

Basin Summary Report 2023

**Lower Colorado River Authority
Texas Clean Rivers Program**

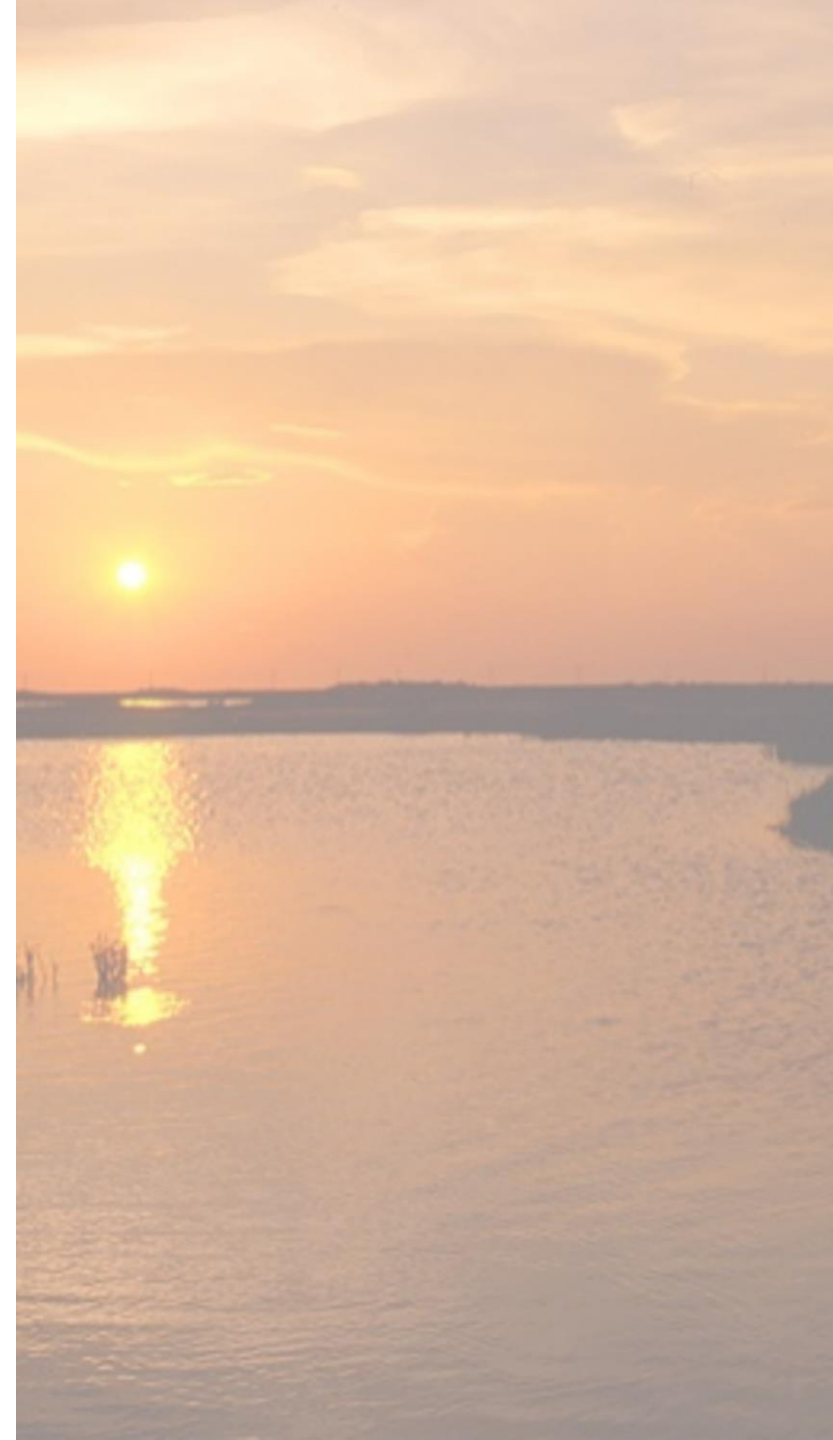
Basin Summary Report Overview

- **What?**

- Decision making aid for water quality
- Prioritize water bodies for action
- Select watersheds for special studies
- Identify sections of the basin that have data gaps

- **Why?**

- Understand water quality conditions, trends, changes, and possible sources of degradation



Analysis Methodology

- **Temporal Trends (changes over time)**
 - Data in SWQMIS collected from 2011 through 2021
 - At least 20 points of data
 - Less than 50% of data is censored (below or above the limit of detection)
- **Spatial Comparison (where are parameters different)**
 - Similar to temporal trends
 - At least 10 points of data

Parameter List

Water Temperature
pH

Dissolved Oxygen
Secchi Depth

Total Suspended Solids
Chloride
Sulfate

Nitrate
Total Kjeldahl Nitrogen

Ammonia
Total Phosphorus
Chlorophyll α

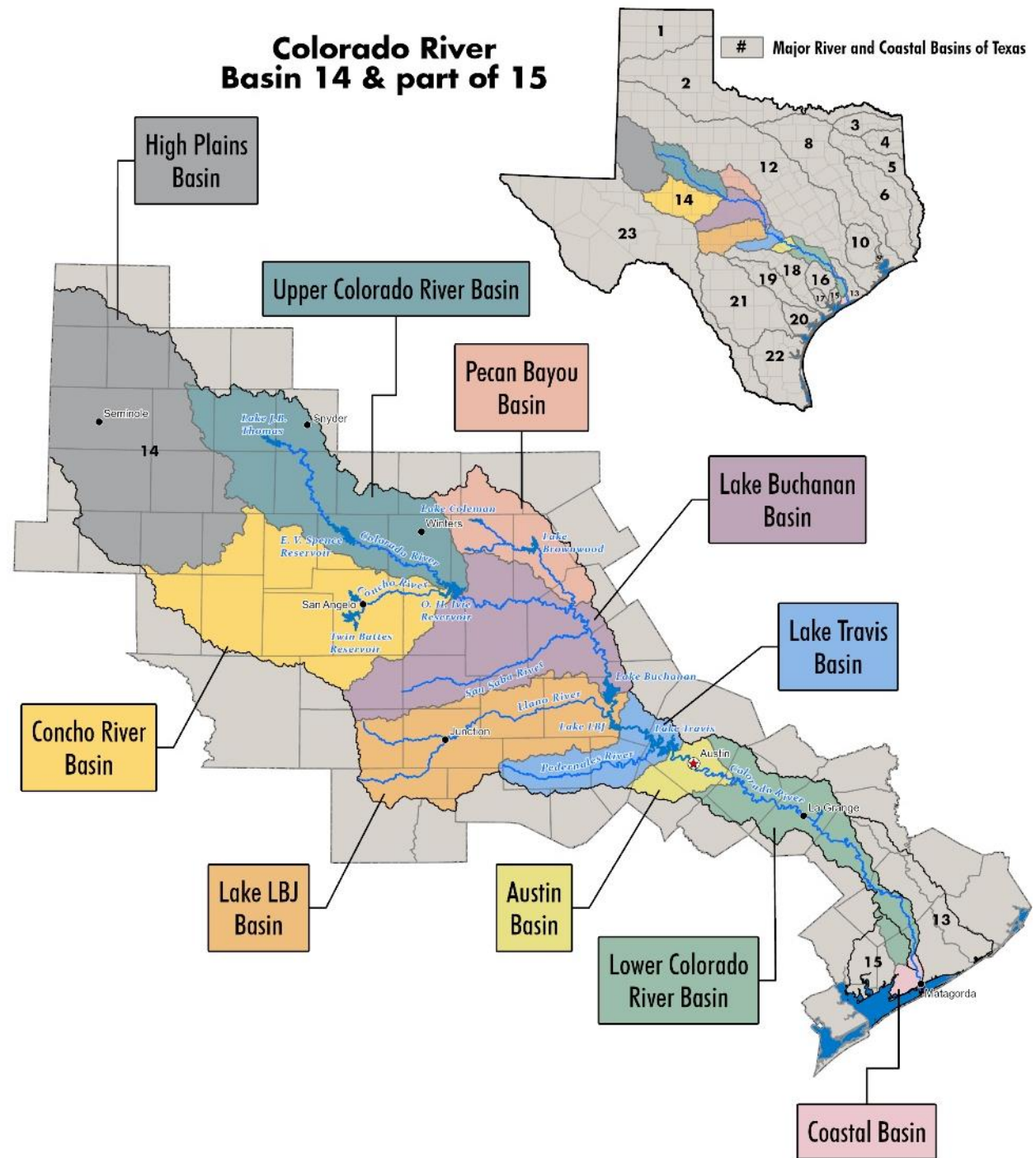
E. coli (freshwater)
Enterococci (saltwater)

General Results

Assessment Units: 174
Stations: 219

	Parameter	Increases	Decreases	Concerns	Impairments
Water Clarity	Water Temperature	4	1		
	pH	9	41		1
	Dissolved Oxygen	6	29	10	4
	Secchi Depth	24	5		
	TSS	11	10		
Salts	Chloride	13	54		2
	Sulfate	9	48		3
Nutrients	<u>Nitrate</u>	<u>20</u>	<u>12</u>	<u>32</u>	
	TKN	8	39		
	Ammonia	3	8		
	Total Phosphorus	4	10	8	
	<u>Chlorophyll α</u>	<u>15</u>	<u>16</u>	<u>32</u>	<u>11</u>
	Bacteria	6	1	9	13

Colorado River Basin



Impairments and Concerns in each Sub-Basin

Sub-Basin	Concerns	Impairments
Upper Colorado	24	9
Concho	19	2
Pecan Bayou	8	1
Lake Buchanan	8	1
Lake LBJ	1	13
Lake Travis	4	2
Austin	29	12
Lower Colorado	21	2
Coastal	2	0

Lake Buchanan Basin



Data Trends

Assessment Unit	Station	Concerns	Impairments
1416B_01	12179		
1416A_02	14232	X	
1416A_01	20411		
1416_05	12393		
1416_03	17004		
1416_02	20662		
1416_01	12392		
1409_02	12355		
1409A_01	12274		
1408_05	12353		
1408_06	12349		
1408_02	12347		
1408_01	12344		

Lake Buchanan Basin

Nitrate Concerns or Impairments

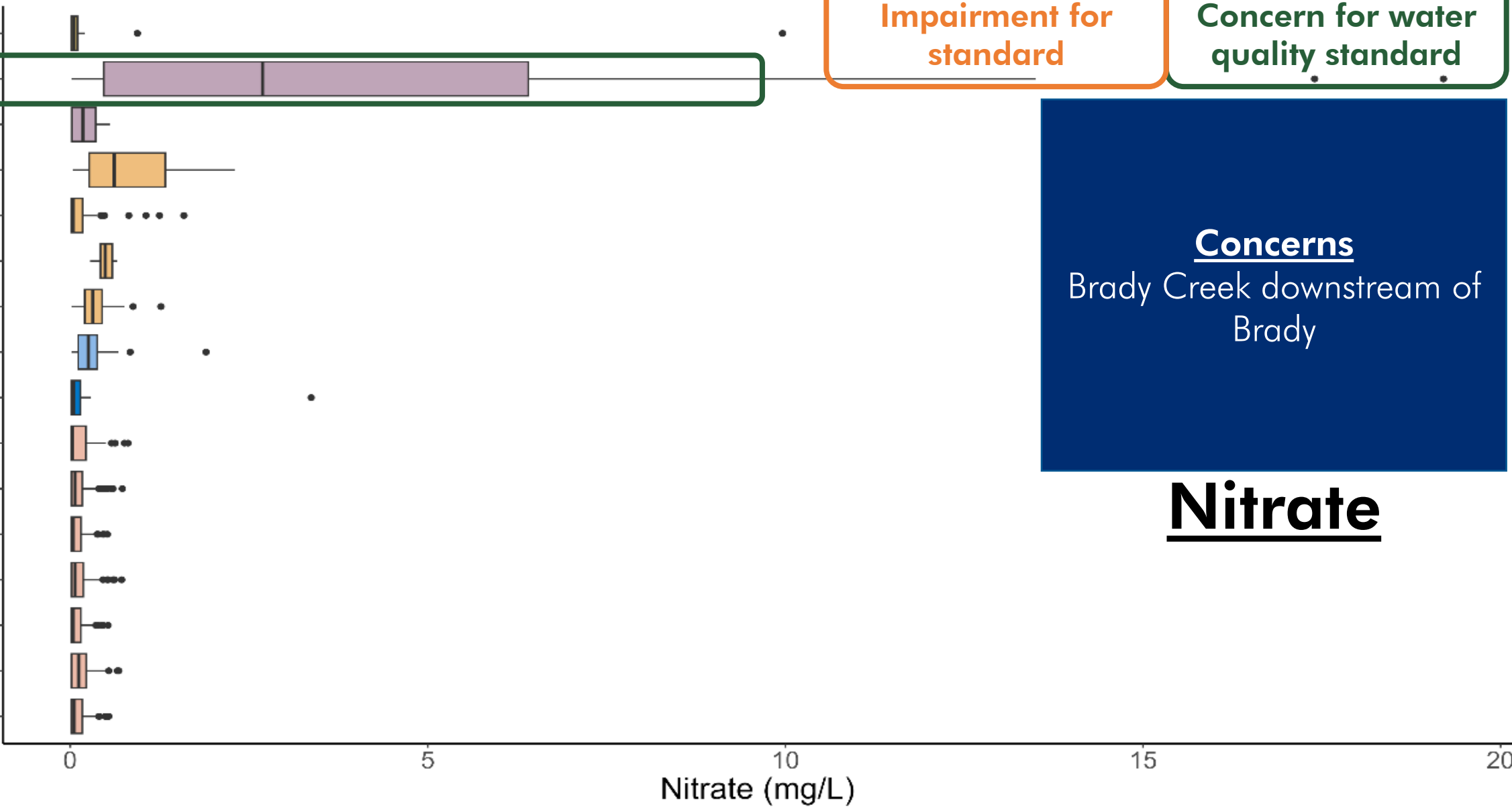
Concerns

Brady Creek downstream of Brady

Lake Buchanan Basin

Station ID - Sample Location

12179-SURFACE
14232-SURFACE
20411-SURFACE
12393-SURFACE
17004-SURFACE
20662-SURFACE
12392-SURFACE
12355-SURFACE
12274-SURFACE
12353-SURFACE
12349-BOTTOM
12349-SURFACE
12347-BOTTOM
12347-SURFACE
12344-BOTTOM
12344-SURFACE

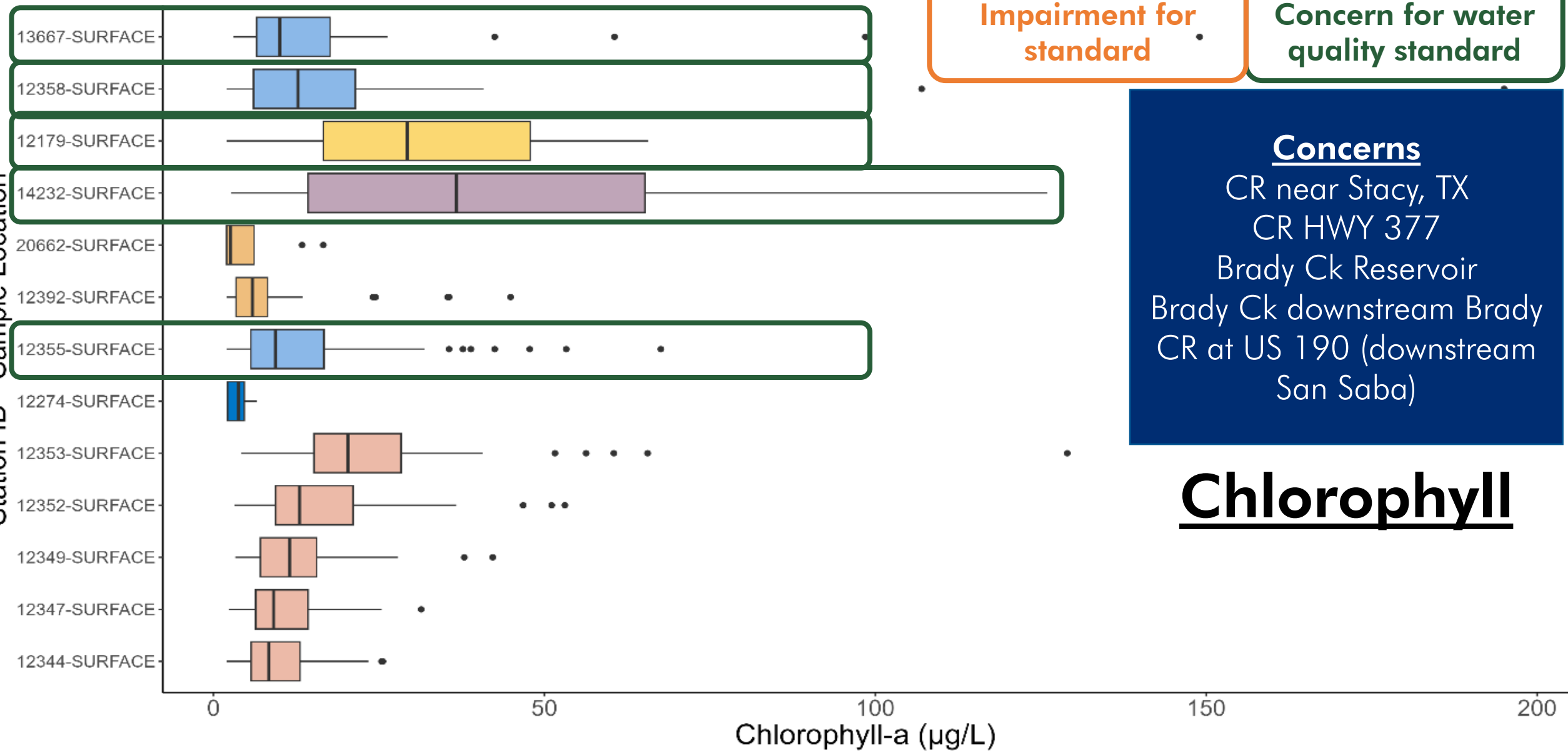


Waterbody

- Lake Buchanan
- Cherokee Ck
- Brady Ck
- Colorado River
- San Saba
- Brady Ck Reservoir

Lake Buchanan Basin

Station ID - Sample Location

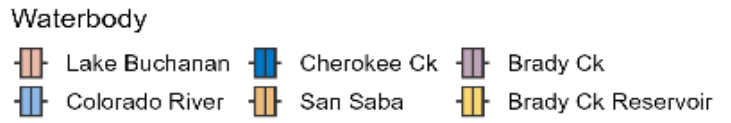


Impairment for standard

Concern for water quality standard

Concerns
 CR near Stacy, TX
 CR HWY 377
 Brady Ck Reservoir
 Brady Ck downstream Brady
 CR at US 190 (downstream San Saba)

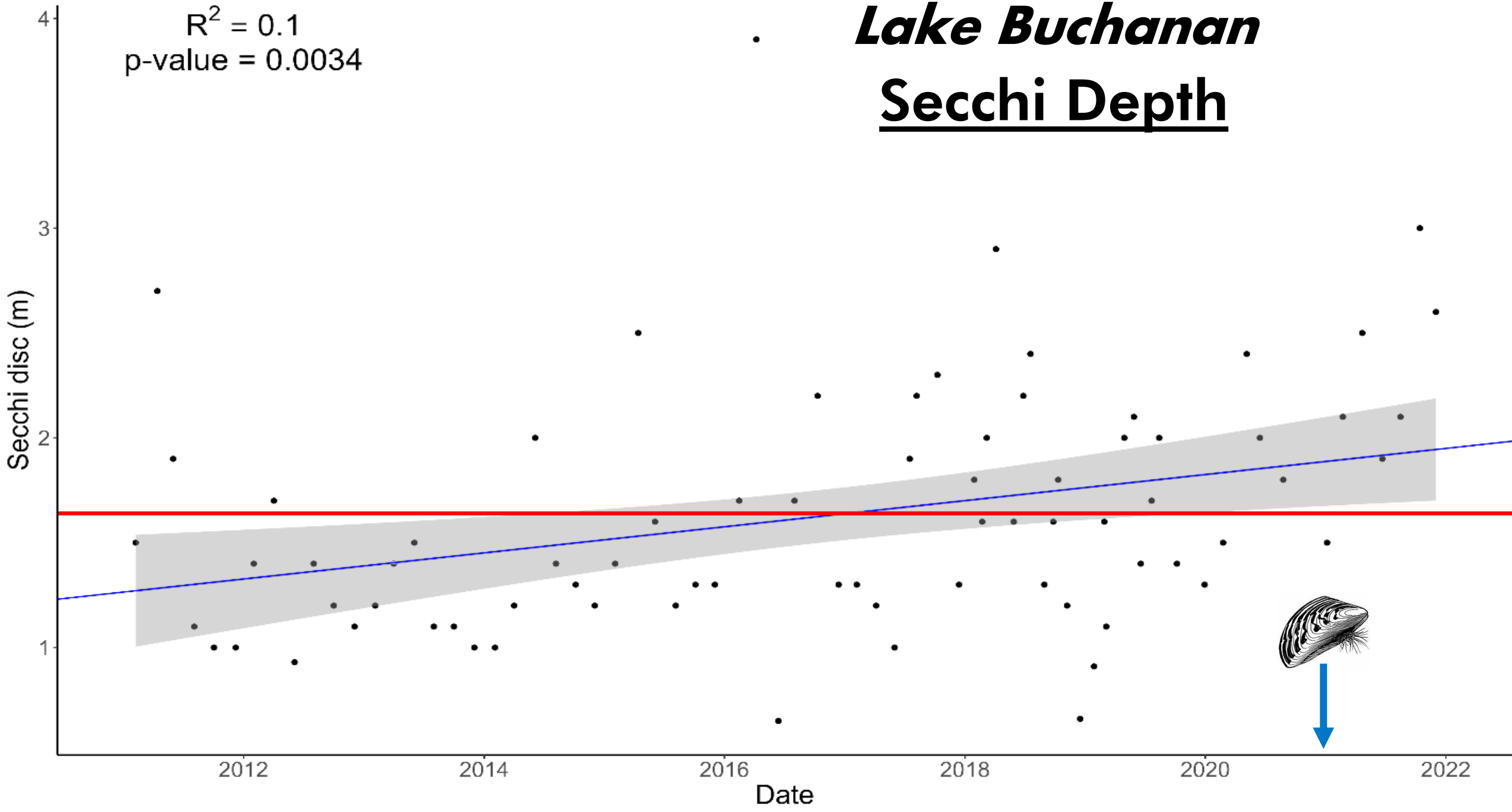
Chlorophyll



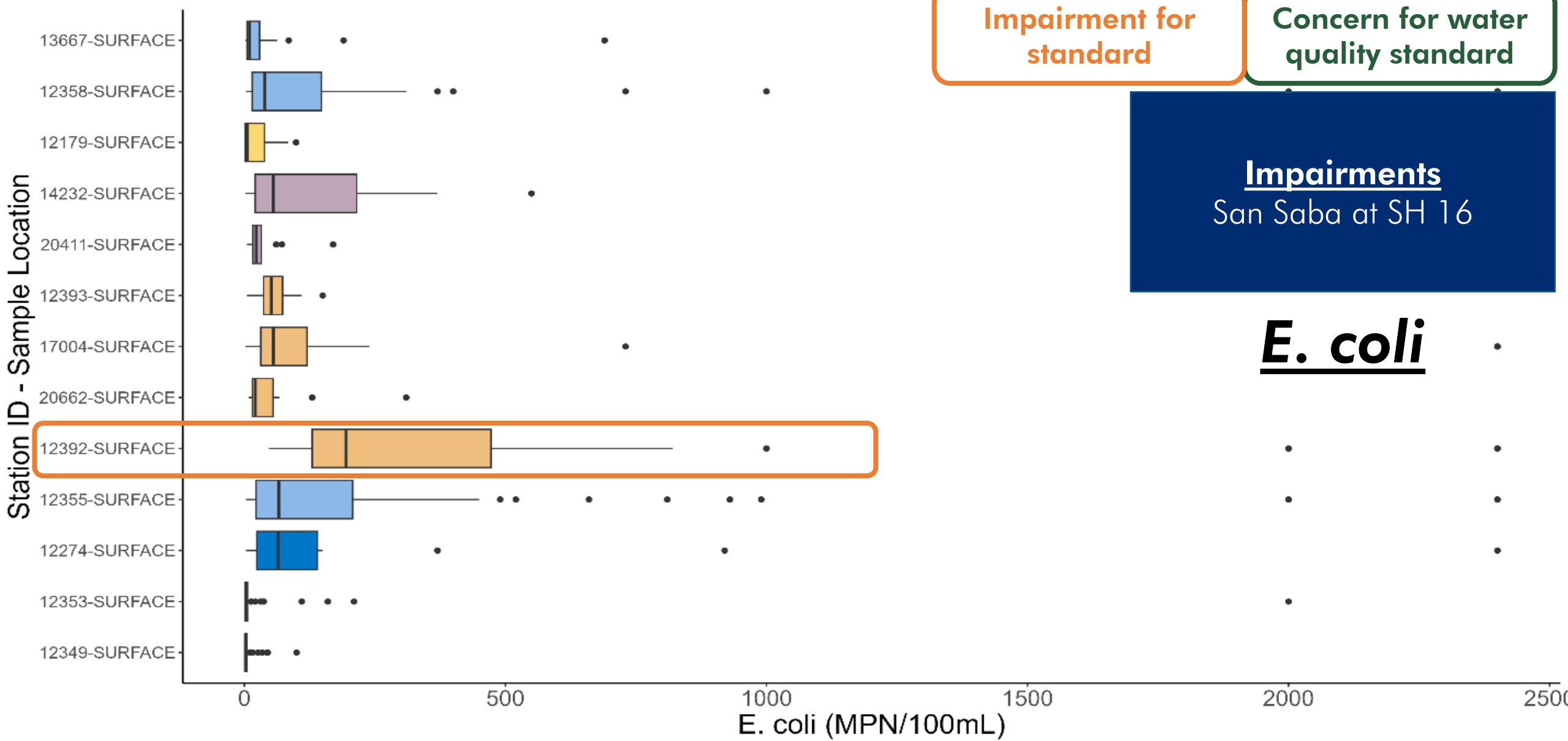
StationID: 12344-SURFACE

Lake Buchanan Secchi Depth

$R^2 = 0.1$
p-value = 0.0034



Lake Buchanan Basin



Lake LBJ Basin



Data Trends

Lake LBJ Basin

Station ID - Sample Location

18710-SURFACE
 12336-BOTTOM
 12336-SURFACE
 12333-BOTTOM
 12333-SURFACE
 16701-SURFACE
 18197-SURFACE
 21548-SURFACE
 17425-SURFACE
 17471-SURFACE
 13550-SURFACE
 21812-SURFACE
 14231-SURFACE
 12210-SURFACE
 17470-SURFACE
 12388-SURFACE
 12386-SURFACE
 12383-SURFACE
 12331-BOTTOM
 12331-SURFACE
 12330-BOTTOM
 12330-SURFACE
 12214-SURFACE
 12327-BOTTOM
 12327-SURFACE
 12324-BOTTOM
 12324-SURFACE

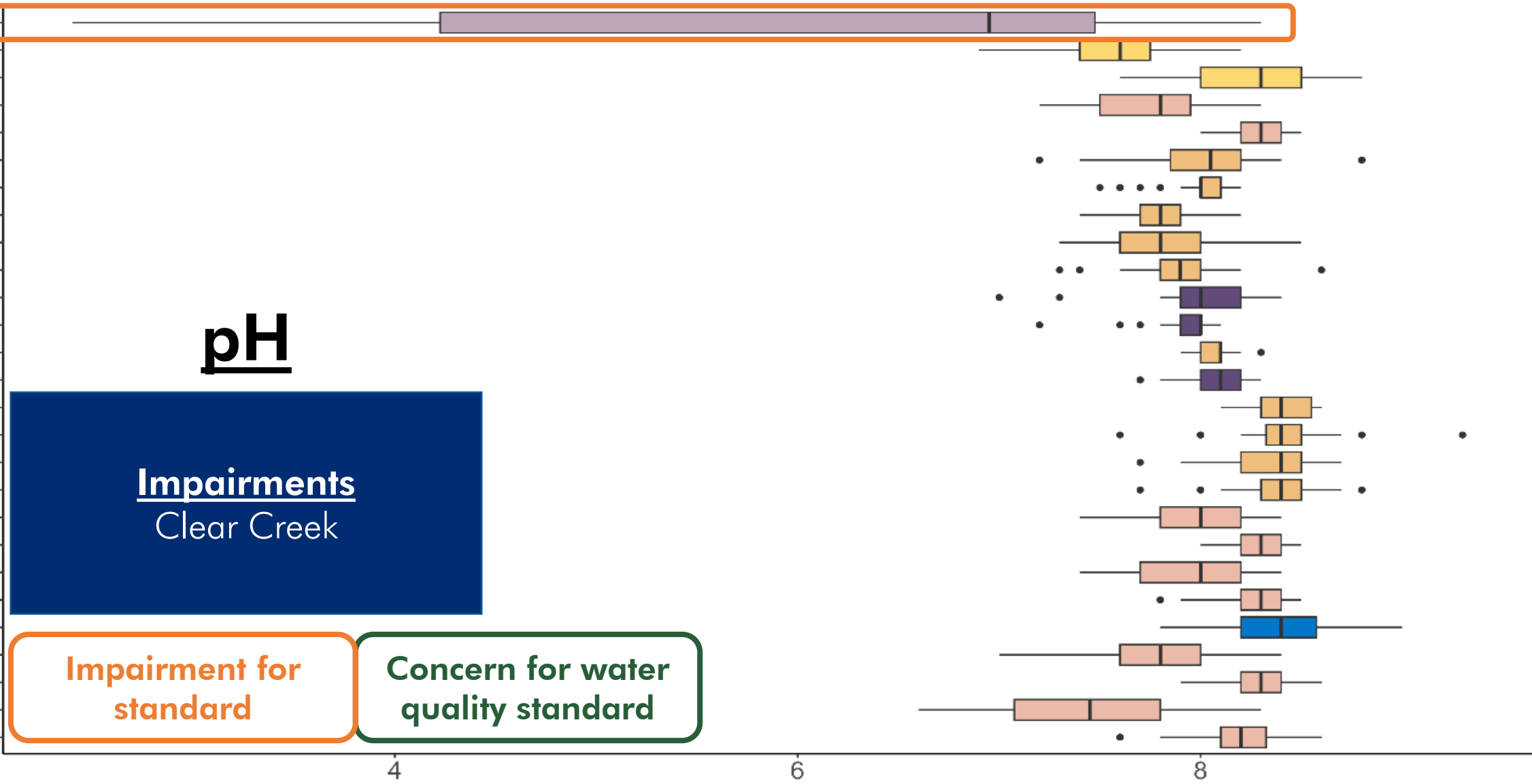
pH

Impairments
 Clear Creek

Impairment for standard

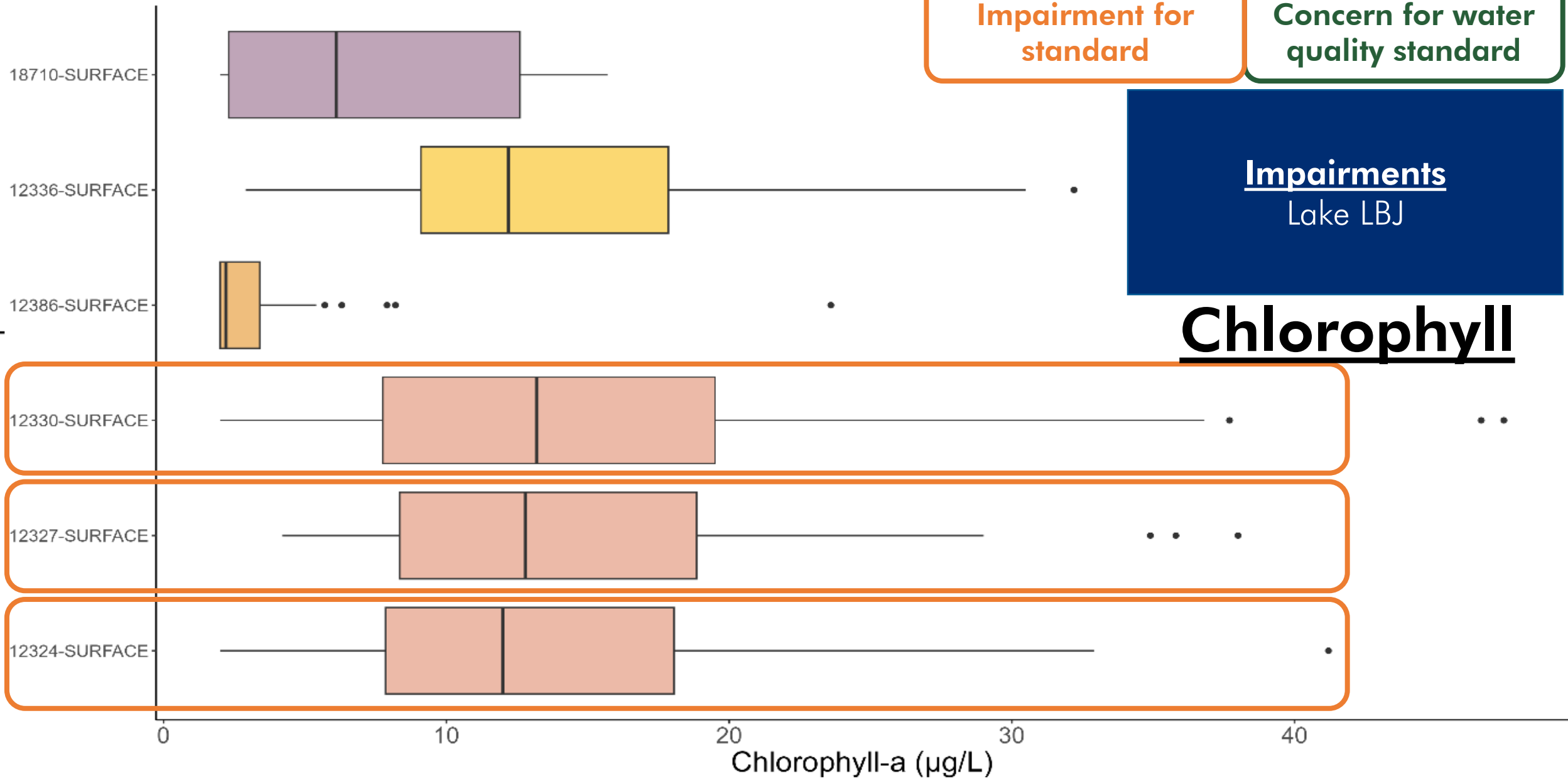
Concern for water quality standard

pH (Standard Units)



Lake LBJ Basin

Station ID - Sample Location



Waterbody
Lake LBJ Llano River Inks Lake Clear Ck

Lake Travis Basin



Data Trends

Lake Travis Basin

Station ID - Sample Location

12319-SURFACE

Impairment for standard

Concern for water quality standard

Impairments
Lake Marble Falls

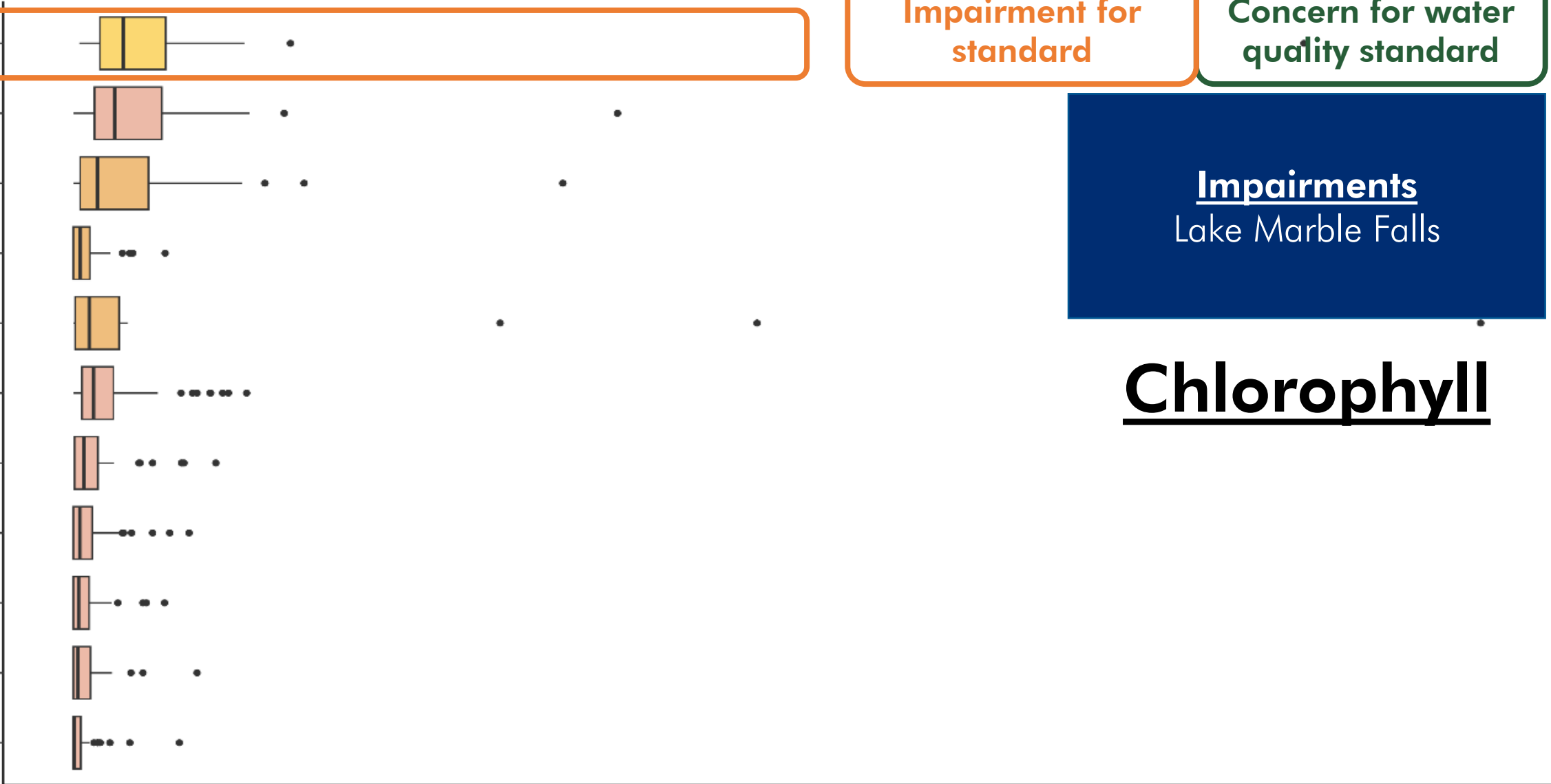
Chlorophyll

12316-SURFACE
12377-SURFACE
12375-SURFACE
12372-SURFACE
12313-SURFACE
20070-SURFACE
15428-SURFACE
12309-SURFACE
12307-SURFACE
12302-SURFACE

0 50 100 150 200 250

Chlorophyll-a ($\mu\text{g/L}$)

Waterbody
Lake Travis Pedernales River Lake Marble Falls

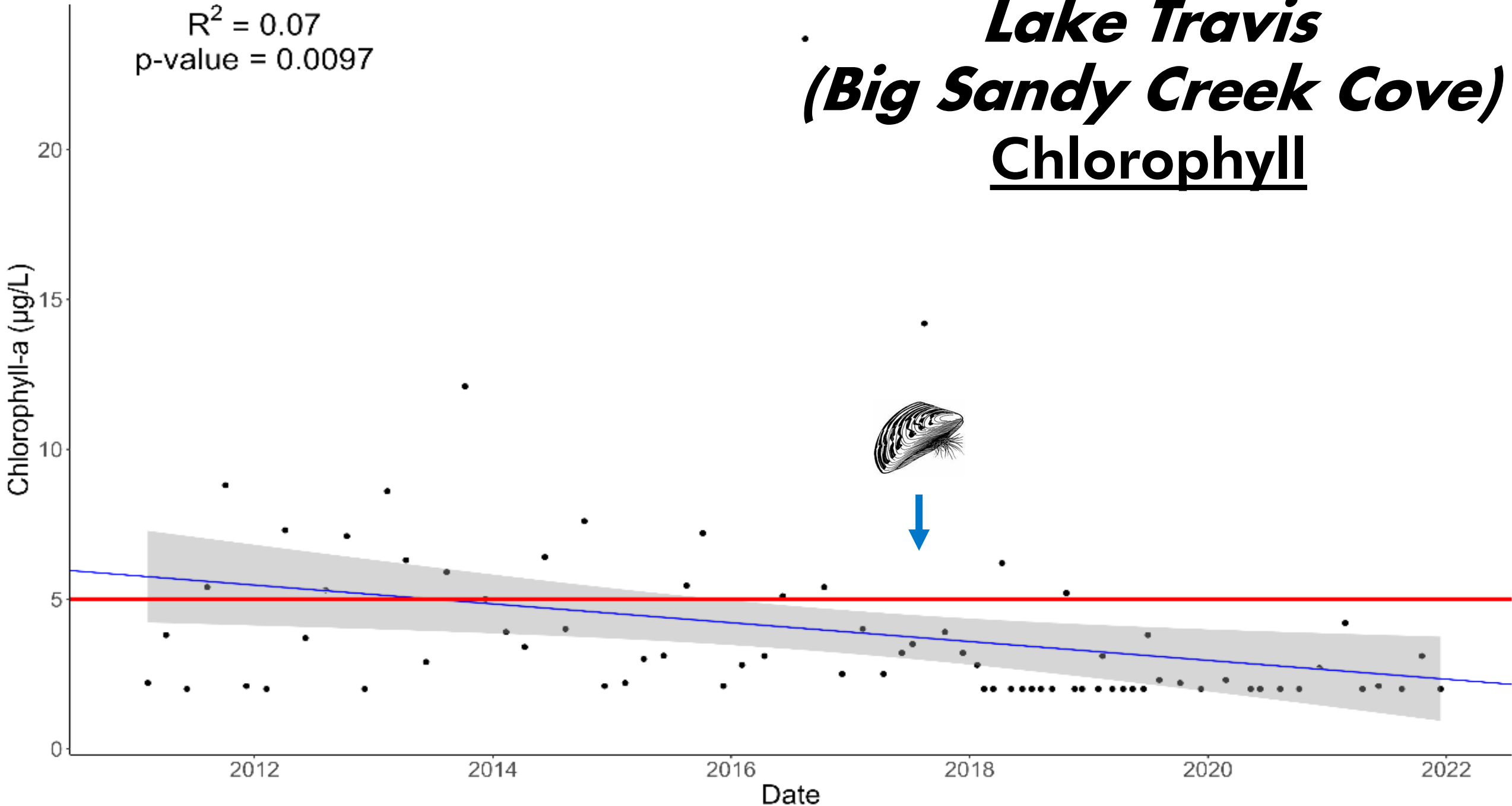


StationID: 12307-SURFACE

$R^2 = 0.07$

p-value = 0.0097

Lake Travis *(Big Sandy Creek Cove)* Chlorophyll

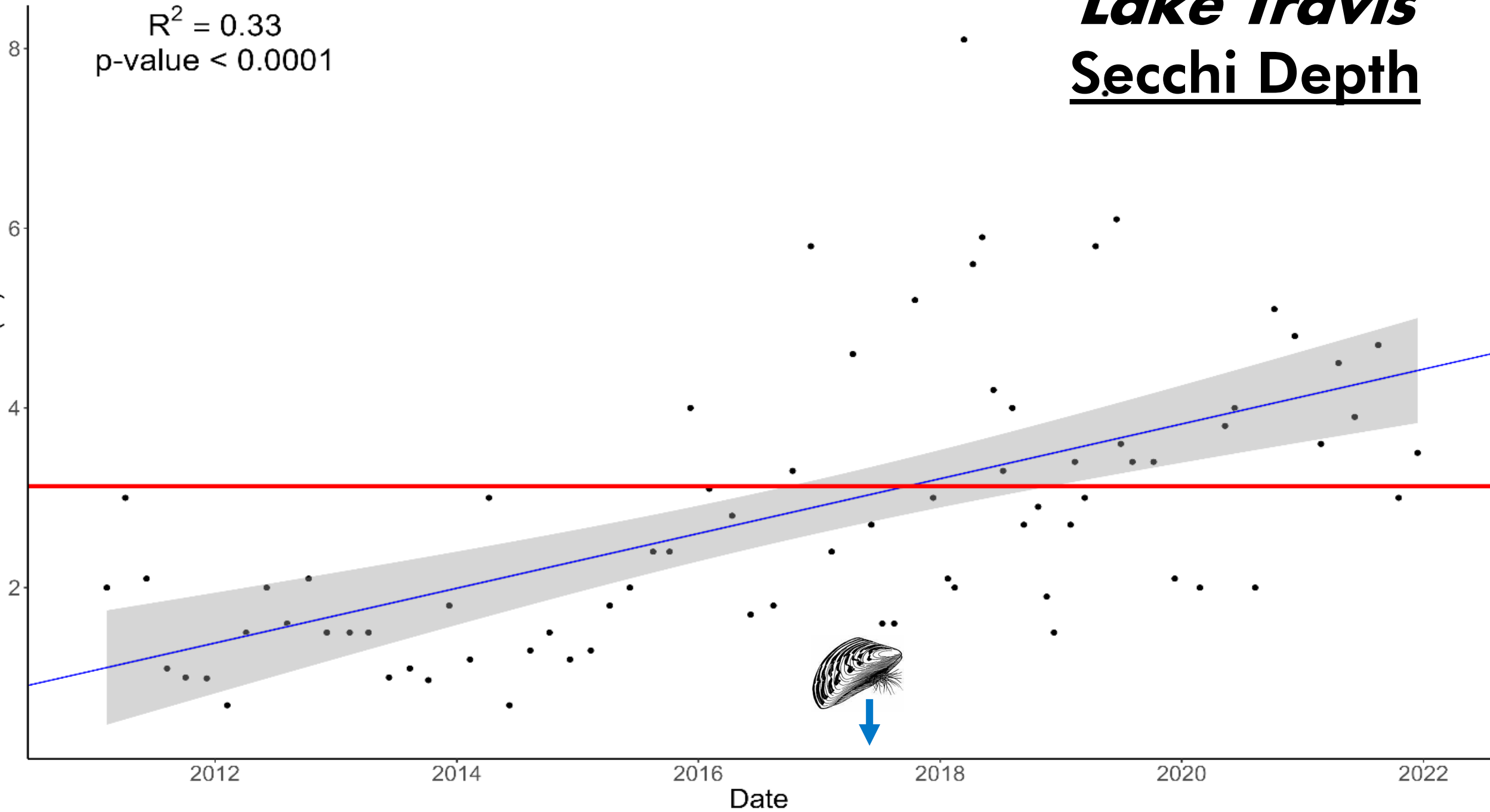


StationID: 12307-SURFACE

Lake Travis Secchi Depth

$R^2 = 0.33$
p-value < 0.0001

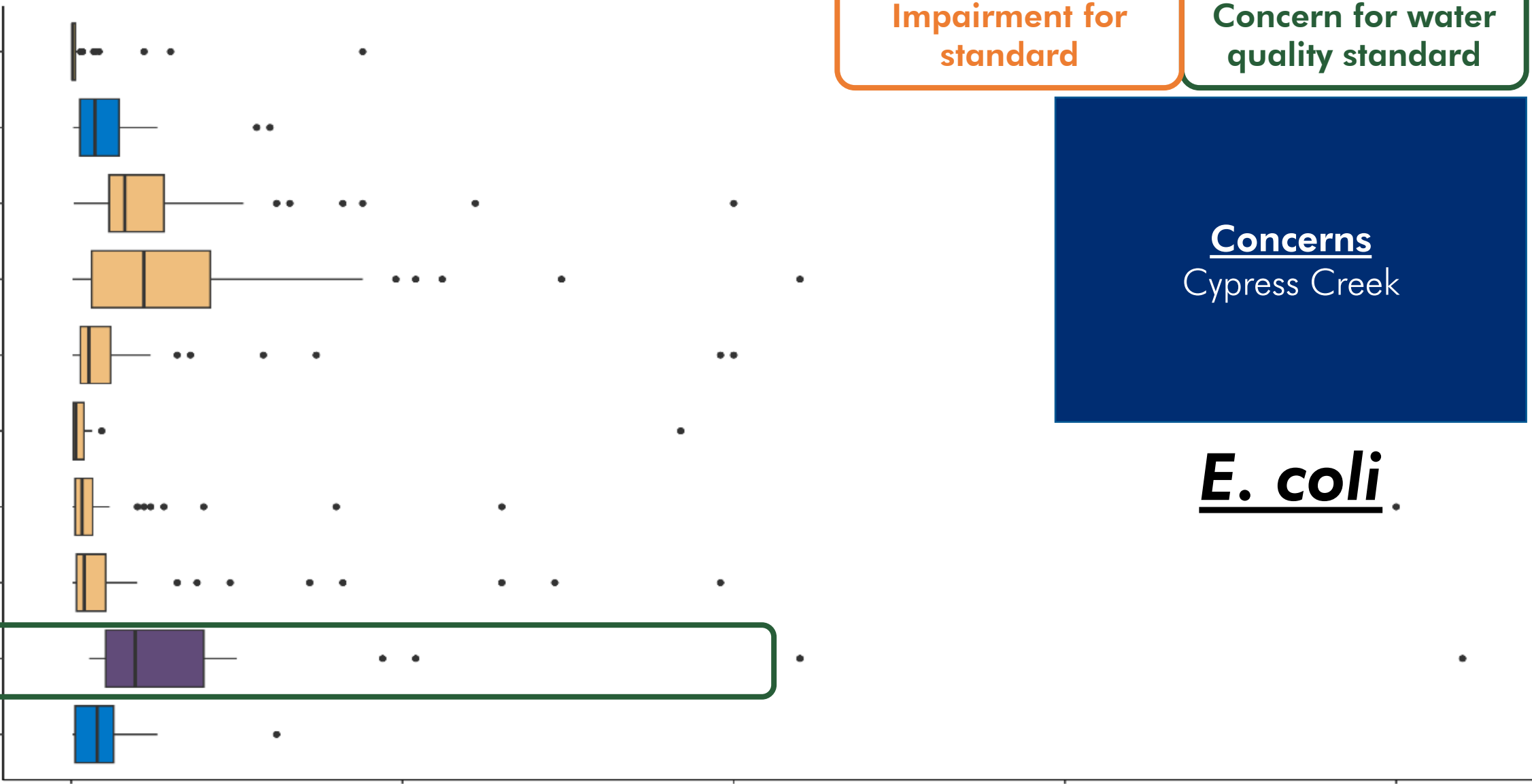
Secchi disc (m)



Lake Travis Basin

Station ID - Sample Location

12319-SURFACE
16929-SURFACE
17472-SURFACE
12377-SURFACE
12375-SURFACE
12372-SURFACE
21398-SURFACE
12369-SURFACE
12258-SURFACE
17054-SURFACE



E. coli (MPN/100mL)

Waterbody

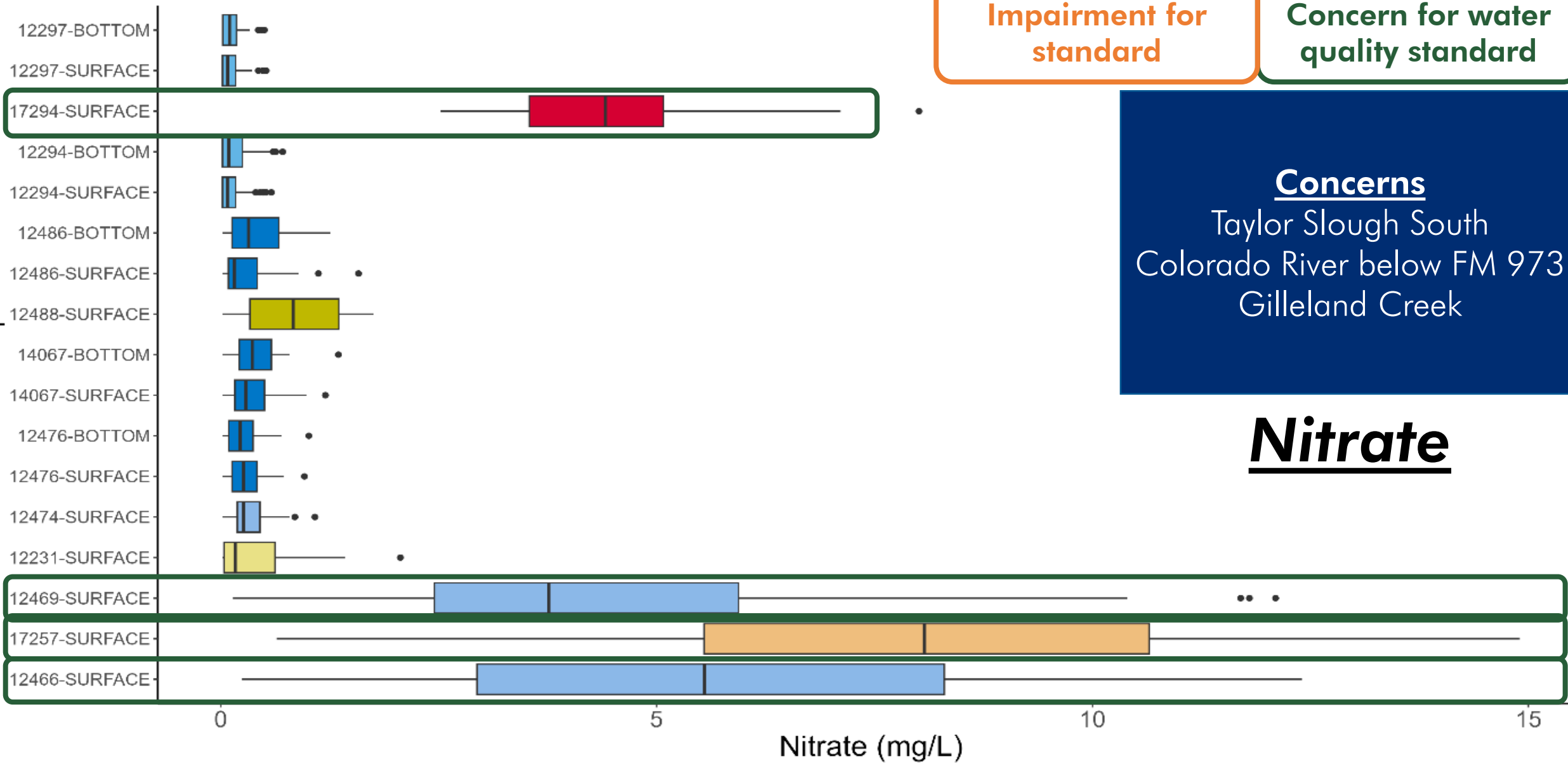
Lake Travis Tribs Pedernales River Pedernales Trib Lake Marble Falls

Austin Basin

Data Trends

Austin Basin

Station ID - Sample Location



Impairment for standard

Concern for water quality standard

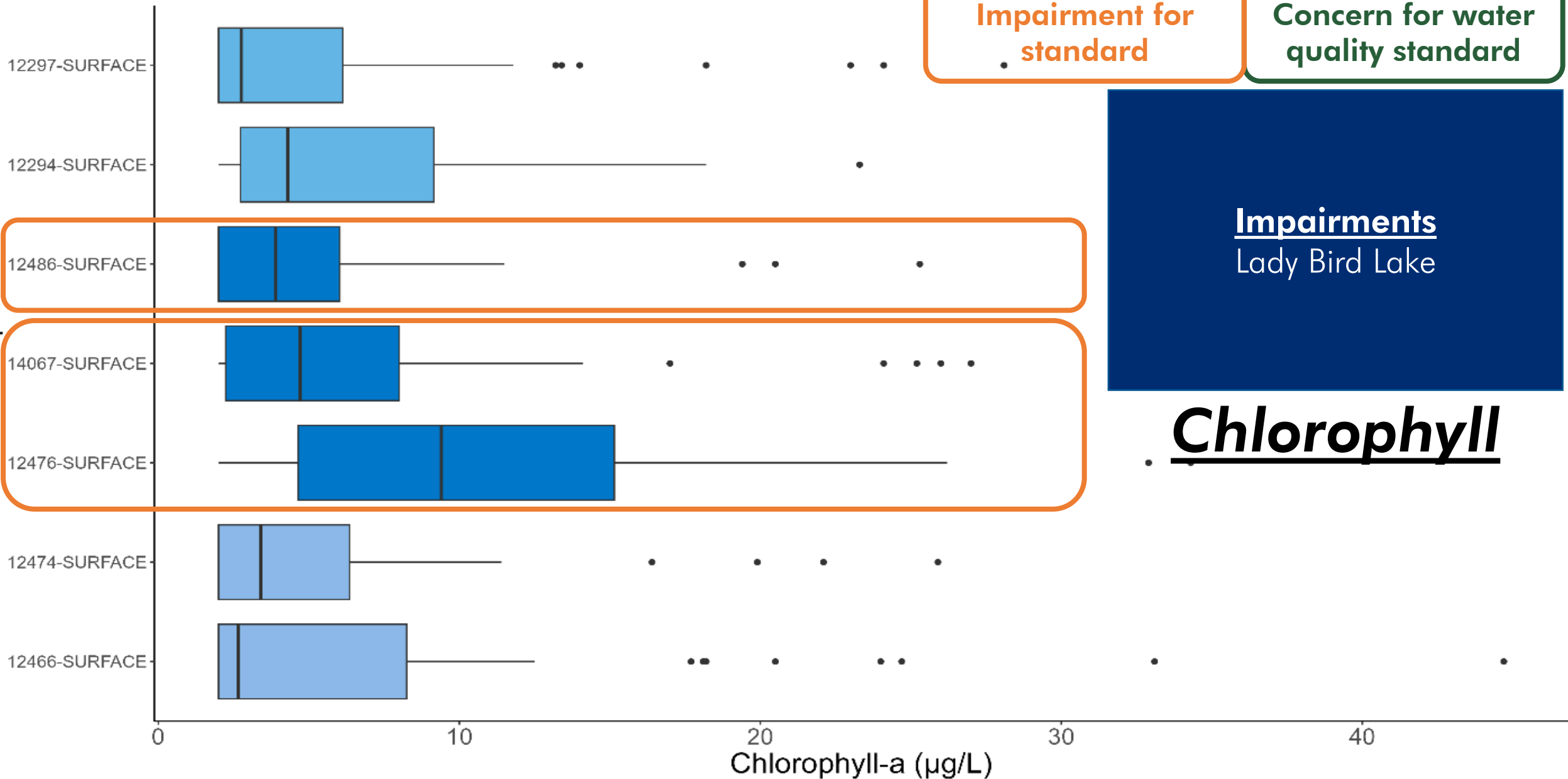
Concerns
 Taylor Slough South
 Colorado River below FM 973
 Gilleland Creek

Nitrate



Austin Basin

Station ID - Sample Location



Waterbody

Colorado River Lady Bird Lake Lake Austin

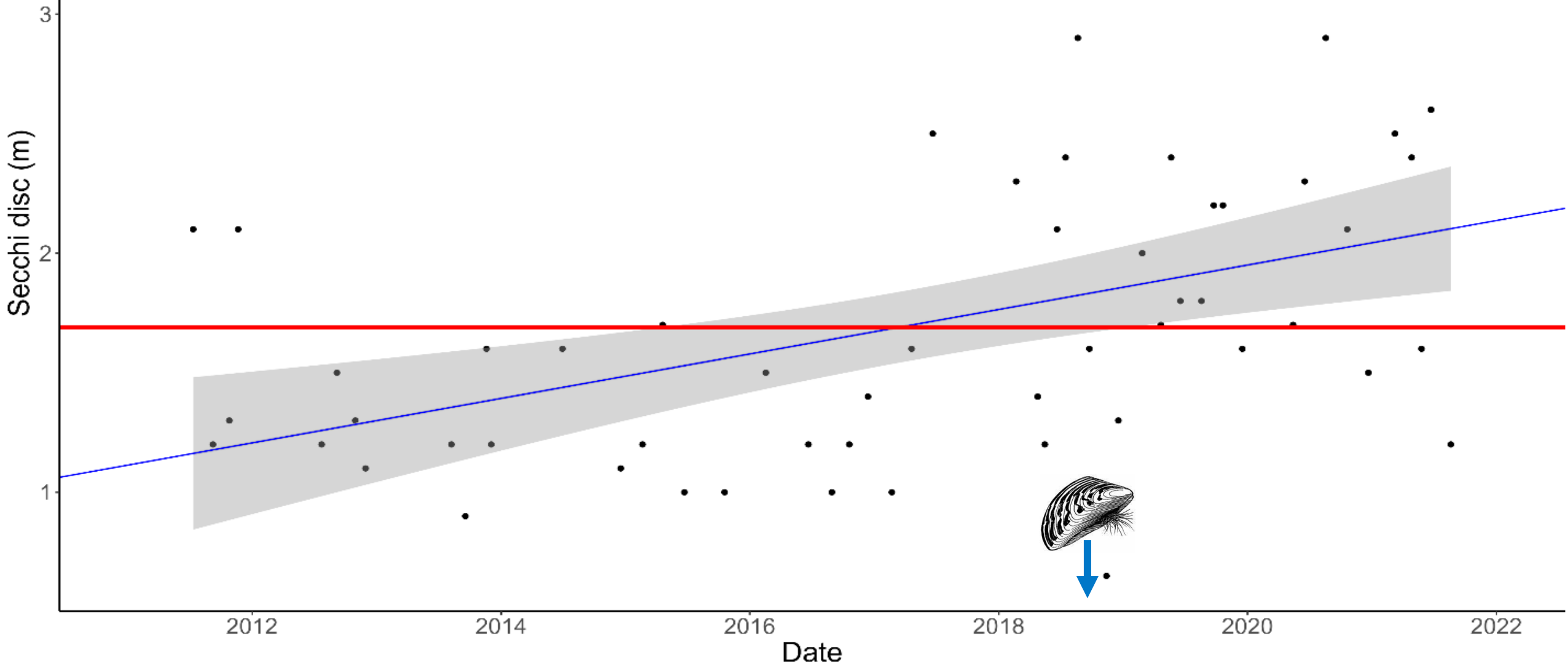
StationID: 12476-SURFACE

$R^2 = 0.2$

p-value = 4e-04

Lady Bird Lake

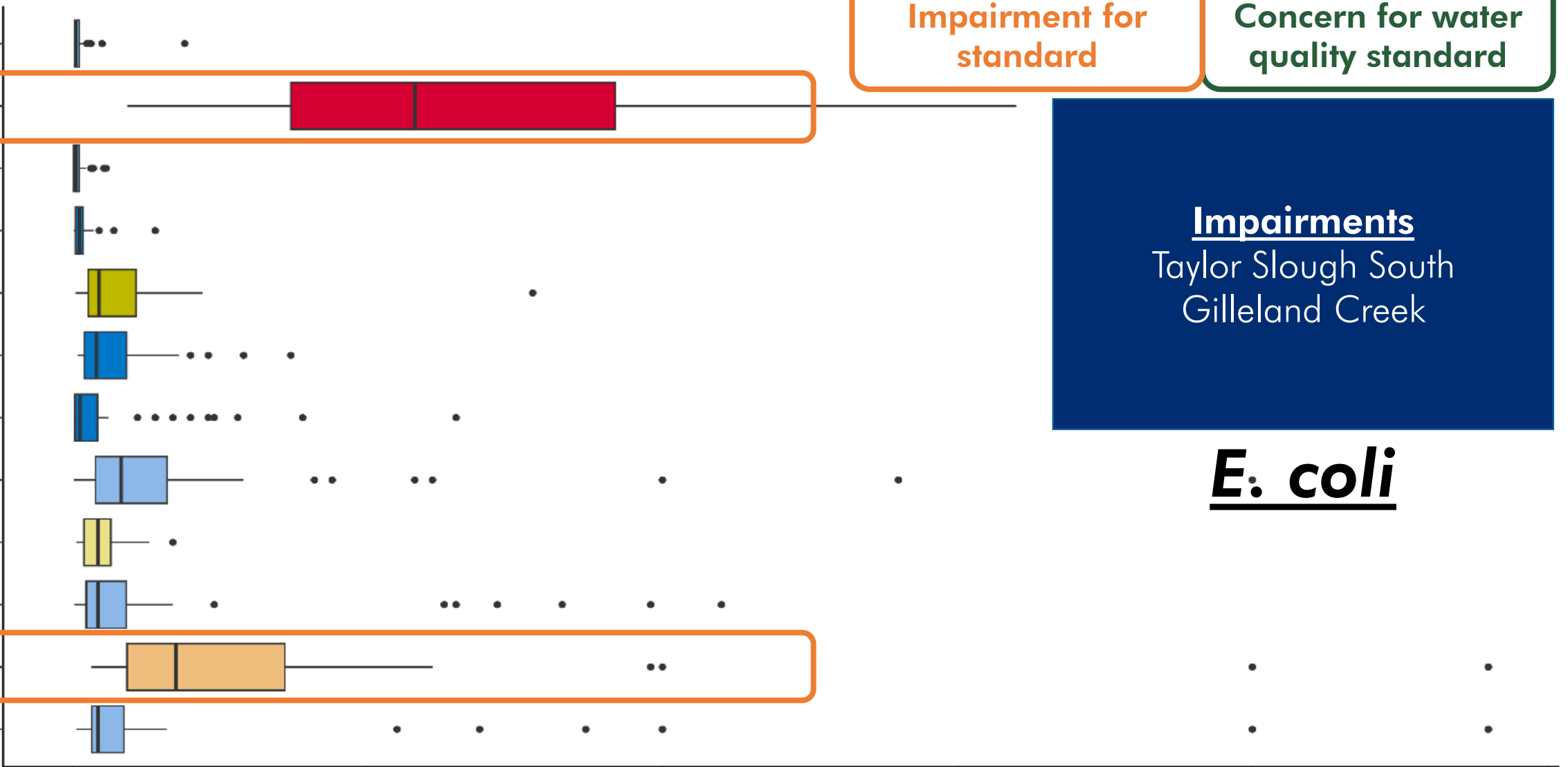
Secchi Depth



Austin Basin

Station ID - Sample Location

12297-SURFACE
17294-SURFACE
12294-SURFACE
12486-SURFACE
12488-SURFACE
14067-SURFACE
12476-SURFACE
12474-SURFACE
12231-SURFACE
12469-SURFACE
17257-SURFACE
12466-SURFACE



Impairment for standard

Concern for water quality standard

Impairments
Taylor Slough South
Gilleland Creek

E. coli



StationID: 12474-SURFACE

Colorado River @ 183

E. coli

$R^2 = 0.03$

p-value = 0.0939

E. coli (MPN/100mL)

2000
1500
1000
500
0

2012

2014

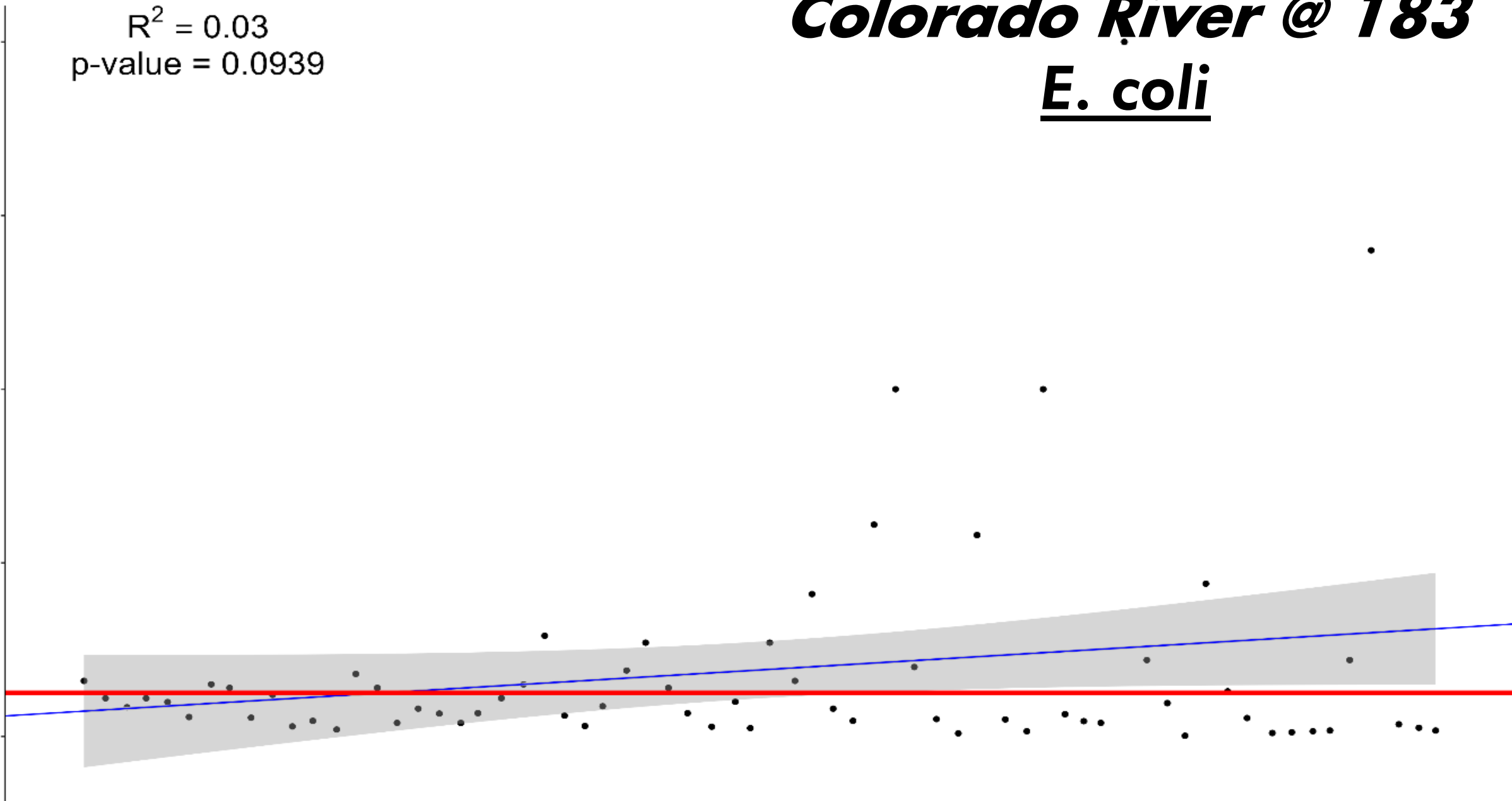
2016

2018

2020

2022

Date



Lower Colorado River Basin

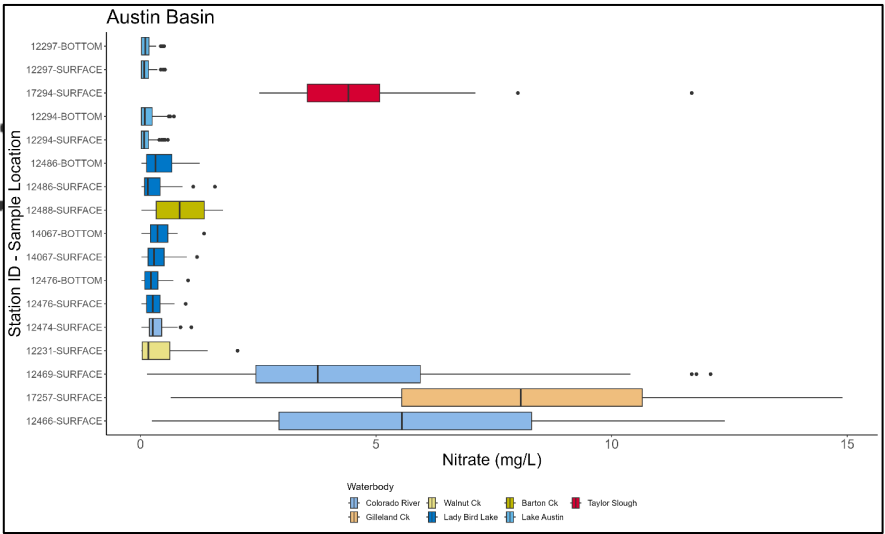
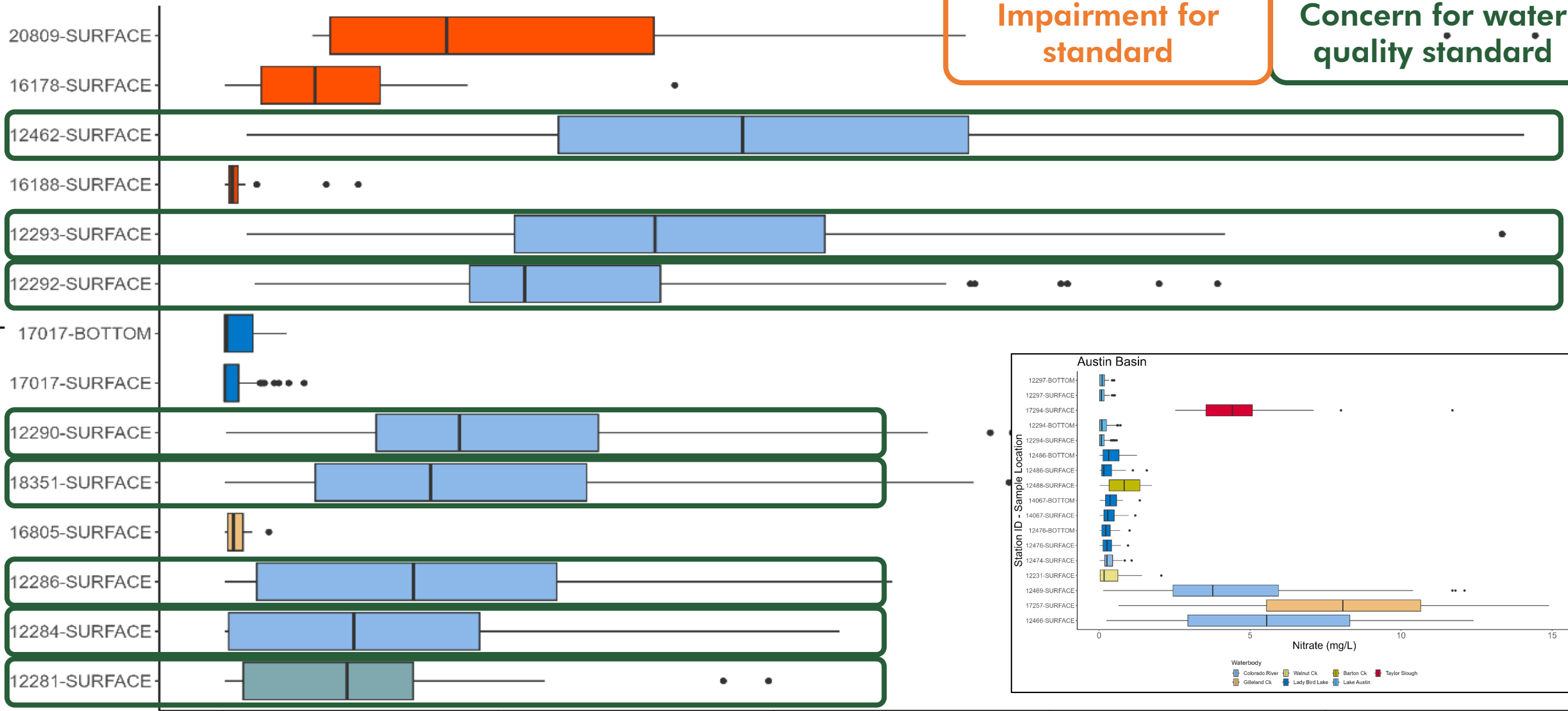
Data Trends

Lower Colorado River Basin

Impairment for standard

Concern for water quality standard

Station ID - Sample Location

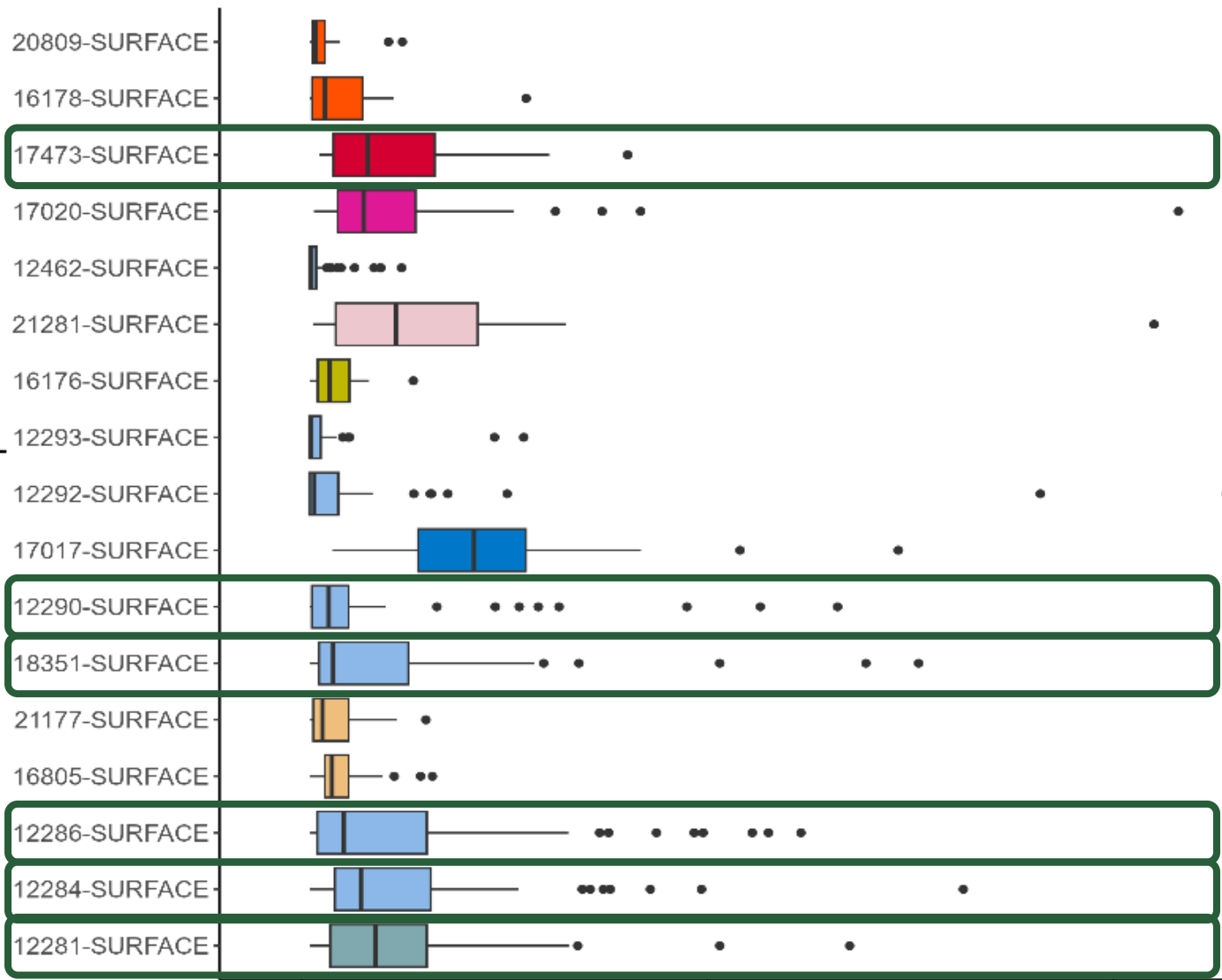


Nitrate



Lower Colorado River Basin

Station ID - Sample Location



Impairment for standard

Concern for water quality standard

Concerns
 Wilbarger Creek
 Colorado River below La Grange

Chlorophyll



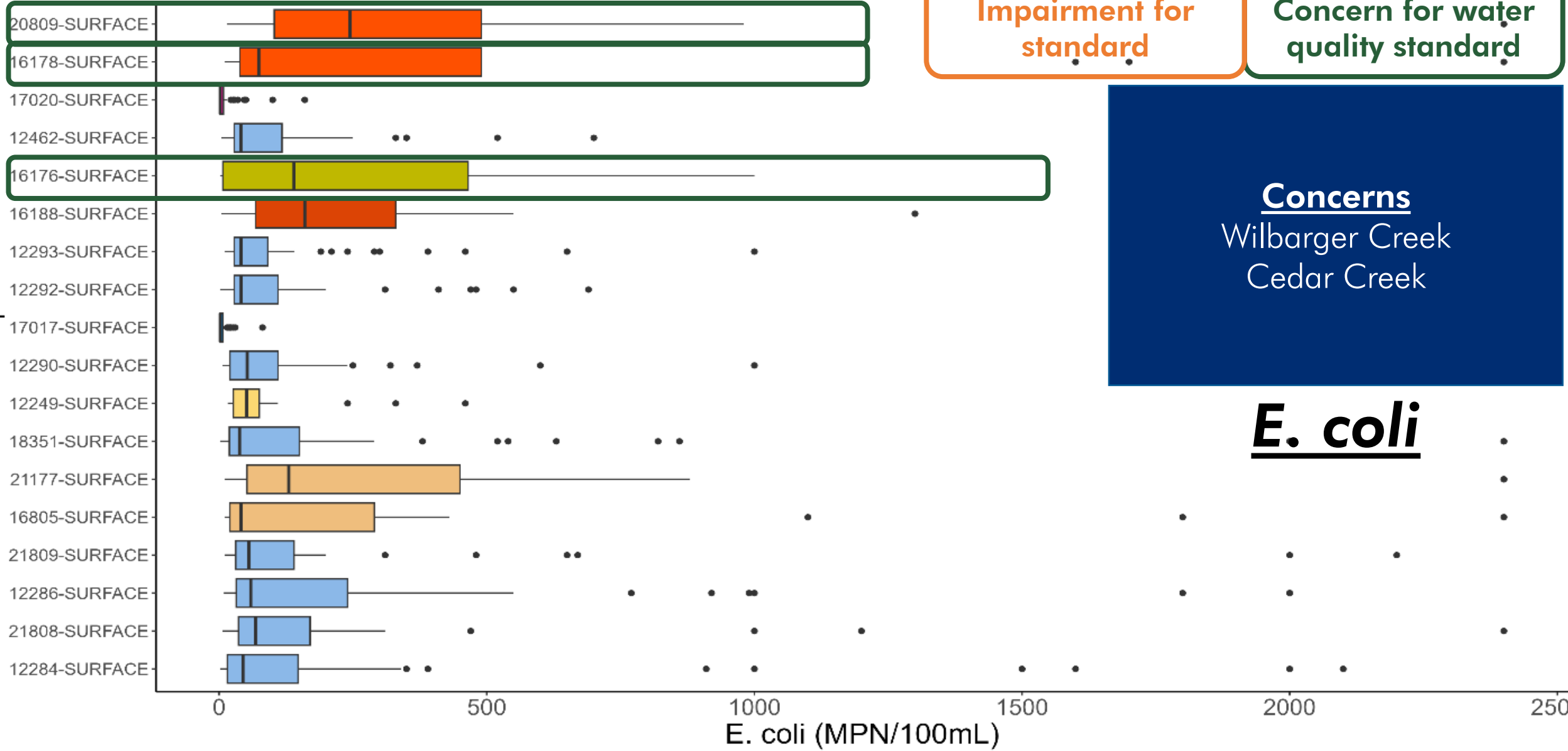
Lower Colorado River Basin

Impairment for standard

Concern for water quality standard

Concerns
Wilbarger Creek
Cedar Creek

Station ID - Sample Location

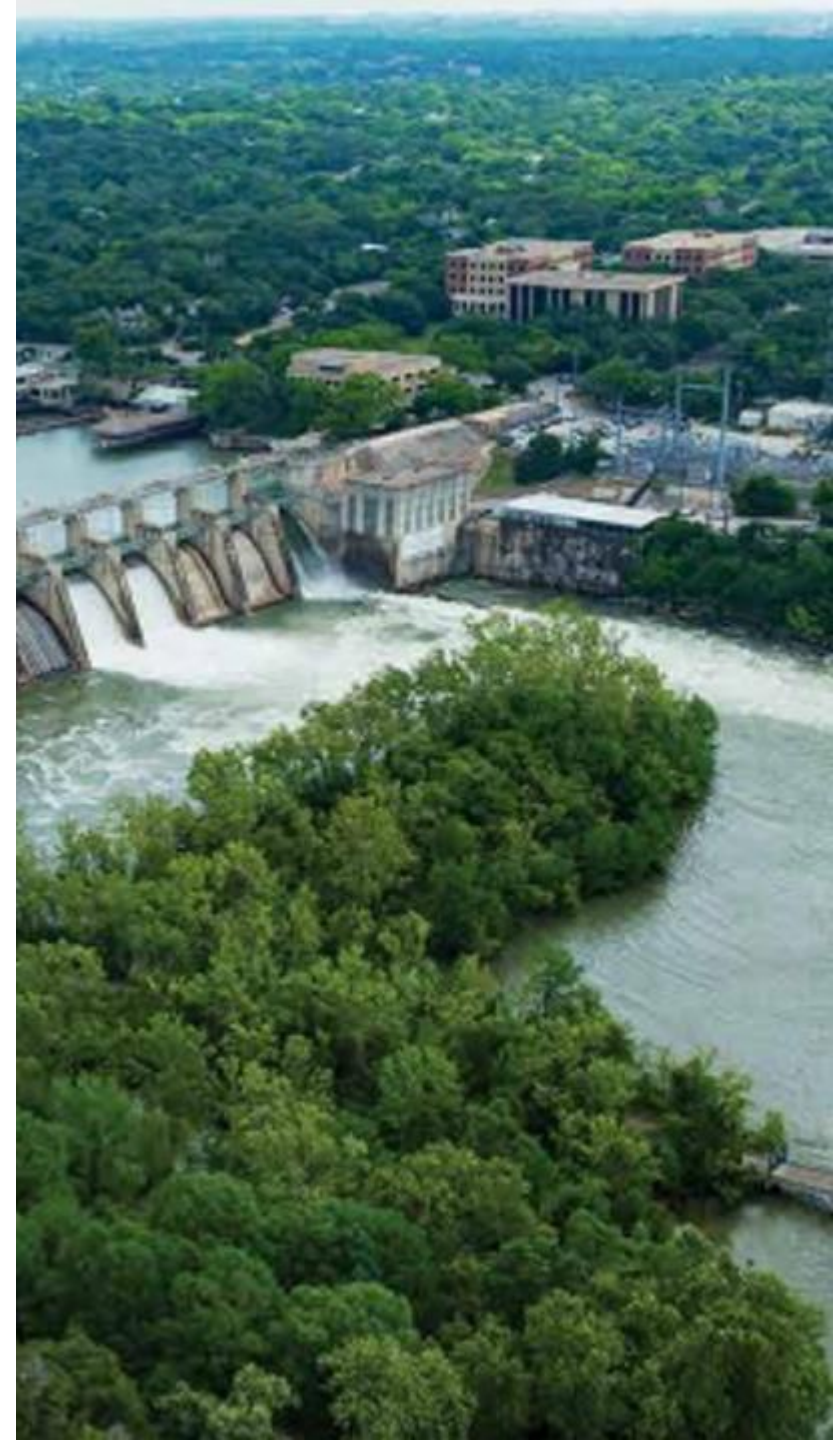


E. coli



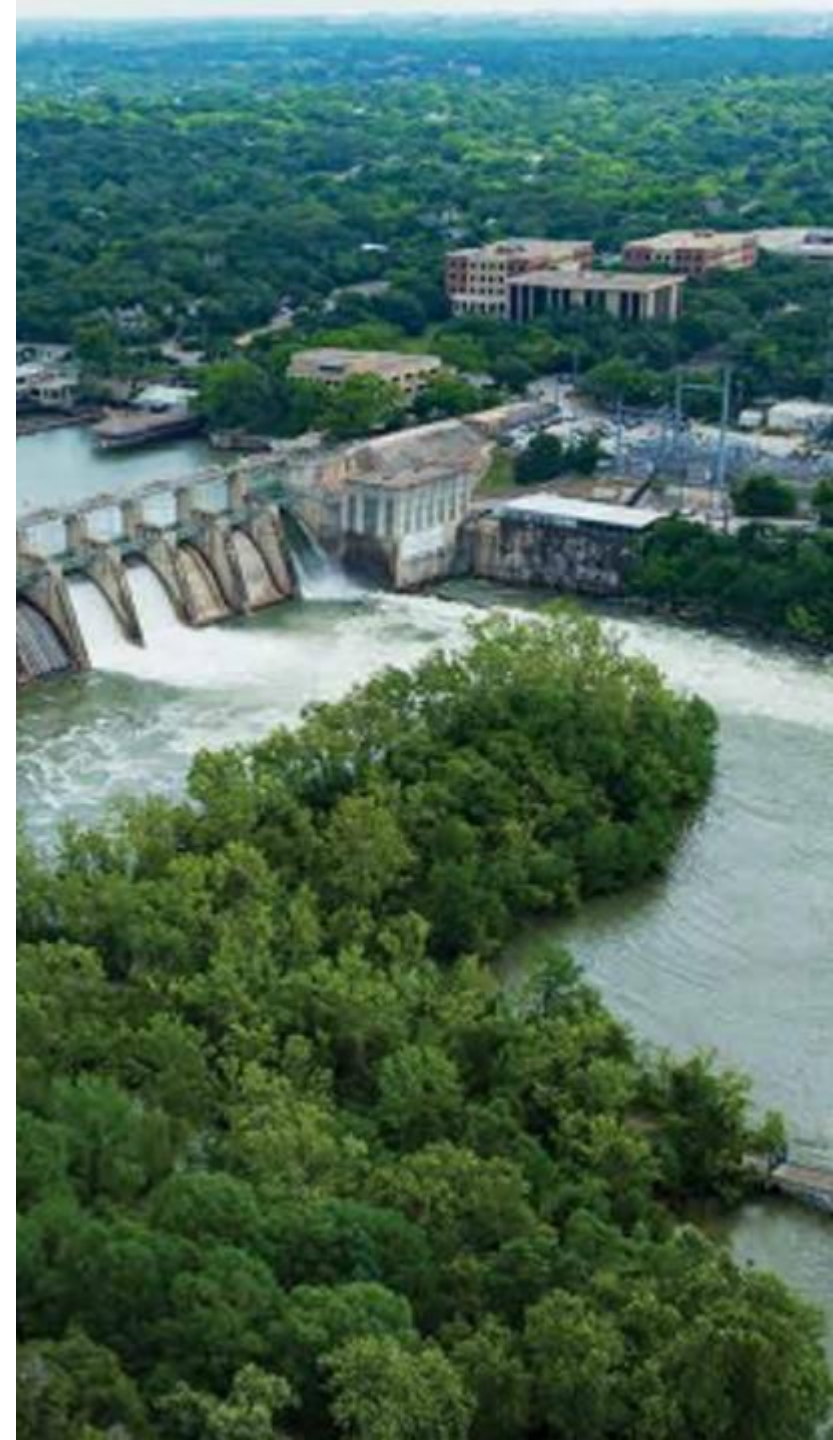
Summary

- **Drought Recovery**
 - Decreasing chloride, sulfate, TKN
- **Concerns for nutrients (especially nitrates) throughout the basin**
 - Especially downstream of urban areas
- **Concerns for chlorophyll *a* throughout basin**
 - Likely due to nutrient loads
- **Increasing trends in bacteria in specific areas**



Next Steps

- **Basin Summary Report Review**
 - Contact Aaron.Richter@lcra.org to be included in review
 - Deadline of notification is Friday, March 31
- **Stakeholder Review of BSR**
 - Report to be sent to reviewers Monday, April 3
 - Deadline for comments/edits is COB Friday, April 14



Questions?



