit).

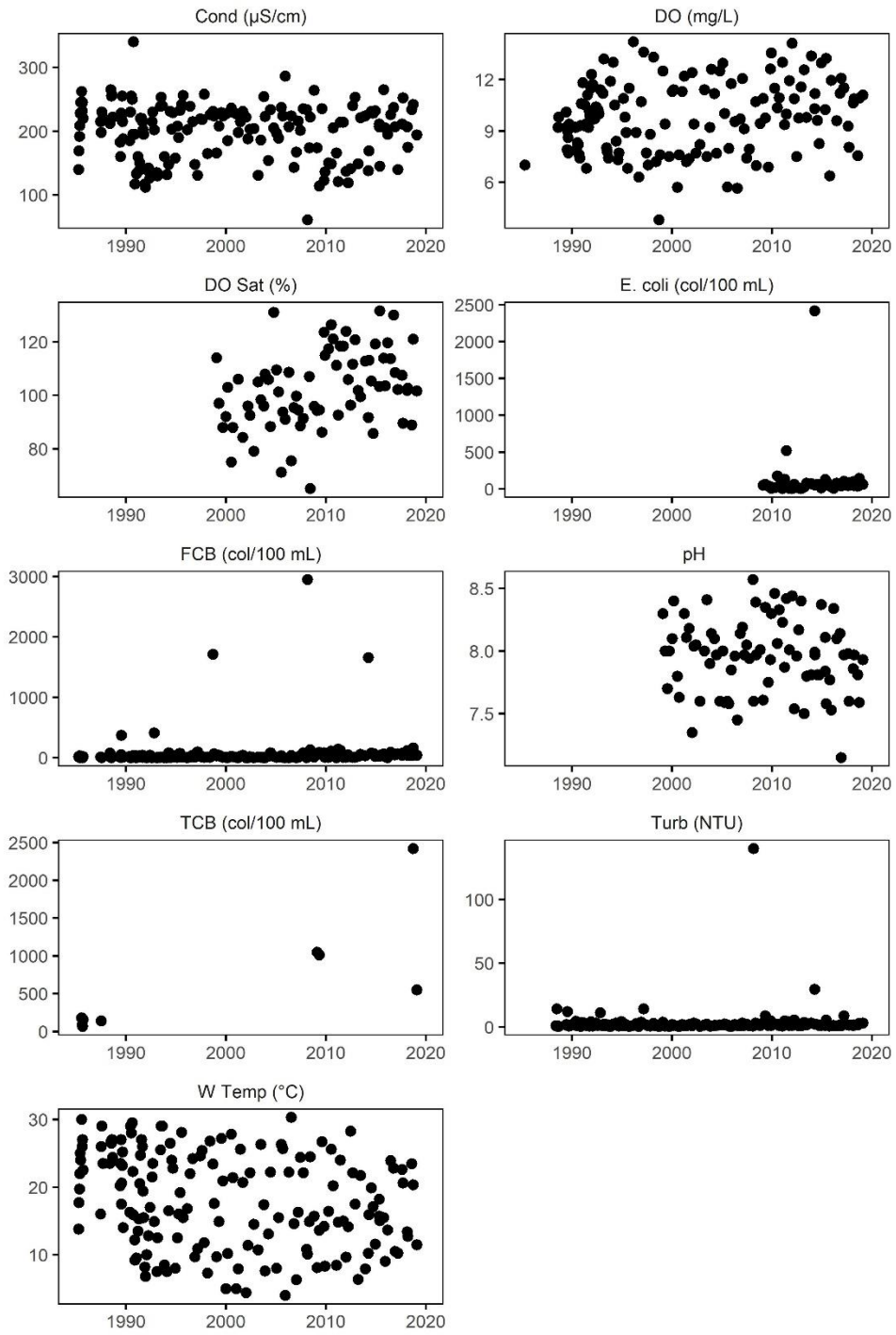


Figure A3.20.2 Bacterial indicator and physicochemical variables (1985-2019) at BUFT08.

A3.20.2 Trend analysis results (2000 - 2019): Narrative summaries

- NO_x-N concentrations are likely not changing ($p \geq 0.10$; **Figure A3.21.3-5A**).
- FCB concentrations are very likely increasing by 12 – 13% annually ($p < 0.05$; **Figure A3.20.3**3 **-5B**).
- Conductivity is likely not changing ($p \geq 0.10$; **Figure A3.20.3-5C**).
- DO trend analysis results required weight of evidence interpretation, suggesting that DO levels are very likely increasing by ~0.5 – 0.9% annually (**Figure A3.20.3-5D & E**). All analyses suggested that DO % saturation is very likely increasing ($p < 0.05$), but only SKT results on DO concentration suggested a likely increase ($p < 0.10$). Differing results between LR/MK and SKT for DO concentration likely reflect the known sizeable seasonal differences in DO due to temperature-dependent gas solubility. Therefore, results of SKT analysis of DO concentration and all analyses of DO % saturation, a metric that corrects for seasonal variability, can be considered the most reliable.
- Stream pH is likely not changing ($p \geq 0.10$; **Figure A3.20.3-5F**).
- Turbidity trend analysis results required weight of evidence interpretation, suggesting that turbidity is likely not changing (MK and SKT $p \geq 0.10$; **Figure A3.20.3-5G**). Results of LR suggested a significant increase ($p < 0.10$), but this finding likely reflects that the last two turbidity measurements were two of the highest three in the dataset. Linear regression is more sensitive to this type of data anomaly than MK or SKT.
- Water temperature trend analysis results required weight of evidence interpretation, suggesting that is likely not changing (MK and SKT $p \geq 0.10$; **Figure A3.20.3-5H**). Results of LR suggested a significant increase ($p < 0.05$), but this finding may reflect that the lowest water temperature measurements occurred early in the dataset. Linear regression is more sensitive to this type of data anomaly than MK or SKT.

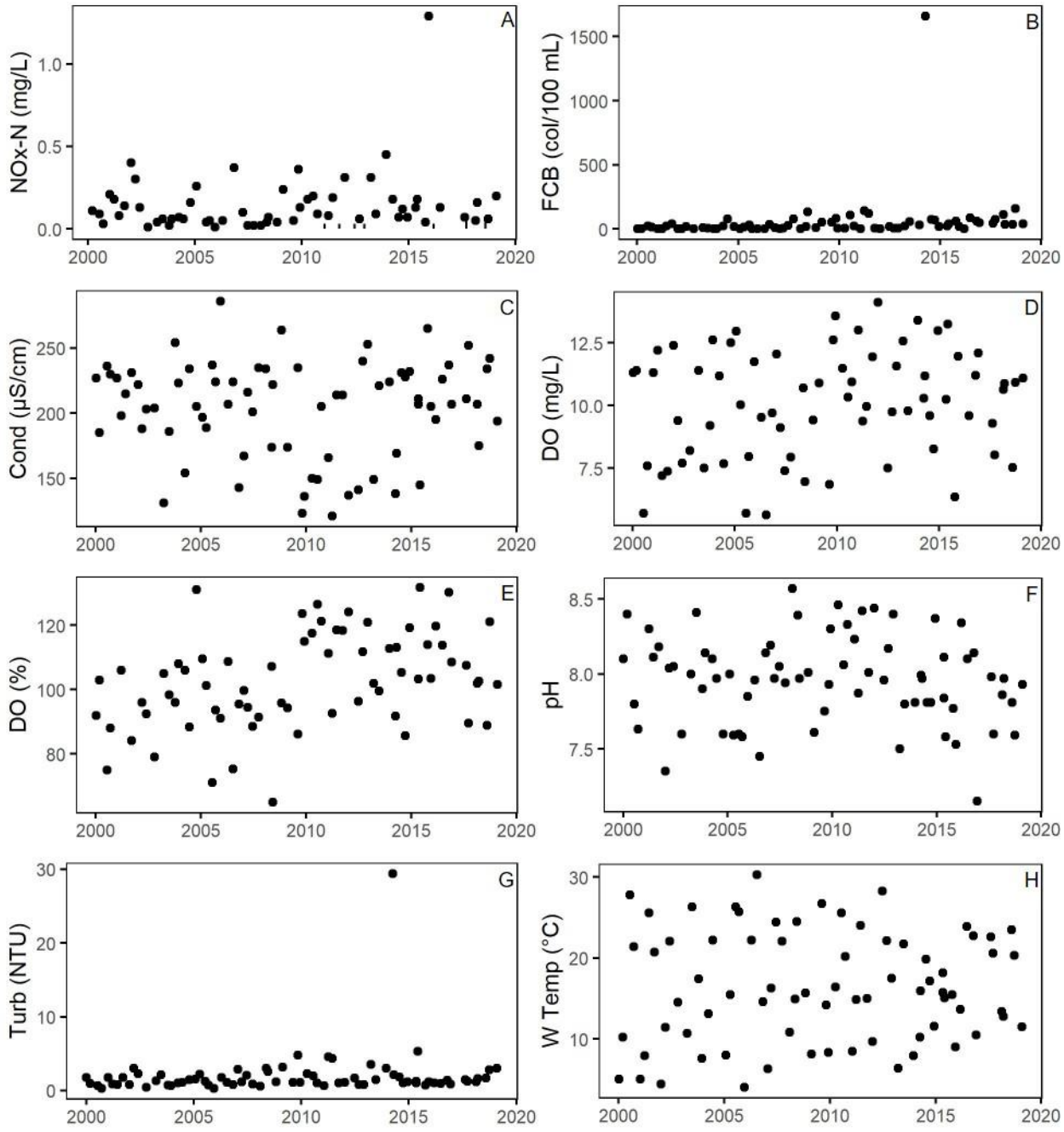


Figure A3.20.3 Water quality variable values shown through time (2000 – 2019) at BUFT08. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections.

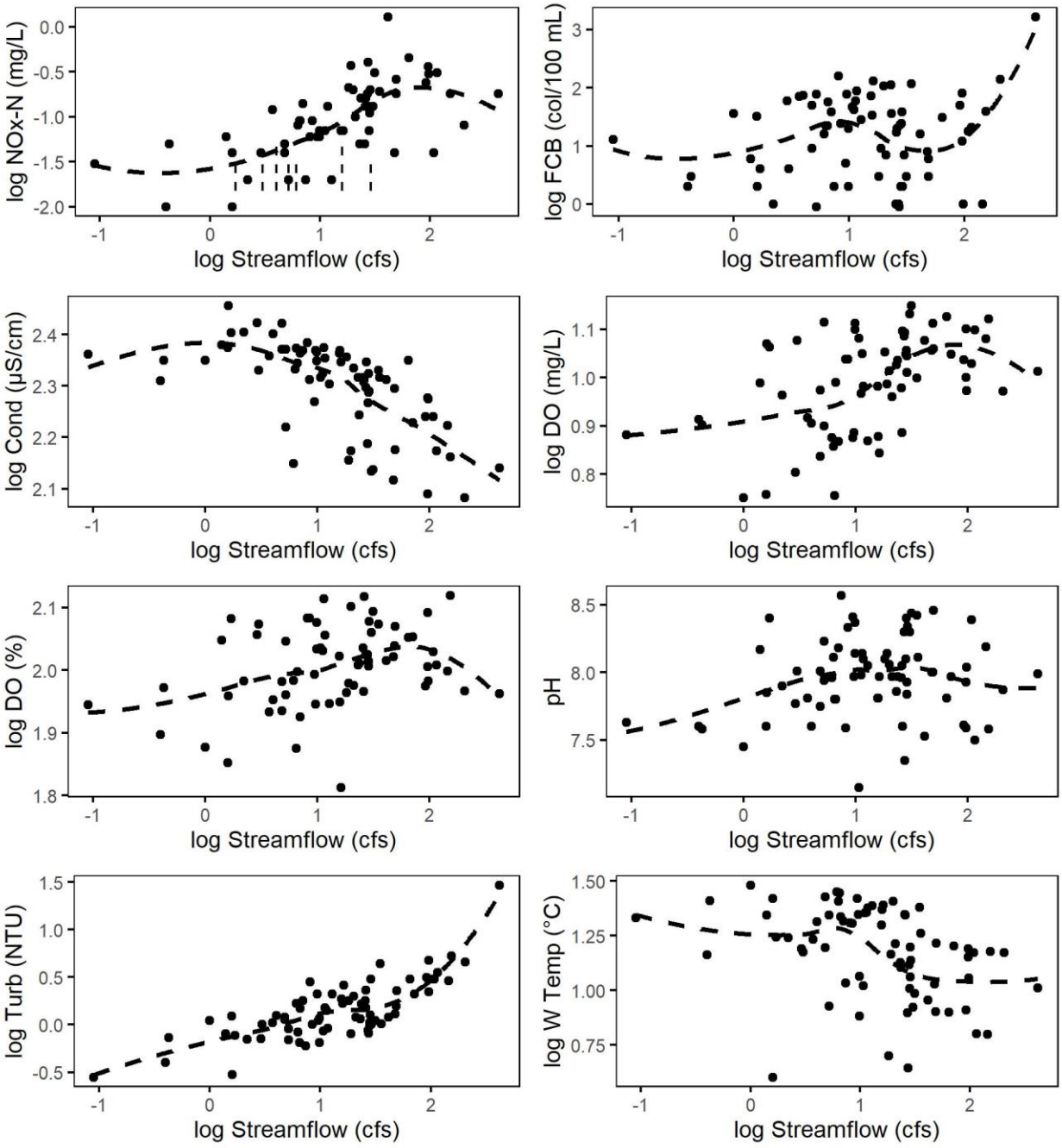


Figure A3.20.4 Water quality variable values (2000 – 2019) shown in relation to streamflow at BUFT08. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation between each variable and streamflow.

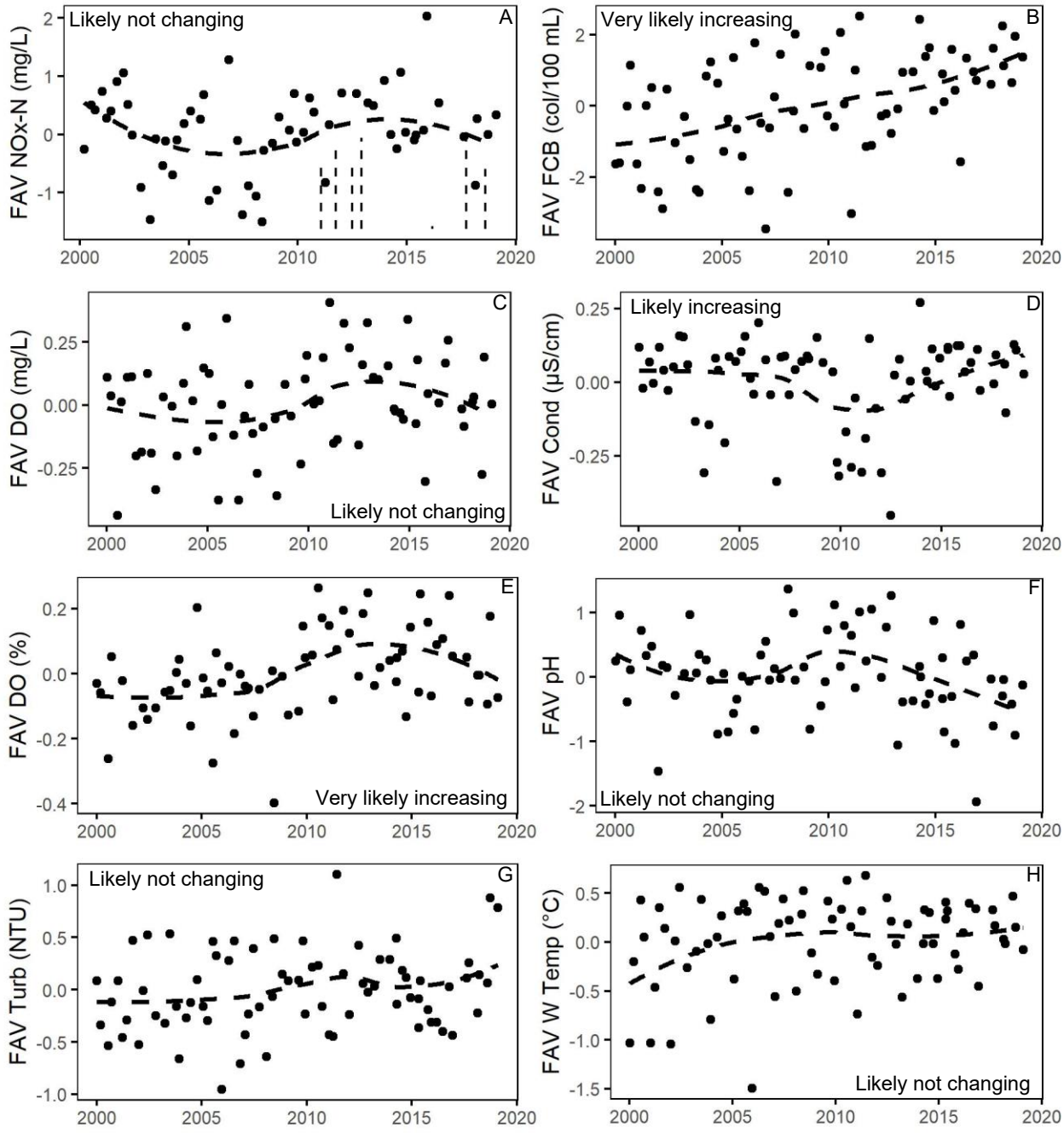


Figure A3.20.5 Flow-adjusted values FAVs of water quality variables shown through time (2000 – 2019) for BUFT08. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation with time. Narrative results summarize statistical significance and trend direction across trend analyses. See **Table A2.2.1** for full results.

A3.21 BUFT09 – Richland Creek above Confluence with Buffalo River

A3.21.1 Site and available data description

Richland Creek above Confluence with Buffalo River (BUFT09; 35.9681, -92.8889) is a long-term water quality monitoring site at BUFF. BUFF staff have measured streamflow and in situ physiochemistry and collected water samples for analysis of bacteriological indicators and nutrient concentrations at the site since 1985 (**Figure A3.21.1-2**). However, the number of paired water quality and streamflow measurements was not sufficient for the flow-adjustment procedures. Trend analysis results for BUFT09 are on raw water quality variable values.

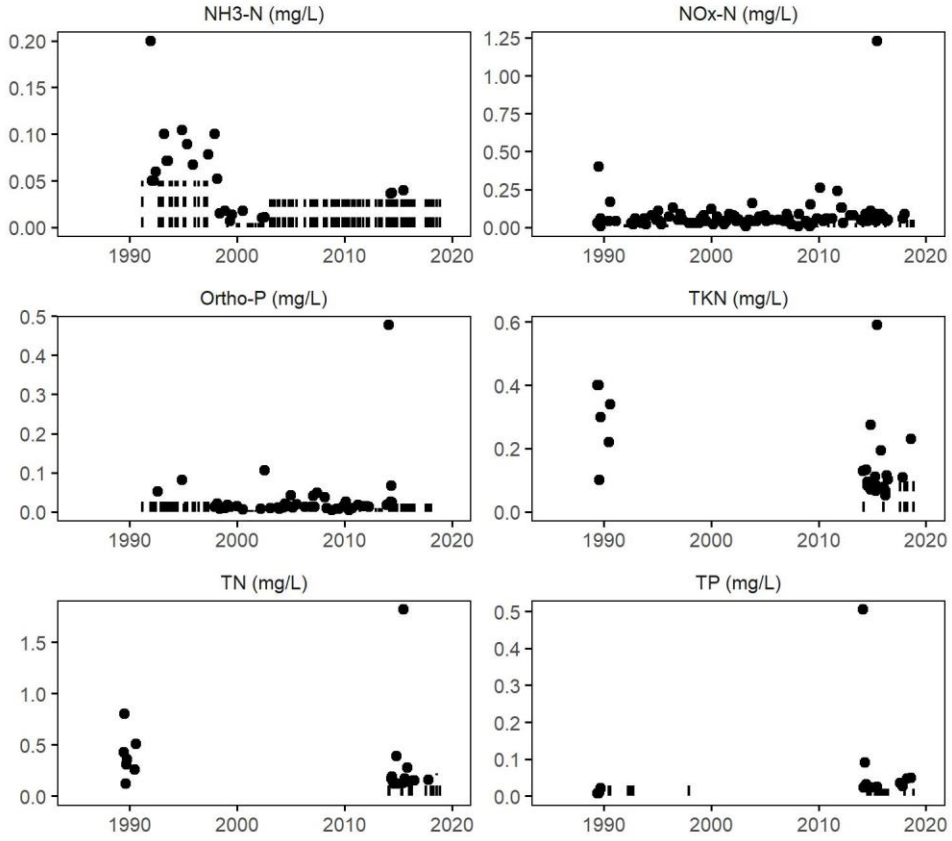


Figure A3.21.1 Nutrient variables (1985-2019) at BUFT09. Dashed lines indicate a non-detection, or that concentration could only be estimated within a range (i.e., between 0 and the relevant reporting limit).

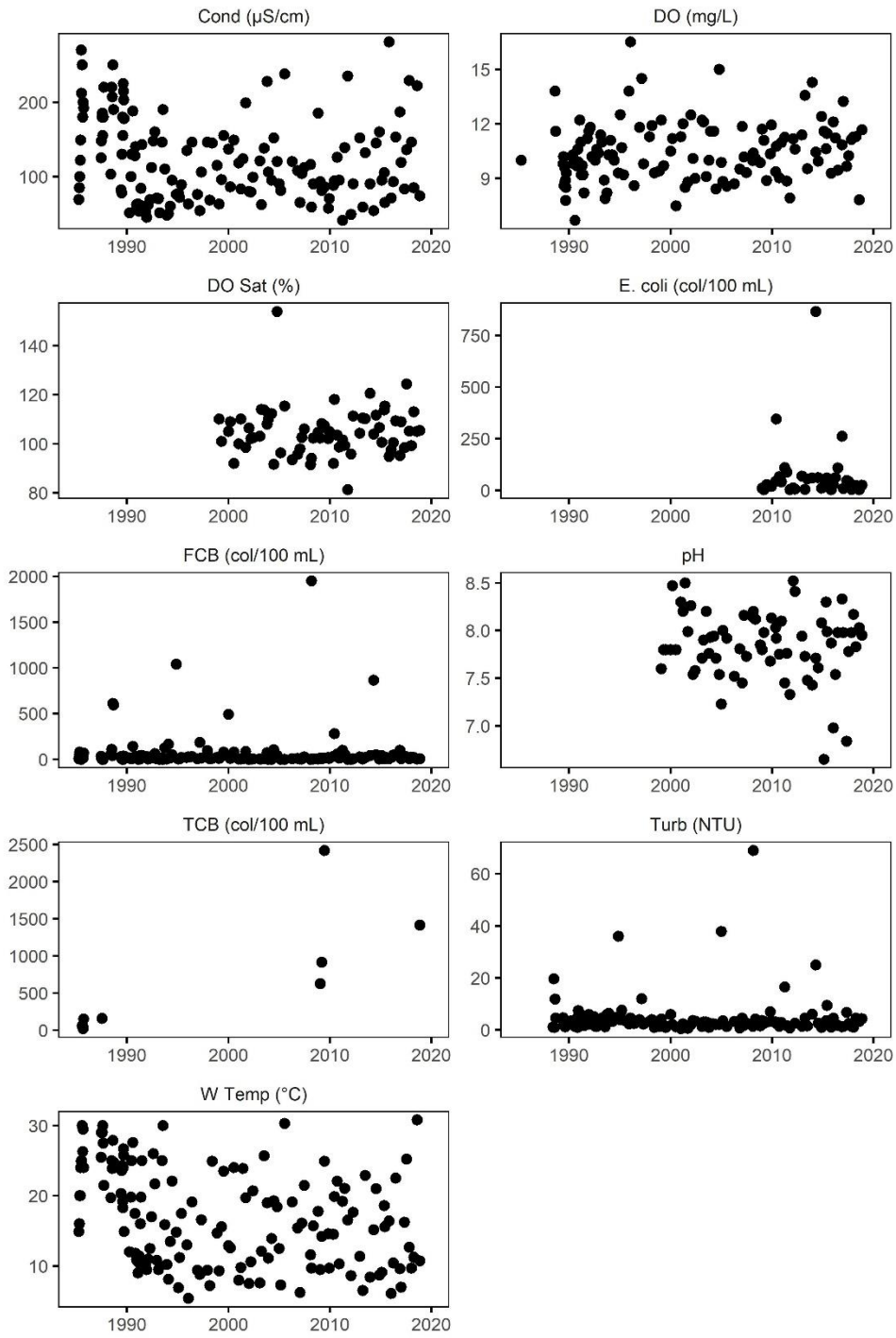


Figure A3.21.2 Bacterial indicator and physicochemical variables (1985-2019) at BUFT09.

A3.21.2 Trend analysis results (2000 - 2019): Narrative summaries

- NO_x-N concentration are likely not changing ($p \geq 0.10$; **Figure A3.21.3A**).
- FCB trend analysis required weight of evidence interpretation and suggested that FCB concentrations are very likely increasing by 6 – 11% annually (SKT $p<0.05$ and MK $p<0.10$; **Figure A3.21.3B**). While LR results suggested no change ($p \geq 0.10$), differing results between LR and MK/SKT are likely due to high range outliers influencing LR analysis. Linear regression is more sensitive to large variability than the non-parametric tests.
- Conductivity is likely not changing ($p \geq 0.10$; **Figure A3.21.3C**).
- DO trend analysis results required weight of evidence interpretation and suggested that DO levels are likely not changing (**Figure A3.21.3D & E**). While SKT results for DO concentration suggested a likely increase ($p<0.10$), the remaining test results suggested no change in concentration or saturation ($p \geq 0.10$).
- Stream pH is likely not changing ($p \geq 0.10$; **Figure A3.21.3**F).
- Turbidity is likely not changing ($p \geq 0.10$; **Figure A3.21.3G**).
- Water temperature is likely not changing ($p \geq 0.10$; **Figure A3.21.3H**).

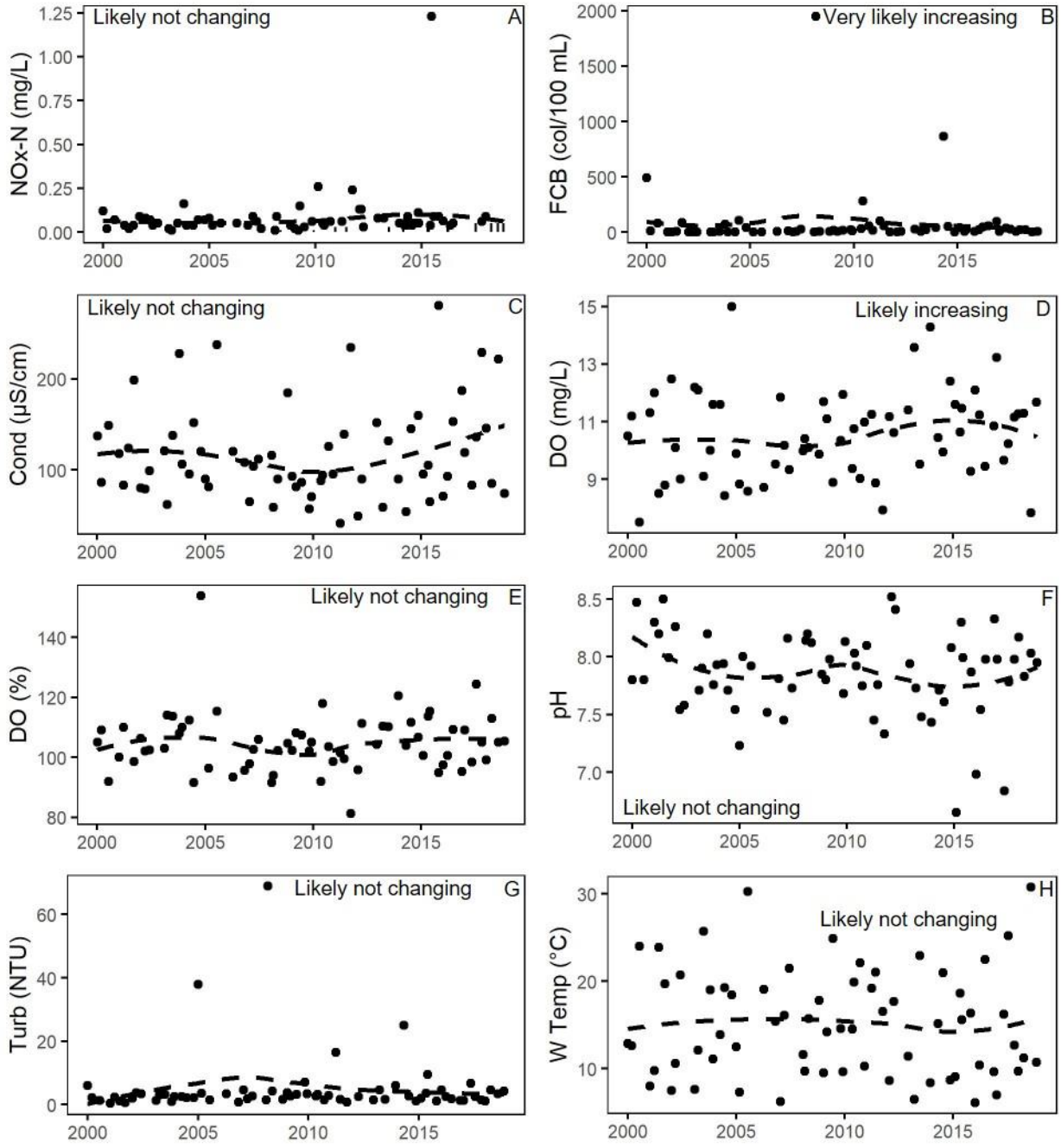


Figure A3.21.3 Water quality variable values shown through time (2000 – 2019) for BUFT09. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation with time. Narrative results summarize statistical significance and trend direction across trend analyses. See **Table A2.3.1** for full results.

A3.22 BUFT10 – Calf Creek above Confluence with Buffalo River

A3.22.1 Site and available data description

Calf Creek above Confluence with Buffalo River (BUFT10; 35.9792, -92.7722) is a long-term water quality monitoring site at BUFF. BUFF staff have measured streamflow and in situ physiochemistry and collected water samples for analysis of bacteriological indicators and nutrient concentrations at the site since 1985 (**Figure A3.22.1-2**). Instantaneous streamflow estimates collected by BUFF staff were used in the flow-adjustment procedure to generate FAVs of water quality variables for trend analysis.

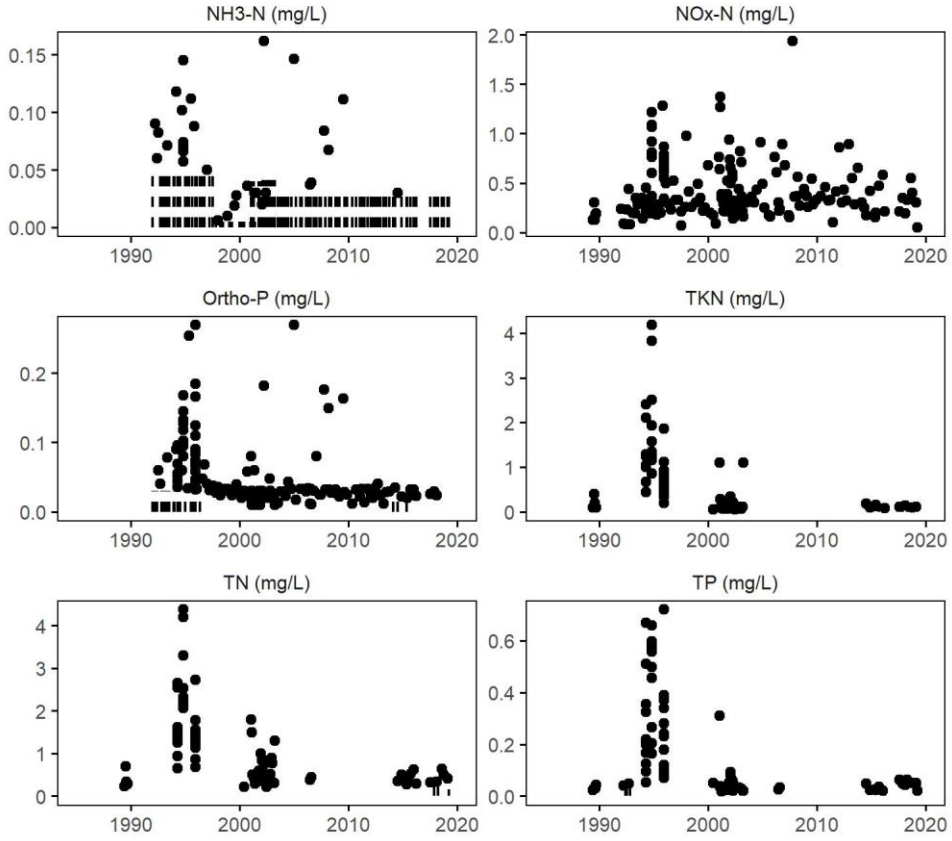


Figure A3.22.1 Nutrient variables (1985-2019) at BUFT10. Dashed lines indicate a non-detection, or that concentration could only be estimated within a range (i.e., between 0 and the relevant reporting limit).

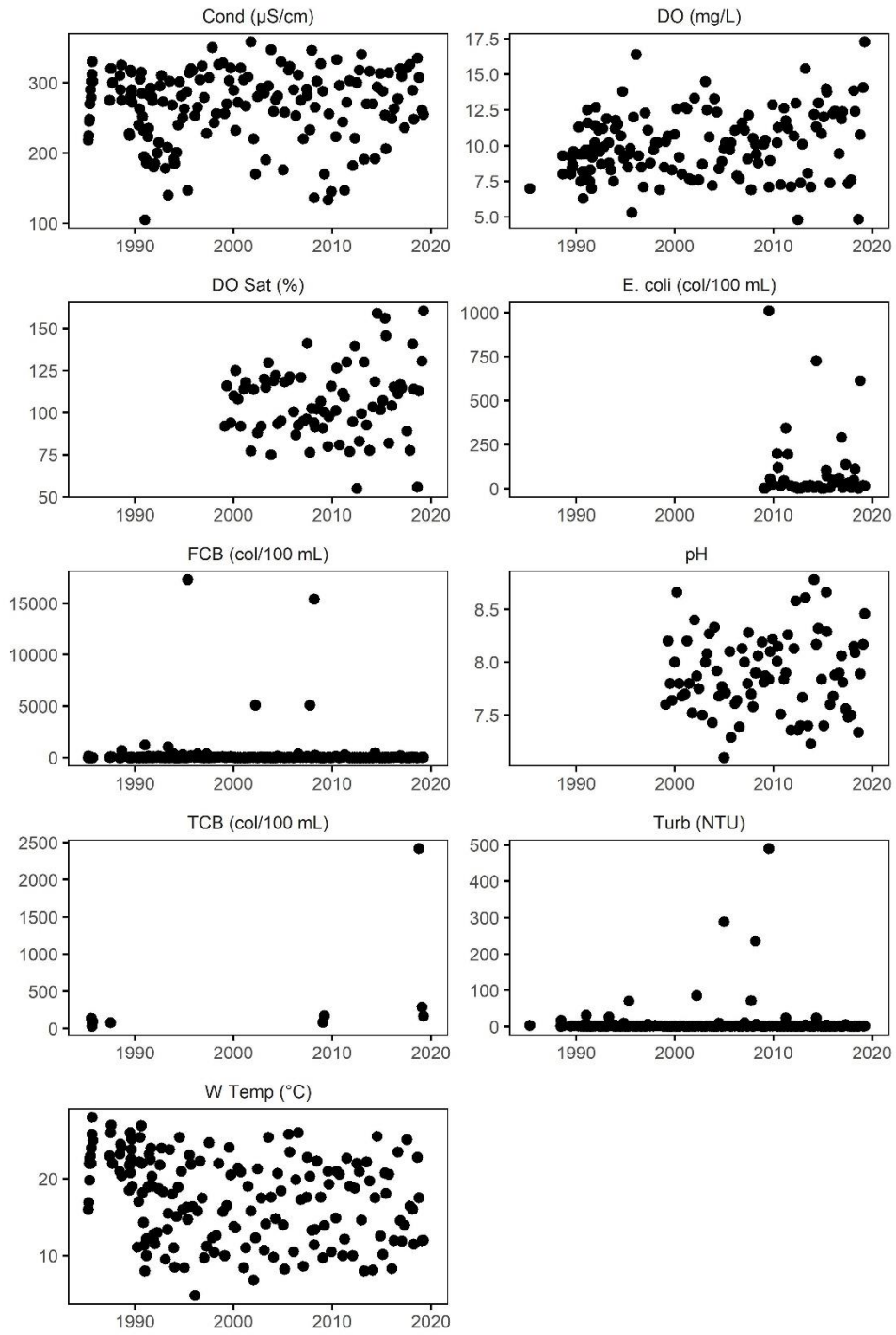


Figure A3.22.2 Bacterial indicator and physicochemical variables (1985-2019) at BUFT10.

A3.22.2 Trend analysis results (2000 - 2019): Narrative summaries

- NOx-N concentrations are likely not changing (**Figure A3.22.1-3A**).
- FCB concentrations were likely not changing (**Figure A3.22.1-3B**).
- Conductivity is likely not changing (**Figure A3.22.1-3C**).
- DO levels are likely not changing (**Figure A3.22.1-3D & E**).
- Stream pH is likely not changing (**Figure A3.22.1-3F**).
- Turbidity is likely not changing (**Figure A3.22.1-3G**).
- Water temperature is likely not changing (**Figure A3.22.1-3H**).

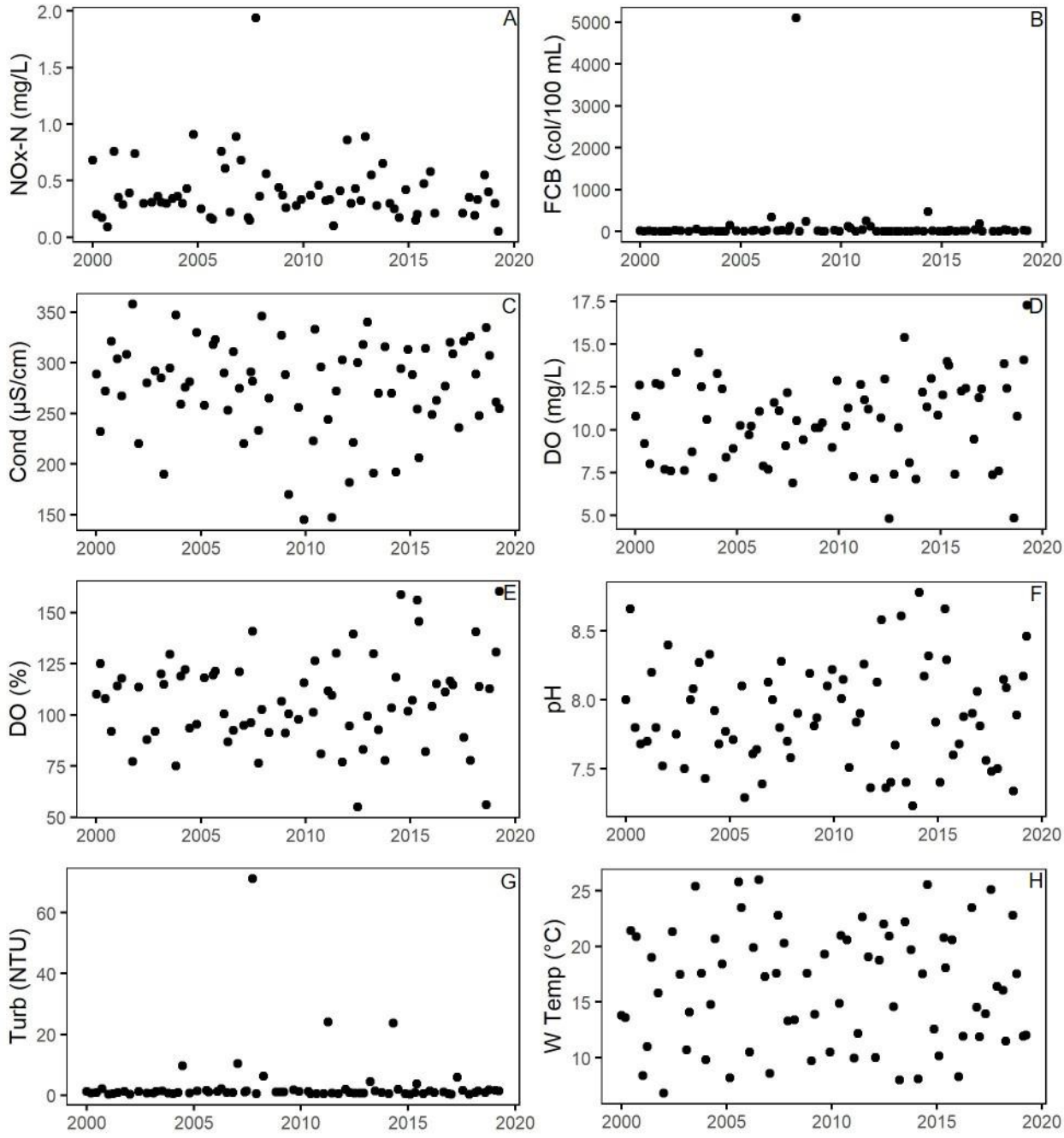


Figure A3.22.3 Water quality variable values shown through time (2000 – 2019) at BUFT10. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections.

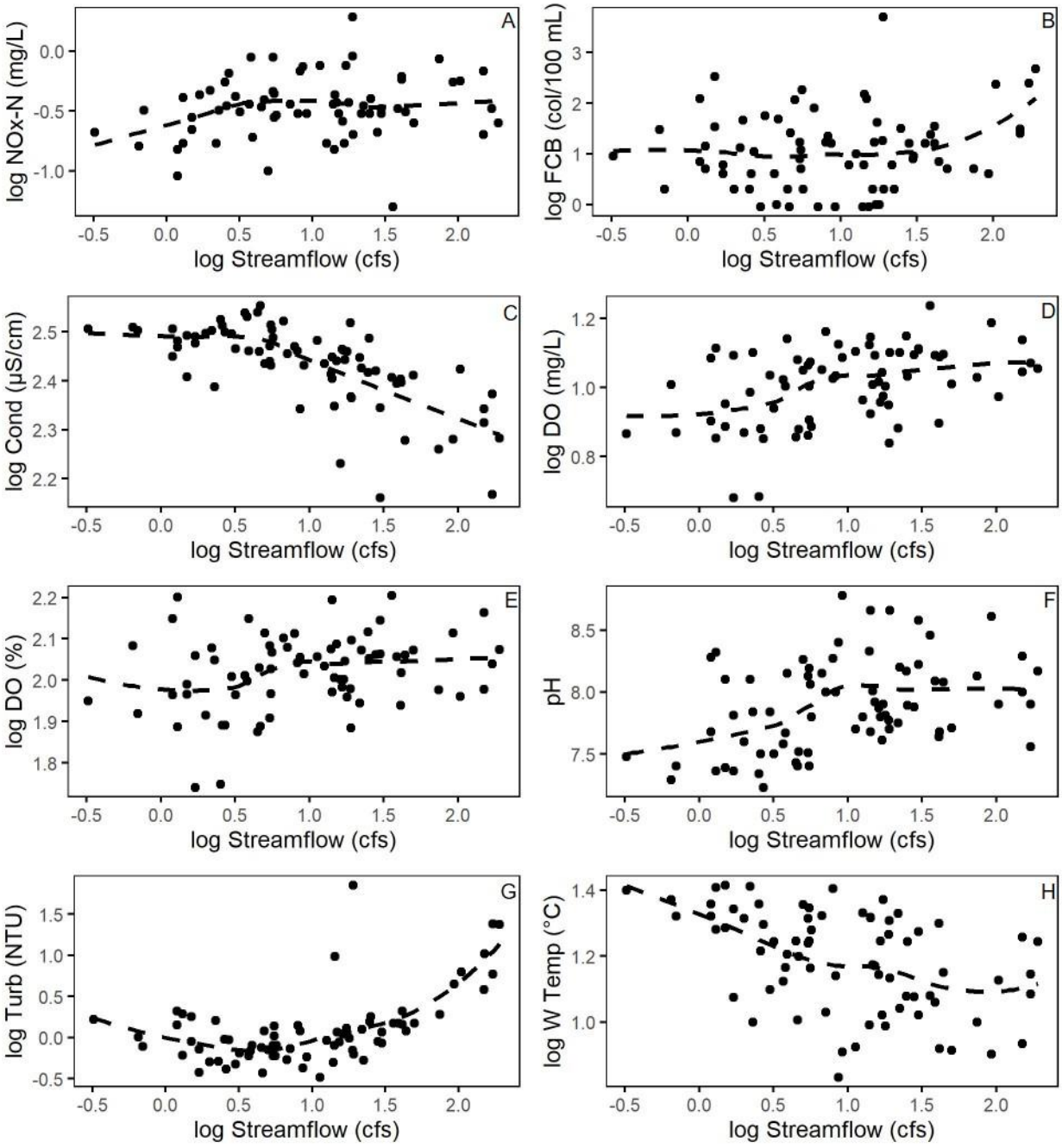


Figure A3.22.4 Water quality variable values (2000 – 2019) shown in relation to streamflow at BUFT10. A) nitrate+ nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation between each variable and streamflow.

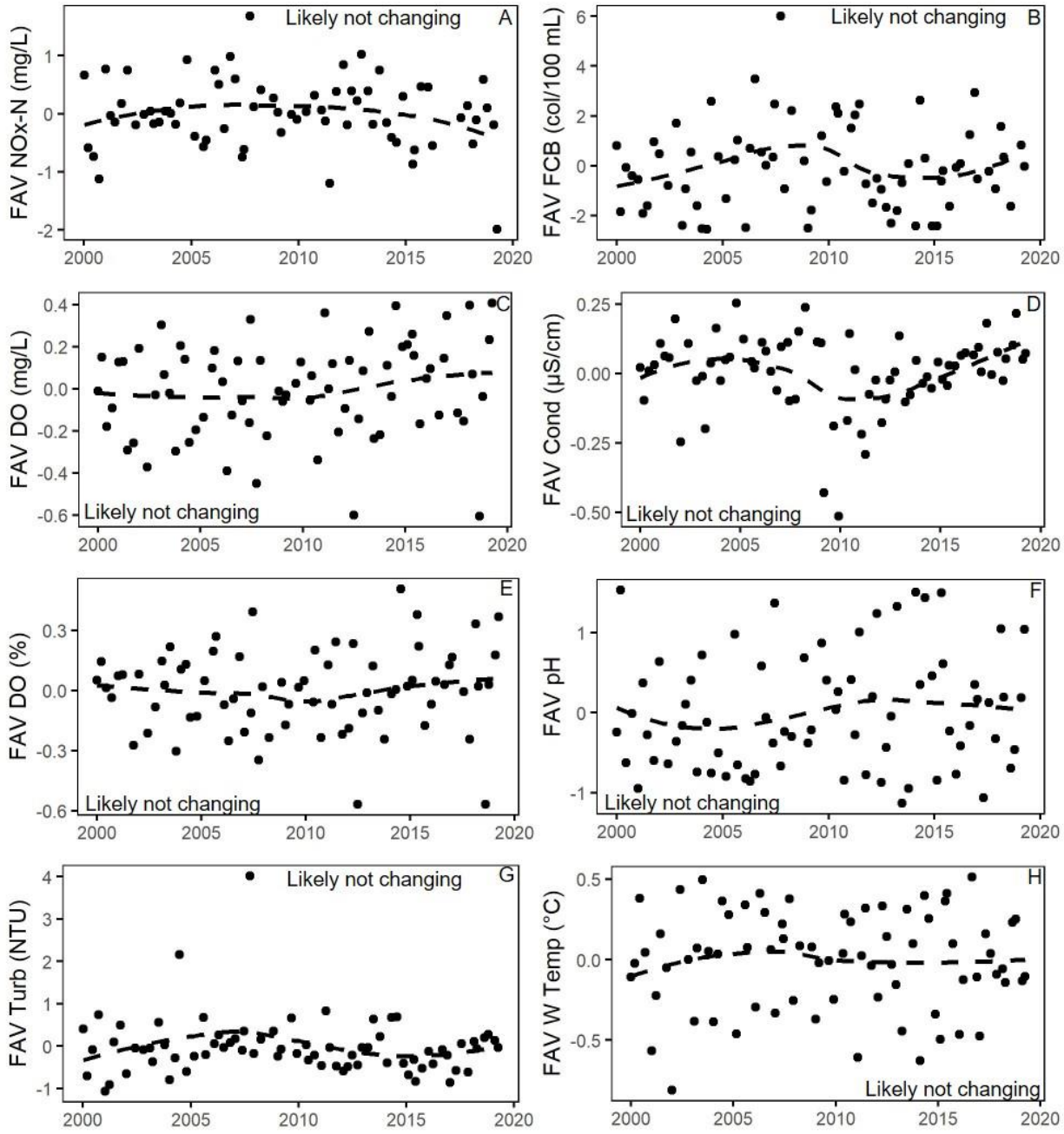


Figure A3.22.5 Flow-adjusted values (FAV) of water quality variables shown through time (2000 – 2019) for BUFT10. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation with time. Narrative results summarize statistical significance and trend direction across trend analyses. See **Table A2.2.1** for full results.

A3.23 BUFT11 – Mill Creek above Confluence with Buffalo River at Tyler Bend Campground

A3.23.1 Site and available data description

Mill Creek above Confluence with Buffalo River at Tyler Bend Campground (BUFT11; 35.9903, -92.7667) is a long-term water quality monitoring site at BUFF. BUFF staff have measured streamflow and in situ physiochemistry and collected water samples for analysis of bacteriological indicators and nutrient concentrations at the site since 1985 (**Figure A3.23.1-2**). Instantaneous streamflow estimates collected by BUFF staff were used in the flow-adjustment procedure to generate FAVs of water quality variables for trend analysis.

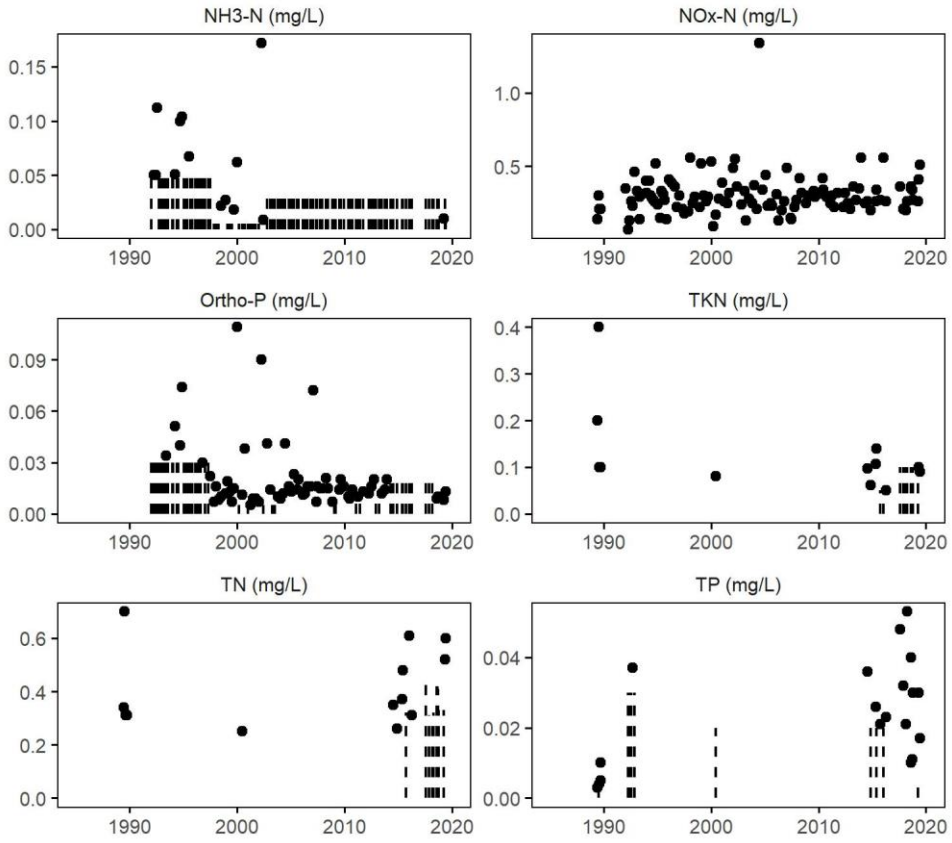


Figure A3.23.1 Nutrient variables (1985-2019) at BUFT11. Dashed lines indicate a non-detection, or that concentration could only be estimated within a range (i.e., between 0 and the relevant reporting limit).

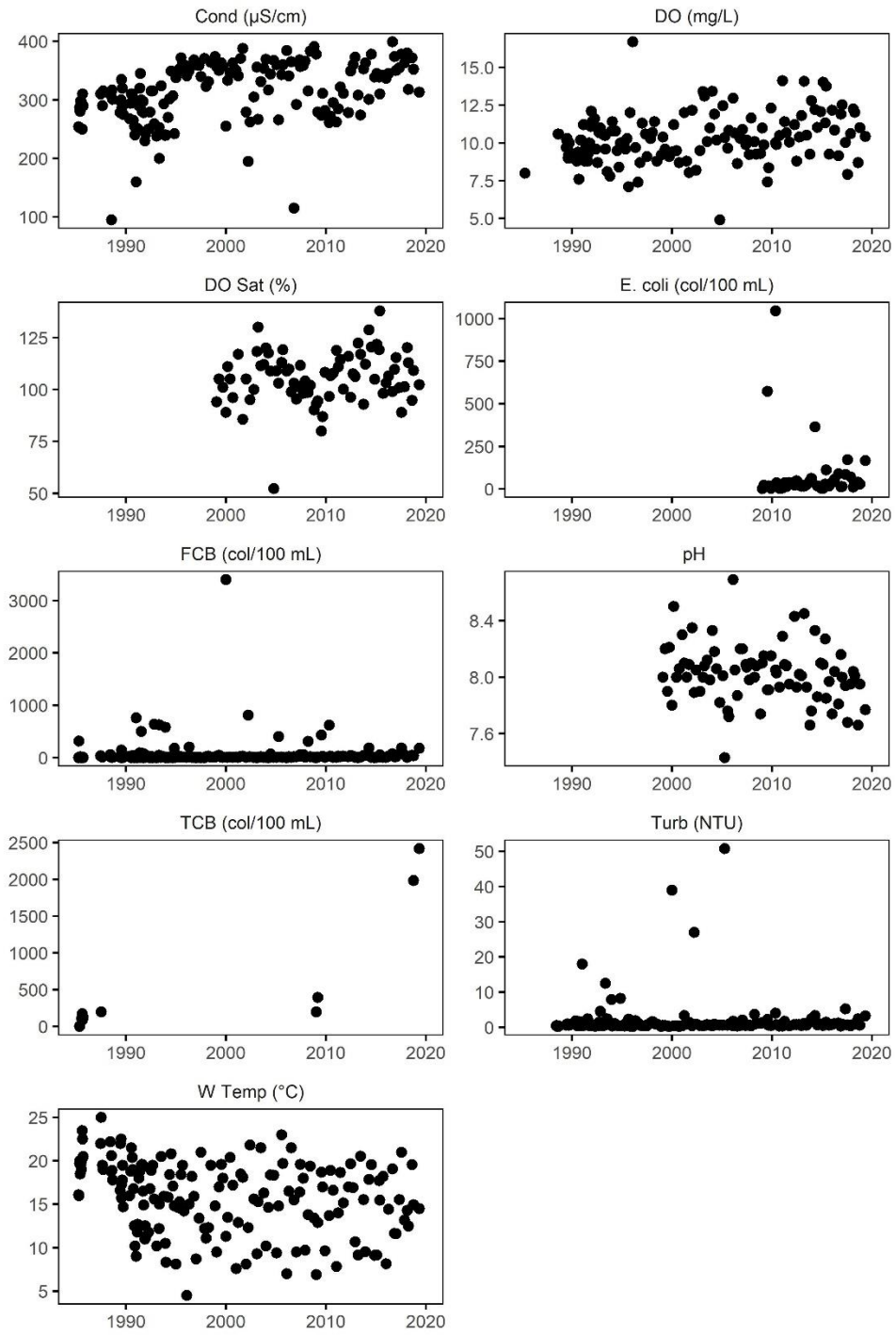


Figure A3.23.2 Bacterial indicator and physicochemical variables (1985-2019) at BUFT11.

A3.23.2 Trend analysis results (2000 - 2019): Narrative summaries

- NO_x-N concentrations are likely not changing ($p \geq 0.10$; **Figure A3.23.3-5A**).
- FCB concentration trend analysis results required weight of evidence interpretation, suggesting that FCB concentrations are likely not changing (LR and SKT $p \geq 0.10$; **Figure A3.23.3-5B**). Results of MK suggested a likely increase ($p < 0.10$), but differing results between MK and SKT suggest that seasonality is a factor for FCB concentrations and that sampling was not even across seasons.
- Conductivity is likely not changing ($p \geq 0.10$; **Figure A3.23.3-5C**).
- DO trend analysis results required weight of evidence interpretation, suggesting that DO levels are likely increasing by 0.6% annually (SKT $p < 0.10$; **Figure A3.23.3-5D & E).** Only SKT results on DO % saturation suggested a significant increase. However, SKT on DO % saturation can be considered the most reliable results due to known seasonal variability in DO concentration due to temperature-dependent gas solubility. Differences between MK and SKT results for DO saturation suggest that sampling may not have occurred evenly across seasons.
- Stream pH trend analysis results required weight of evidence interpretation of trend analysis results suggested that pH is likely not changing (SKT $p \geq 0.10$; **Figure A3.23.3-5F**). Results of LR and MK suggested a likely decrease ($p < 0.10$), but differing results between MK and SKT suggest that seasonality is a factor for pH and that sampling may not have occurred evenly across seasons.
- Turbidity is likely not changing ($p \geq 0.10$; **Figure A3.23.3-5G**).
- Water temperature is likely not changing ($p \geq 0.10$; **Figure A3.23.3-5H**).

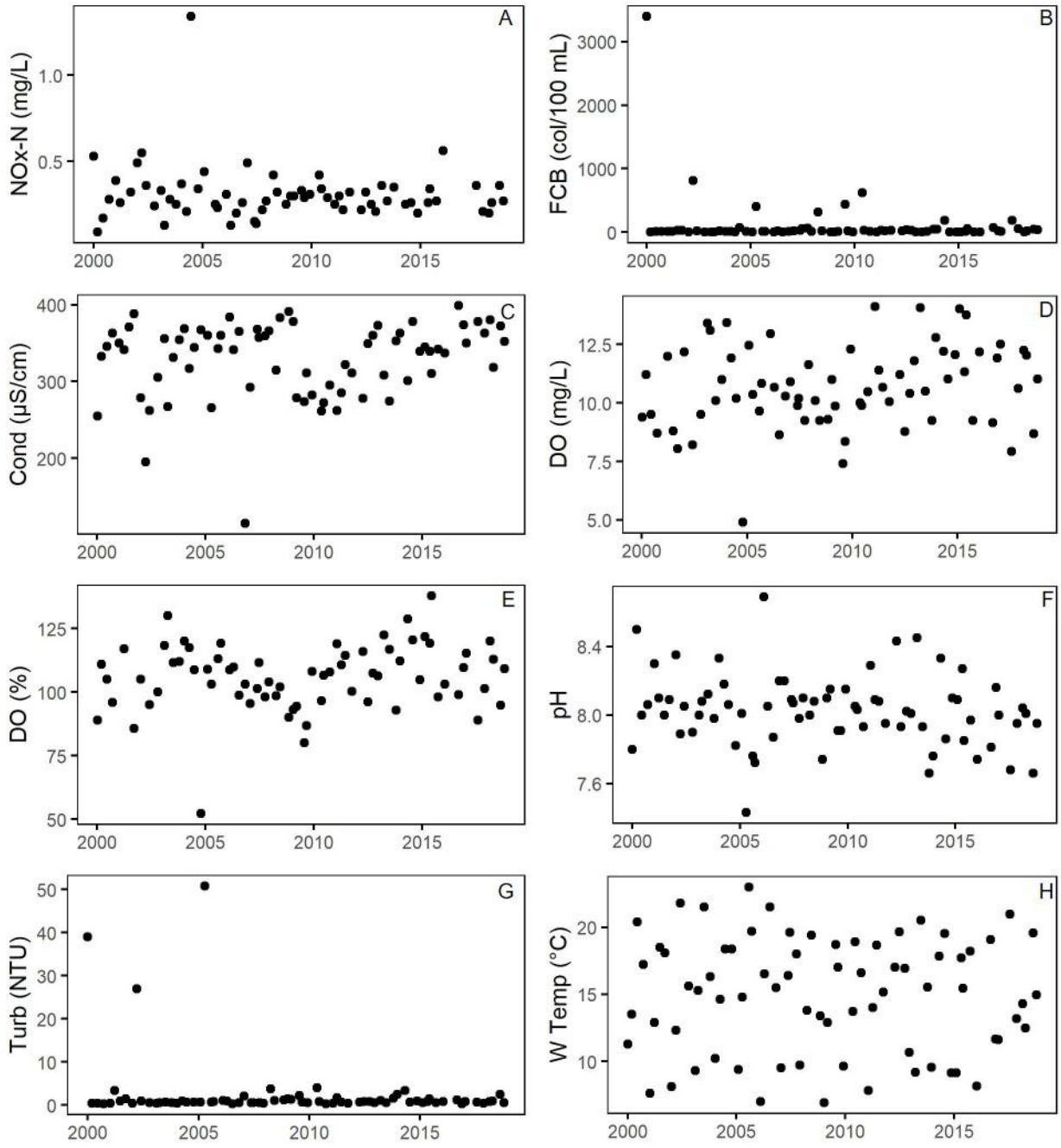


Figure A3.23.3 Water quality variable values shown through time (2000 – 2019) at BUFT11. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections.

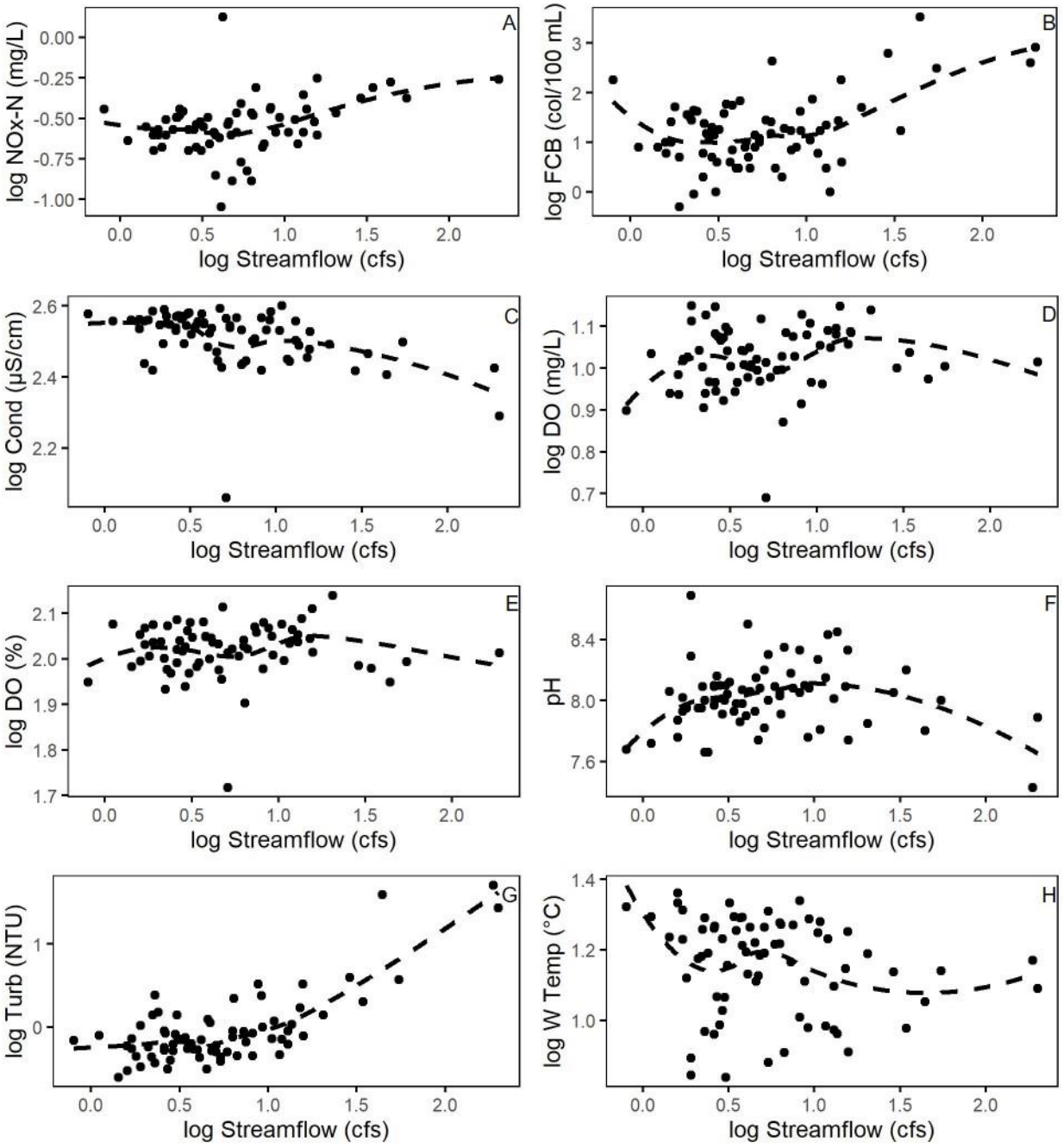


Figure A3.23.4 Water quality variable values (2000 – 2019) shown in relation to streamflow at BUFT11. A) nitrate+ nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation between each variable and streamflow.

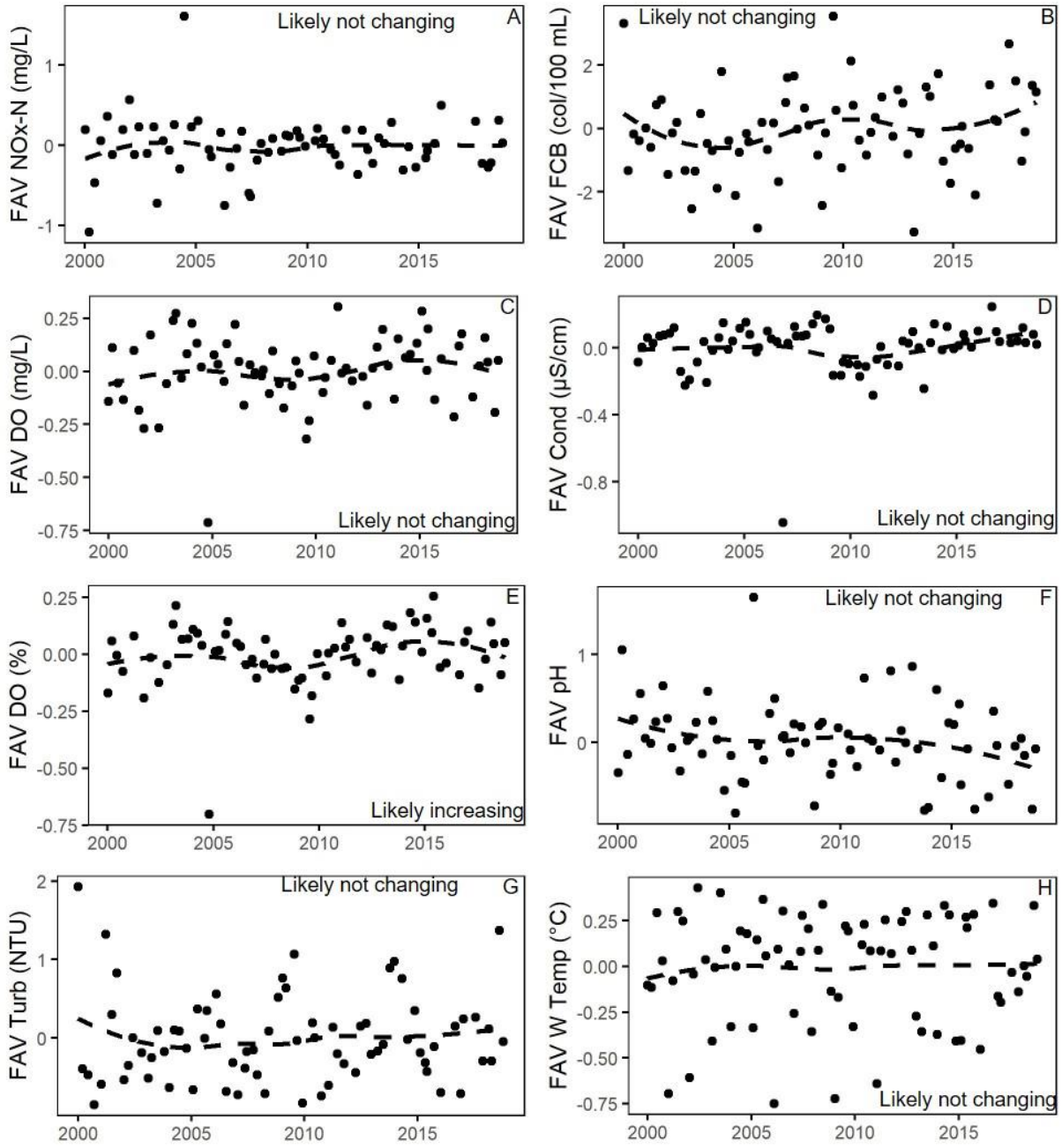


Figure A3.23.5 Flow-adjusted values (FAV) of water quality variables shown through time (2000 – 2019) for BUFT11. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation with time. Narrative results summarize statistical significance and trend direction across trend analyses. See **Table A2.2.1** for full results.

A3.24 BUFT12 – Bear Creek above Confluence with Buffalo River

A3.24.1 Site and available data description

Bear Creek above Confluence with Buffalo River (BUFT12; 35.9966, -92.7) is a long-term water quality monitoring site at BUFF. BUFF staff have measured streamflow and in situ physiochemistry and collected water samples for analysis of bacteriological indicators and nutrient concentrations at the site since 1985 (**Figure A3.24.1-2**). Instantaneous streamflow estimates collected by BUFF staff were used in the flow-adjustment procedure to generate FAVs of water quality variables for trend analysis.

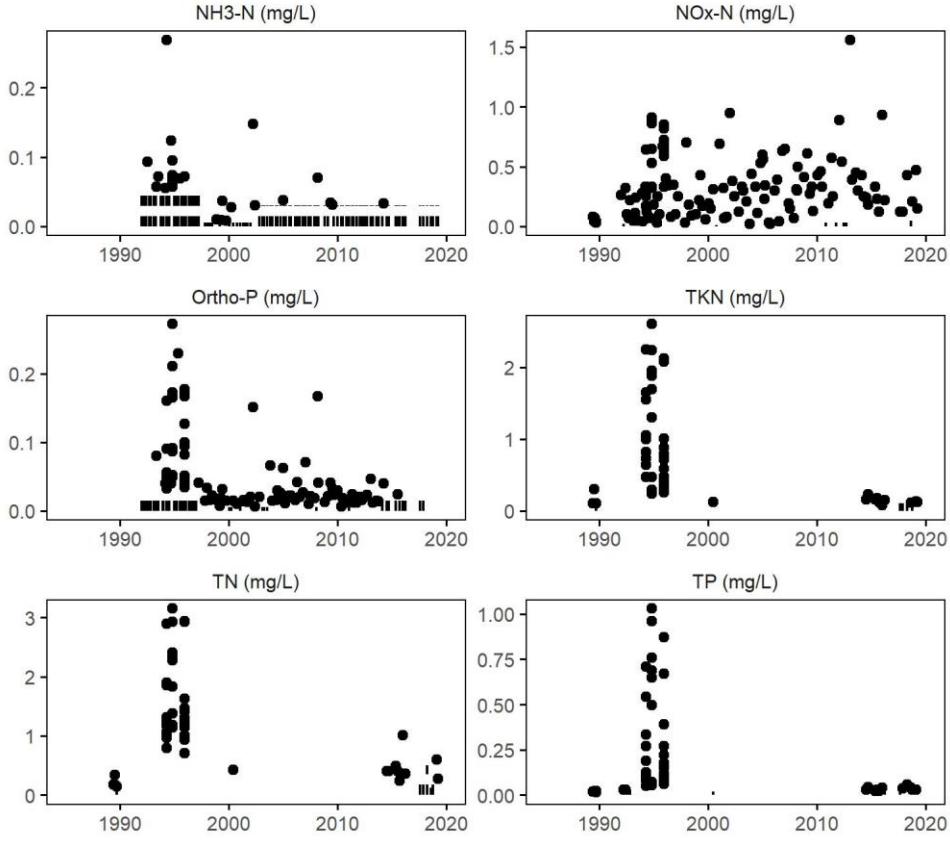


Figure A3.24.1 Nutrient variables (1985-2019) at BUFT12. Dashed lines indicate a non-detection, or that concentration could only be estimated within a range (i.e., between 0 and the relevant reporting limit).

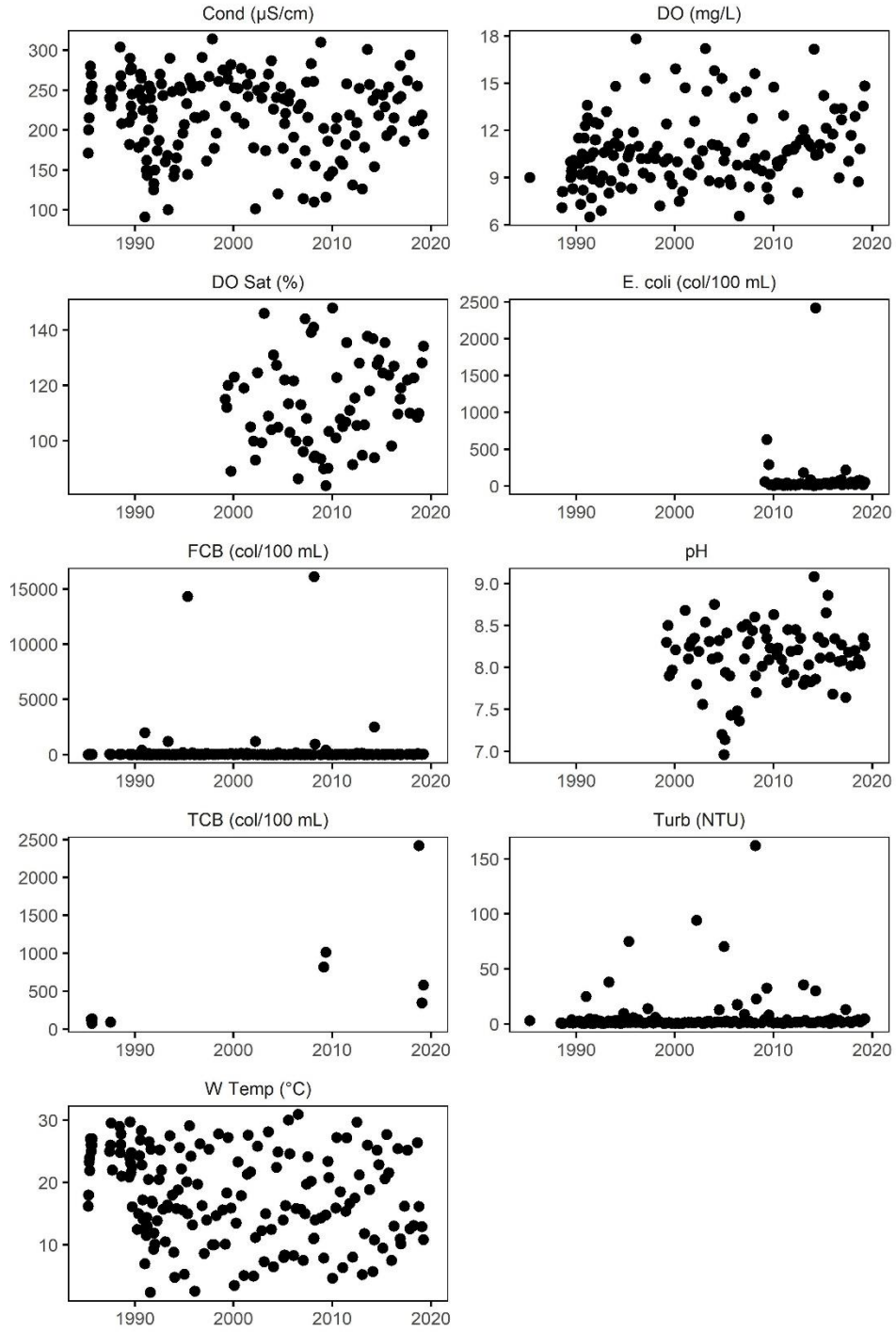


Figure A3.24.2 Bacterial indicator and physicochemical variables (1985-2019) at BUFT12.

A3.24.2 Trend analysis results (2000 - 2019): Narrative summaries

- NO_x-N concentrations are likely not changing ($p \geq 0.10$; **Figure A3.24.3-5A**).
- FCB concentration trend analysis results required weight of evidence interpretation, suggesting that FCB concentrations are likely not changing (MK and SKT $p \geq 0.10$; **Figure A3.24.3-5B**). Results of LR suggested a likely increase that just qualified as significant ($p = 0.098$), but non-significant MK and SKT results suggest that the LR analysis was influenced by data anomalies, such as outliers or uneven sampling across seasons, that did not affect the non-parametric tests.
- Conductivity is likely not changing ($p \geq 0.10$; **Figure A3.24.3-5C**).
- DO levels are likely not changing ($p \geq 0.10$; **Figure A3.24.3-5D & E**).
- Stream pH is likely not changing ($p \geq 0.10$; **Figure A3.24.3-5F**).
- Turbidity trend analysis results required weight of evidence interpretation, suggesting that turbidity is likely not changing ($p \geq 0.10$; **Figure A3.24.3-5G**). Results of LR and MK suggested a very likely increase ($p < 0.05$), but differing results between MK and SKT suggest that seasonality is a factor for turbidity and that sampling may have occurred unevenly across seasons.
- Water temperature is likely not changing ($p \geq 0.10$; **Figure A3.24.3-5H**).

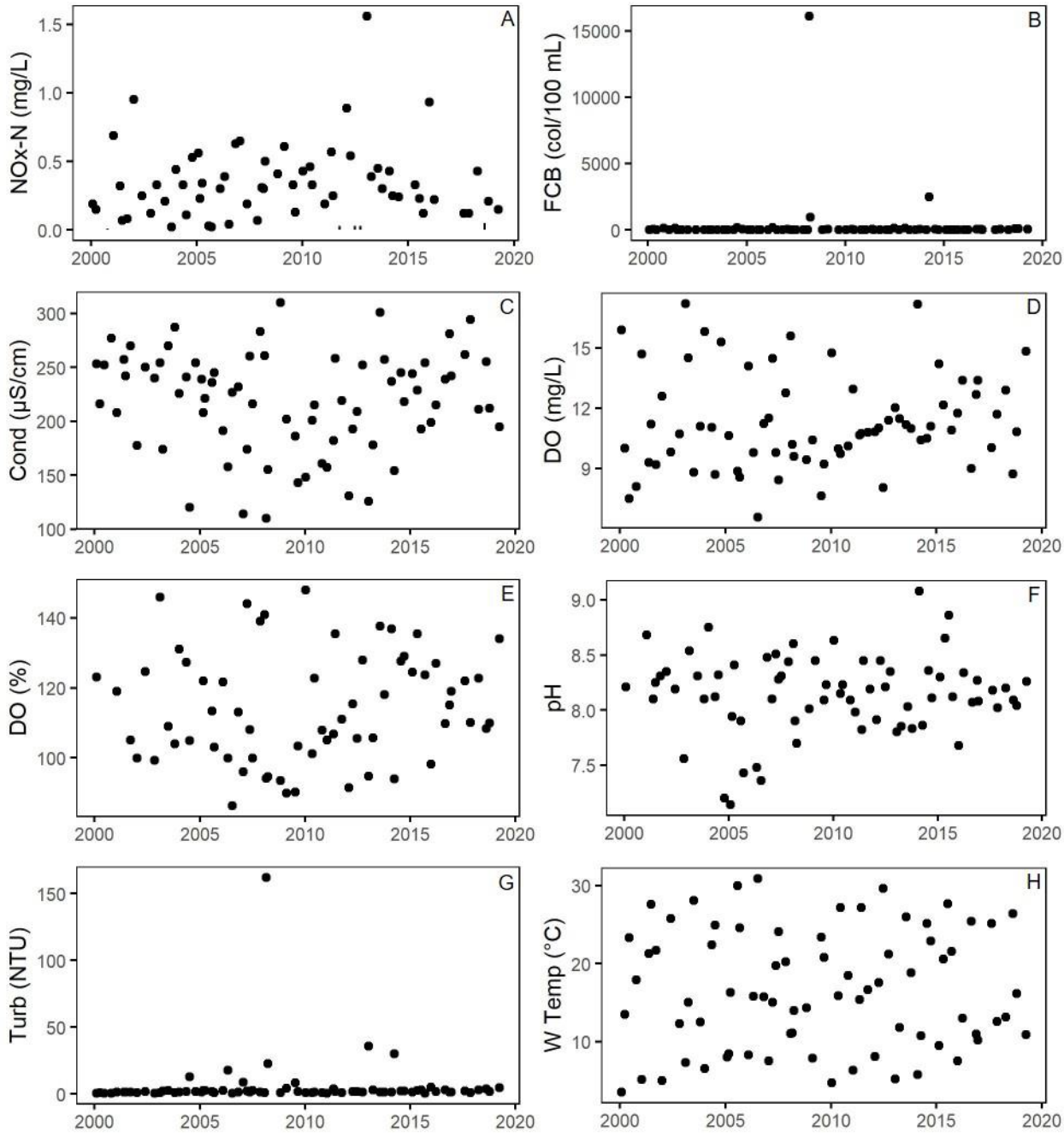


Figure A3.24.3 Water quality variable values shown through time (2000 – 2019) at BUFT12. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections.

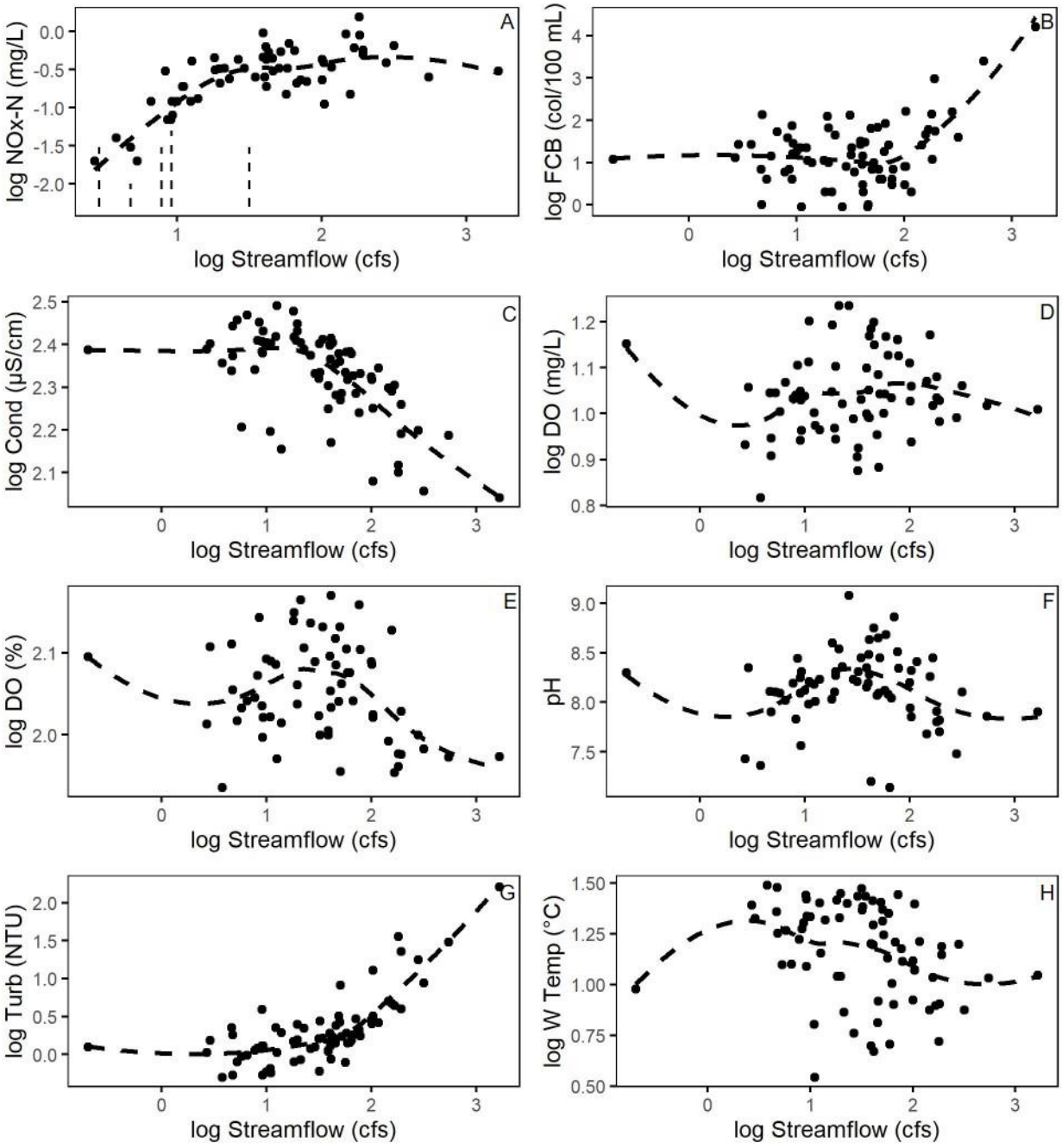


Figure A3.24.4 Water quality variable values (2000 – 2019) shown in relation to streamflow at BUFT12. A) nitrate+ nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation between each variable and streamflow.

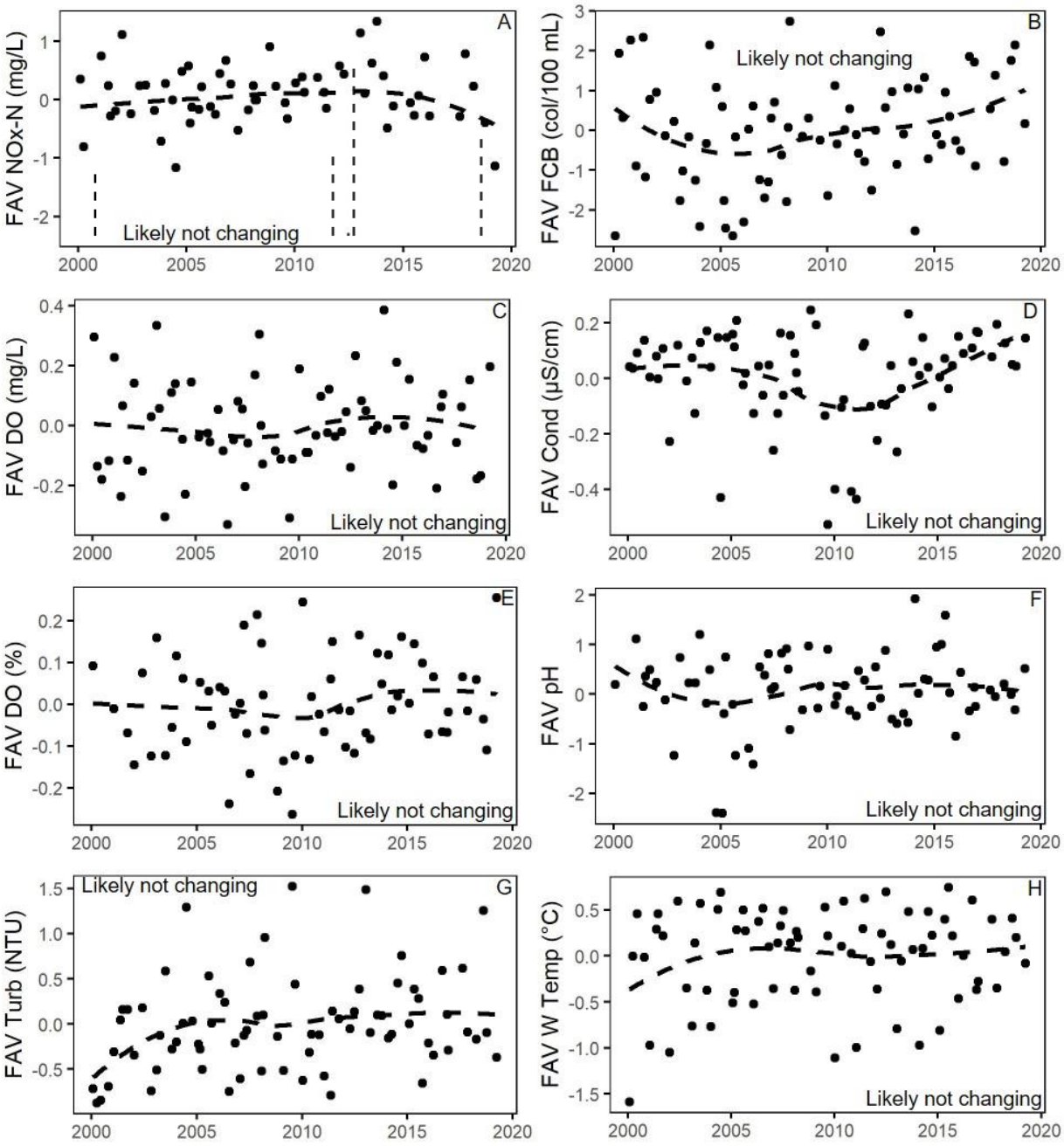


Figure A3.24.5 Flow-adjusted values (FAV) of water quality variables shown through time (2000 – 2019) for BUFT12. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation with time. Narrative results summarize statistical significance and trend direction across trend analyses. See **Table A2.2.1** for full results.

A3.25 BUFT13 – Brush Creek above Confluence with Buffalo River

A3.25.1 Site and available data description

Brush Creek above Confluence with Buffalo River (BUFT13; 35.998702, -92.689382) is a long-term water quality monitoring site at BUFF. BUFF staff have measured streamflow and in situ physiochemistry and collected water samples for analysis of bacteriological indicators and nutrient concentrations at the site since 1985 (**Figure A3.25.1 -2**). Instantaneous streamflow estimates collected by BUFF staff were used in the flow-adjustment procedure to generate FAVs of water quality variables for trend analysis.

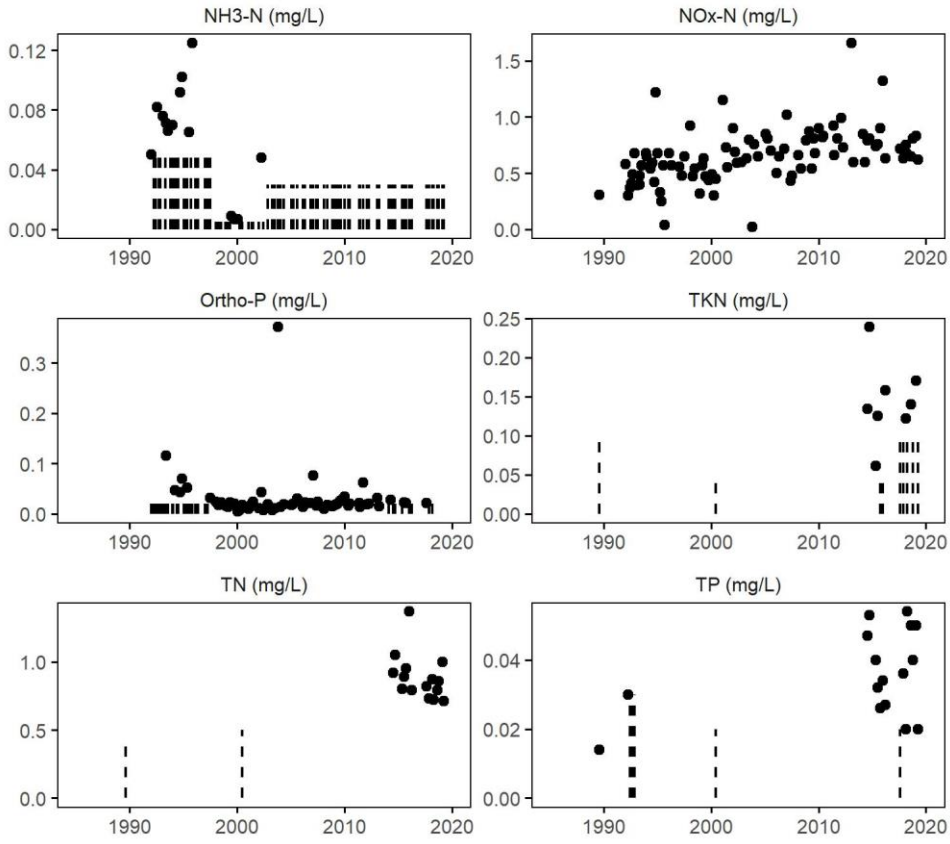


Figure A3.25.1 Nutrient variables (1985-2019) at BUFT13. Dashed lines indicate a non-detection, or that concentration could only be estimated within a range (i.e., between 0 and the relevant reporting limit).

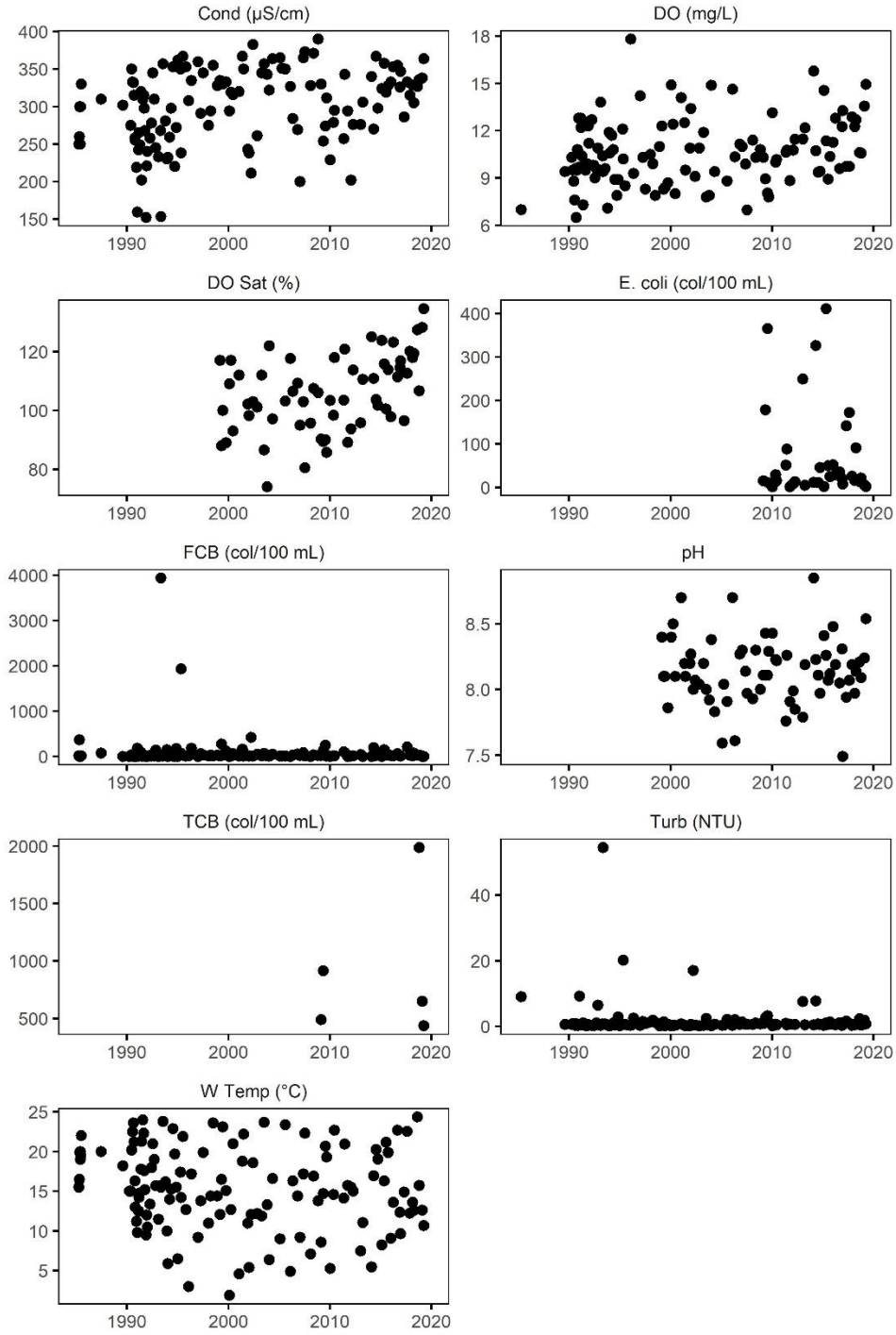


Figure A3.25.2 Bacterial indicator and physicochemical variables (1985-2019) at BUFT13.

A3.25.2 Trend analysis results (2000 - 2019): Narrative summaries

- NO_x-N concentrations are likely not changing ($p \geq 0.10$; **Figure A3.25.3-5A**).
- FCB concentration trend analysis results required weight of evidence interpretation, suggesting that FCB concentrations were likely increasing by 5% annually (SKT $p < 0.10$; **Figure A3.25.3-5B**). Results of LR and MK suggested no change ($p \geq 0.10$), but differing SKT results suggest that seasonality is a factor for FCB concentration and that sampling has not occurred evenly across seasons.
- Conductivity is likely not changing ($p \geq 0.10$; **Figure A3.25.3-5C**).
- DO trend analysis results required weight of evidence interpretation, suggesting that DO levels are likely not changing (**Figure A3.25.3-5D & E**). Results of all analyses on DO concentration, as well as SKT on DO saturation, suggested no change ($p \geq 0.10$). Though LR and MK results for DO saturation suggested a very likely change ($p < 0.05$), SKT results can be considered most reliable due to known sizeable seasonal variability in DO due to temperature-dependent gas solubility. Though DO saturation typically corrects for seasonal variability, the differing results between MK and SKT suggest that sampling did not occur evenly across seasons.
- Stream pH is likely not changing ($p \geq 0.10$; **Figure A3.25.3-5F**).
- Turbidity trend analysis results required weight of evidence interpretation, suggesting that turbidity is likely not changing ($p \geq 0.10$; **Figure A3.25.3-5G**). Results of LR and MK suggested a likely to very likely increase ($p < 0.10$), but differing results between MK and SKT suggest that seasonality is a factor for turbidity and that sampling may have occurred unevenly across seasons.
- Water temperature is likely not changing ($p \geq 0.10$; **Figure A3.25.3-5H**).

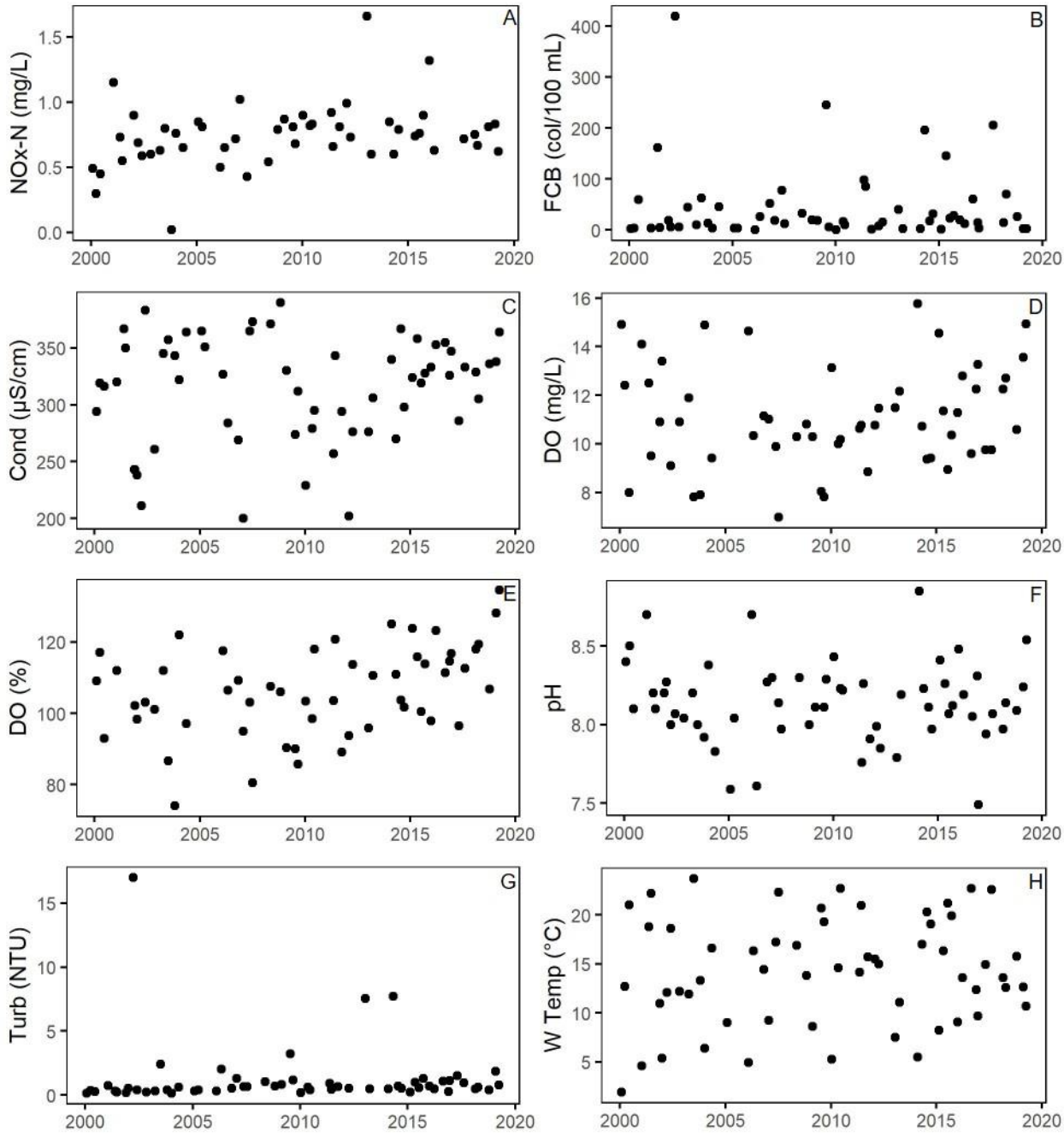


Figure A3.25.3 Water quality variable values shown through time (2000 – 2019) at BUFT13. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp).

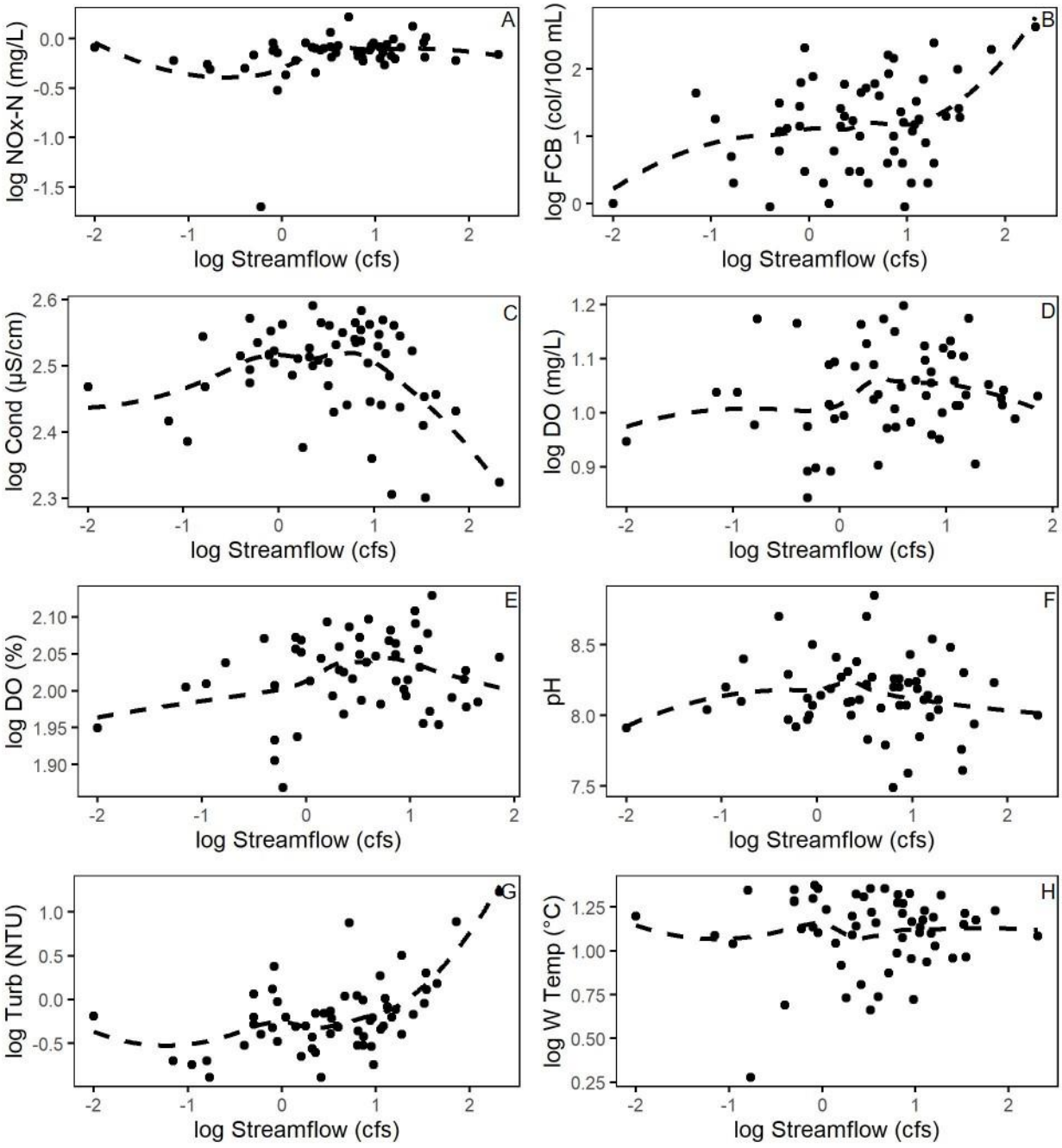


Figure A3.25.4 Water quality variable values (2000 – 2019) shown in relation to streamflow at BUFT13. A) nitrate+ nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation between each variable and streamflow.

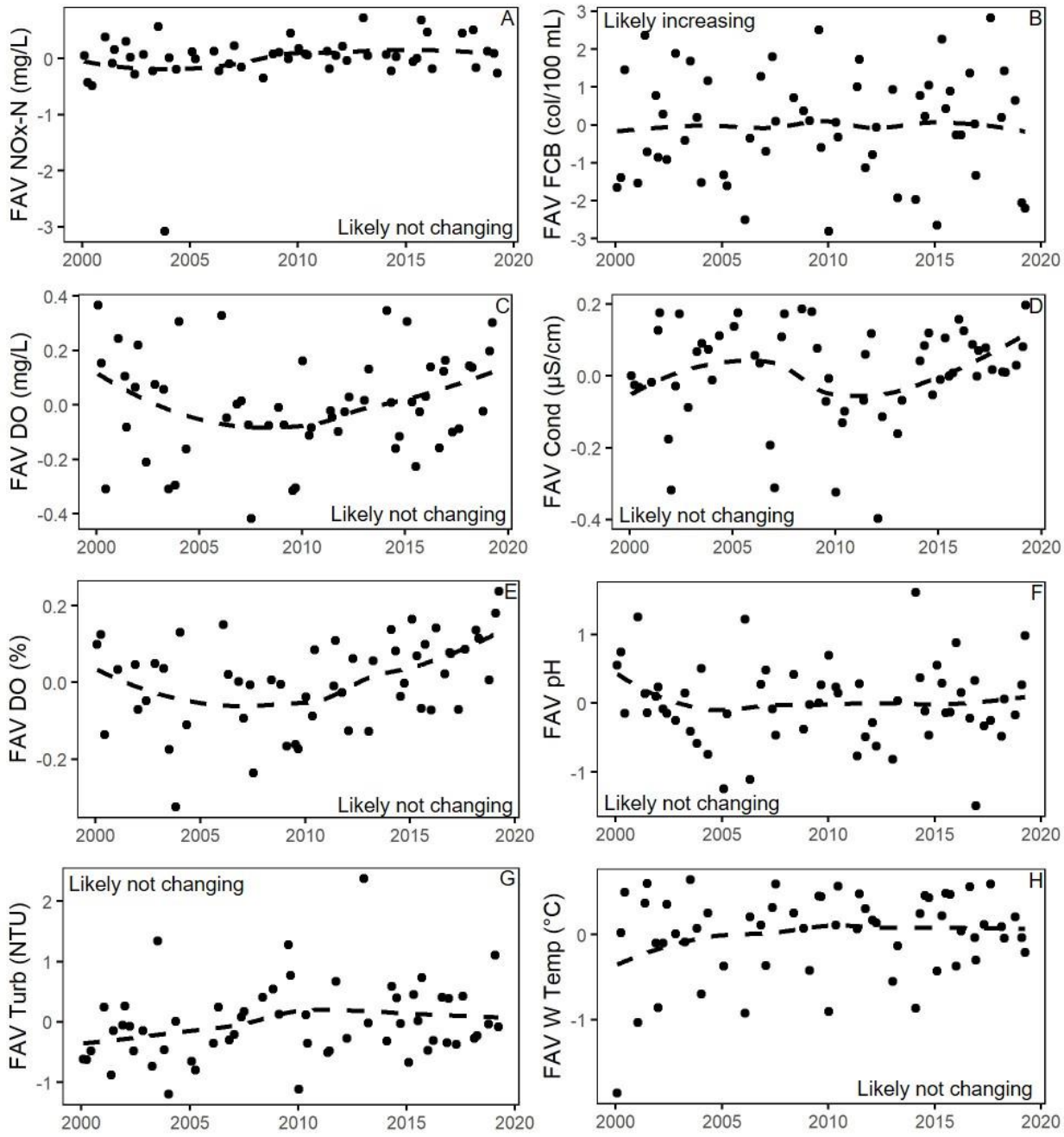


Figure A3.25.5 Flow-adjusted values (FAV) of water quality variables shown through time (2000 – 2019) for BUFT13. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation with time. Narrative results summarize statistical significance and trend direction across trend analyses. See **Table A2.2.1** for full results.

A3.26 BUFT14 – Tomahawk Creek at Searcy County Road 82 Crossing

A3.26.1 Site and available data description

Tomahawk Creek at Searcy County Road 82 Crossing (BUFT14; 36.0217, -92.6717) is a long-term water quality monitoring site at BUFF. BUFF staff have measured streamflow and in situ physiochemistry and collected water samples for analysis of bacteriological indicators and nutrient concentrations at the site since 1985 (**Figure A3.26.1-2**). Instantaneous streamflow estimates collected by BUFF staff were used in the flow-adjustment procedure to generate FAVs of water quality variables for trend analysis.

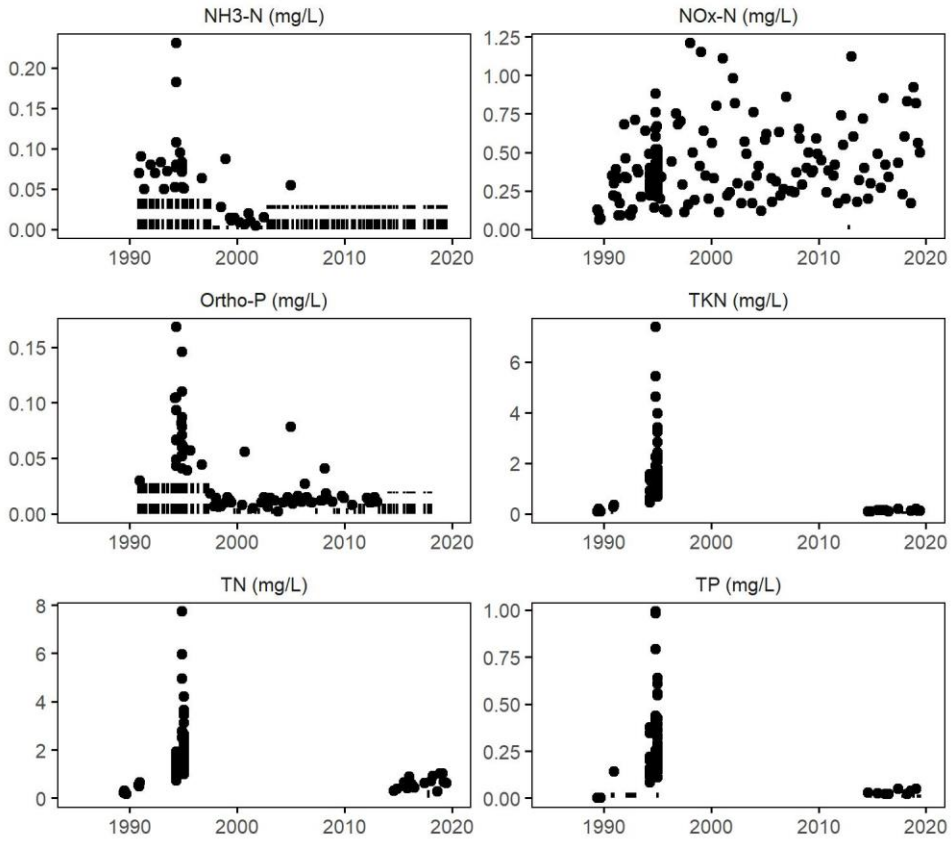


Figure A3.26.1 Nutrient variables (1985-2019) at BUFT14. Dashed lines indicate a non-detection, or that concentration could only be estimated within a range (i.e., between 0 and the relevant reporting limit).

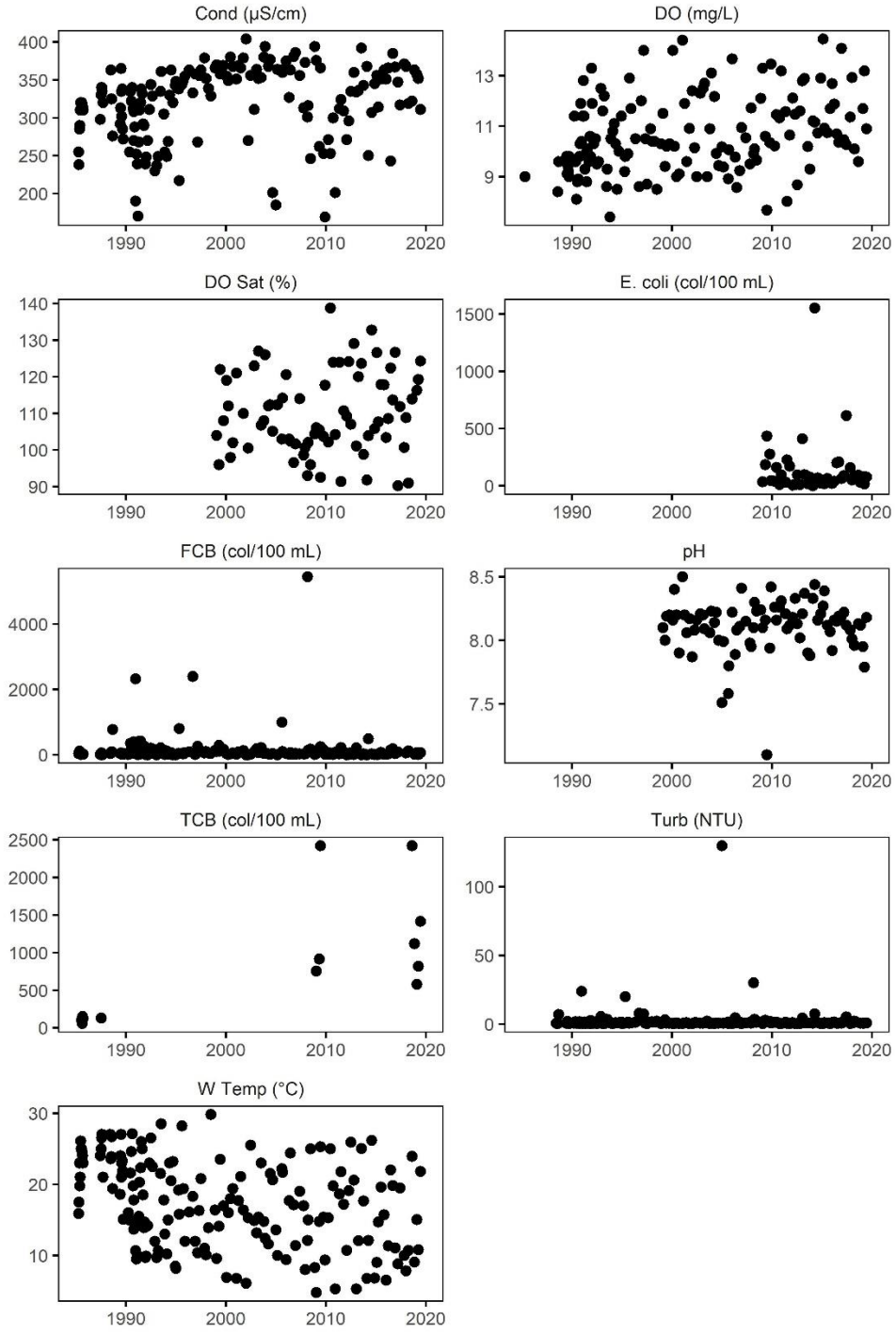


Figure E3.26.2 Bacterial indicator and physicochemical variables (1985-2019) at BUFT14.

A3.26.2 Trend analysis results (2000 - 2019): Narrative summaries

- NO_x-N concentrations are likely not changing ($p \geq 0.10$; **Figure E3.26.3-5A**).
- FCB concentrations are likely not changing ($p \geq 0.10$; **Figure E3.26.3-5B**).
- Conductivity is likely not changing ($p \geq 0.10$; **Figure E3.26.3-5C**).
- DO trend analyses required weight of evidence interpretation, suggesting that DO levels are likely not changing (**Figure E3.26.3-5D & E**). Results of all analyses on DO saturation suggested no change ($p \geq 0.10$), as well as LR and MK on DO concentration. Only SKT results for concentration suggested a likely increase ($p < 0.10$). Results of analyses on DO saturation can be considered most reliable due to known sizeable seasonal variability in DO concentration due to temperature-dependent gas solubility.
- Stream pH is likely not changing ($p \geq 0.10$; **Figure E3.26.3-5F**).
- Turbidity is likely not changing ($p \geq 0.10$; **Figure E3.26.3-5G**).
- Water temperature is likely not changing ($p \geq 0.10$; **Figure E3.26.3-5H**).

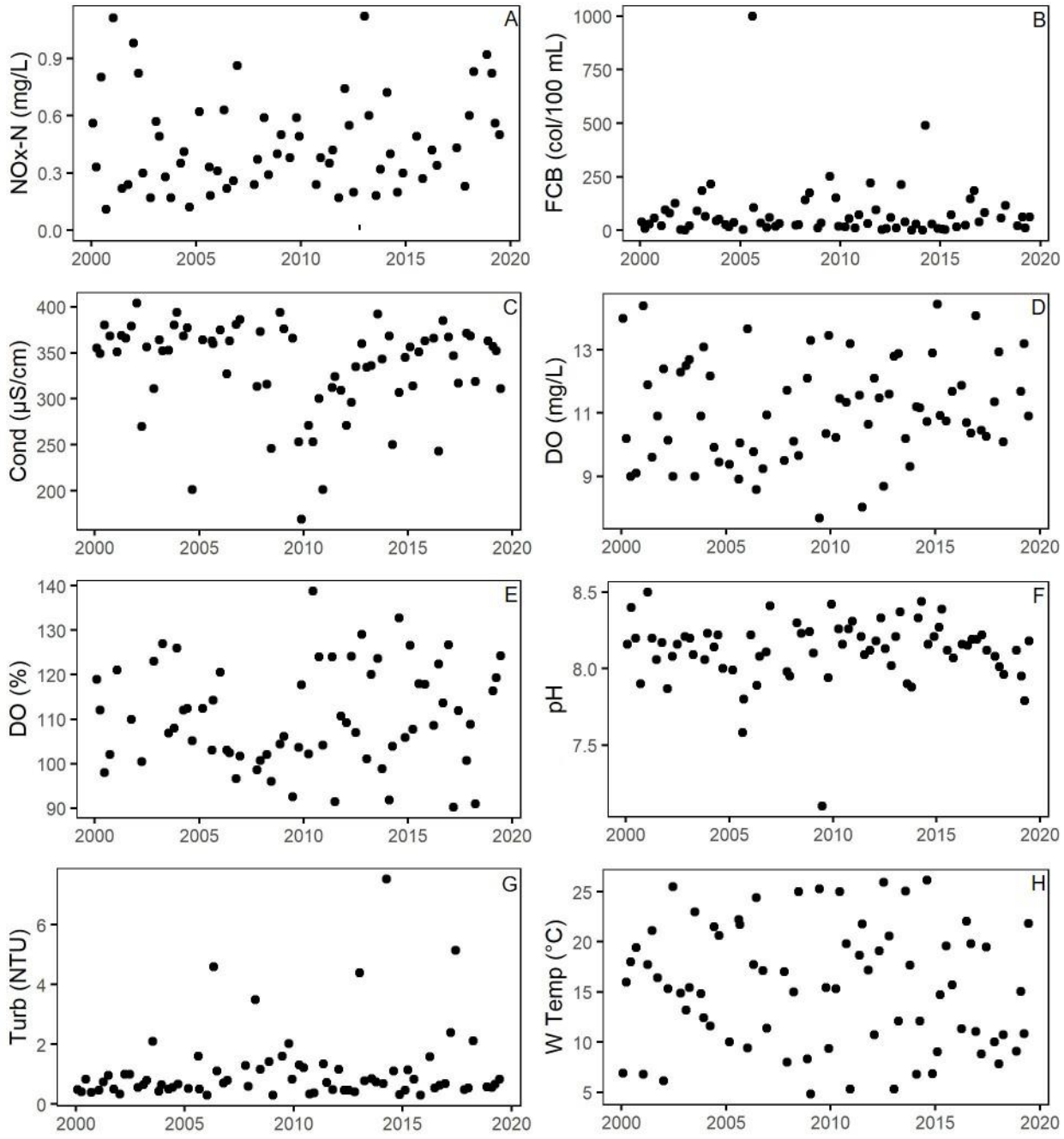


Figure E3.26.3 Water quality variable values shown through time (2000 – 2019) at BUFT14. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections.

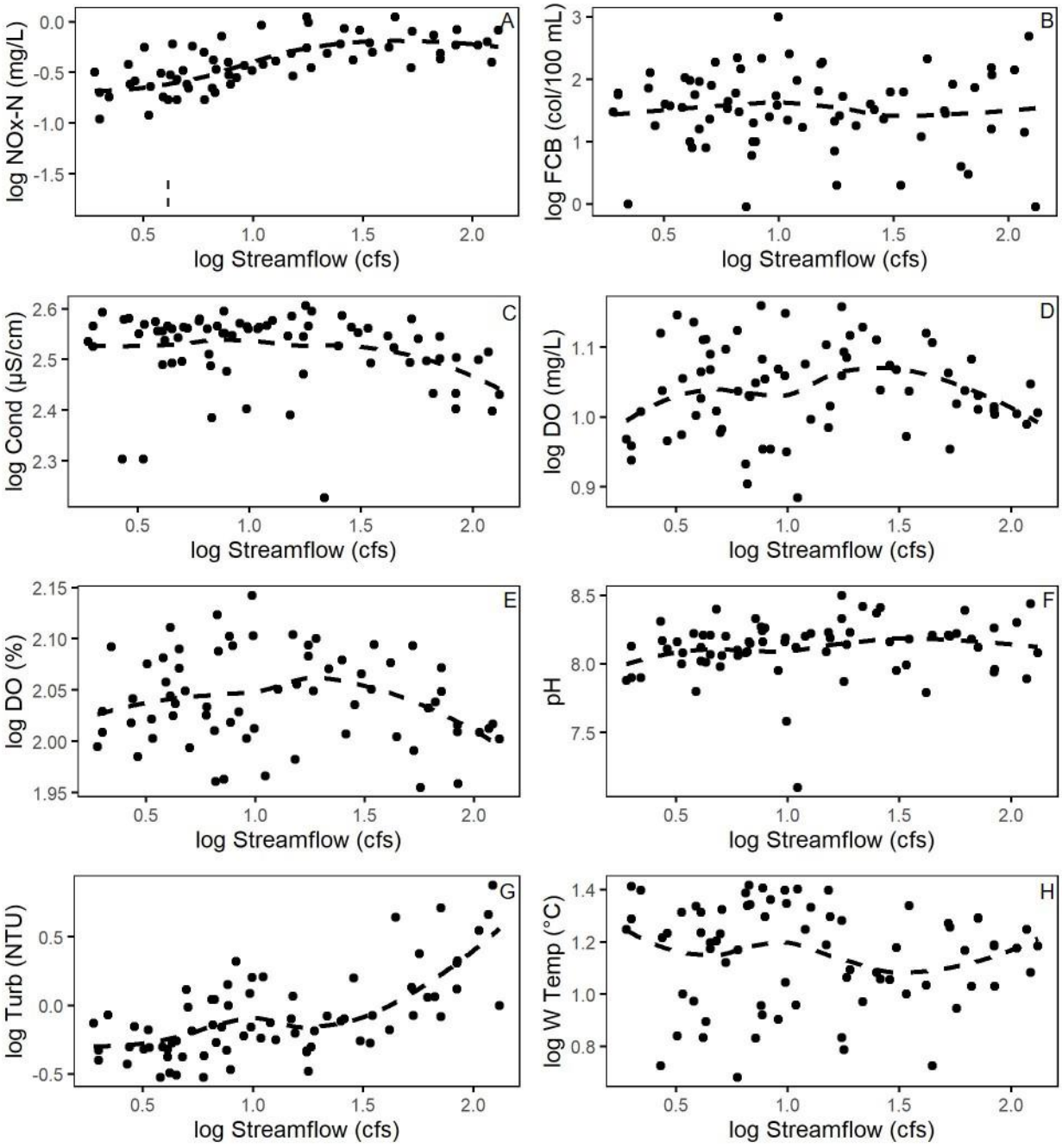


Figure E3.26.4 Water quality variable values (2000 – 2019) shown in relation to streamflow at BUFT14. A) nitrate+ nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation between each variable and streamflow.

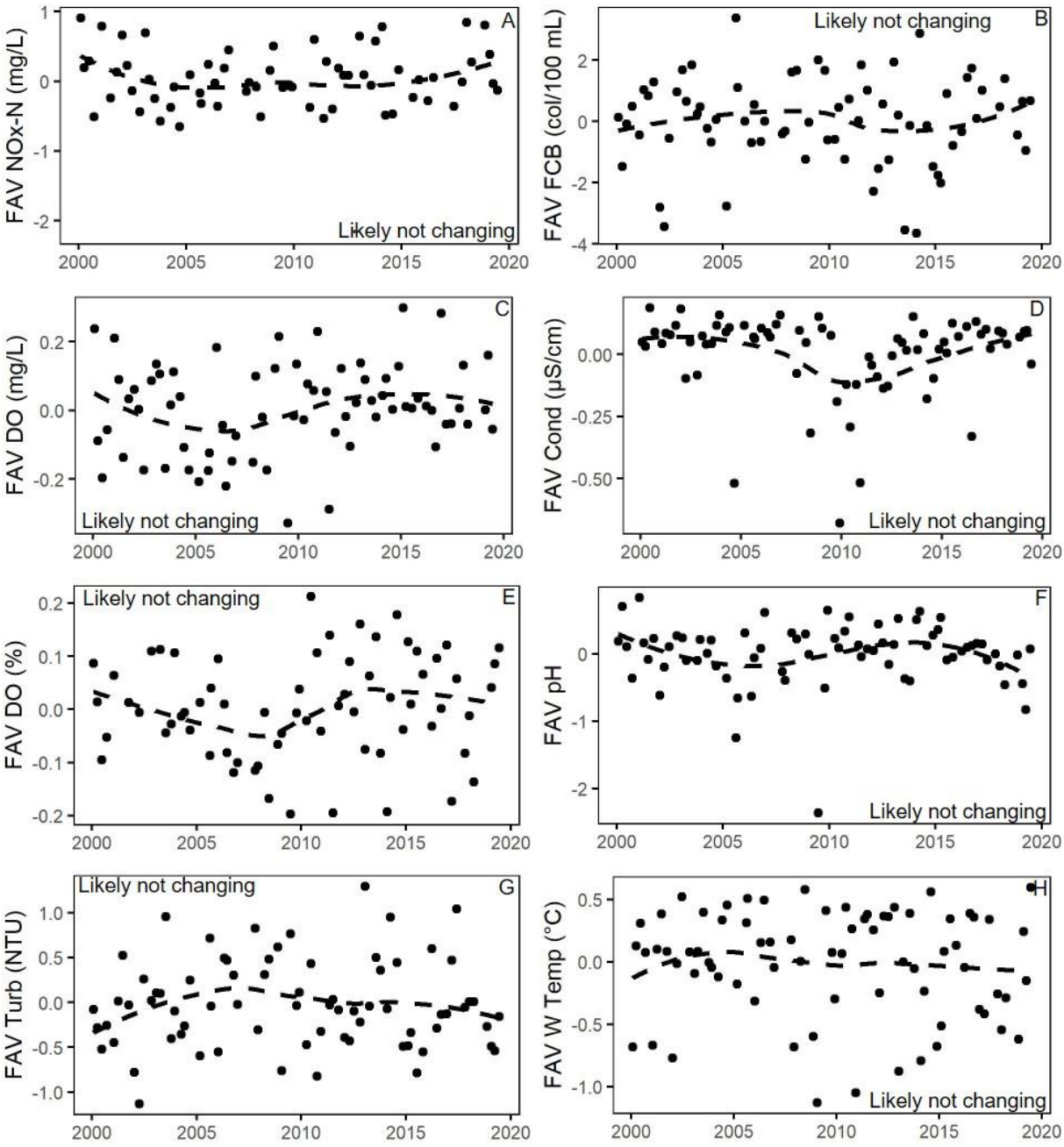


Figure E3.26.5 Flow-adjusted values FAVs of water quality variables shown through time (2000 – 2019) for BUFT14. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation with time. Narrative results summarize statistical significance and trend direction across trend analyses. See **Table A2.2.1** for full results.

A3.27 BUFT15 – Water Creek 1.5 Miles above Confluence with Buffalo River

A3.27.1 Site and available data description

Water Creek 1.5 Miles above Confluence with Buffalo River (BUFT15; 36.05, -92.5778) is a long-term water quality monitoring site at BUFF. BUFF staff have measured streamflow and in situ physiochemistry and collected water samples for analysis of bacteriological indicators and nutrient concentrations at the site since 1985 (**Figure E3.27.1-2**). Instantaneous streamflow estimates collected by BUFF staff were used in the flow-adjustment procedure to generate FAVs of water quality variables for trend analysis.

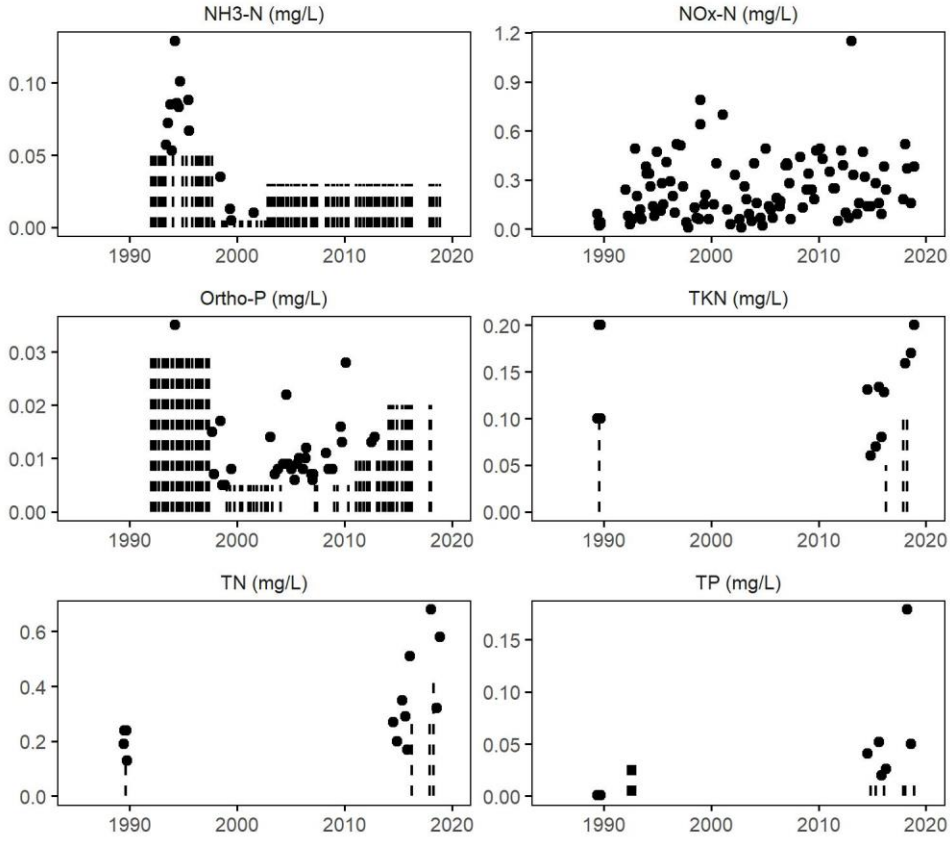


Figure E3.27.1 Nutrient variables (1985-2019) at BUFT15. Dashed lines indicate a non-detection, or that concentration could only be estimated within a range (i.e., between 0 and the relevant reporting limit).

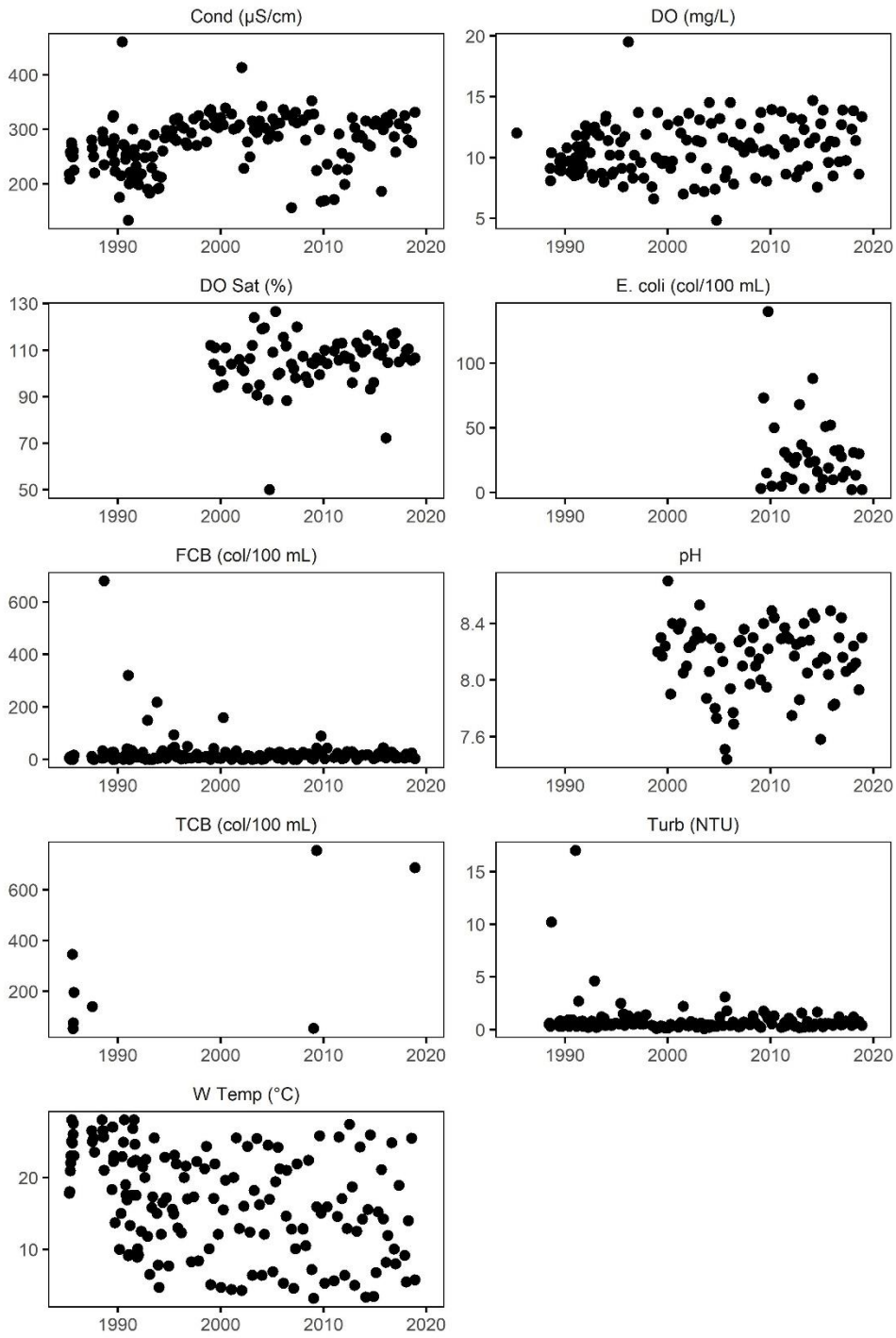


Figure E3.27.2 Bacterial indicator and physicochemical variables (1985-2019) at BUFT15.

A3.27.2 Trend analysis results (2000 - 2019): Narrative summaries

- NO_x-N trend analysis results required weight of evidence interpretation of trend analysis results and suggested that NO_x-N concentrations are likely increasing by 3 – 5% annually ($p<0.10$; **Figure E3.27.3-5A**). Though significant, results of SKT were statistically weaker than the other tests, especially compared to LR, likely reflecting known seasonal variability in NO_x-N and that sampling may not have occurred evenly across seasons.

- FCB trend analysis required weight of evidence interpretation and suggested that FCB concentrations are likely increasing by 4 – 6% annually (SKT $p<0.10$; **Figure E3.27.3-5B**). Results of LR and MK suggested no change ($p\geq0.10$), but differing results between MK and SKT suggests that seasonality is a factor for FCB concentrations and that sampling was uneven across seasons.

- Conductivity trend analysis results required weight of evidence interpretation of trend analysis results suggested that conductivity is likely not changing (LR and SKT $p\geq0.10$; **Figure E3.27.3-5C**). Though MK results were suggested a decrease ($p<0.10$), differing results between MK and SKT suggest that seasonality is a factor for conductivity and that sampling was uneven across seasons.

- DO trend analysis results required weight of evidence interpretation of trend analysis results suggested that DO levels are likely increasing by 0.4 – 0.7% annually (**Figure E3.27.3-5D & E**). Results of SKT on DO concentration and of MK and SKT on % saturation suggested a likely increase ($p<0.10$), while the results of the remaining tests suggested no change ($p\geq0.10$). Differences between results likely reflect known sizeable seasonable variability in DO concentrations due to temperature-dependent gas solubility. Therefore, results of SKT on DO concentration and all analyses on % saturation can be considered most reliable.

- Stream pH is likely not changing ($p\geq0.10$; **Figure E3.27.3-5F**).

- Turbidity is likely not changing ($p\geq0.10$; **Figure E3.27.3-5G**).

- Water temperature is likely not changing ($p\geq0.10$; **Figure E3.27.3-5H**).

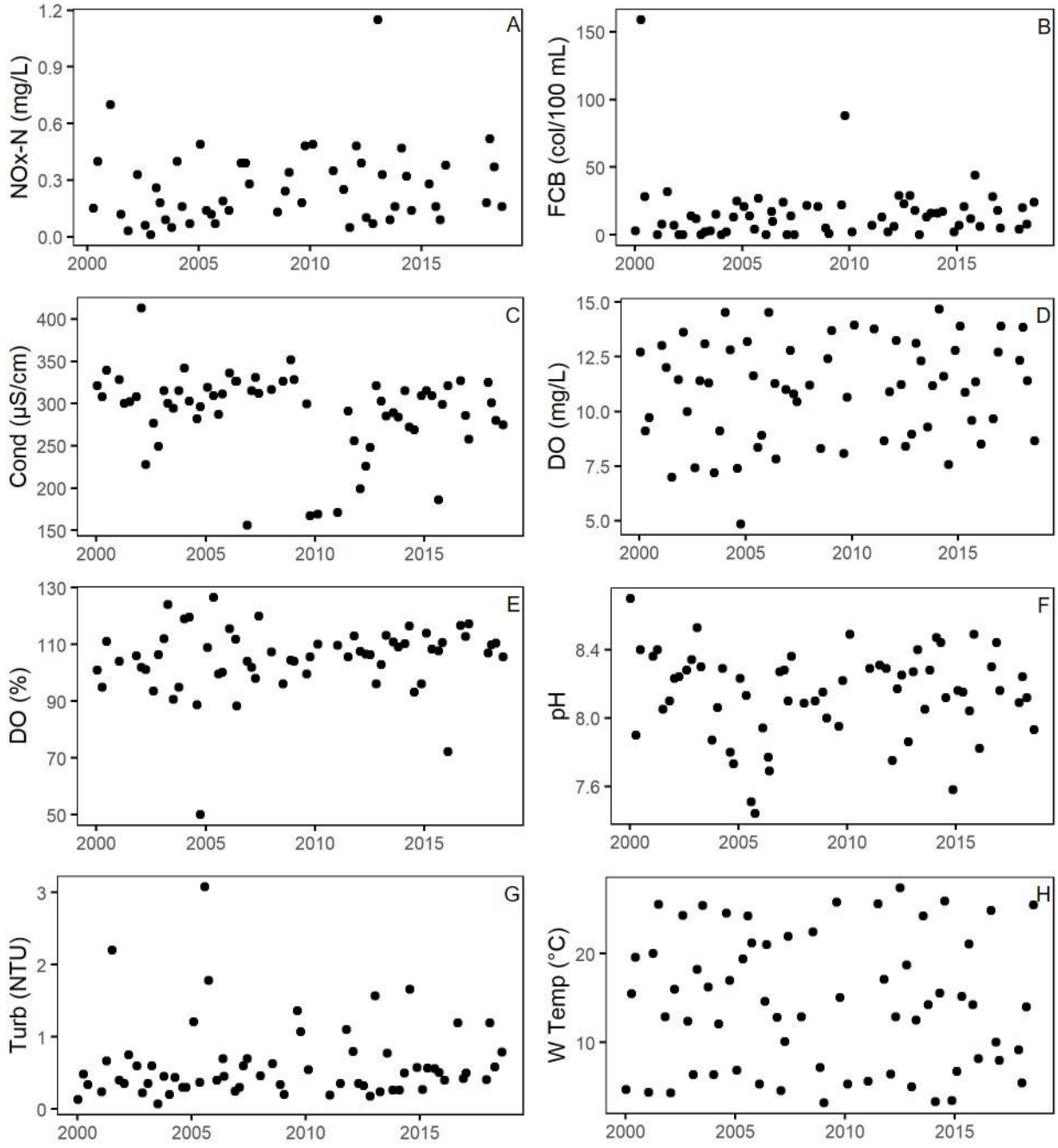


Figure E3.27.3 Water quality variable values shown through time (2000 – 2019) at BUFT15. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections.

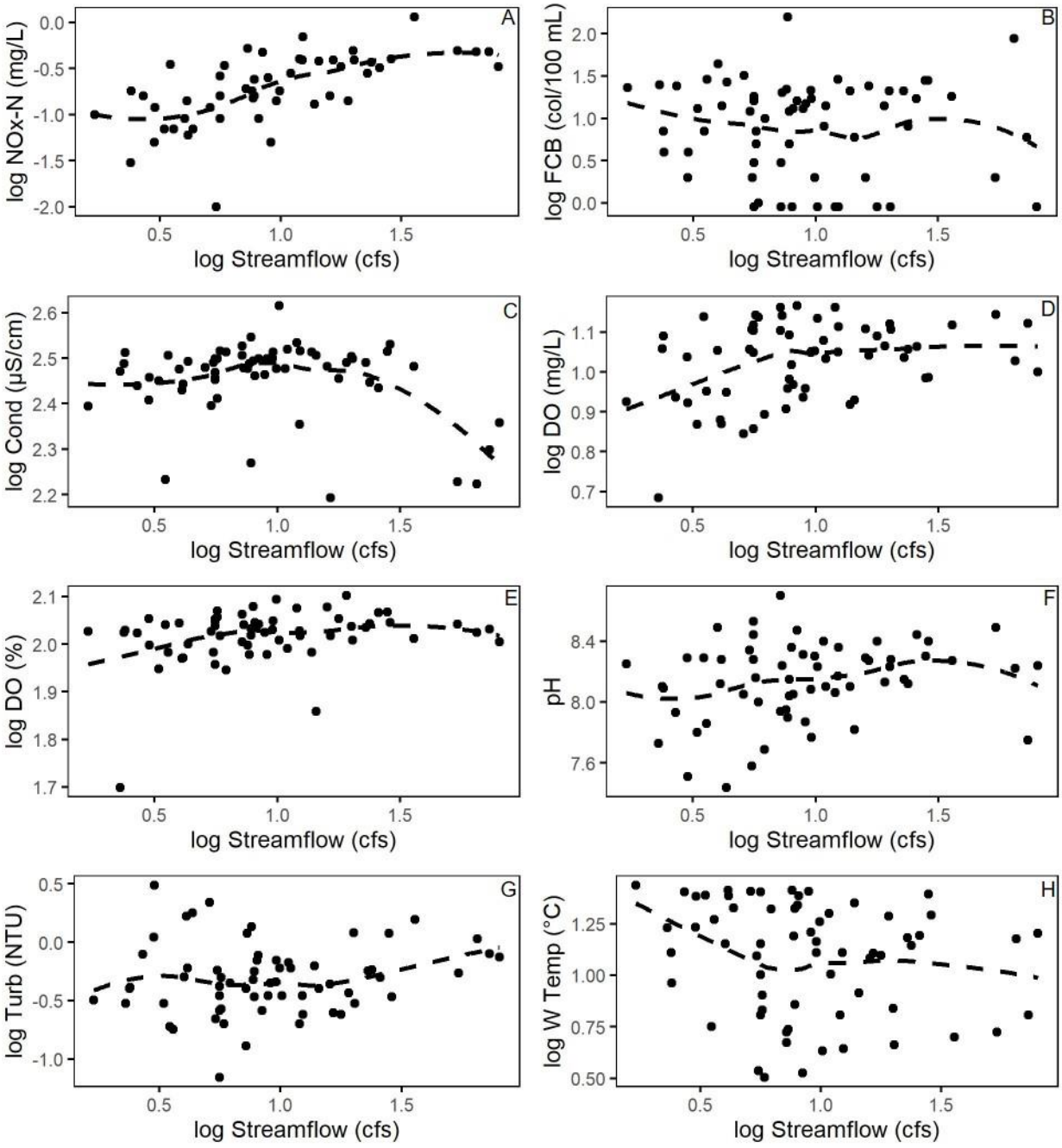


Figure E3.27.4 Water quality variable values (2000 – 2019) shown in relation to streamflow at BUFT15. A) nitrate+ nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation between each variable and streamflow.

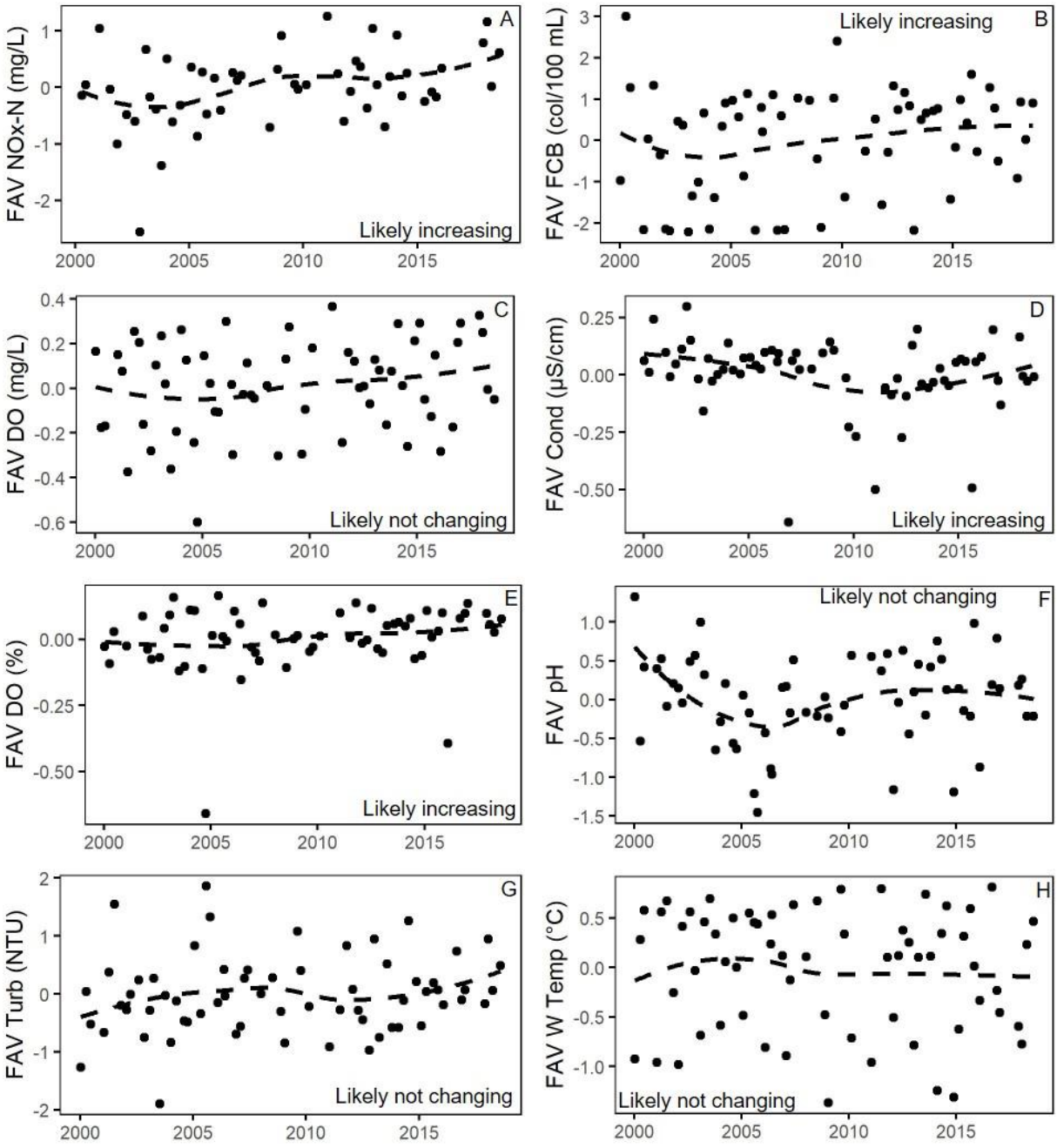


Figure E3.27.5 Flow-adjusted values (FAV) of water quality variables shown through time (2000 – 2019) for BUFT15. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation with time. Narrative results summarize statistical significance and trend direction across trend analyses. See **Table A2.2.1** for full results.

A3.28 BUFT16 – Rush Creek above Confluence with Buffalo River at Rush Access

A3.28.1 Site and available data description

Rush Creek above Confluence with Buffalo River at Rush Access (BUFT16; 36.1244, -92.5492) is a long-term water quality monitoring site at BUFF. BUFF staff have measured streamflow and in situ physiochemistry and collected water samples for analysis of bacteriological indicators and nutrient concentrations at the site since 1985 (**Figure E3.28.1-2**). Instantaneous streamflow estimates collected by BUFF staff were used in the flow-adjustment procedure to generate FAVs of water quality variables for trend analysis.

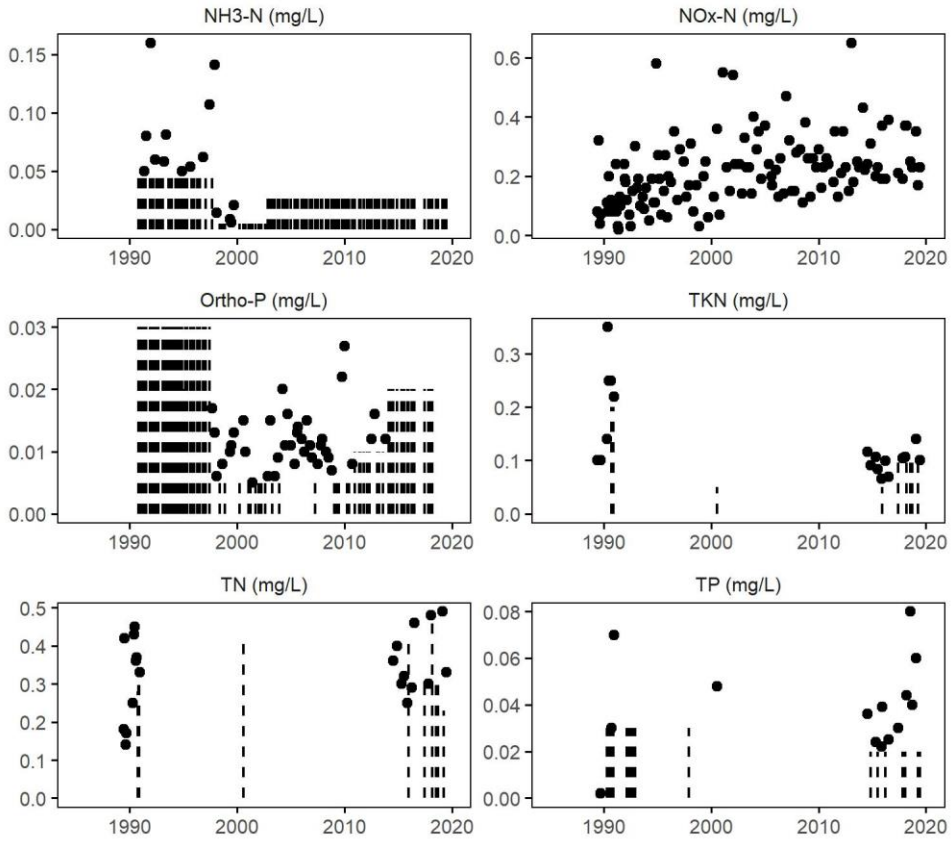


Figure E3.28.1 Nutrient variables (1985-2019) at BUFT16. Dashed lines indicate a non-detection, or that concentration could only be estimated within a range (i.e., between 0 and the relevant reporting limit).

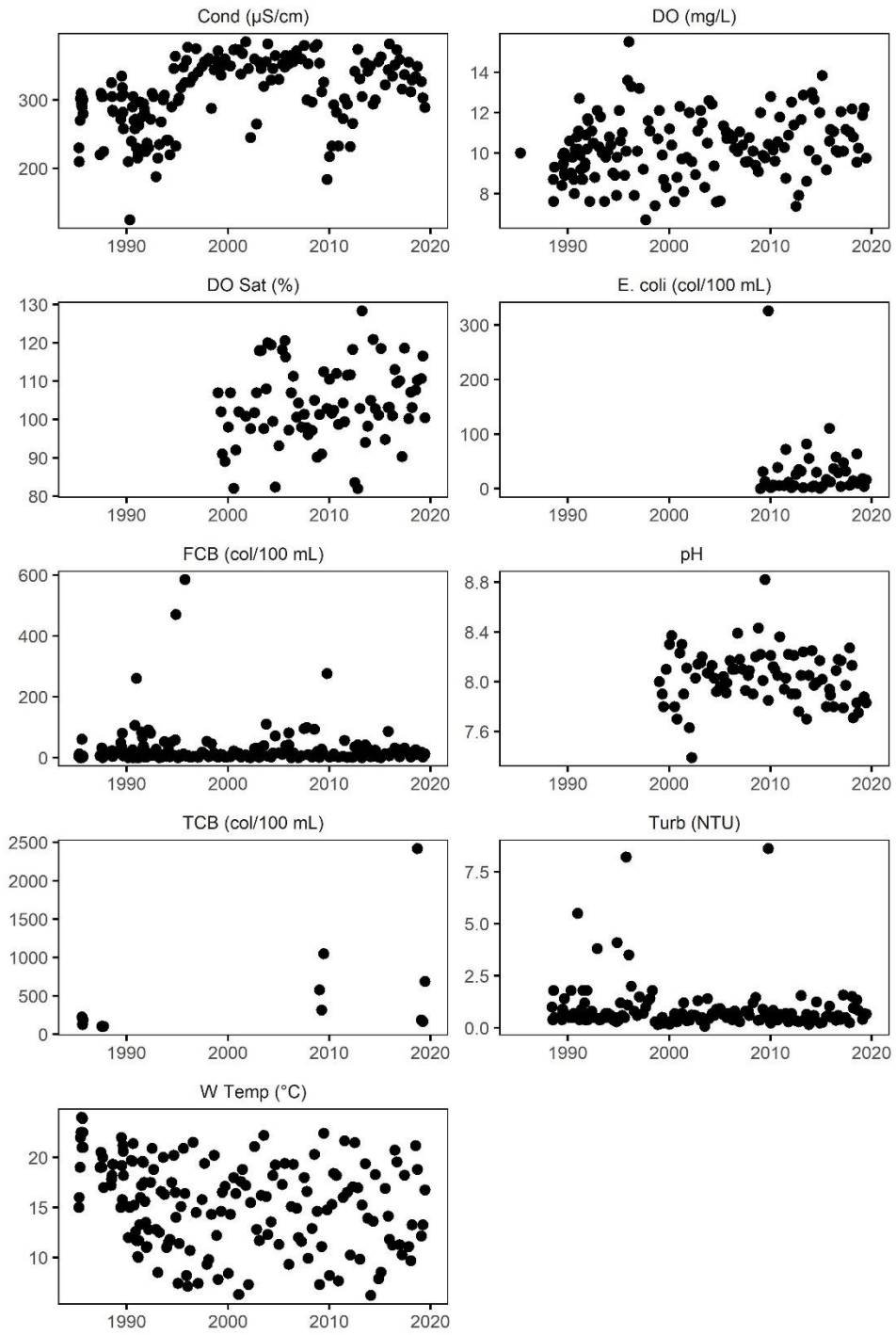


Figure E3.28.2 Bacterial indicator and physicochemical variables (1985-2019) at BUFT16.

A3.28.2 Trend analysis results (2000 - 2019): Narrative summaries

- NO_x-N concentrations are likely not changing ($p \geq 0.10$; **Figure E3.28.3-5A**).
- FCB concentrations are likely not changing ($p \geq 0.10$; **Figure E3.28.3-5B**).
- Conductivity is likely not changing ($p \geq 0.10$; **Figure E3.28.3-5C**).
- DO trend analysis results required weight of evidence interpretation and suggested that DO levels are likely increasing by 0.3 – 0.4% annually (**Figure E3.28.3-5D & E**). Results of SKT on DO concentration and % saturation both suggested a likely ($p < 0.10$) to very likely increase ($p < 0.05$), but results of the remaining analyses suggested no change ($p \geq 0.10$). Differences between results likely reflect known sizeable seasonable variability in DO concentrations due to temperature-dependent gas solubility. Therefore, results of SKT on DO concentration and all analyses on % saturation can be considered most reliable.
- Stream pH trend analysis results required weight of evidence interpretation and suggested that pH is likely not changing (LR and SKT $p \geq 0.10$; **Figure E3.28.3-5F**). Though MK results suggested a likely decrease ($p < 0.10$), differing results between MK and SKT suggest that seasonality is a factor for pH and that sampling may not have occurred evenly across seasons.
- Turbidity is likely not changing ($p \geq 0.10$; **Figure E3.28.3-5G**).
- Water temperature is likely not changing ($p \geq 0.10$; **Figure E3.28.3-5H**).

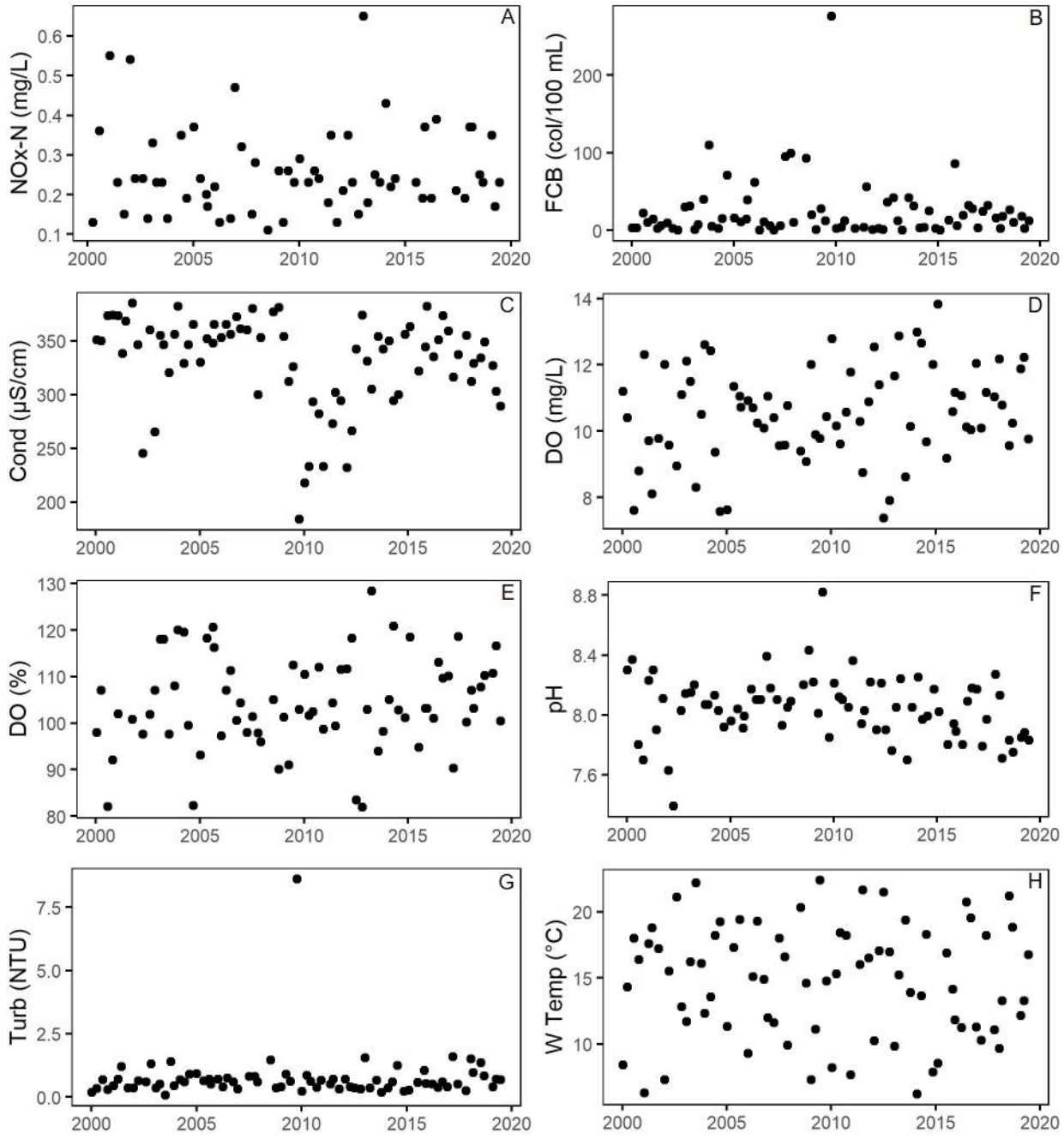


Figure E3.28.3 Water quality variable values shown through time (2000 – 2019) at BUFT16. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections.

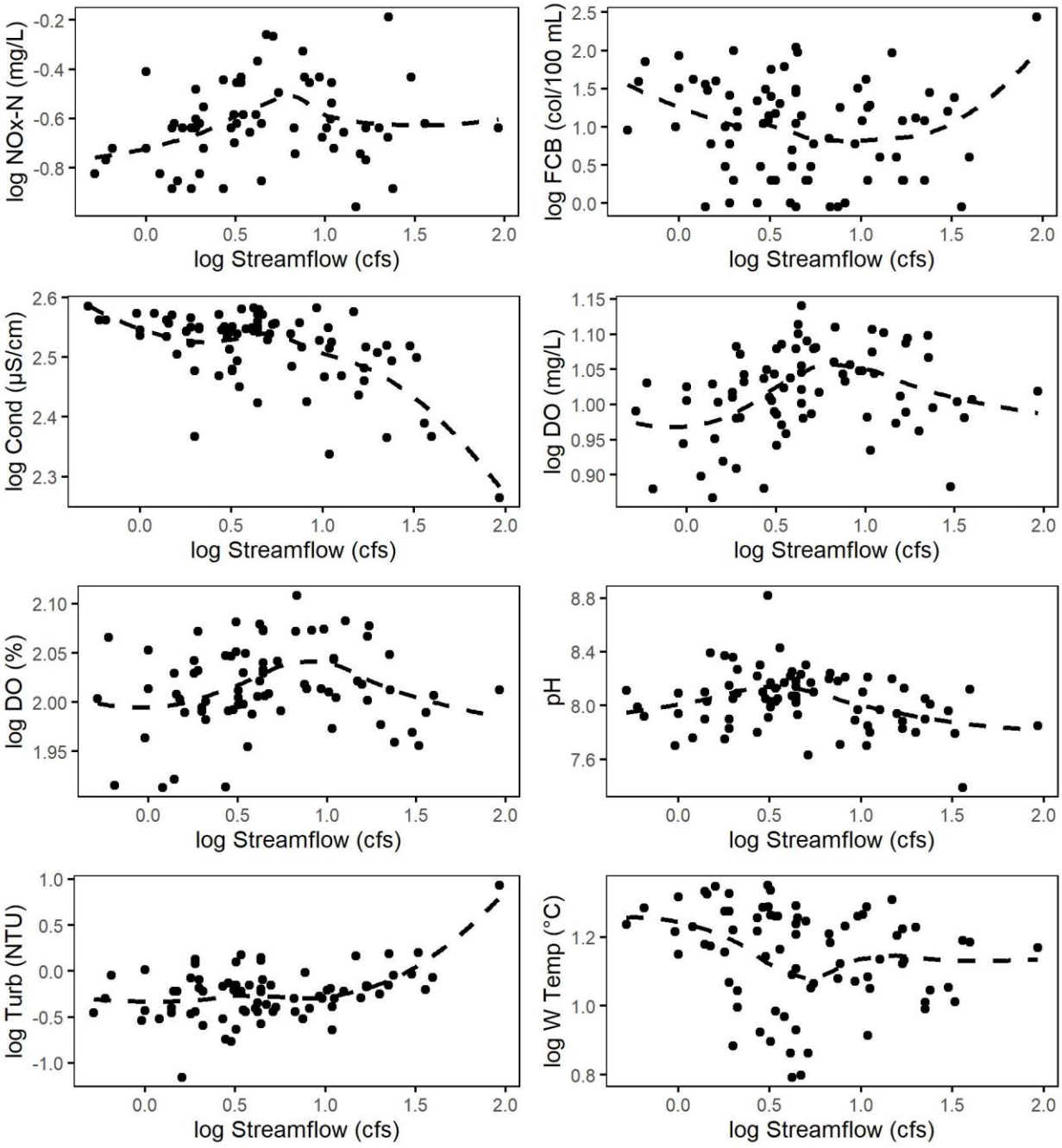


Figure E3.28.4 Water quality variable values (2000 – 2019) shown in relation to streamflow at BUFT16. A) nitrate+ nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation between each variable and streamflow.

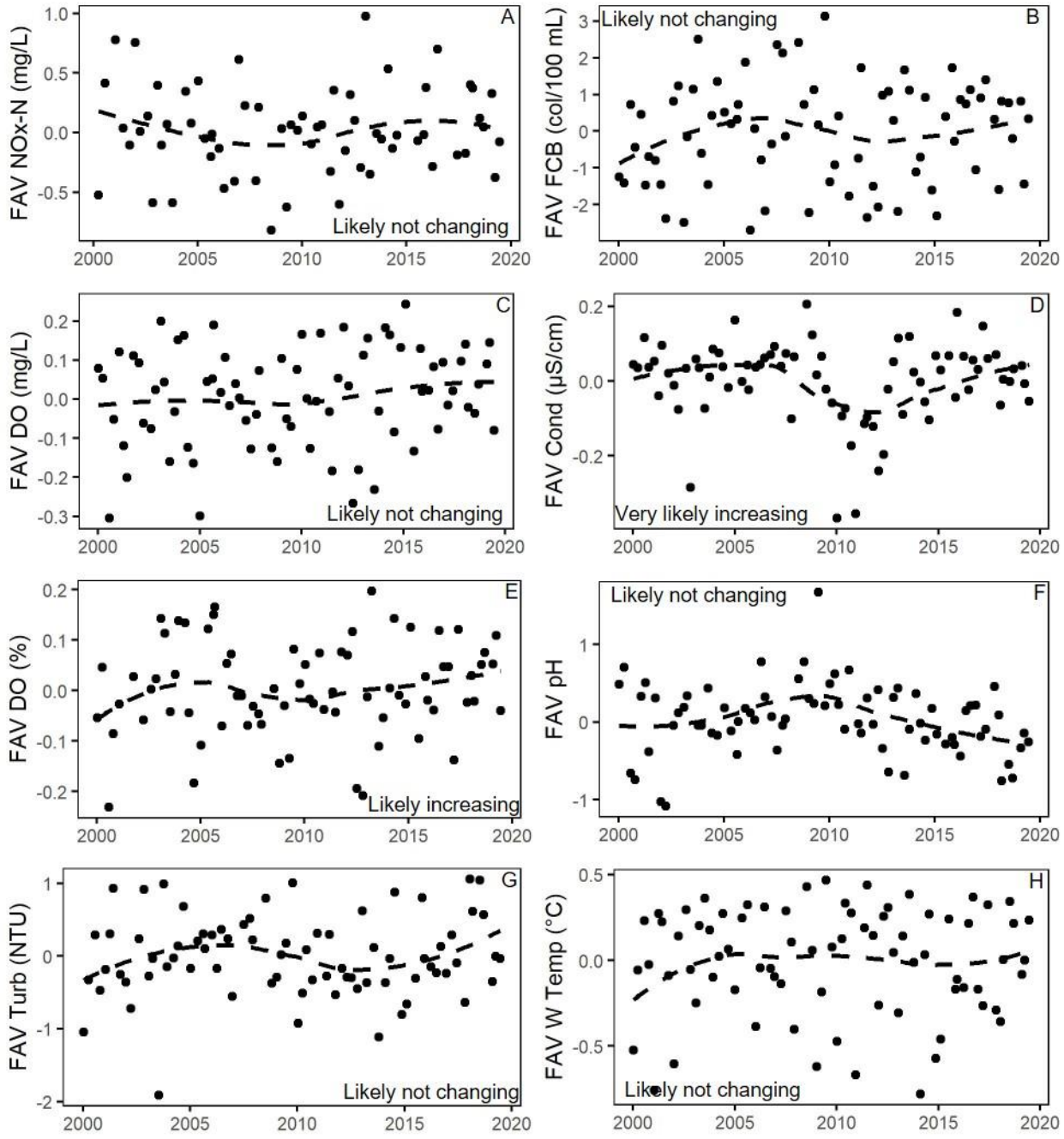


Figure E3.28.5 Flow-adjusted values (FAV) of water quality variables shown through time (2000 – 2019) for BUFT16. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation with time. Narrative results summarize statistical significance and trend direction across trend analyses. See **Table A2.2.1** for full results.

A3.29 BUFT17– Clabber Creek above Confluence with Buffalo River

A3.29.1 Site and available data description

Clabber Creek above Confluence with Buffalo River (BUFT17; 36.1292, -92.5458) is a long-term water quality monitoring site at BUFF. BUFF staff have measured streamflow and in situ physiochemistry and collected water samples for analysis of bacteriological indicators and nutrient concentrations at the site since 1985 (**Figure E3.29.1-2**). Instantaneous streamflow estimates collected by BUFF staff were used in the flow-adjustment procedure to generate FAVs of water quality variables for trend analysis.

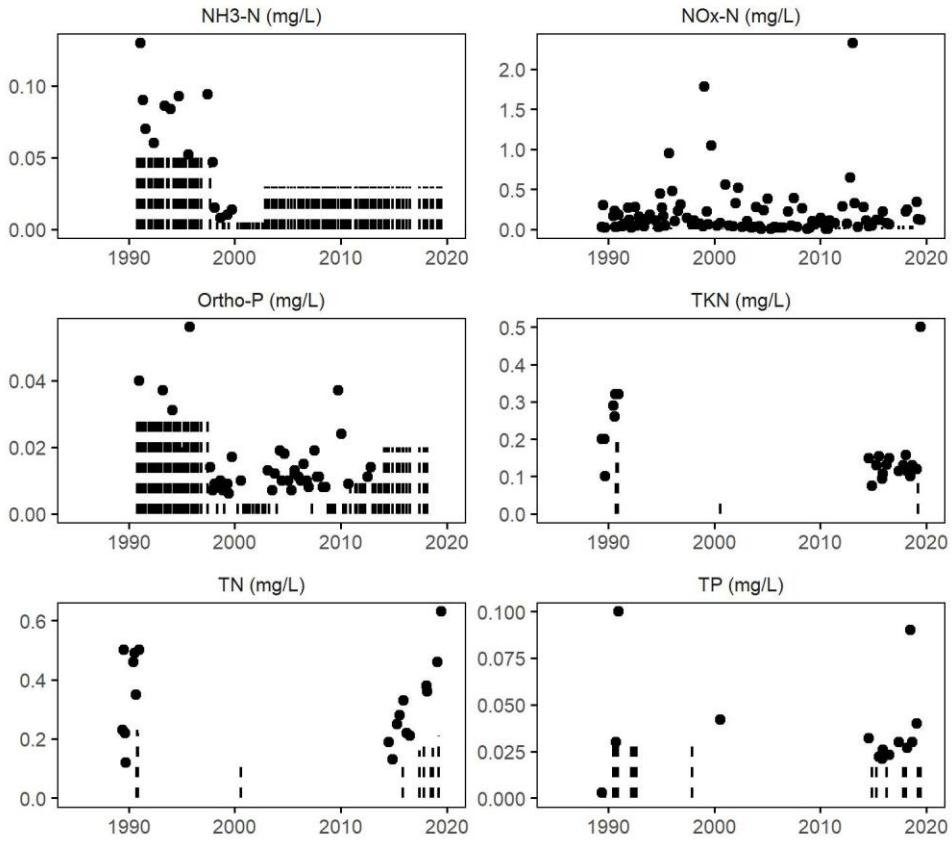


Figure E3.29.1 Nutrient variables (1985-2019) at BUFT17. Dashed lines indicate a non-detection, or that concentration could only be estimated within a range (i.e., between 0 and the relevant reporting limit).

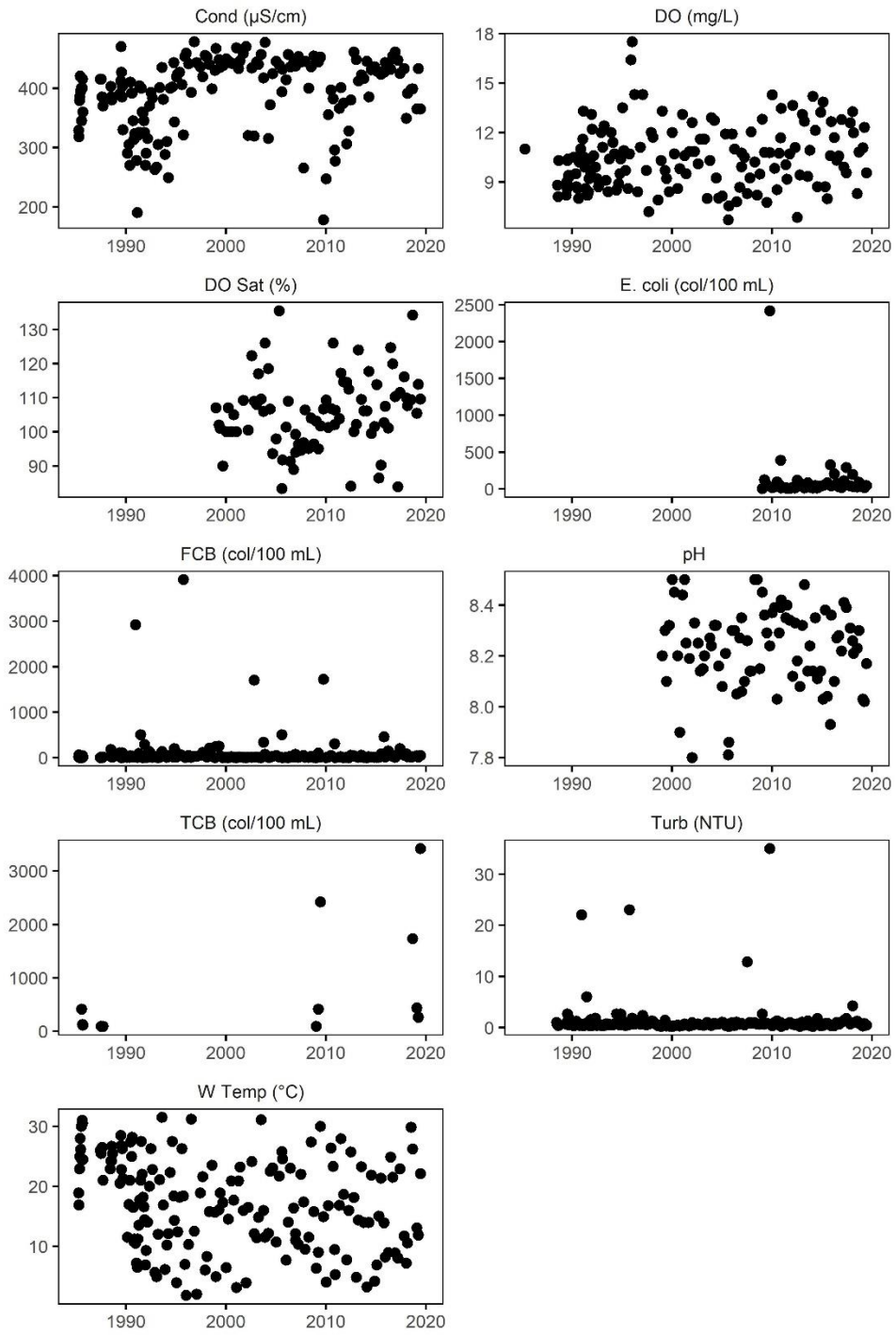


Figure E3.29.2 Bacterial indicator and physicochemical variables (1985-2019) at BUFT17.

A3.29.2 Trend analysis results (2000 - 2019): Narrative summaries

- NO_x-N concentrations are likely not changing ($p \geq 0.10$; **Figure E3.29.3-5A**).
- FCB concentrations are likely (SKT $p < 0.10$) to very likely (LR and MK $p < 0.05$) increasing by 5 – 8% annually (**Figure E3.29.3-5B**).
- Conductivity is likely not changing ($p \geq 0.10$; **Figure E3.29.3-5C**).
- Do trend analysis results required weight of evidence interpretation and suggested that DO levels are likely increasing by 0.3 – 0.4% annually (**Figure E3.29.3-5D & E).** Results of SKT on DO concentration and of MK and SKT on % saturation both suggested a likely ($p < 0.10$) to very likely increase ($p < 0.05$), though results of the remaining tests were not significant ($p \geq 0.10$). Differences between results likely reflect known sizeable seasonable variability in DO concentrations due to temperature-dependent gas solubility. Therefore, results of SKT on DO concentration and all analyses on % saturation can be considered most reliable.
- Stream pH is likely not changing ($p \geq 0.10$; **Figure E3.29.3-5F**).
- Turbidity is likely (LR $p < 0.10$) to very likely (MK and SKT $p < 0.05$) increasing by 2 – 4% annually (**Figure E3.29.3-5G**).
- Water temperature is likely not changing ($p \geq 0.10$; **Figure E3.29.3-5H**).

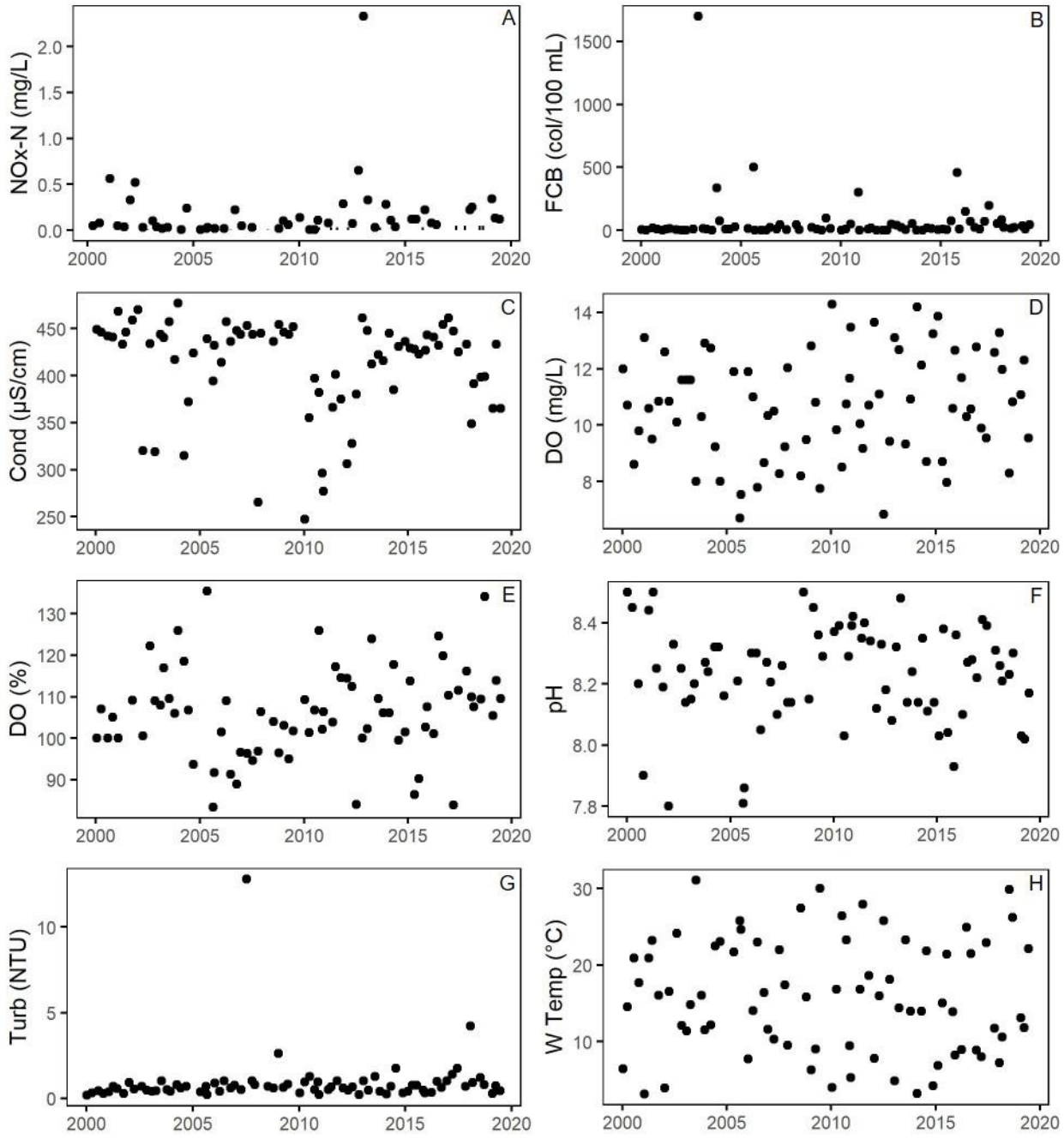


Figure E3.29.3 Water quality variable values shown through time (2000 – 2019) at BUFT17. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections.

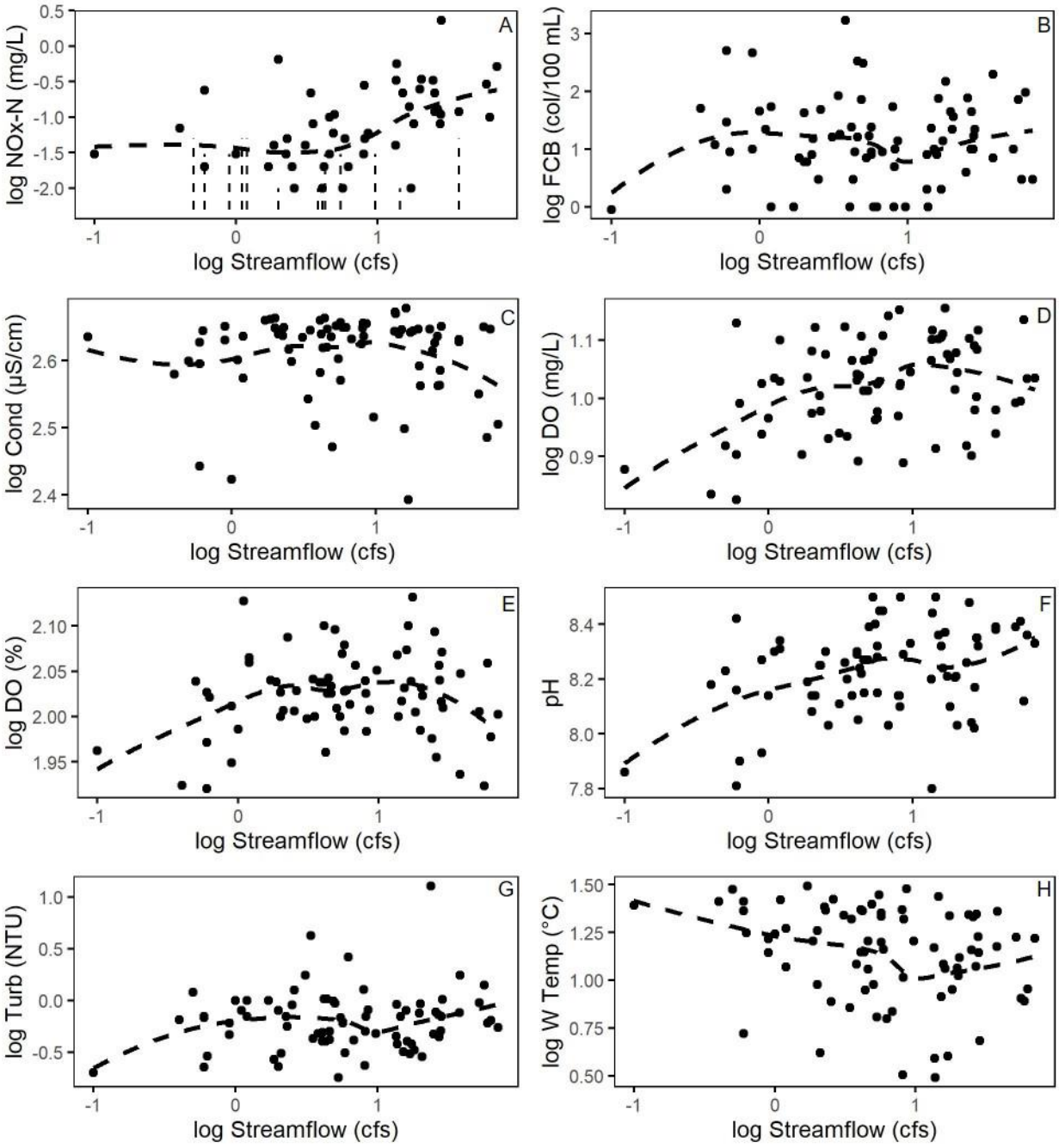


Figure E3.29.4 Water quality variable values (2000 – 2019) shown in relation to streamflow at BUFT17. A) nitrate+ nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation between each variable and streamflow.

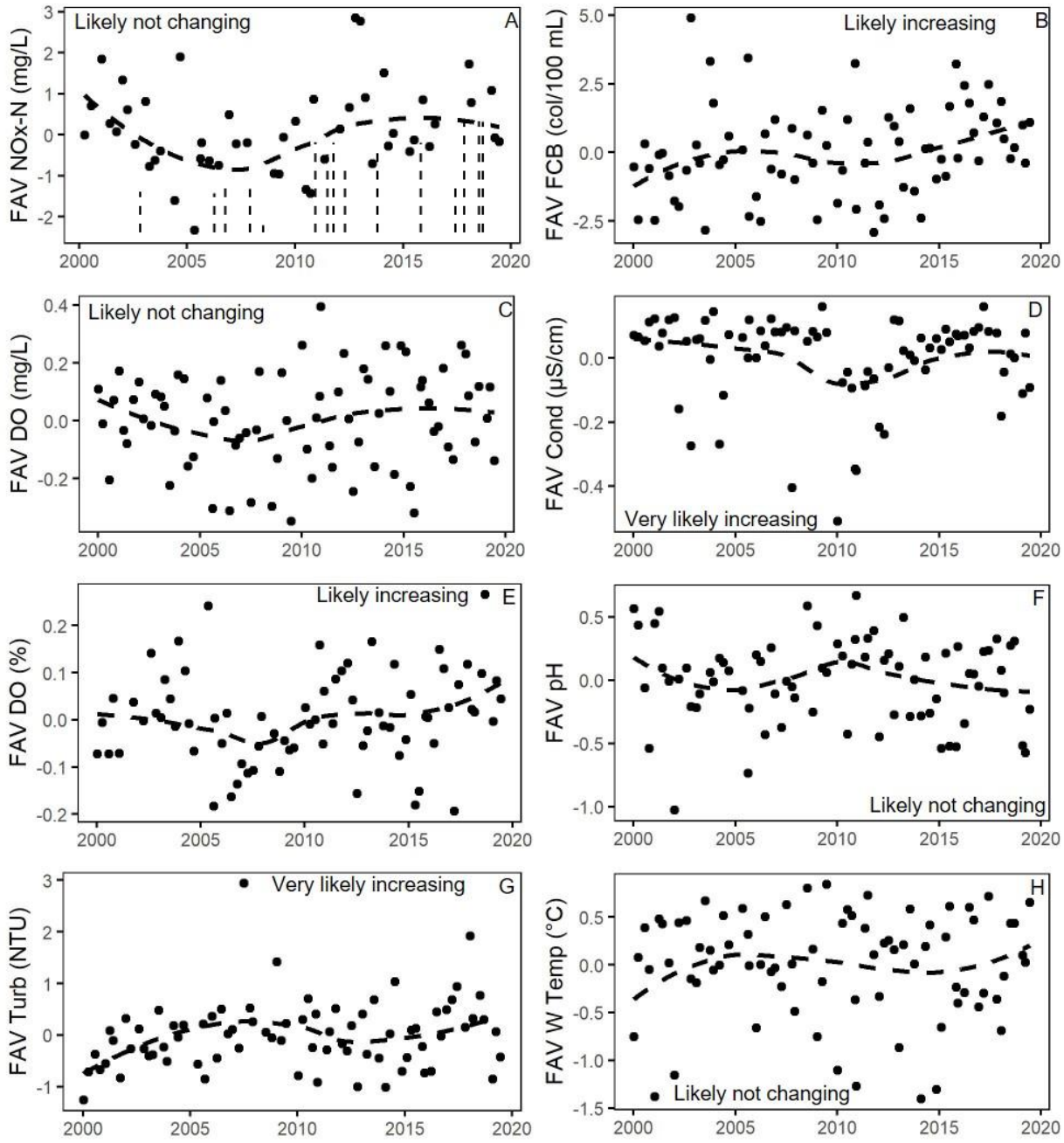


Figure E3.29.5 Flow-adjusted values (FAV) of water quality variables shown through time (2000 – 2019) for BUFT17. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation with time. Narrative results summarize statistical significance and trend direction across trend analyses. See **Table A2.2.1** for full results.

A3.30 BUFT18 – Big Creek in the Lower Wilderness above Confluence

A3.30.1 Site and available data description

Big Creek in the Lower Wilderness above Confluence (BUFT18; 36.0792, -92.4728) with Buffalo River is a long-term water quality monitoring site at the BUFF. BUFF staff have measured streamflow and in situ physiochemistry and collected water samples for analysis of bacteriological indicators and nutrient concentrations at the site since 1985 (**Figure E3.30.1-2**). Instantaneous streamflow estimates collected by BUFF staff were used in the flow-adjustment procedure to generate FAVs of water quality variables for trend analysis.

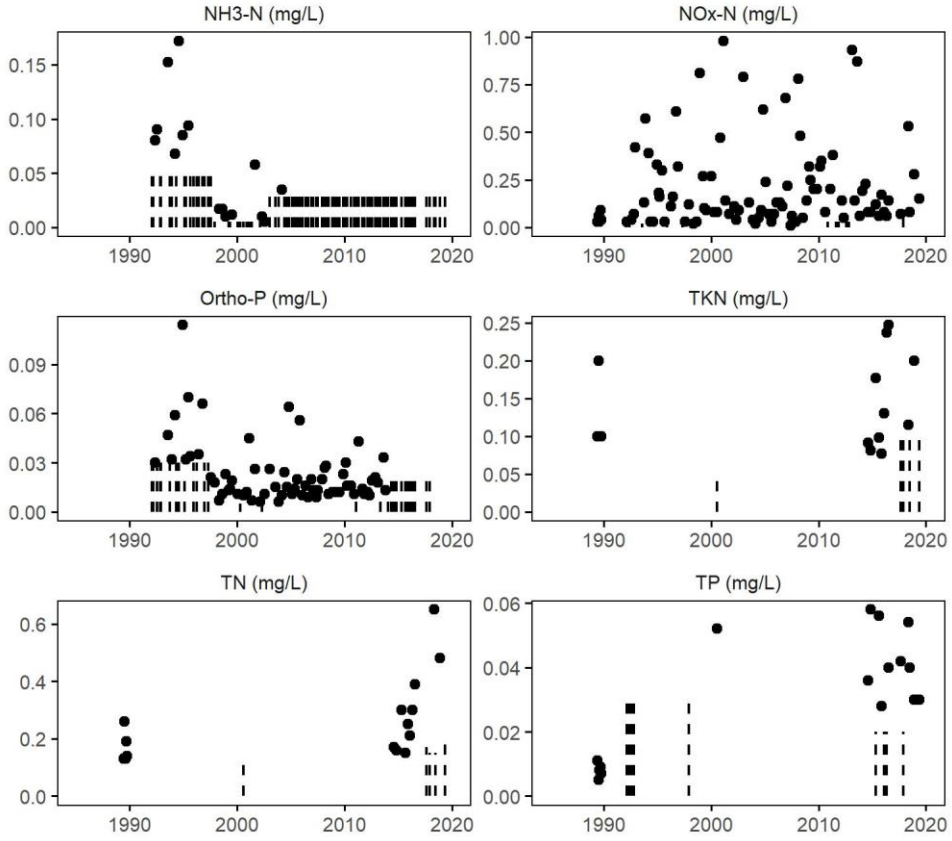


Figure E3.30.1 Nutrient variables (1985-2019) at BUFT18. Dashed lines indicate a non-detection, or that concentration could only be estimated within a range (i.e., between 0 and the relevant reporting limit).

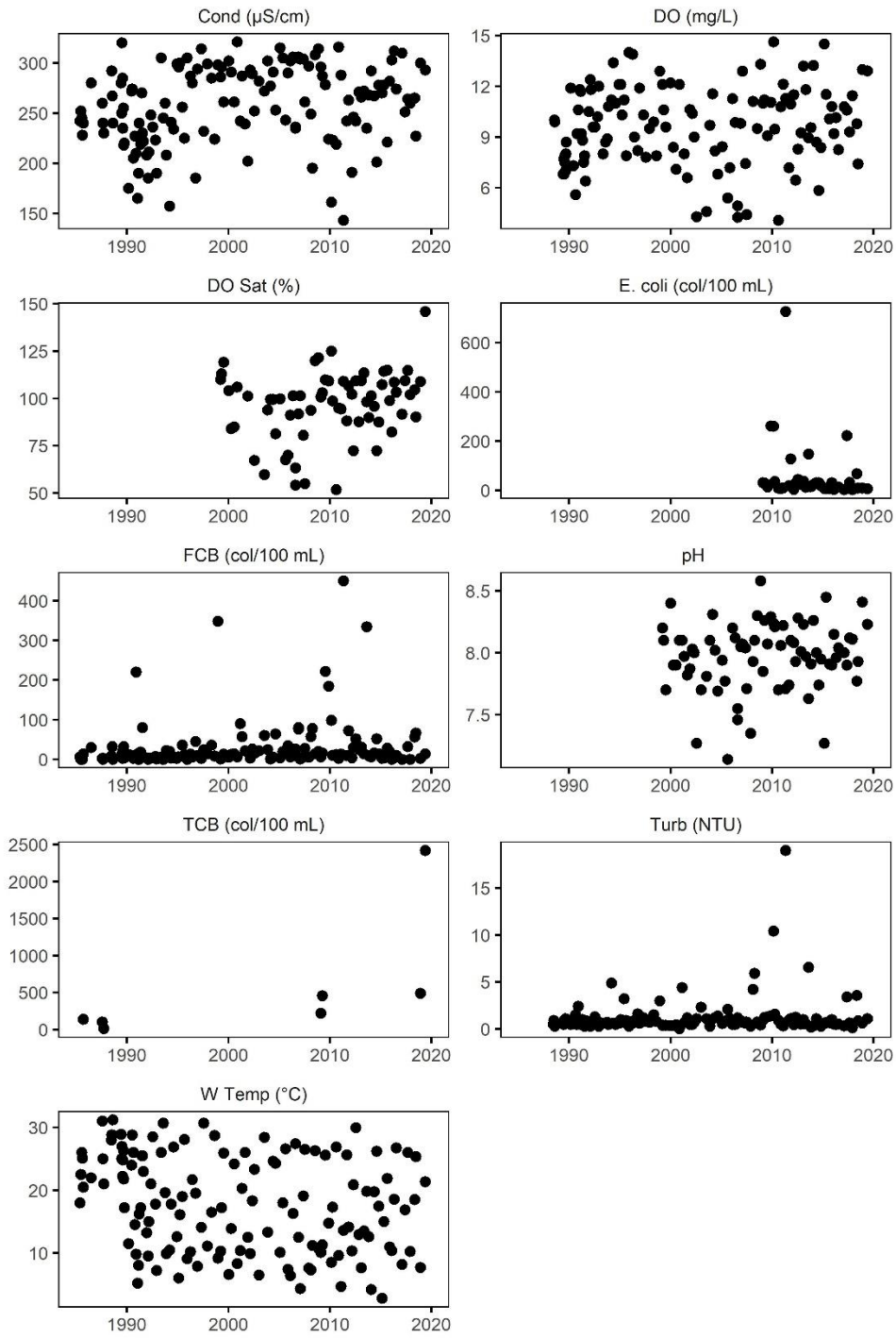


Figure E3.30.2 Bacterial indicator and physicochemical variables (1985-2019) at BUFT18.

A3.30.2 Trend analysis results (2000 - 2019): Narrative summaries

- NO_x-N concentrations are likely not changing ($p \geq 0.10$; **Figure E3.30.3-5A**).
- FCB concentrations are likely not changing ($p \geq 0.10$; **Figure E3.30.3-5B**).
- Conductivity trend analysis results required weight of evidence interpretation and suggested that conductivity is likely not changing (LR and SKT $p \geq 0.10$;**Figure E3.30.3-5C**). While MK results suggested a likely decrease ($p < 0.10$), differing results between MK and SKT suggests that seasonality is a factor for conductivity and that sampling may not have occurred evenly across seasons.
- DO trend analysis results required weight of evidence interpretation and suggested that DO levels are likely increasing by approximately 1% annually (**Figure E3.30.3-5D & E**). Results of SKT and LR on DO concentration and of MK and SKT on % saturation all suggested a likely ($p < 0.10$) to very likely increase ($p < 0.05$), though results of the remaining tests suggested no change ($p \geq 0.10$). Differences between results likely reflect known sizeable seasonable variability in DO concentrations due to temperature-dependent gas solubility. Therefore, results of SKT on DO concentration and all analyses on % saturation can be considered most reliable.
- Stream pH is likely not changing ($p \geq 0.10$; **Figure E3.30.3-5F**).
- Turbidity is likely not changing ($p \geq 0.10$; **Figure E3.30.3-5G**).
- Water temperature is likely not changing ($p \geq 0.10$; **Figure E3.30.3-5H**).

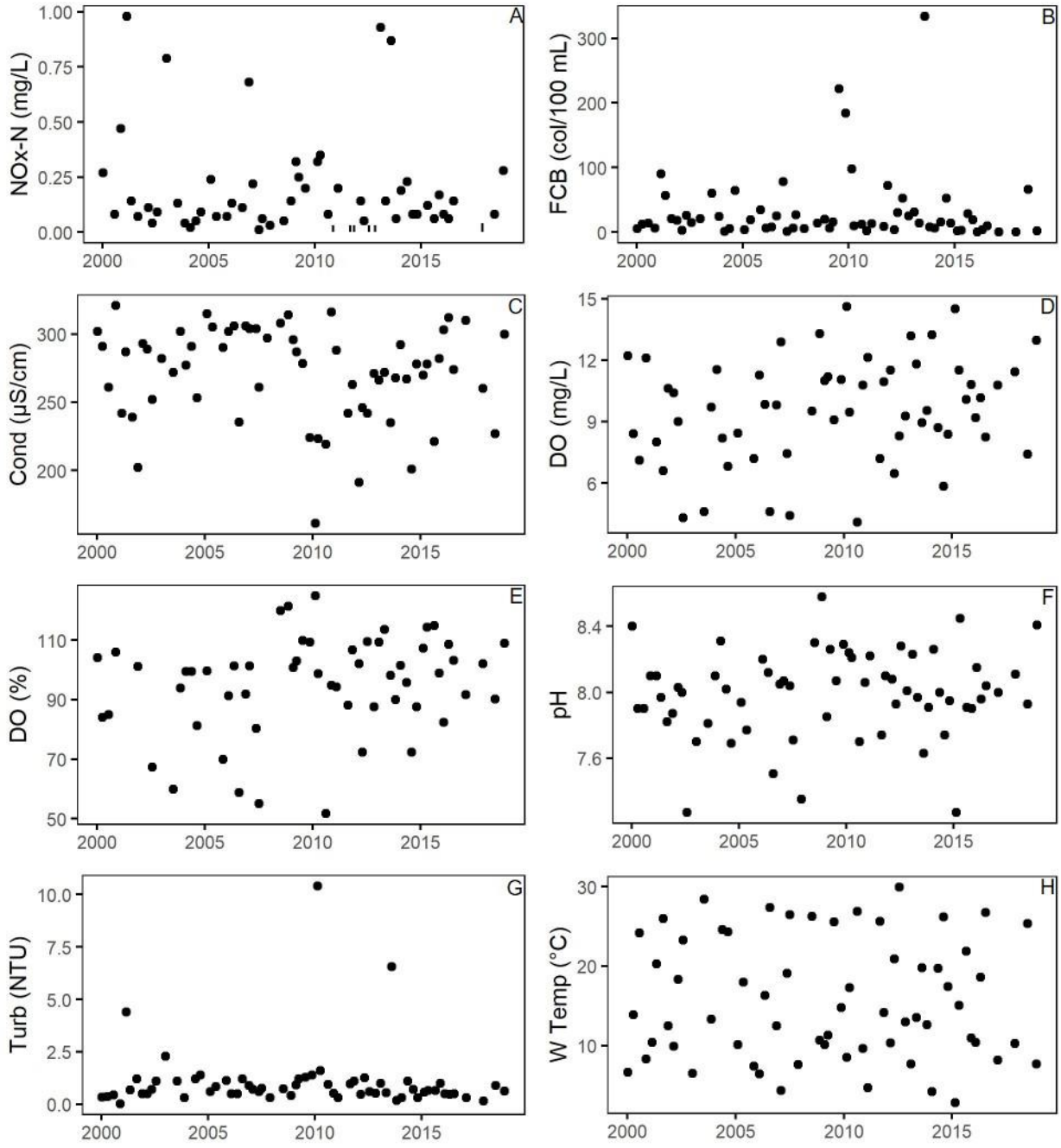


Figure E3.30.3 Water quality variable values shown through time (2000 – 2019) at BUFT18. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections.

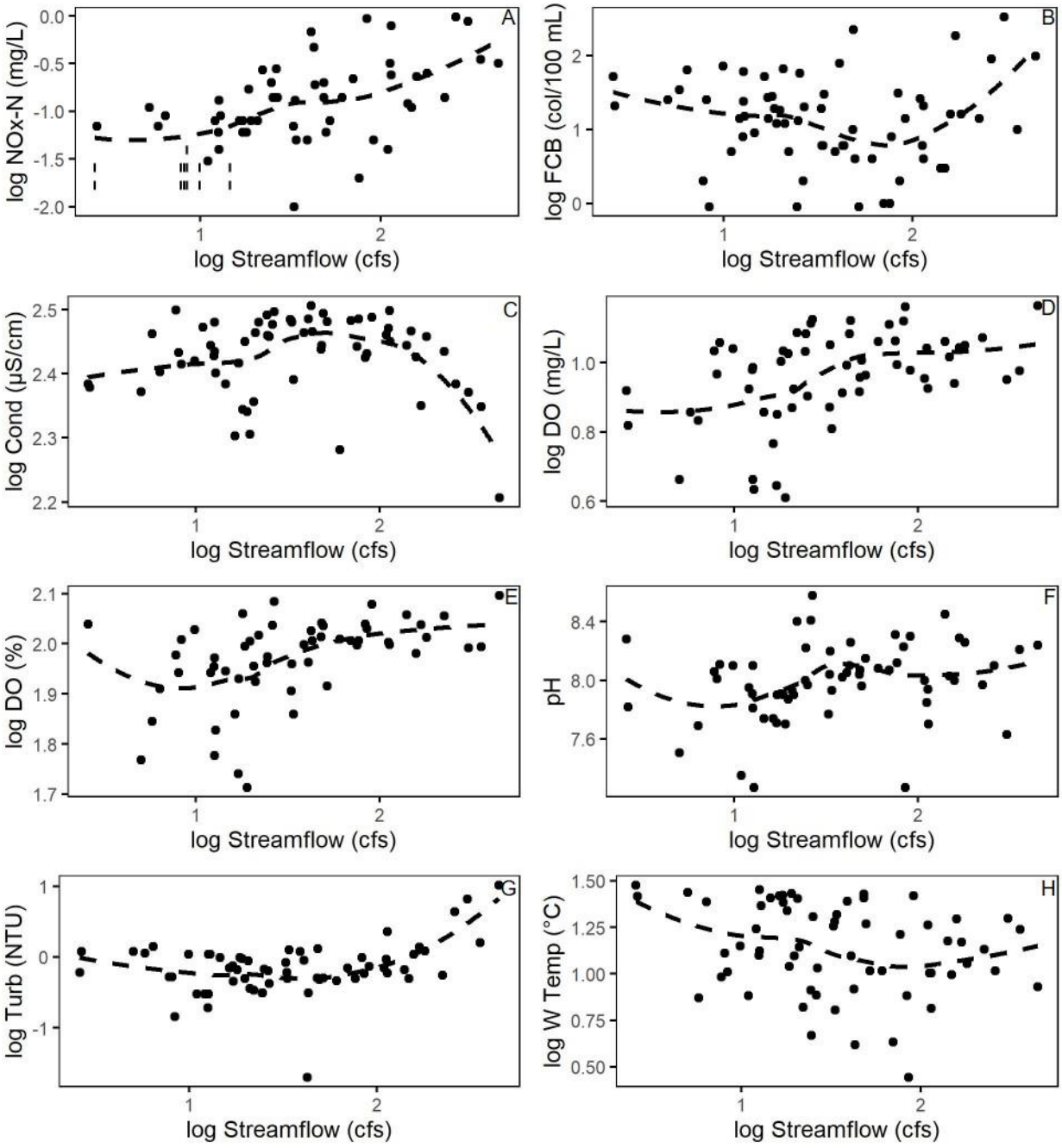


Figure E3.30.4 Water quality variable values (2000 – 2019) shown in relation to streamflow at BUFT18. A) nitrate+ nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation between each variable and streamflow.

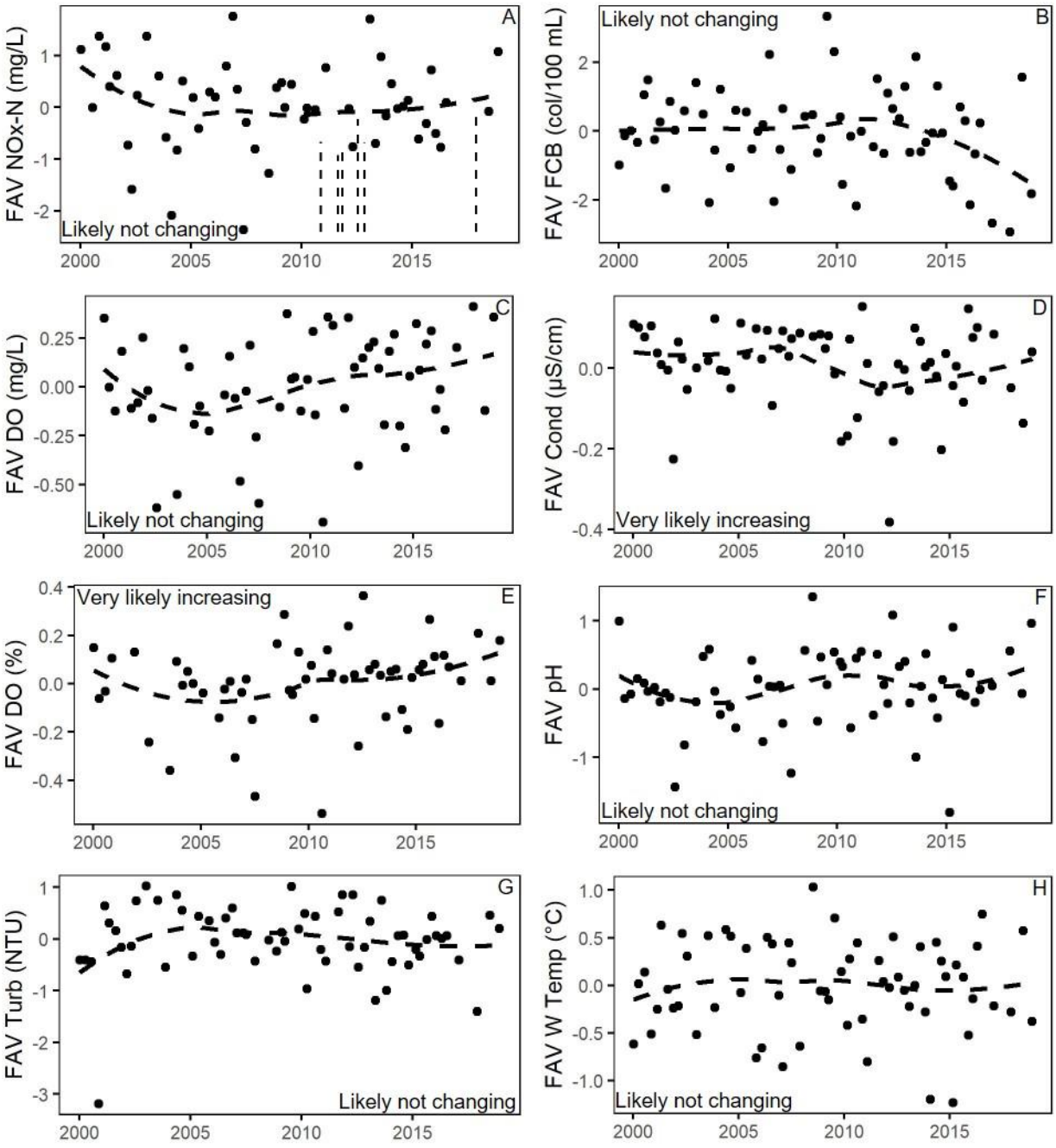


Figure E3.30.5 Flow-adjusted values (FAV) of water quality variables shown through time (2000 – 2019) for BUFT18. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation with time. Narrative results summarize statistical significance and trend direction across trend analyses. See **Table A2.2.1** for full results.

A3.31 BUFT23 – Middle Creek above Confluence with Buffalo River in Lower Wilderness

A3.31.1 Site and available data description

Middle Creek above Confluence with Buffalo River in Lower Wilderness (BUFT23; 36.0856, -92.4283) is a long-term water quality monitoring site at BUFF. BUFF staff have measured streamflow and in situ physiochemistry and collected water samples for analysis of bacteriological indicators and nutrient concentrations at the site since 1985 (**Figure E3.31.1-2**). Instantaneous streamflow estimates collected by BUFF staff were used in the flow-adjustment procedure to generate FAVs of water quality variables for trend analysis.

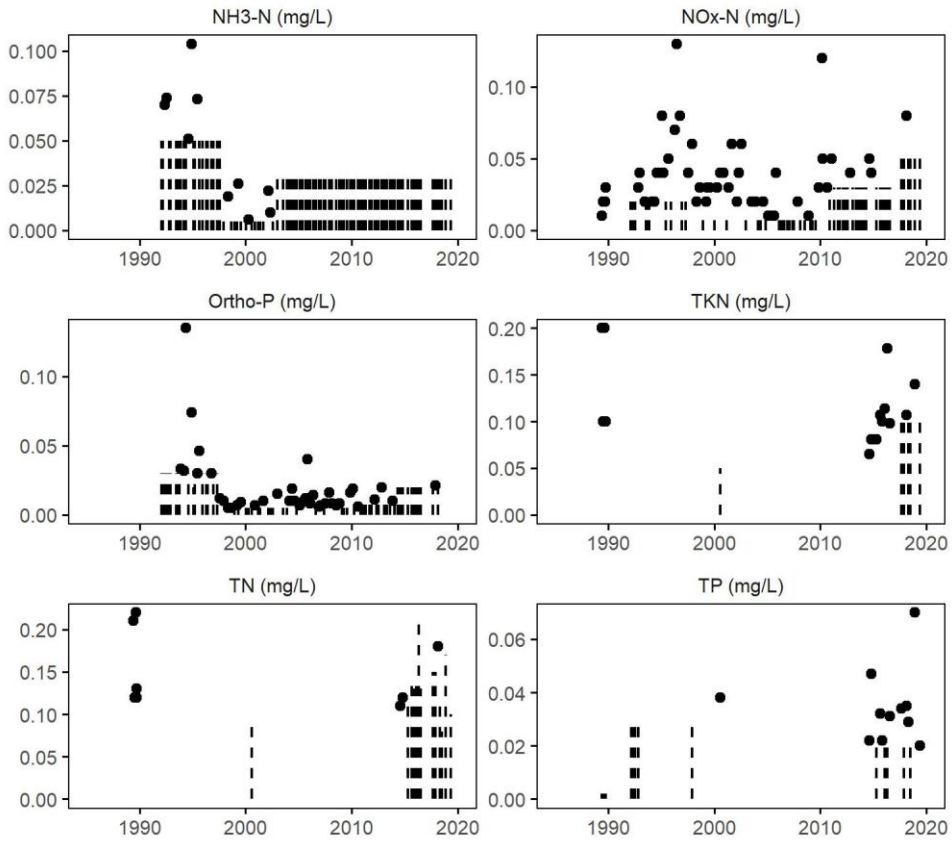


Figure E3.31.1 Nutrient variables (1985-2019) at BUFT23. Dashed lines indicate a non-detection, or that concentration could only be estimated within a range (i.e., between 0 and the relevant reporting limit).

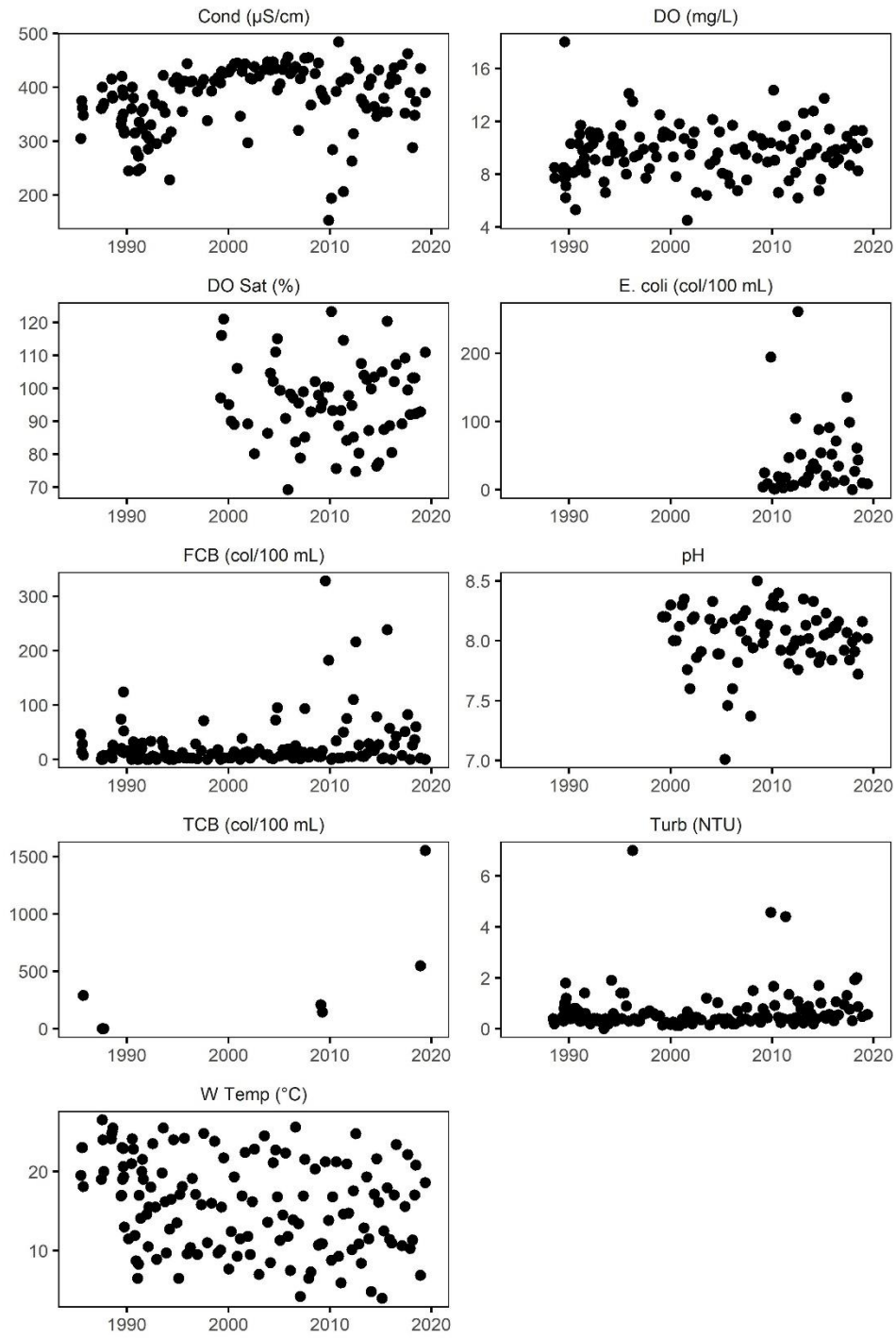


Figure E3.31.2 Bacterial indicator and physicochemical variables (1985-2019) at BUFT23.

A3.31.2 Trend analysis results (2000 - 2019): Narrative summaries

- NOx-N concentrations could not be analyzed at this site due non-detection frequency greater than 30% (**Figure E3.31.3-5A**).
- FCB concentrations are likely not changing ($p \geq 0.10$; **Figure E3.31.3-5B**).
- Conductivity trend analysis results required weight of evidence interpretation and suggested that conductivity is likely not changing (LR and SKT $p \geq 0.10$; **Figure E3.31.3-5C**). While MK results suggested a significant decrease ($p < 0.05$), differing results between MK and SKT suggested that seasonality is a factor for conductivity and that sampling may not have occurred evenly across seasons.
- DO levels are likely not changing ($p \geq 0.10$; **Figure E3.31.3-5D & E**).
- Stream pH is likely not changing ($p \geq 0.10$; **Figure E3.31.3-5F**).
- Turbidity is very likely increasing by 5% annually ($p < 0.05$; **Figure E3.31.3-5G**).
- Water temperature trend analysis results required weight of evidence interpretation and suggested that water temperature is likely decreasing by 0.9% annually (SKT $p < 0.10$; **Figure E3.31.3-5H**). Though LR and MK results suggested no change, SKT results can be considered most reliable due to known seasonal variability in water temperature. Differing results between MK and SKT suggest sampling has not occurred evenly across seasons.

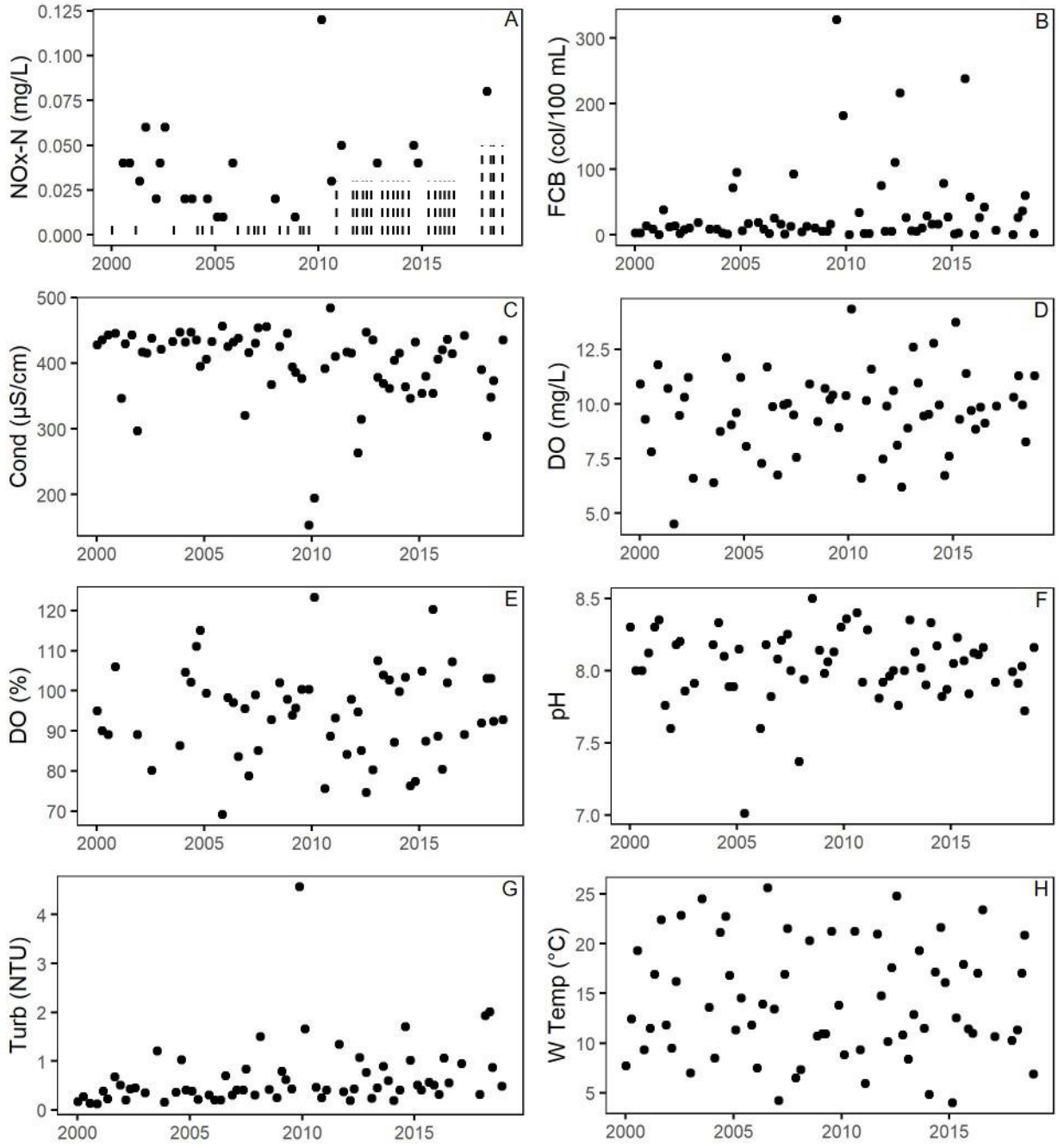


Figure E3.31.3 Water quality variable values shown through time (2000 – 2019) at BUFT23. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections.

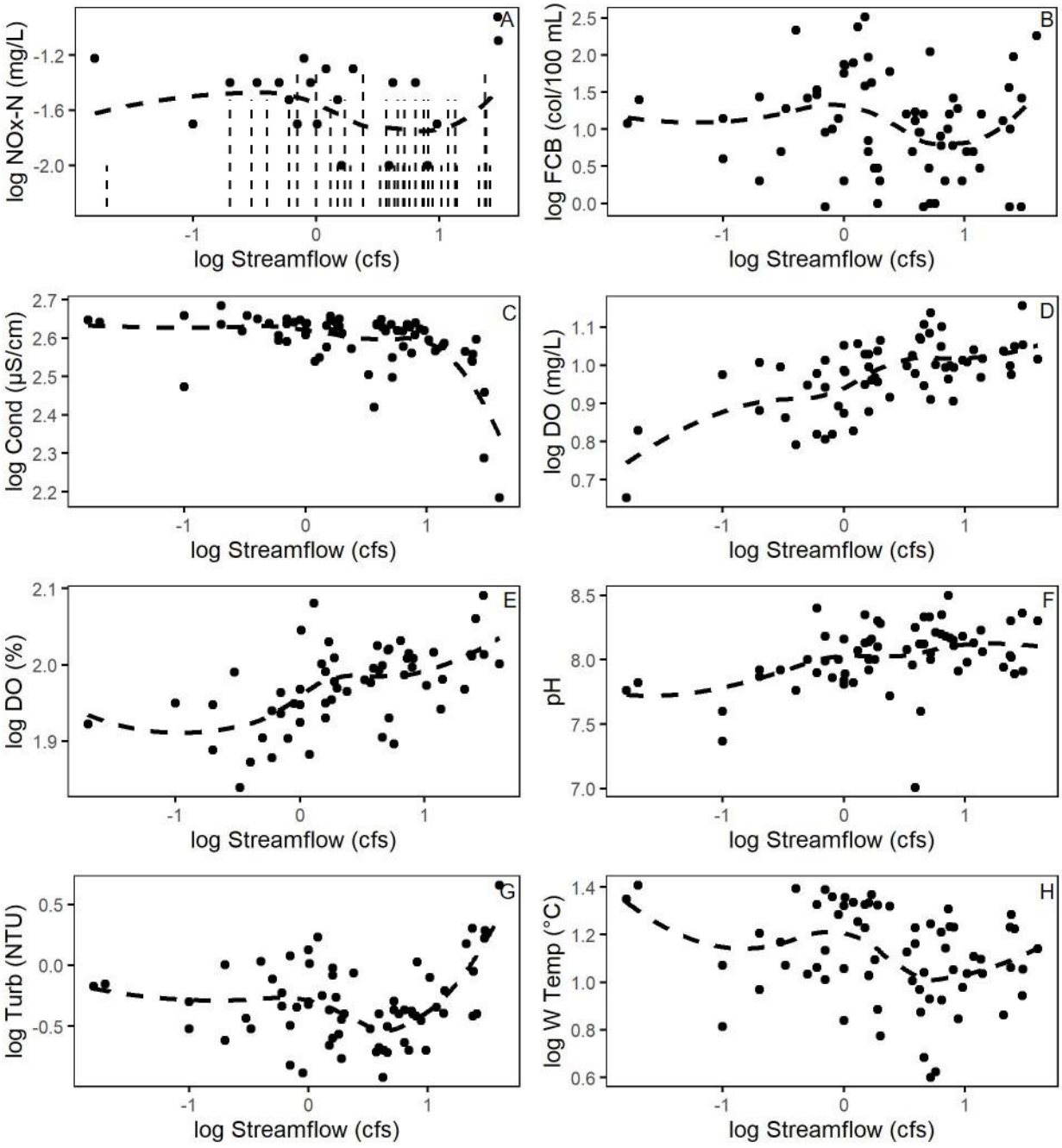


Figure E3.31.4 Water quality variable values (2000 – 2019) shown in relation to streamflow at BUFT23. A) nitrate+ nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation between each variable and streamflow.

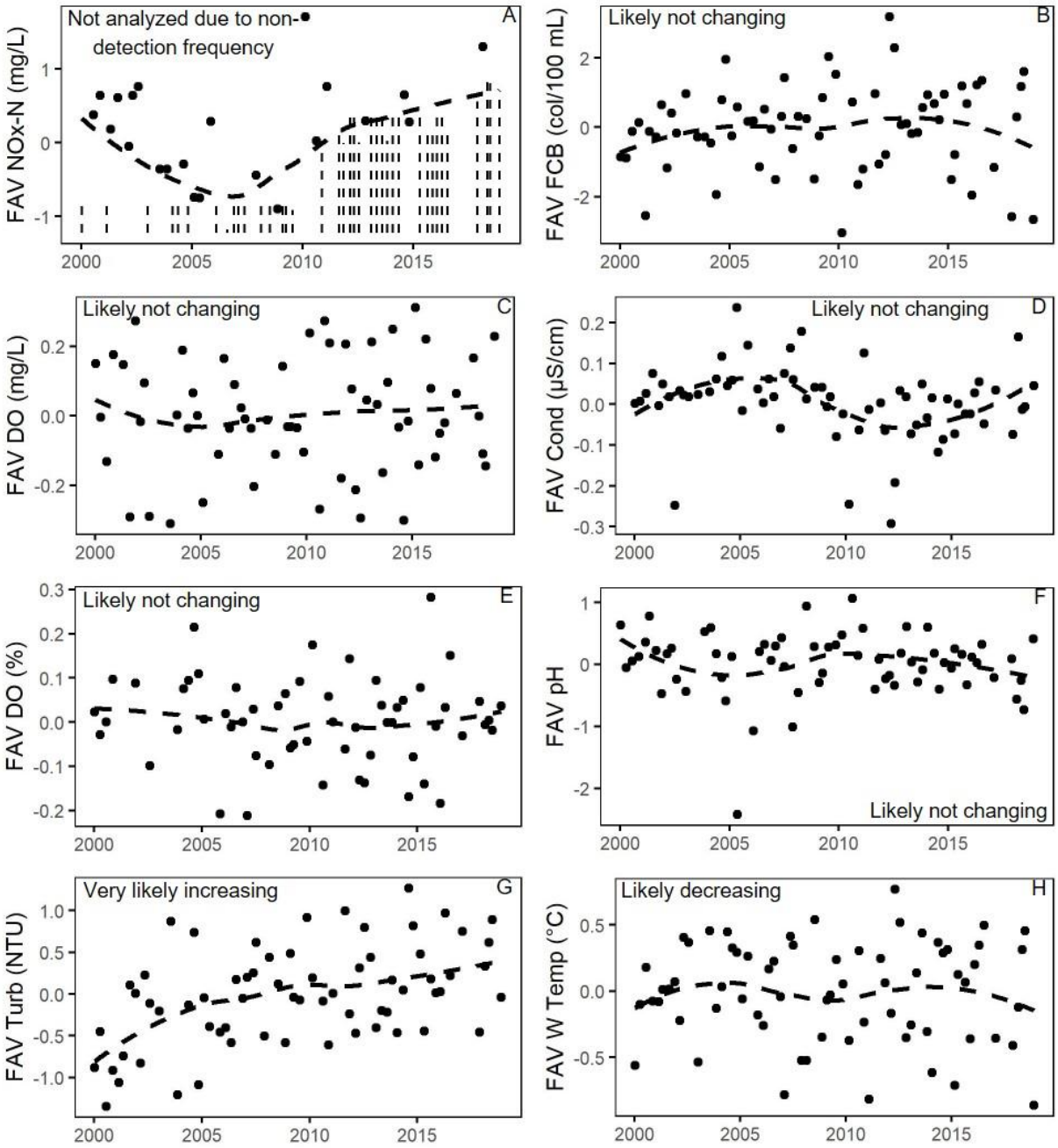


Figure E3.31.5 Flow-adjusted values FAVs of water quality variables shown through time (2000 – 2019) for BUFT23. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation with time. Narrative results summarize statistical significance and trend direction across trend analyses. See **Table A2.2.1** for full results.

A3.32 BUFT24 - Leatherwood Creek above Confluence with Buffalo River in Lower Wilderness

A3.32.1 Site and available data description

Leatherwood Creek above Confluence with Buffalo River in Lower Wilderness (BUFT24; 36.1089, -92.4292) is a long-term water quality monitoring site at BUFF. National Park Service Buffalo National River personnel have measured streamflow and in situ physiochemistry and collected water samples for analysis of bacteriological indicators and nutrient concentrations at the site since 1985 (**Figure E3.32.1-2**). Instantaneous streamflow estimates collected by BUFF staff were used in the flow-adjustment procedure to generate FAVs of water quality variables for trend analysis.

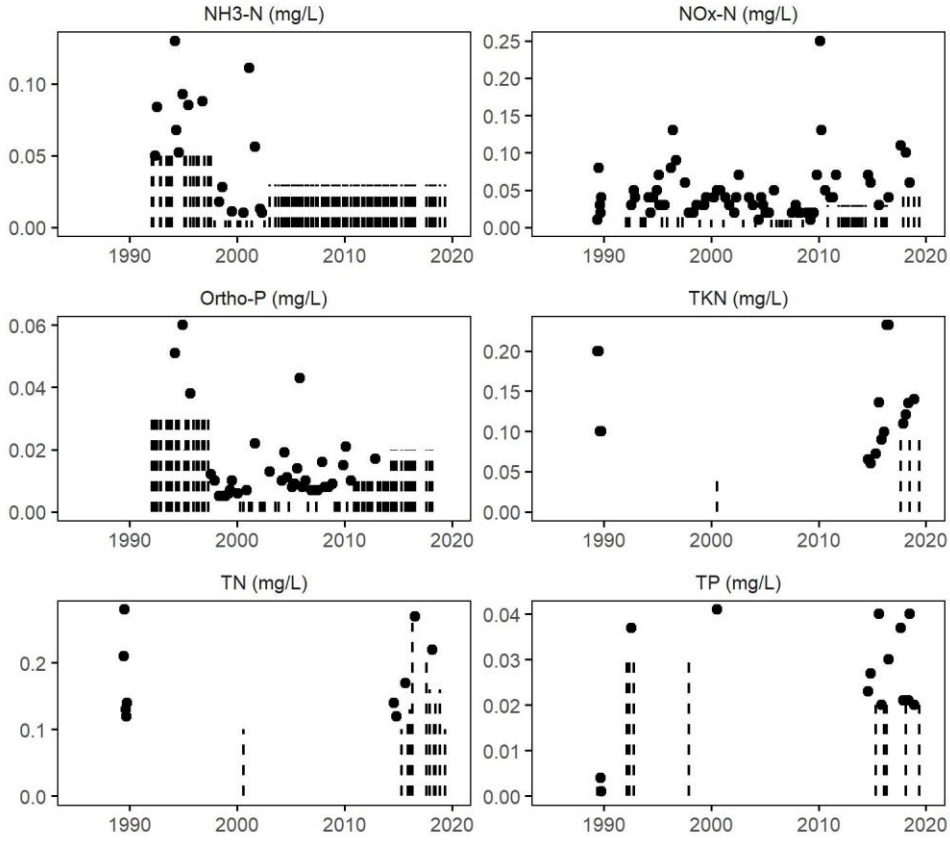


Figure E3.32.1 Nutrient variables (1985-2019) at BUFT24. Dashed lines indicate a non-detection, or that concentration could only be estimated within a range (i.e., between 0 and the relevant reporting limit).

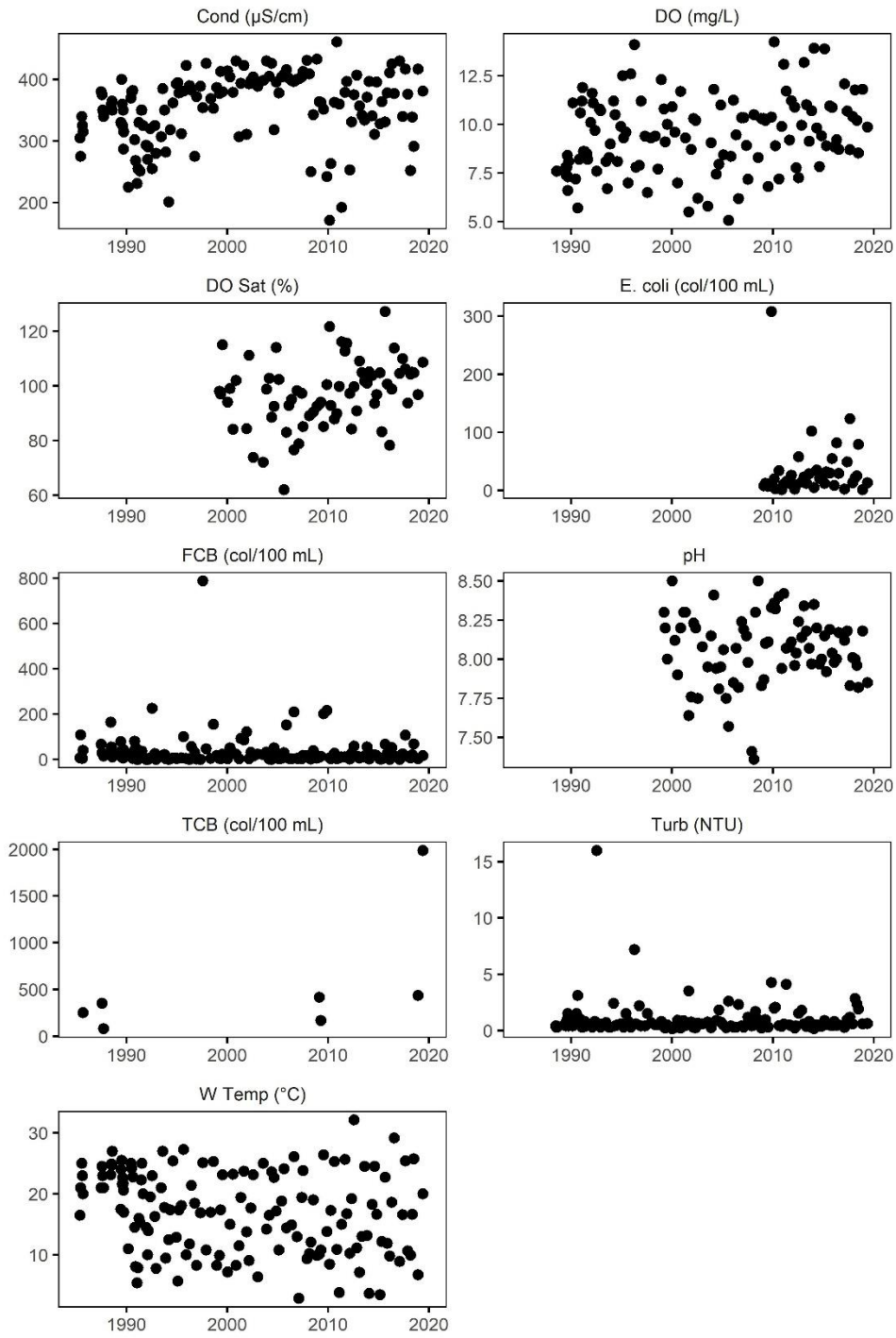


Figure E3.32.2 Bacterial indicator and physicochemical variables (1985-2019) at BUFT24.

A3.32.2 Trend analysis results (2000 - 2019): Narrative summaries

- NOx-N concentrations could not be analyzed at this site due non-detection frequency greater than 30% (**Figure E3.32.3-5A**).
- FCB concentrations are likely not changing ($p \geq 0.10$; **Figure E3.32.3-5B**).
- Conductivity is likely (LR $p < 0.10$) to very likely ($p < 0.05$) decreasing by 0.5% annually (**Figure E3.32.3-5C**).
- DO levels are very likely increasing by approximately 1% annually ($p < 0.05$; **Figure E3.32.3-5D &E**).
- Stream pH is likely not changing ($p \geq 0.10$; **Figure E3.32.3-5F**).
- Turbidity is likely not changing ($p \geq 0.10$; **Figure E3.32.3-5G**).
- Water temperature is likely not changing ($p \geq 0.10$; **Figure E3.32.3-5H**).

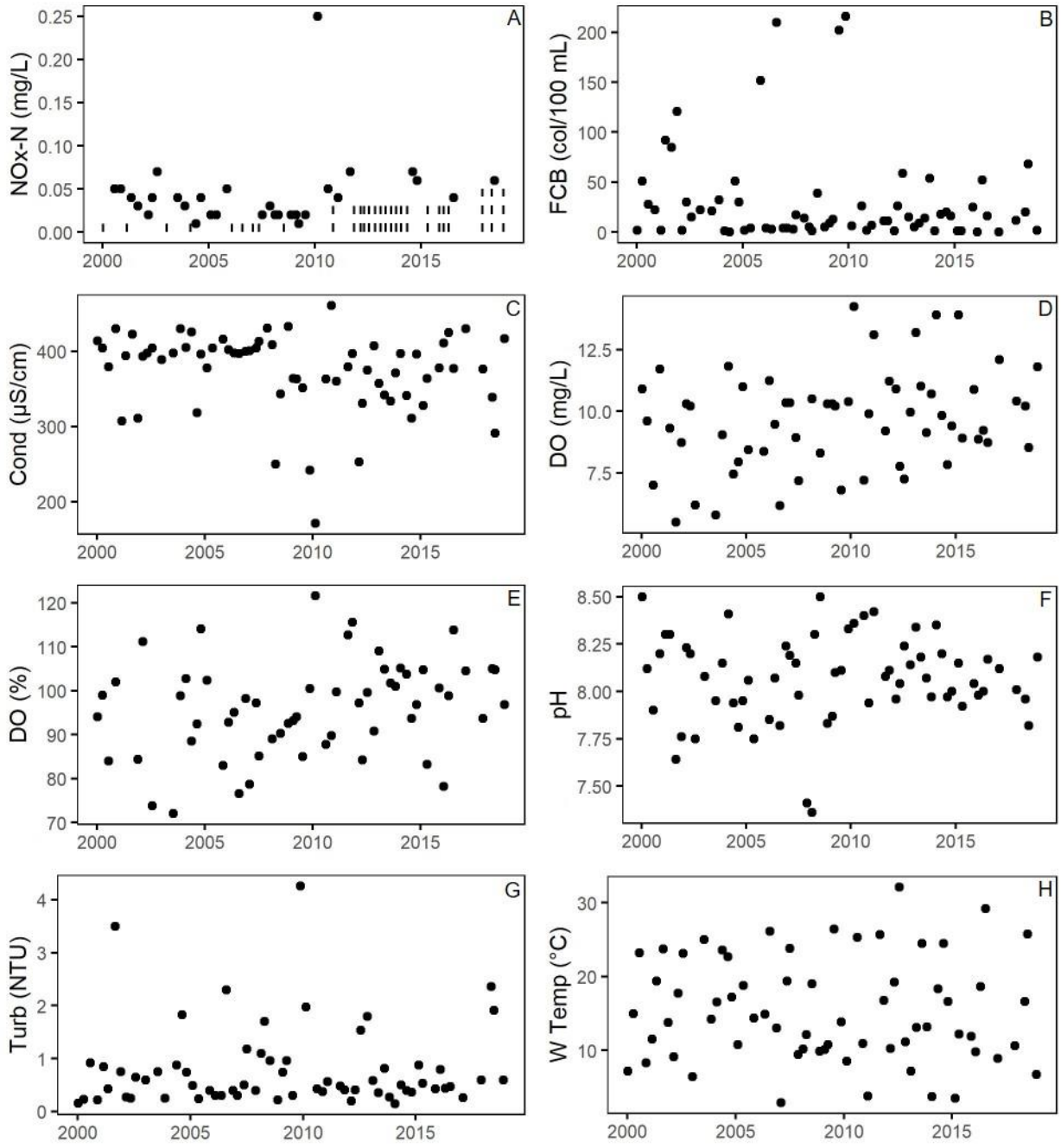


Figure E3.32.3 Water quality variable values shown through time (2000 – 2019) at BUFT24. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections.

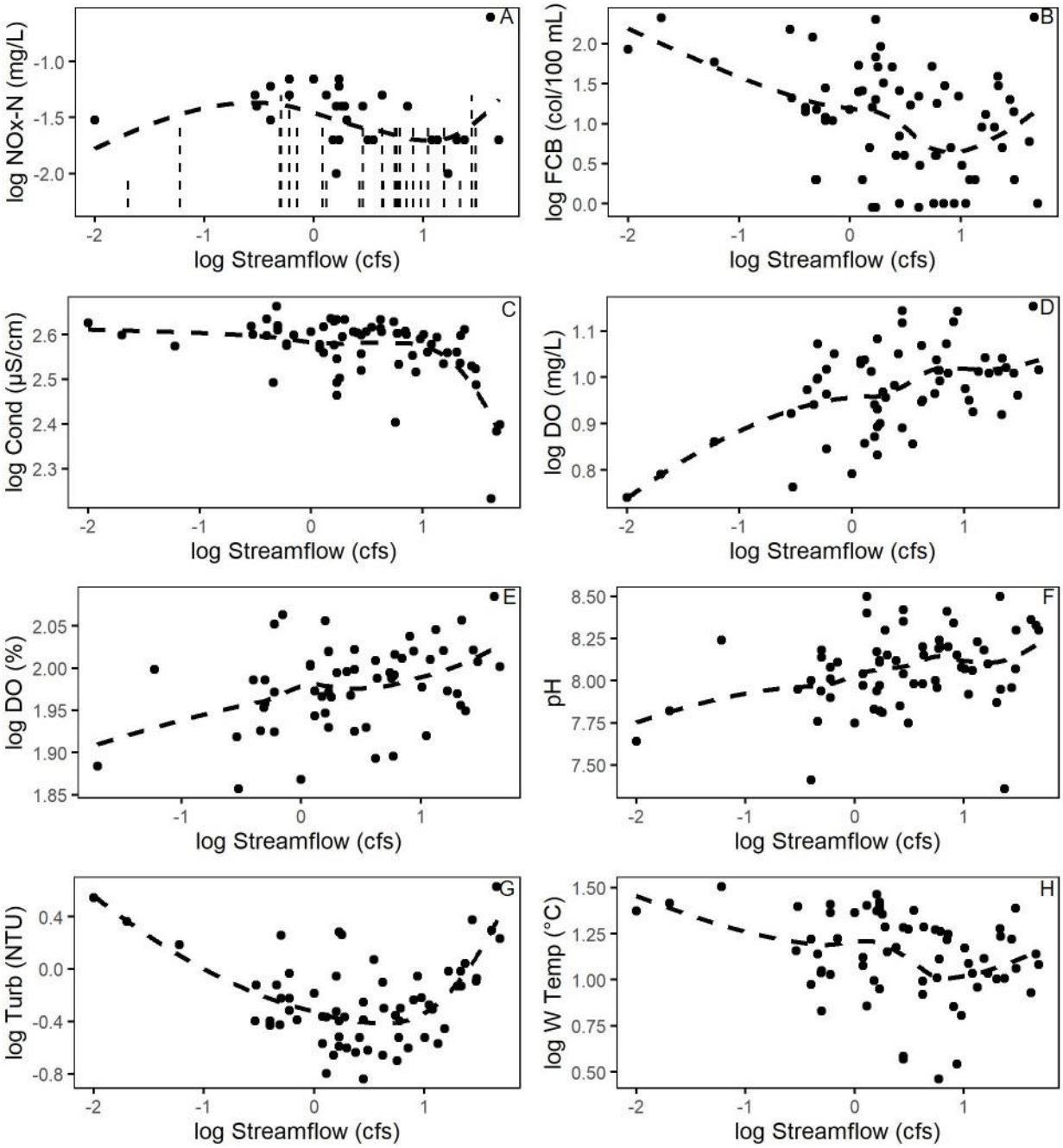


Figure E3.32.4 Water quality variable values (2000 – 2019) shown in relation to streamflow at BUFT24. A) nitrate+ nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation between each variable and streamflow.

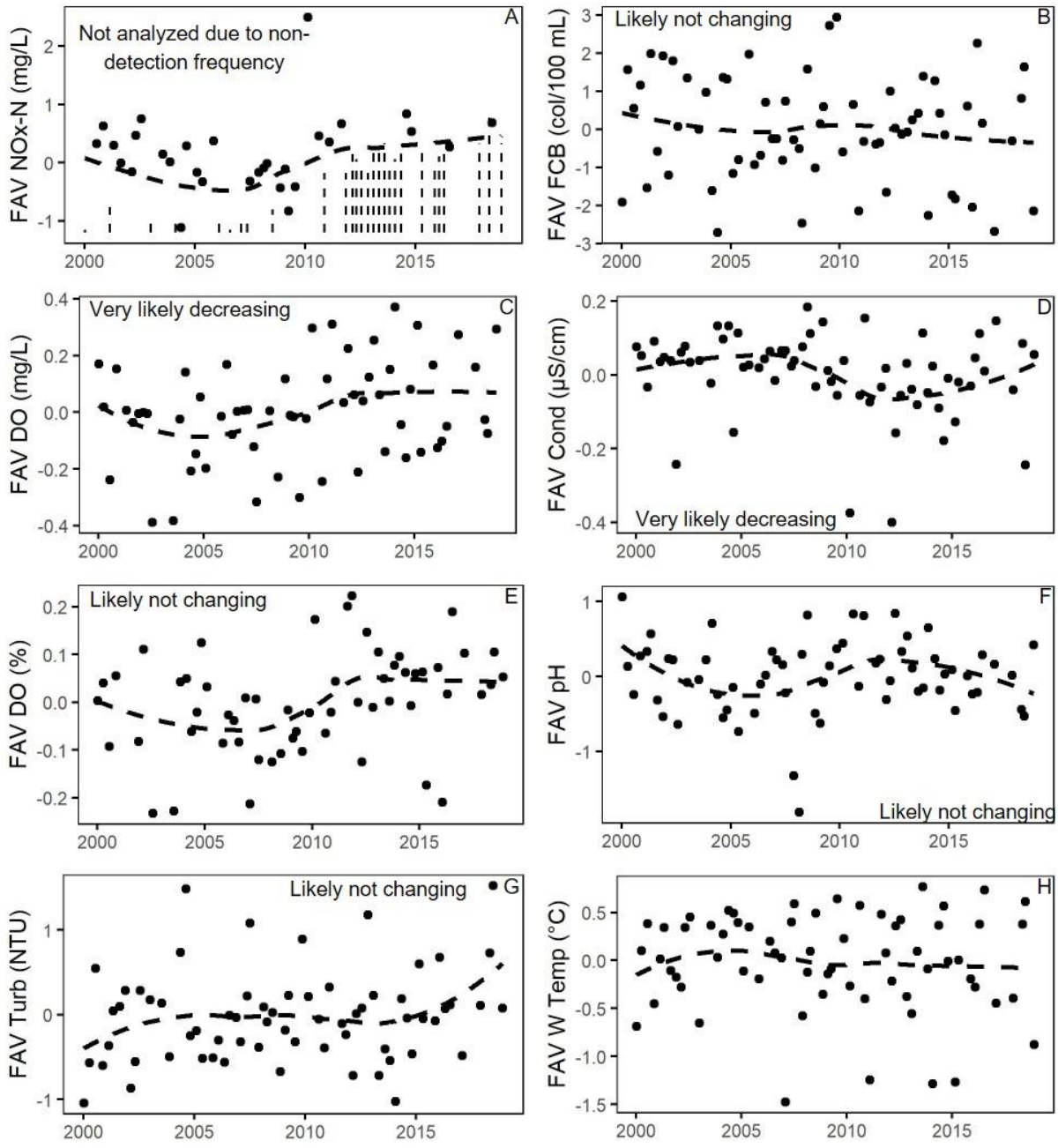


Figure E3.32.5 Flow-adjusted values (FAV) of water quality variables shown through time (2000 – 2019) for BUFT24. A) nitrate+nitrite-nitrogen (NOx-N), B) fecal coliform bacteria (FCB), C) conductivity (Cond), D) dissolved oxygen (DO) as concentration and E) as percent saturation, F) pH, G) turbidity (Turb), and H) water temperature (W Temp). Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation with time. Narrative results summarize statistical significance and trend direction across trend analyses. See **Table A2.2.1** for full results.

A3.33 BRSJ - Buffalo River near St. Joe, AR, USGS gage #07056000

A3.33.1 Site and available data description

Buffalo River near St. Joe (BRSJ; 35.983056, -92.747222) is a long-term stream gage (USGS-07056000) and water quality monitoring site (ADEQ-WHI0049A). The ADEQ has collected water samples for nutrient analysis at this location since September 25, 1990, while the USGS historically collected samples for nutrient analysis between July 23, 1945 and March 23, 2003 (**Figure E3.33.1-2**). This study incorporated USGS nutrient concentration data collected in 1985 or later for water quality variables that were compatible with the ADEQ variables to compile a continuous record. See **Figure E3.33.3** for plots showing data for the full period of record for all monitored water quality variables from both USGS and ADEQ samples. Beginning October 10, 1991, estimates of average daily discharge were available for this location and were used in flow-adjustment procedure to generate FAVs of water quality variables as inputs to trend analysis.

A3.33.2 Trend analysis results (2000 - 2019): Narrative summaries

- TN concentrations are likely not changing (**Figure E3.33.1-3A**), as well as TKN concentrations (**Figure E3.33.1-3A-B**).
- TP concentrations are likely increasing by ~3% annually (**Figure E3.33.1-3C**).
- NOx-N concentrations are likely not changing (**Figure E3.33.1-3D**).

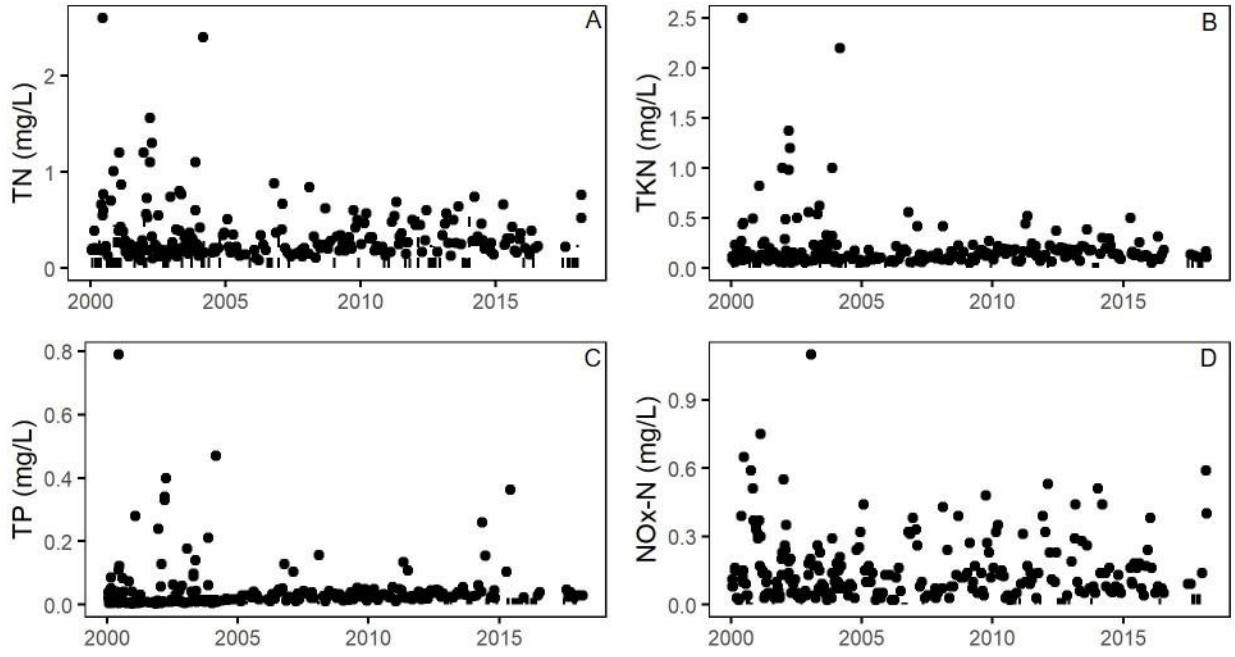


Figure E3.33.1 Water quality variables shown through time (2000-2019) at BRJS A) total nitrogen (TN), B) total Kjeldahl nitrogen (TKN), C) total phosphorus (TP), and D) nitrate+nitrite-nitrogen (NOx-N) concentration. Vertical dashed lines represent non-detection, or that concentration could only be estimated within a range (i.e., between 0 and the relevant reporting limit).

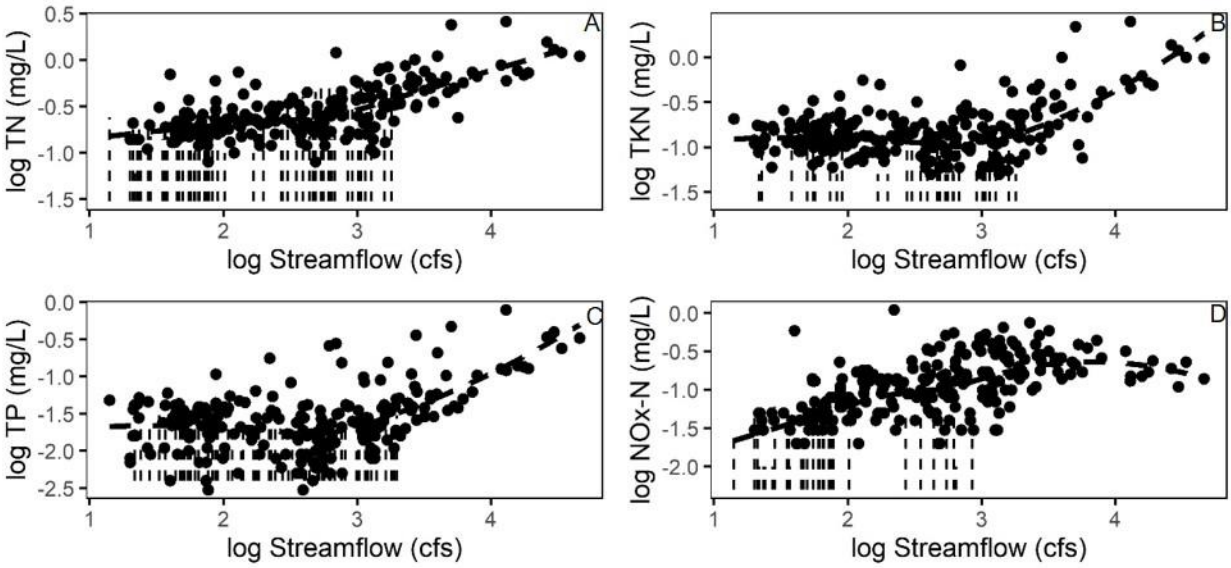


Figure E3.33.2 Water quality variables values (2000 – 2019) shown in relation to streamflow at BRSJ A) total nitrogen (TN), B) total Kjeldahl nitrogen (TKN), C) total phosphorus (TP), and D) nitrate+nitrite-nitrogen (NOx-N) concentration. Horizontal dashed lines show the locally estimated scatterplot smoothing (LOESS) relation between each variable and streamflow. Vertical dashed lines represent non-detection, or that concentration could only be estimated within a range (i.e., between 0 and the reporting limit).

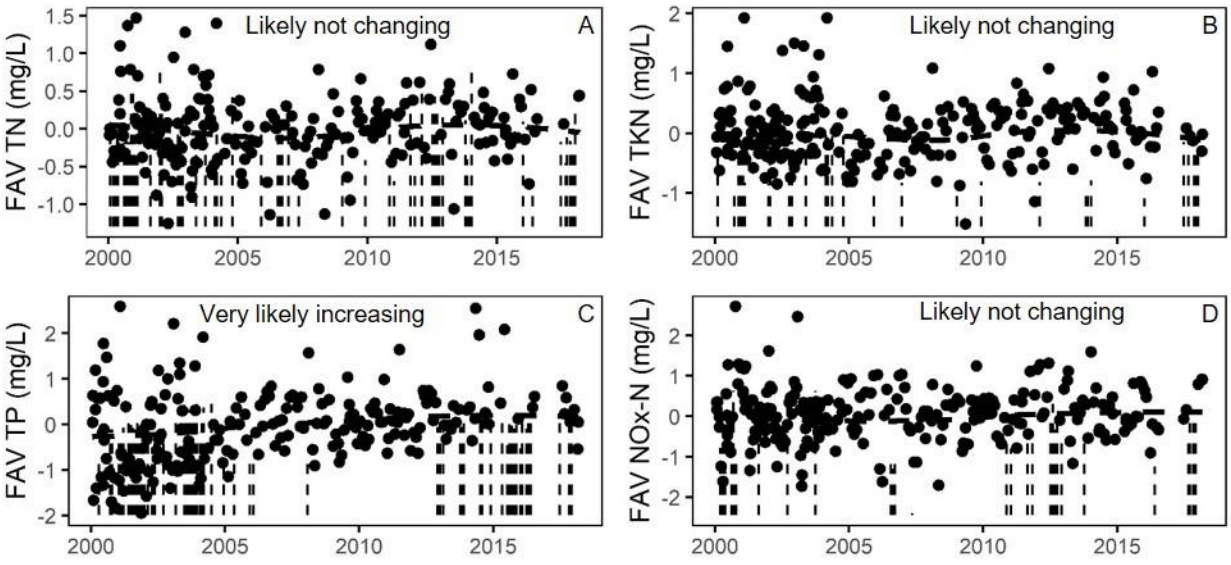


Figure E3.33.3 Flow adjusted values (FAV) of water quality variables shown through time (2000 – 2019) for BRSJ. A) total nitrogen (TN), B) total Kjeldahl nitrogen (TKN), C) total phosphorus (TP), and D) nitrate+nitrite-nitrogen (NOx-N) concentration. Vertical dashed lines represent non-detections. Horizontal dashed lines show the locally estimated scatterplot smoothing relation with time. Narrative results summarize statistical significance and trend direction across trend analyses. See **Table A2.2.1** for full results.