WEEKI WACHEE RIVER SPRINGSWATCH MONITORING SUMMARY

January 2023 – December 2023

PREPARED FOR
FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION,
DIVISION OF PARKS AND RECREATION

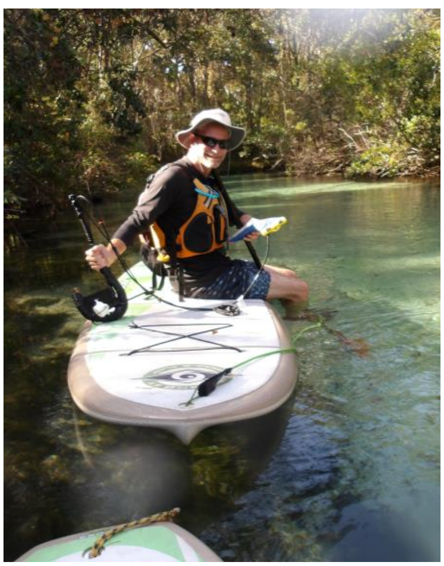
Howard T. Odum
FLORIDA SPRINGS INSTITUTE

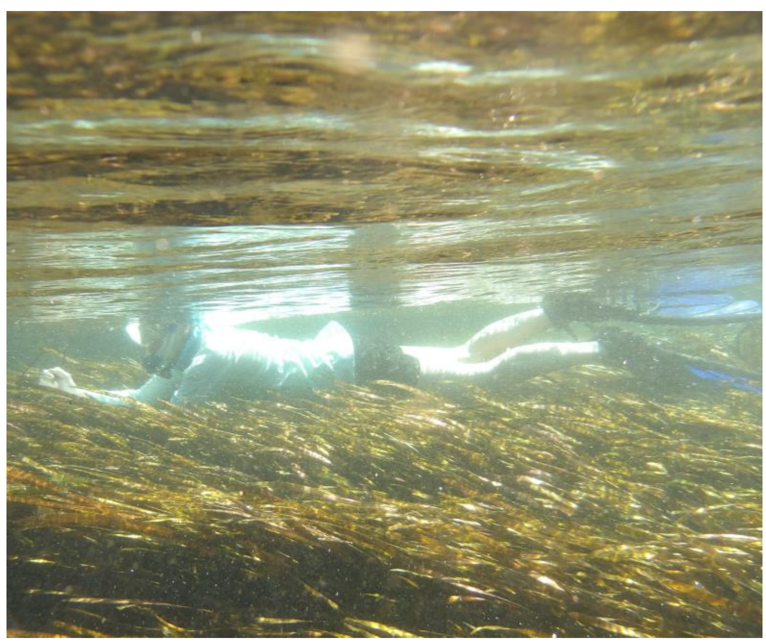
Volunteer and Staff Acknowledgements

This report was prepared by the Howard T. Odum Florida Springs Institute (FSI). Ecological monitoring was conducted by FSI staff and the Florida SpringsWatch volunteers under the Florida Department of Environmental Protection (FDEP) Division of Recreation and Parks Research/Collection Permit Number 07012340.

Our Weeki Wachee SpringsWatch program would not be possible without the hard work of our team leader, Jill Lingard. We would also like to acknowledge the contribution and dedication of our other volunteers: Scott Jantz, Paul Grimshaw, Sara Tunder, Brooke Longval, Shannon Letcher, John Whitfield, Wyatt Letcher-Whitfield, Wren Letcher-Whitfield, Willabelle Letcher-Whitfield. Steven Blanchard, Joan Landis, Dana Hamiliton, Michael Fay, Blake Harvey, Brooke Longval, Casey Fay. Together they put in 185 volunteer hours over 10 monitoring sessions in 2023. We would like to thank Isaac Szabo for his underwater fish photography utilized in this report.

We would like to thank FSI's SpringsWatch Coordinators, Emanuela Torres-Marquis, Shannon Letcher, and Jill Lingard and Environmental Scientist Bill Hawthorne, and Associate Director Haley Moody for their contributions to this report; all of whom worked under the guidance of Executive Director Dr. Emily Taylor. We also acknowledge the ongoing guidance from former Executive Director Dr. Robert Knight.





Section 1.0 Introduction

Weeki Wachee Spring and River is located in western Hernando County and is a focal point for outdoor recreation in the region. Rainbow, Crystal River/Kings Bay, Homosassa, Chassa-howitzka, and Weeki Wachee springs systems comprise the Springs Coast (Figure 1). The headspring that feeds the Weeki Wachee River is in Weeki Wachee Springs State Park. The Weeki Wachee River flows approximately 7.5 miles from its headspring to the Gulf of Mexico.

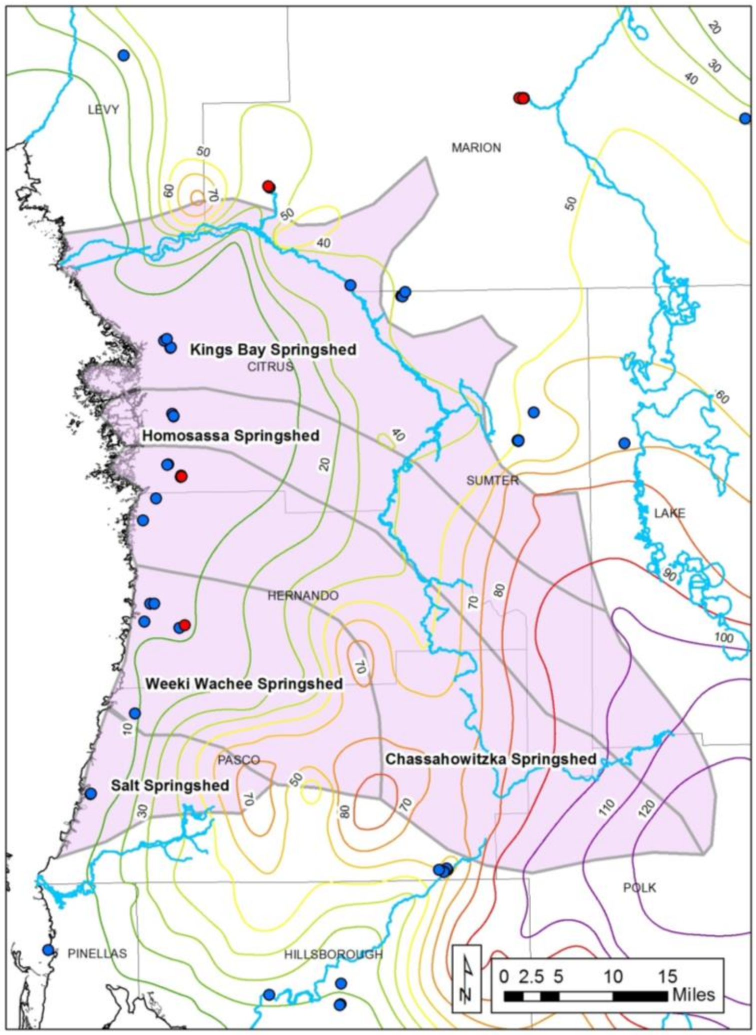


Figure 1. Florida's Springs Coast and the location of the springsheds in the region (FSI 2016).

Since 2018, the Florida SpringsWatch citizen science program has provided enhanced monitoring of the Weeki Wachee River's ecological health through monthly sampling sessions. The resulting data are provided in annual reports and via FSI's SpringsWatch website (floridaspringsinstitute.org/springswatch) to inform the state's environmental agencies and to educate the public about the springs and river health.

This report was prepared by the Howard T. Odum Florida Springs Institute (FSI) and is focused on ecological monitoring conducted along the Weeki Wachee River in 2023 by SpringsWatch volunteers.

1.1 Monitoring Stations

Each month, SpringsWatch volunteers collected data at 15 stations along the Weeki Wachee River from Weeki Wachee Springs State Park to Rogers County Park (Figure 2). Station 1 is closest to the headspring at the top of the river; station 15 is at Rogers Park. The upper five stations are situated within state park boundaries where regulations prohibit boaters from exiting their watercraft. Eight of the 15 stations occur along stretches of the river that are protected by state parks and national refuge lands.

Figure 2. Weeki Wachee River SpringsWatch Monitoring Stations

Section 2.0 Methods

SpringsWatch volunteers conducted monthly ecological monitoring on the Weeki Wachee River from January to December 2023. Data collection included water quality field parameters, water clarity, light attenuation, aquatic vegetation cover, and fish counts.

2.1 Sampling Events

Table 1 summarizes the 10 sampling events conducted along the Weeki Wachee River in 2023 by SpringsWatch volunteers. Two sampling events (March and July) were cancelled due to inclement weather conditions.

Volunteers collected the following data during each monitoring session:

- Water quality field parameters (temperature, dissolved oxygen, conductivity, nitrate)
- Vertical light attenuation (PAR)
- Horizontal Secchi disk measurements
- Submerged aquatic vegetation
- Bird survey

Table 1. 2023 Weeki Wachee SpringsWatch sampling events.

Date	Temperature	Dissolved Oxygen	Specific Conductance	PAR	Nitrate+Nitrite	Vegetation	Birds
1/19/2023	X	X		X		X	X
2/16/2023	X	X		X		X	X
3/16/2023	X	X		X		X	X
4/20/2023	X	X	X	X		X	X
5/18/2023	X	X	X	X		X	X
6/15/2023	X	X	X	X		X	X
7/20/2023	X	X	X	X		X	X
8/17/2023	X	X		X		X	X
9/21/2023	X		X	X		X	X
10/19/2023	X	X	X	X		X	X
12/21/2023	X	X	X	X		X	X
12/26/2023					X		

2.2 Water Quality

Surface water data were collected monthly along the Weeki Wachee River with YSI water quality meters. Volunteers used handheld YSI ProODO and YSI Pro30 meters at each of the 15 monitoring stations to collect measurements of dissolved oxygen, water temperature, and specific conductance. The SpringsWatch team leader maintained the meters and calibrated them before and after each sampling event according to factory instructions. Water samples were also collected in a month for nitrate-nitrite analysis.

2.2.1. Nitrate-Nitrite (NOx-N)

FSI staff collected NOx-N samples at WW-1, the station nearest the head spring, WW-9, and WW-15 during their March 2023 sampling session (Figure 2). Water samples were sent to a state-accredited laboratory (McGlynn Laboratories Inc.) for NOx-N analysis. Preparation, storage, and analysis all followed FDEP Standard Operating Procedures. Samples were hand collected from approximately 0.1m depth. Sample bottles were re-capped and sealed before being acidified with approximately 0.25mL of 50% sulfuric acid (H_2SO_4) and then stored on ice prior to transport. Water sampled were held in a refrigerator for <21days before being sent to a state-accredited laboratory (McGlynn Laboratories Inc.) for NOx-N analysis. All analyses were conducted within a standard holding time of 28 days from sample collection.

2.3 Light Measurements

Photosynthetically Active Radiation (PAR) underwater light transmission and attenuation coefficients were measured monthly at the 15 monitoring sites. Volunteers used a LI-COR brand LI-250A underwater quantum photometer to measure PAR energy reaching the water surface and at depth intervals of one foot and two feet. Figure 3 provides an image of the LI-COR PAR light sensor.

Figure 3. LI-COR PAR light sensor.

2.4 Secchi Disk Visibility

SpringsWatch volunteers took monthly horizontal Secchi disk measurements at stations 1, 9, 14, and 15 throughout the sampling period.

The Secchi disk (Figure 4) is a tool for measuring water clarity in aquatic ecosystems. It is a disk with alternating black and white quadrants that is lowered into the water until it is no longer visible. The depth at which the disk disappears is known as the Secchi depth and is used as an indicator of water quality. The longer the Secchi depth, the clearer the water is. As Florida springs are often clearer than they are deep, we measure Secchi horizontally. Secchi length can be used to monitor changes in water clarity over time and can be used to identify problems such as algal blooms or pollution.

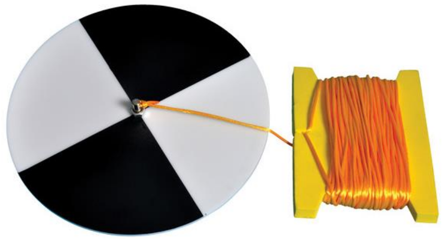


Figure 4. Secchi disk.

2.5 Fish Survey

SpringsWatch volunteers donned masks, snorkels, and fins to count fish visually and identify them to the lowest taxonomic group for a 0.3-mile stretch of river between stations 2 and 3 (Figure 2). Following each survey, underwater observers estimated the average lengths for each fish species they saw.

2.6 Vegetation

Submerged aquatic vegetation (SAV) was photographed monthly at all 15 stations (Figure 2). SpringsWatch volunteers took two underwater photographs at each station in two different locations, which they sent to FSI for vegetation identification and coverage estimates.

2.6 Bird Survey

Weeki Wachee SpringsWatch volunteers recorded visual monthly observations of birds between stations WW-1 and WW-15.

Section 3.0 Results

This section summarizes field data collected by SpringsWatch volunteers along the Weeki Wachee River from January to December 2023.

3.1 Water Quality

3.1.1 Dissolved Oxygen, Water Temperature, Specific Conductance, and Nitrate-Nitrite

Figure 5 through Figure 8 present 2023 water quality data collected from the 15 stations along the Weeki Wachee River. Figures 5 show dissolved oxygen results measured in percent saturation (DO%) at each river station. Figure 6 shows DO results measured in milligrams per liter (mg/L), or parts per million, at each river station.

Incoming DO is relatively low (~ 3 to 5 mg/L) and is typical of groundwater that has spent considerable time underground before emerging from a spring vent. Moving downstream from the spring vent there is a consistent increase in DO saturation from about 35% to more than 80% as the water accumulates more free oxygen from photosynthesizing SAV/algae and atmospheric diffusion.

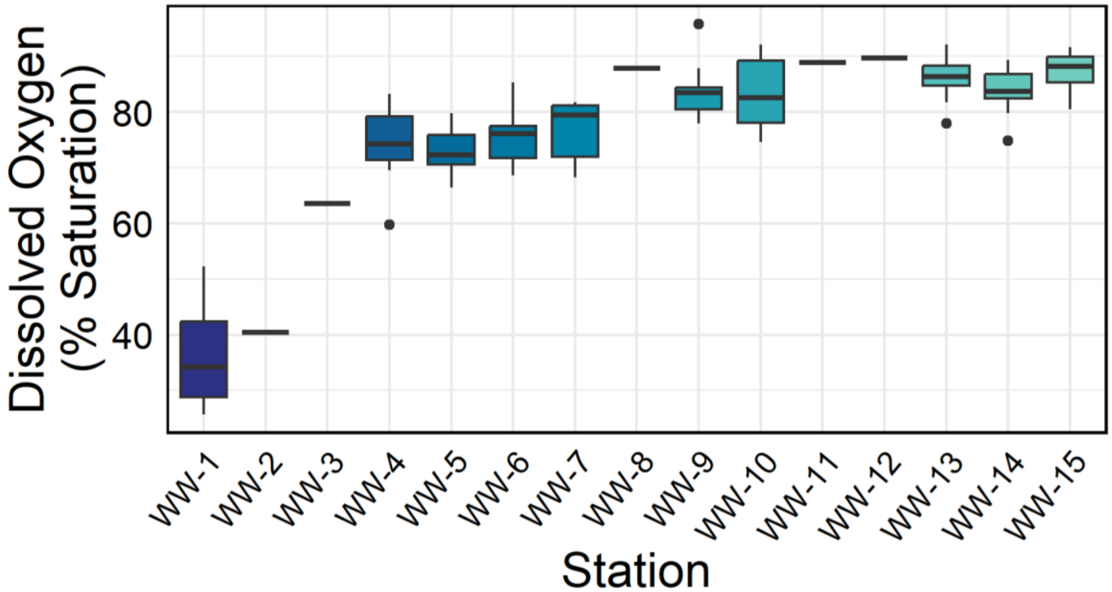


Figure 5. Dissolved oxygen (DO% saturation) by Weeki Wachee SpringsWatch station (January – December 2023)

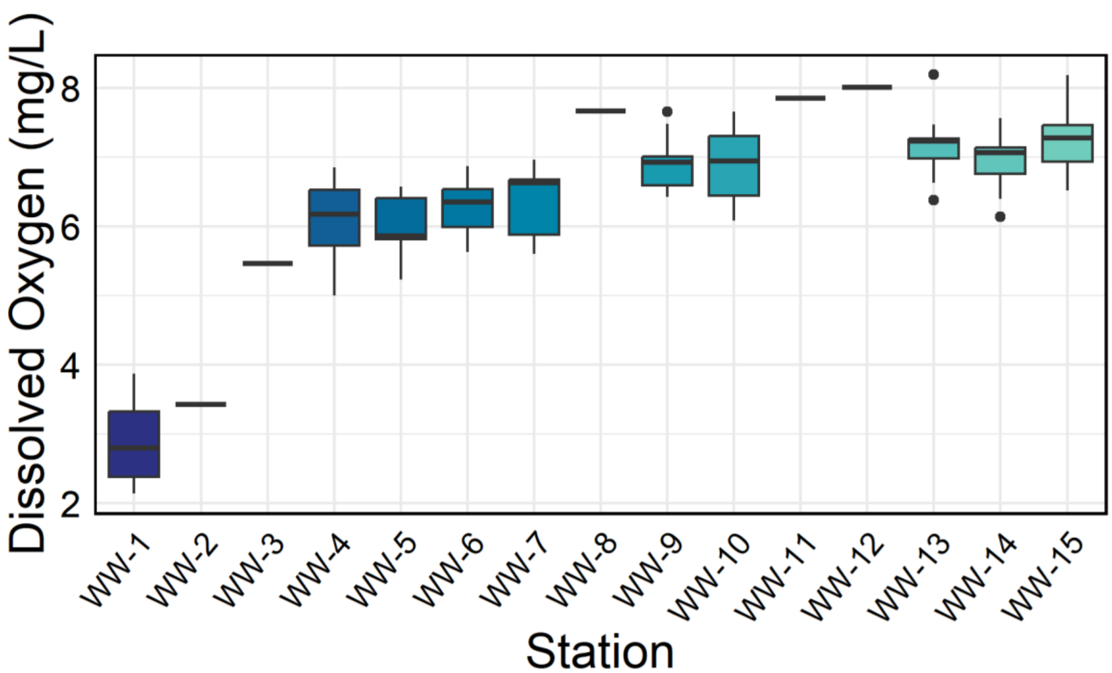


Figure 6. Dissolved oxygen (mg/L) by Weeki Wachee SpringsWatch station (January-December 2023).

Figure 8 summarize 2023 water temperature field measurements. Temperature in the Weeki Wachee River remains relatively constant year-round (typically ~24°C) since it is primarily fed by spring water in the southern range of the Floridan Aquifer. Station WW-15 is closest to the Gulf of Mexico; the temperature variability there reflects tidal influences.

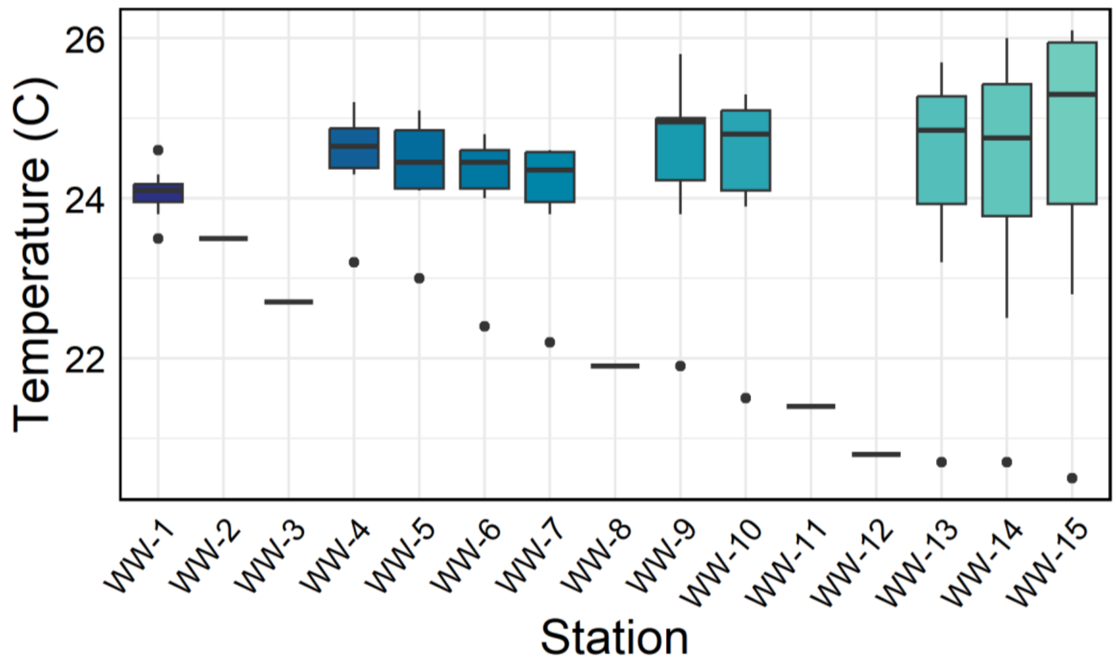


Figure 7. Average temperature (°C) by SpringsWatch Weeki Wachee (January to December 2023)

Specific conductance levels can be influenced by naturally occurring ions present in spring water but also from ions present due to higher levels of nitrate/nitrite, saltwater, and other compounds. Higher specific conductance values suggest a higher concentration of these ions in the water. Figure 8 illustrates characteristic spring specific conductance levels less than 400 uS/cm at stations 1 through 12. A sharp increase in specific conductance occurs at stations 13 through 15 (Figure 9). This spike is likely caused by an influx of saltwater flowing in from daily tidal changes (Figure 2).

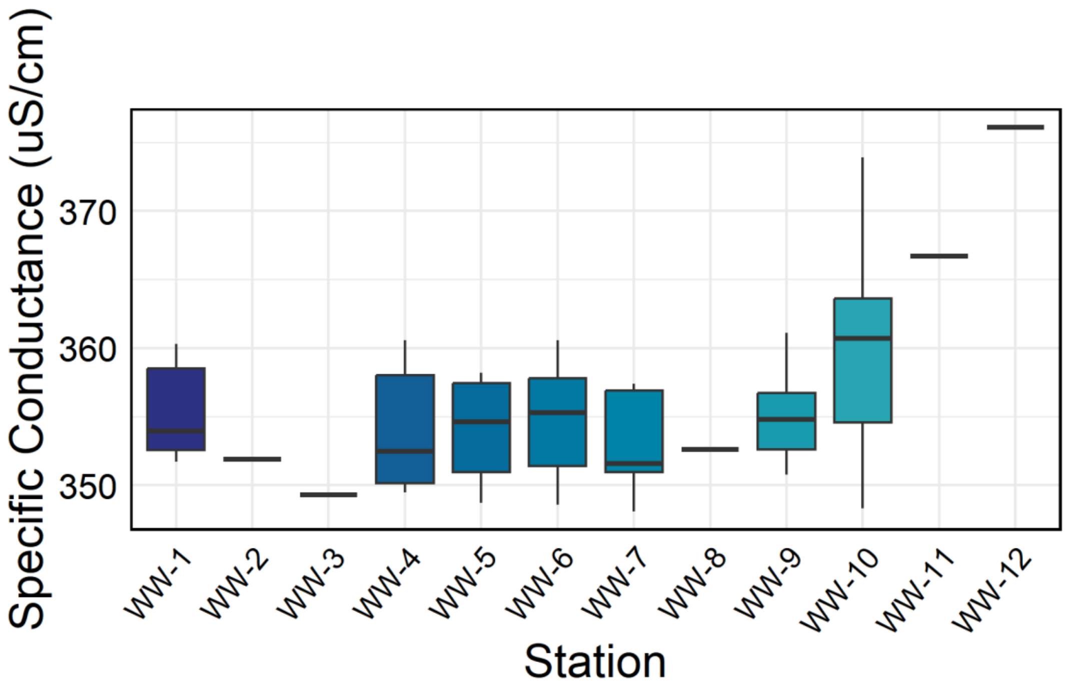


Figure 8. A box plot of specific conductance measurements over 2023.

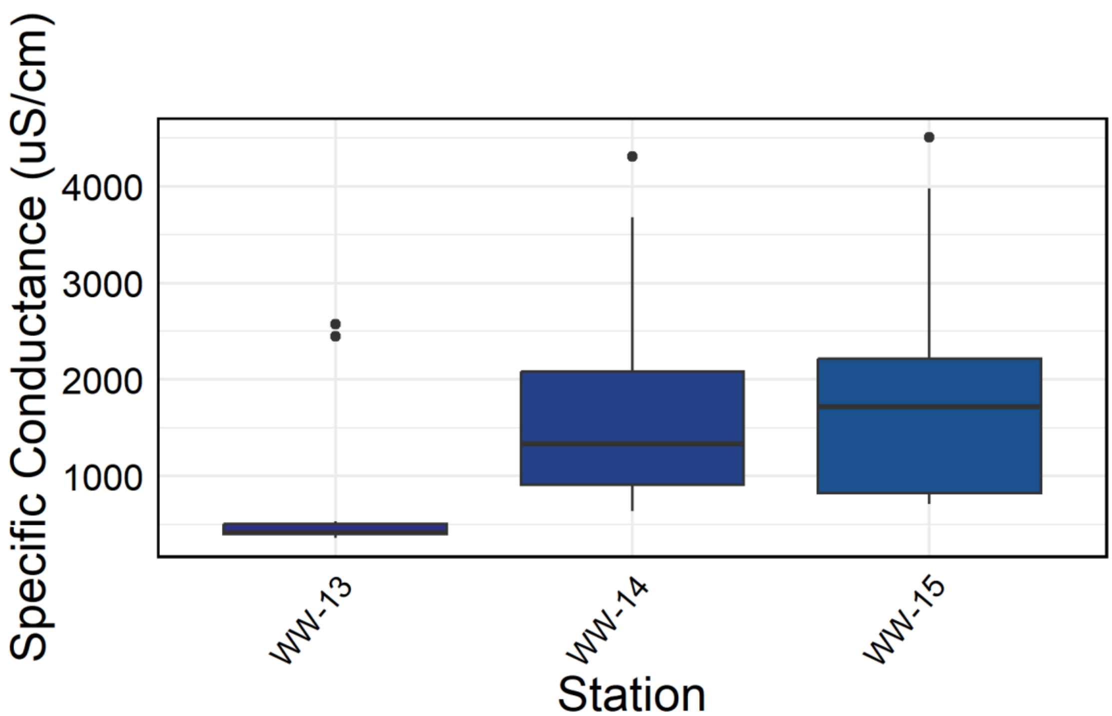


Figure 9. A box plot of specific conductance measurements over 2023.

FSI staff collected NOx-N samples at WW-1, the station nearest the head spring, WW-9, and WW-15 during their March 2023 sampling session. The springs impairment level set by the Florida Department of Environmental Protection is 0.35mg/L. NOx-N at station WW-1 was 0.814 mg/L, which is over 2 times greater than the FDEP threshold. NOx-N at station WW-9 was 0.834 mg/L, which is over 2 times greater than the FDEP threshold. NOx-N at station WW-15 was 0.678 mg/L, which is almost 2 times greater than the FDEP threshold.

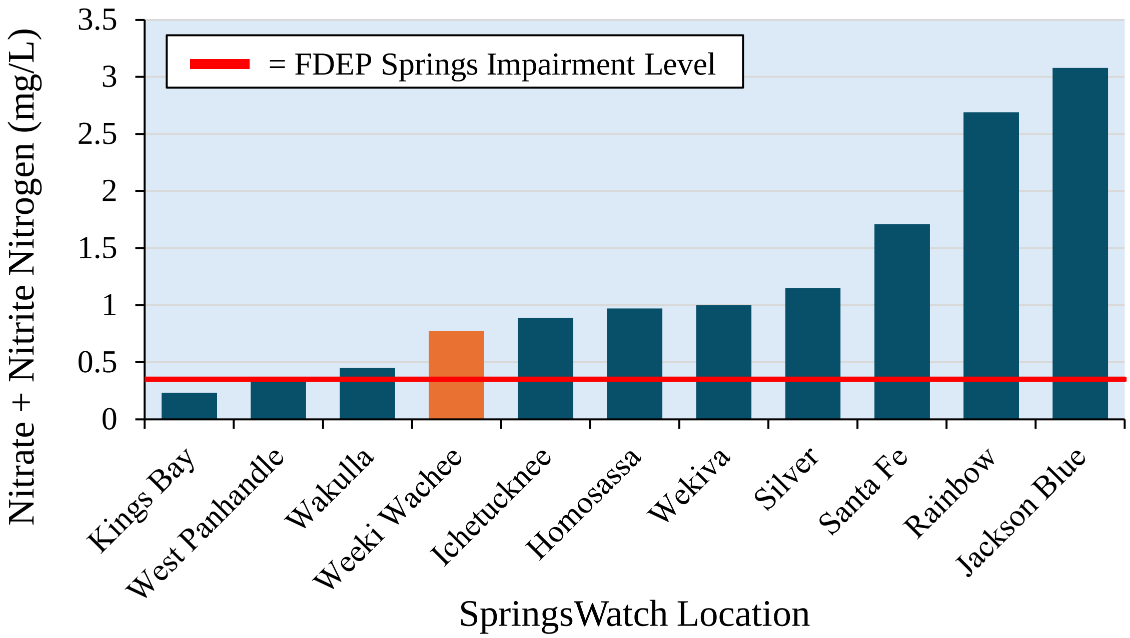


Figure 10. Nitrate-nitrite (NOx-N levels at SpringsWatch samples sites in 2023. Taken in December 2023, Weeki Wachee is denoted by the orange bar.

3.2 Clarity and Light Measurements

3.2.1 Secchi Disk Visibility

Figure 11 presents horizontal Secchi disk measurements in meters at stations WW-1, WW-9, and WW-15, and vertical Secchi measurements at station 14 (the 140-foot deep "Hospital Hole"). Secchi data provides additional information concerning water clarity and the light attenuation properties of the spring run. Lower Secchi measurements indicate reduced water clarity, possibly due to recreational activity and resuspension of algae growing attached to surfaces in the stream channel.

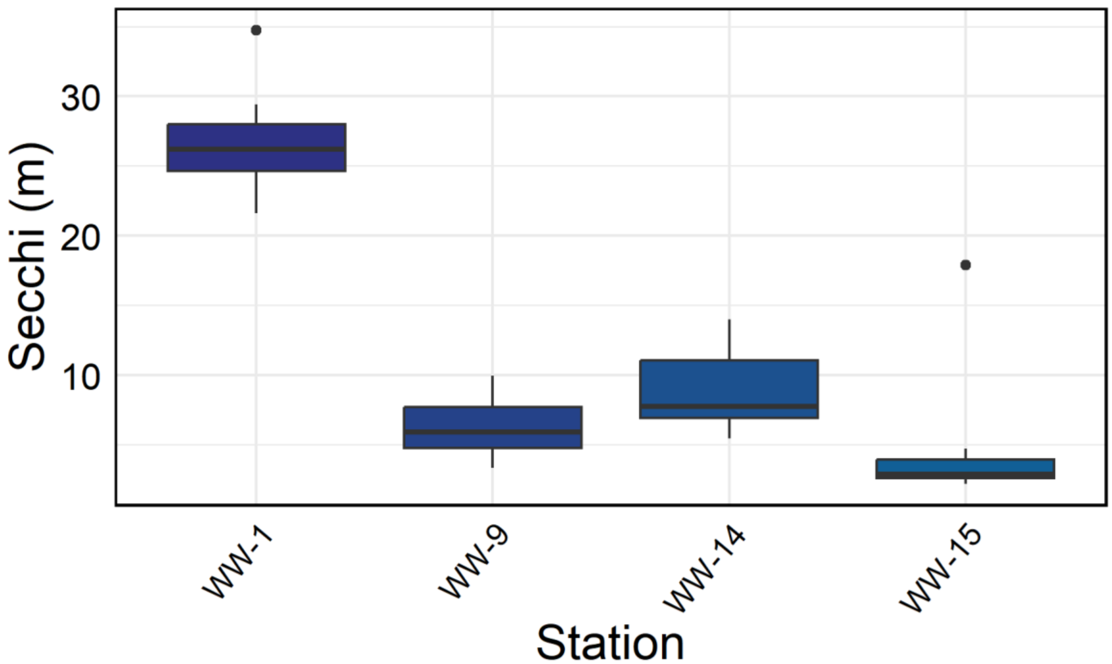


Figure 11. Secchi disk measurements (m) for upper, middle, and lower Weeki Wachee River (January-December 2023).

3.2.2 Light Measurements

Figure 12 presents the percent transmittance estimates collected by Weeki Wachee SpringsWatch volunteers from January through December 2023.

Percent transmittance refers to the amount of light that is able to pass through the water column to a depth of 1 meter below the surface. Figure 13 presents the k (diffuse light attenuation) calculated average per Santa SpringsWatch monitoring session (January to November 2023). The diffuse attenuation coefficient (k) is the calculated via the Lambert-Beer equation (Wetzel 2001) to measure how readily light dissipates throughout the water column. Higher attenuation values correspond to less water clarity. Higher values of percent transmittance tend to correspond with lower values of coefficient k. Higher k values, or lower percent transmittance values, can indicate poor water clarity since light cannot pass as easily through the water column, often due to increases in dissolved substances such as tannins (color) and suspended solids (turbidity) in the water.

In aquatic ecosystems, the diffusion attenuation coefficient can have a significant impact on the biota that inhabit the water. For example, in shallow, clear water with a low diffusion attenuation coefficient and high percent transmittance, light can easily reach the bottom of the water column, enabling the growth of aquatic plants and phytoplankton. This, in turn, can support the entire food web, from primary producers to top predators. On the other hand, in deep, turbid water with a high diffusion attenuation coefficient and low percent transmittance, light is unable to penetrate as far, limiting the growth of aquatic plants and phytoplankton. This can have cascading effects on the entire ecosystem, potentially reducing the population size and diversity of biota that depend on these primary producers. Thus, the diffusion attenuation coefficient is an important factor to consider when evaluating the health and productivity of aquatic ecosystems.

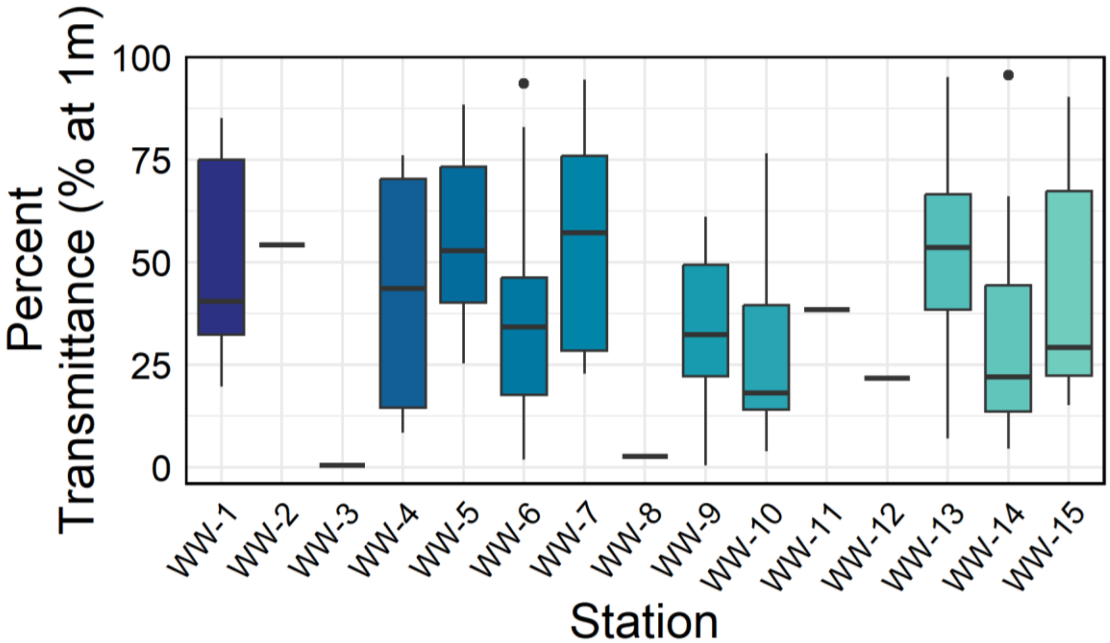


Figure 12. Percent Transmittance (% @1m) by Weeki Wachee SpringsWatch station (January to December 2023)

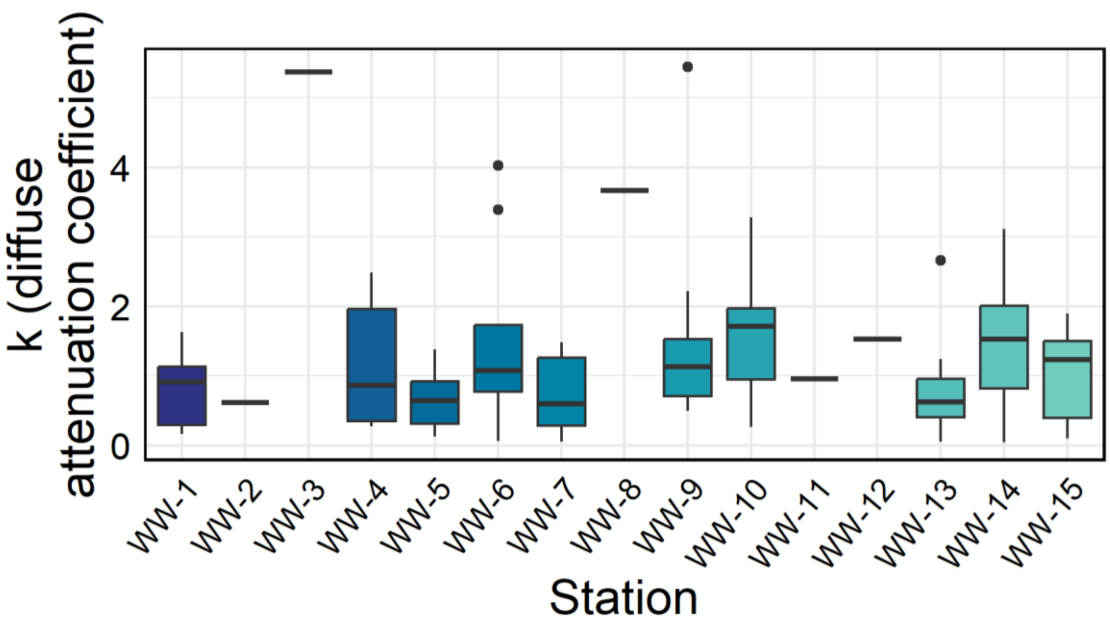


Figure 13. Average k (diffuse attenuation coefficient) by Weeki Wachee SpringsWatch station (January – December 2023)

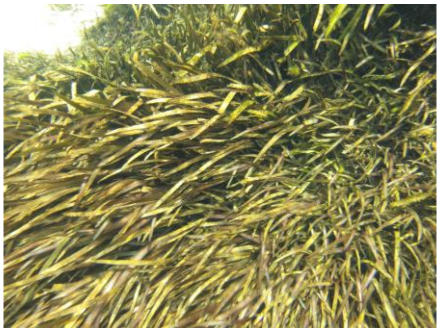
3.3 Aquatic Vegetation Survey

Submerged aquatic vegetation plays an important ecological role within a springs system. It provides habitat and food for fish and other wildlife, increases water clarity, affects nutrient cycles, and stabilizes shorelines and sediments. This data presents an ongoing record of conditions in the river and spring and will be useful for comparison to future evaluations of the ecological health of the system.

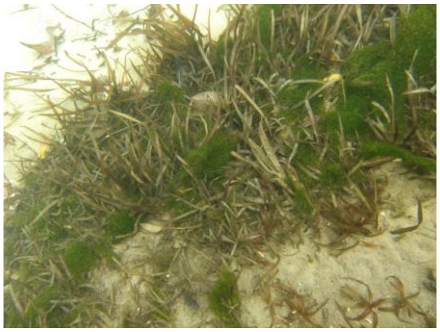
Healthy populations of native submerged aquatic plant species occur in the upstream portion of the Weeki Wachee River, from stations 1 through 5. The majority of the river below station 5 lacks native plants and is dominated by bare sand and attached algae. During 2022 sampling sessions, SpringsWatch volunteers noticed small patches of new eelgrass (Vallisneria) growth downstream around station WW-13.

Pictured below are river bottom photos taken by SpringsWatch volunteers in 2023 which feature the SAV of the upper, middle, and lower Weeki Wachee.

Upper Weeki Wachee River (stations WW-1 through WW-5):



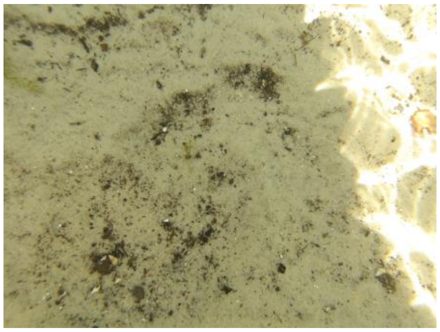
Vallisneria



Vallisneria, algae, and sand

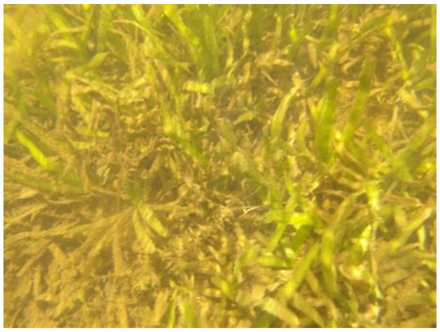
Middle Weeki Wachee River (stations WW-6 through WW-10):

Algae and sand

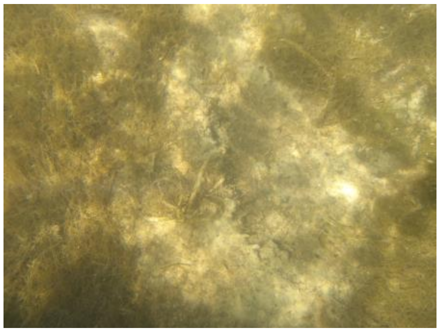


Sand

Lower Weeki Wachee River (stations WW-11 through WW-15):



Vallisneria and algae



Algae, Vallisneria, and detritus

3.4 Fish Survey

SpringsWatch volunteers conducted visual fish counts monthly along a 0.3-mile stretch of the Weeki Wachee River, about 2.5 acres of surface area, between stations WW-2 and WW-3 (Figure 2). Table 2 presents a summary of fish observed on monthly outings.

Table 2. Average counted fish observed during Weeki Wachee SpringsWatch between stations WW-2 to WW-3 (January – December 2023)

Common Name	Scientific Name	Average # Counted per Survey
Atlantic Needlefish	*Strongylura marina*	139
Bass	*Micropterus* sp.	55
Crevalle jack	*Caranx hippos*	2
Gizzard Shad	*Dorosoma cepedianum*	31
Golden Shiner	*Notemigonus crysoleucas*	3
Gulf Killifish	*Fundulus grandis*	160
Lake Chubsucker	*Erimyzon sucetta*	1
Mangrove Snapper	*Lutjanus griseus*	13
Mullet	*Mugil cephalus*	283
Redeye chub	*Pteronotropis harperi*	775
Sailfin Molly	*Poecilia latipinna*	200
Sheepshead	*Archosargus probatocephalus*	29
Snook	*Centropomus undecimalis*	3
Sunfish sp.	*Lepomis* sp.	271
Minnow sp.	*Notropis* sp.	106

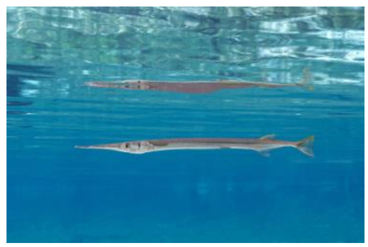
Pictured below are some of fish species frequently observed by SpringsWatch volunteers during their monthly outings from January to December 2023.


Striped Mullet


Largemouth Bass


Sheepshead


Crevalle Jack


Atlantic Needlefish


Mangrove Snapper


Lake Chubsucker


Common Snook


Redeye Chub

3.5 Bird Survey

Weeki Wachee SpringsWatch volunteers recorded visual monthly observations of birds between stations WW-1 and WW-15 (Figure 2). Table 3 presents a summary of birds observed during monthly outings. In total, 32 species were observed. The most commonly observed birds were Black and White Warblers.

Table 3. Table of bird species observed and the average number of birds counted per survey SpringsWatch Weeki Wachee monitoring sessions (January – December 2023).

Common Name	Scientific Name	Average # Counted Per Survey
American Robin	*Turdus migratorius*	4
Anhinga	*Anhinga anhinga*	3
Barred Owl	*Strix varia*	2
Belted Kingfisher	*Megaceryle alcyon*	2
Black and White Warbler	*Mniotilta varia*	22
Black Crowned Night Heron	*Nycticorax nycticorax*	3
Black Vulture	*Coragyps atratus*	8
Boat Tailed Grackle	*Quiscalus major*	1
Carolina Wren	*Thryothorus ludovicianus*	2
Catbird	*Dumetella carolinensis*	1
Cerulean Warbler	*Setophaga cerulea*	3
Crow	*Corvus* sp.	7
Great Blue Heron	*Ardea herodias*	2
Great Egret	*Ardea alba*	2
Green Heron	*Butorides virenscens*	1
Herring Gull	*Larus argentatus*	12
Laughing Gull	*Leucophaeus atricilla*	3
Limpkin	*Aramus guarauna*	2
Little Blue Heron	*Egretta caerulea*	4
Northern Cardinal	*Cardinalis cardinalis*	2
Osprey	*Pandion haliaetus*	3
Pileated Woodpecker	*Dryocopus pileatus*	2
Red Bellied Woodpecker	*Melanerpes carolinus*	1
Red Shouldered Hawk	*Buteo lineatus*	2
Swainson's Warbler	*Limnothlypis swainsonii*	20
Swallow Tailed Kite	*Elanoides forficatus*	2
Tricolored Heron	*Egretta tricolo*	1
Tufted Titmouse	*Baeolophus bicolor*	1
Turkey Vulture	*Cathartes aura*	3
Water Mocassin	*Agkistrodon piscivorous*	1
White Ibis	*Eudocimus albus*	3
Wood Stork	*Mycteria americana*	3

Section 4.0 References

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Section 5.0 Appendix

Table A.1. Averages of data collected during Weeki Wachee

Station Name	Parameter Name	Average	Number of Samples	Maximum	Minimum	Standard Deviation
WW-1	k (diffuse attenuation coefficient)	0.8	9	1.6	0.2	0.5
	Temperature (°C)	24.1	10	24.6	23.5	0.3
	Dissolved Oxygen (%)	36.0	10	52.3	25.7	8.8
	Dissolved Oxygen (mg/L)	2.9	10	3.9	2.1	0.6
	Specific Conductance (µS/cm)	355.2	10	360.3	351.7	3.5
	Secchi (meters)	26.7	10	34.8	21.6	3.6
	Nitrate+Nitrite (mg/L)	0.8	1	0.8	0.8	NA
	Percent Transmittance (% at 1 meter)	48.7	9	85.1	19.7	25.0
WW-2	k (diffuse attenuation coefficient)	0.6	1	0.6	0.6	NA
	Temperature (°C)	23.5	1	23.5	23.5	NA
	Dissolved Oxygen (%)	40.4	1	40.4	40.4	NA
	Dissolved Oxygen (mg/L)	3.4	1	3.4	3.4	NA
	Specific Conductance (µS/cm)	351.9	1	351.9	351.9	NA
	Percent Transmittance (% at 1 meter)	54.2	1	54.2	54.2	NA
WW-3	k (diffuse attenuation coefficient)	5.4	1	5.4	5.4	NA
	Temperature (°C)	22.7	1	22.7	22.7	NA
	Dissolved Oxygen (%)	63.5	1	63.5	63.5	NA
	Dissolved Oxygen (mg/L)	5.5	1	5.5	5.5	NA
	Specific Conductance (µS/cm)	349.3	1	349.3	349.3	NA
	Percent Transmittance (% at 1 meter)	0.5	1	0.5	0.5	NA
WW-4	k (diffuse attenuation coefficient)	1.2	10	2.5	0.3	0.9
	Temperature (°C)	24.6	10	25.2	23.2	0.6
	Dissolved Oxygen (%)	74.5	10	83.2	59.7	7.1
	Dissolved Oxygen (mg/L)	6.1	10	6.9	5.0	0.6
	Specific Conductance (µS/cm)	354.0	10	360.6	349.5	4.3
	Percent Transmittance (% at 1 meter)	42.9	10	76.0	8.3	29.0
WW-5	k (diffuse attenuation coefficient)	0.7	10	1.4	0.1	0.4
	Temperature (°C)	24.4	10	25.1	23.0	0.6
	Dissolved Oxygen (%)	73.2	10	79.8	66.4	4.1
	Dissolved Oxygen (mg/L)	6.0	10	6.6	5.2	0.4
	Specific Conductance (µS/cm)	354.0	10	358.2	348.7	3.9
	Percent Transmittance (% at 1 meter)	56.0	10	88.4	25.2	22.7
WW-6	k (diffuse attenuation coefficient)	1.5	9	4.0	0.1	1.4
	Temperature (°C)	24.2	10	24.8	22.4	0.7
	Dissolved Oxygen (%)	75.9	10	85.3	68.6	5.5
	Dissolved Oxygen (mg/L)	6.3	10	6.9	5.6	0.4
	Specific Conductance (µS/cm)	354.8	10	360.6	348.6	4.0
	Percent Transmittance (% at 1 meter)	38.5	9	93.5	1.8	32.4

Table A.1 Continued

WW-7	k (diffuse attenuation coefficient)	0.7	8	1.5	0.1	0.6
	Temperature (°C)	24.1	10	24.6	22.2	0.7
	Dissolved Oxygen (%)	76.9	10	81.7	68.3	5.2
	Dissolved Oxygen (mg/L)	6.3	10	7.0	5.6	0.5
	Specific Conductance (µS/cm)	353.2	10	357.4	348.1	3.5
	Percent Transmittance (% at 1 meter)	55.6	8	94.4	22.7	29.0
WW-8	k (diffuse attenuation coefficient)	3.7	1	3.7	3.7	NA
	Temperature (°C)	21.9	1	21.9	21.9	NA
	Dissolved Oxygen (%)	87.8	1	87.8	87.8	NA
	Dissolved Oxygen (mg/L)	7.7	1	7.7	7.7	NA
	Specific Conductance (µS/cm)	352.6	1	352.6	352.6	NA
	Percent Transmittance (% at 1 meter)	2.6	1	2.6	2.6	NA
WW-9	k (diffuse attenuation coefficient)	1.5	10	5.4	0.5	1.5
	Temperature (°C)	24.5	10	25.8	21.9	1.1
	Dissolved Oxygen (%)	83.8	10	95.8	77.9	5.1
	Dissolved Oxygen (mg/L)	6.9	10	7.7	6.4	0.4
	Specific Conductance (µS/cm)	355.2	10	361.1	350.8	3.5
	Secchi (meters)	6.3	10	10.0	3.4	2.0
	Nitrate+Nitrite (mg/L)	0.8	1	0.8	0.8	NA
	Percent Transmittance (% at 1 meter)	33.8	10	61.1	0.4	19.7
WW-10	k (diffuse attenuation coefficient)	1.6	7	3.3	0.3	1.0
	Temperature (°C)	24.4	9	25.3	21.5	1.2
	Dissolved Oxygen (%)	83.3	9	92.1	74.6	6.2
	Dissolved Oxygen (mg/L)	6.9	9	7.7	6.1	0.5
	Specific Conductance (µS/cm)	360.1	9	373.9	348.3	7.6
	Percent Transmittance (% at 1 meter)	29.3	7	76.4	3.8	25.0
WW-11	k (diffuse attenuation coefficient)	1.0	1	1.0	1.0	NA
	Temperature (°C)	21.4	1	21.4	21.4	NA
	Dissolved Oxygen (%)	88.9	1	88.9	88.9	NA
	Dissolved Oxygen (mg/L)	7.9	1	7.9	7.9	NA
	Specific Conductance (µS/cm)	366.7	1	366.7	366.7	NA
	Percent Transmittance (% at 1 meter)	38.4	1	38.4	38.4	NA
WW-12	k (diffuse attenuation coefficient)	1.5	1	1.5	1.5	NA
	Temperature (°C)	20.8	1	20.8	20.8	NA
	Dissolved Oxygen (%)	89.7	1	89.7	89.7	NA
	Dissolved Oxygen (mg/L)	8.0	1	8.0	8.0	NA
	Specific Conductance (µS/cm)	376.1	1	376.1	376.1	NA
	Percent Transmittance (% at 1 meter)	21.7	1	21.7	21.7	NA

Table A.1. Continued

WW-13	k (diffuse attenuation coefficient)	0.8	9	2.7	0.0	0.8
	Temperature (°C)	24.4	10	25.7	20.7	1.5
	Dissolved Oxygen (%)	86.3	10	92.1	78.0	4.3
	Dissolved Oxygen (mg/L)	7.2	10	8.2	6.4	0.5
	Specific Conductance (µS/cm)	833.3	10	2573.0	359.9	884.8
	Percent Transmittance (% at 1 meter)	51.7	9	95.1	7.0	25.8
WW-14	k (diffuse attenuation coefficient)	1.5	10	3.1	0.0	1.0
	Temperature (°C)	24.3	10	26.0	20.7	1.6
	Dissolved Oxygen (%)	83.7	10	89.4	74.8	4.2
	Dissolved Oxygen (mg/L)	6.9	10	7.6	6.1	0.4
	Specific Conductance (µS/cm)	1813.6	10	4307.0	640.0	1249.8
	Secchi (meters)	8.9	10	14.0	5.5	3.0
	Percent Transmittance (% at 1 meter)	32.8	10	95.6	4.4	29.4
WW-15	k (diffuse attenuation coefficient)	1.0	9	1.9	0.1	0.7
	Temperature (°C)	24.6	10	26.1	20.5	1.8
	Dissolved Oxygen (%)	87.4	10	91.6	80.5	3.6
	Dissolved Oxygen (mg/L)	7.2	10	8.2	6.5	0.5
	Specific Conductance (µS/cm)	1936.8	10	4507.0	713.0	1347.7
	Secchi (meters)	4.6	10	17.9	2.2	4.7
	Nitrate+Nitrite (mg/L)	0.7	1	0.7	0.7	NA
	Percent Transmittance (% at 1 meter)	45.5	9	90.2	15.0	27.7