2025 JACKSON BLUE SPRINGS SPRINGSWATCH MONITORING SUMMARY



Developed for Florida Department of Environmental Protection

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Volunteer and Staff Acknowledgments

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 and 09132401.

This SpringsWatch group would not have been possible without the help of Kelly and Chris Wyatt, our sole volunteers for this group. Over two sampling events they amounted 14 volunteer hours.

We would also like to acknowledge FSI's Programs Coordinator Michael Garvey who wrote this report; as well as Senior Environmental Scientist Bill Hawthrone and Environmental Scientist TJ Comer for their continued support, working under the supervision of Executive Director Haley Moody. Special acknowledgement should be given to Outreach Assistant Ada Nesbit and TJ Comer for assistance with data entry and figure development. Finally, we are thankful for the ongoing guidance and vision of FSI founder, Dr. Robert Knight, as well as our board of directors including Tedd Greenwald, Bob Palmer, Steve Walsh, Karen Lenese, Jacqui Sulek, and Melissa Perkins.



Figure 1: Our Amazing Jackson Blue Volunteers

Executive Summary

In 2025, the Jackson Blue SpringsWatch group collected data on two separate sampling days throughout the year to analyze the health and productivity of the spring. SpringsWatch volunteers collected data on a number of water quality parameters and ecological indices to examine both abiotic and biotic factors that drive the health of the spring:

- **Water Quality** in Homosassa Springs is changing
    - **Temperature** was relatively stable between all stations and varied between 21-23 degrees Celsius
    - **Dissolved Oxygen** varied from station to station. This is likely due to the number of smaller vents along the run that pump in water low in dissolved oxygen
    - **Specific Conductivity** was relatively stable across all stations and ranged from 250-300 uS/cm
    - **Light** Measurements had high variability across all stations. This could indicate that light availability is highly variable throughout this springshed
- **Biology** of Homosassa Springs is diverse and healthy
    - **Submerged Aquatic Vegetation** was documented at each of our stations. The most commonly seen species was Vallisneria sp. Often times this eelgrass was covered with filamentous algae which could indicate high levels of nutrients in the water.

Introduction

Located in Jackson County's Blue Springs Recreation Area, Jackson Blue Spring is located outside the city of Marianna, Florida, and supplies freshwater to the 202-acre impounding reservoir known as Merritt's Mill Pond, a clear water pond known for its redear sunfish and largemouth bass. Jackson Blue Spring is the only first magnitude spring in the Chipola River Basin. Jackson Blue Spring was designated an Outstanding Florida Spring when the Florida Springs and Aquifer Protection Act was passed in 2016. It is currently one of the twenty four Outstanding Florida Springs or Springs Groups that is considered "impaired".

FSI's SpringsWatch volunteer citizen-science program has provided enhanced monitoring of the Jackson Blue Springs system's ecological health. The resulting data are provided in annual reports and via the SpringsWatch website (floridaspringsinstitute.org/springswatch) to inform the state's environmental agencies and 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 at Jackson Blue Spring and other springs along Merritts Mill Pond conducted by SpringsWatch volunteers in 2025.

1.1 Sampling Stations

SpringsWatch volunteers collect data at seven stations (Figure 1). JB represents the station at Jackson Blue headspring. Stations SL, TC, IW, and GH represent smaller springs throughout the northeast end of Merritts Mill Pond. MM1 and MM2 are Merritts Mill Pond monitoring sites. A summary of all sampling sites, their station names, latitude, and longitude used within the Jackson Blue SpringsWatch groups can be viewed in Table 1.

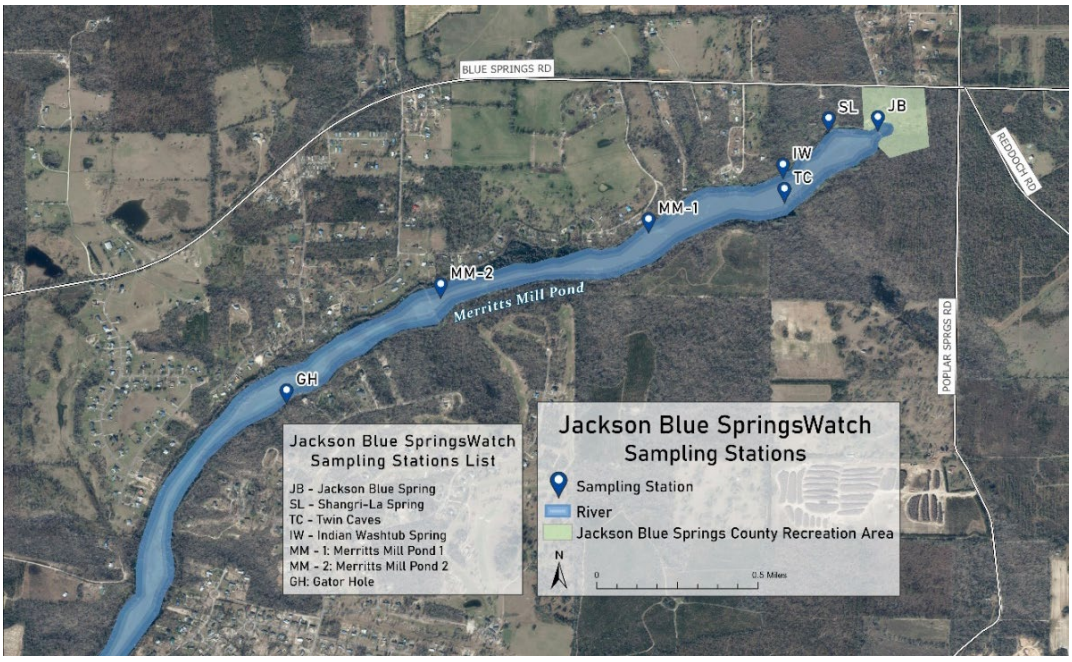


Figure 1. A map of Jackson Blue Springs SpringsWatch Monitoring Stations

Table 1. Coordinates for Jackson Blue Springs SpringsWatch Monitoring Stations

Station Code	Station Name	Latitude	Longitude
JB	Jackson Blue Headspring	30.790186	-85.140548
SL	Shangri-La Spring	30.790134	-85.142754
IW	Jackson Blue Indian Washtub Spring	30.788056	-85.144799
TC	Twin Caves Spring	30.786973	-85.144735
MM-1	Merrits Mill Pond 1	30.785613	-85.15082
MM-2	Merrits Mill Pond 2	30.782698	-85.160133
GH	Jackson Blue Gator Hole	30.777952	-85.167038

1.2 Monitoring Parameters

1.2.1. Temperature

Water Temperature is an extremely important metric in terms of water quality. It is measured in degrees Celsius using a thermometer. Water temperature is relatively constant in Florida springs. However, heavy rain, runoff from land, river flooding, and spring reversals (when surface water flows back into the spring) can disrupt this stability and cause the temperature to fluctuate along the spring run. In Florida, the average temperature from the spring vent is determined by the annual average air temperature and depth of the groundwater source. Temperature directly affects how much dissolved oxygen the water can hold and the metabolism of plants and animals use (Gillooly et al., 2001; Short et al., 2016). The purpose of monitoring water temperature is to indicate any significant changes that may have large effects on other biological and chemical processes in the spring system.

1.2.2. Dissolved Oxygen

Dissolved Oxygen is another very important water quality parameter. Dissolved Oxygen is measured in both percent saturation and milligrams per liter. Healthy aquatic ecosystems typically have higher DO values due to atmospheric diffusion and photosynthesis from aquatic plants and algae. This oxygen in the water can in turn be consumed by fish and other aquatic organisms. Groundwater stored in the aquifer typically has lower DO values which can vary depending on how long it takes for the water to exit out a spring vent. By monitoring DO values, we can get insight into how much oxygen is available for organisms to use inside spring systems.

1.2.3. Specific Conductance

Specific Conductance is a water quality parameter similar to salinity in saltwater. Specific conductance values are influenced by the amount of ions present in the water. These ions can be naturally occurring or may be present from nitrate/nitrite, saltwater, and a number of other compounds. In general, ecoregions dominated by karst limestone typically have higher conductivity values compared to ecoregions dominated by different geological makeup (Griffith, 2014). Monitoring specific conductivity is important to examine how springs are influenced by the addition or decrease of ions in these aquatic systems.

1.2.4. Photosynthetically Active Radiation

Photosynthetically Active Radiation refers to the specific wavelengths of light that can actually be used by plants to preform photosynthesis. This parameter is extremely important in terms of springs health because aquatic plants create the base of the food webs in these systems and also provide things like oxygen as well as refugia for smaller springs organisms. PAR is measured to estimate how light percolates through the water column depending on depth and water clarity. This parameter is very

important to monitor to examine any changes in light availability that could impact submerged aquatic vegetation.

1.2.5. Submerged Aquatic Vegetation Surveys

As mentioned in the section on Photosynthetically Active Radiation, Submerged Aquatic Vegetation (SAV) is an extremely important indicator of spring health. SAV acts as a food source for many springs animals, provides dissolved oxygen into the water column, and provides housing refugia for a number of small springs organisms. In addition to its benefits, Florida is also home to several species of invasive aquatic vegetation which can be known to outcompete native species (Evans, 2008). It is important to monitor vegetation communities in springs in order to document changes of species composition or density which can have major impacts on other aspects of springs ecology.

Materials & Methods

Ecological monitoring was conducted in Jackson Blue Spring from January to December 2025. Data collection included water quality field parameters, light measurements, and submerged aquatic vegetation (SAV) photography.

2.1 Sampling Events

Table 2 summarizes the sampling events conducted during 2025 by the Florida SpringsWatch Program with assistance from FSI staff.

Jackson Blue SpringsWatch monitoring events included the following:

- Water quality field parameters (temperature, dissolved oxygen, specific conductivity, and nitrate-nitrite)
- Vertical light attenuation (PAR)
- Submerged aquatic vegetation (SAV) photography

Table 2: A summary of the 2025 Jackson Blue Sampling events

Month	Temp	DO	SpC	PAR	SAV
Mar.	x	x	x	x	x
May	x	x	x	x	x

2.2 Water Quality

2.2.1 Dissolved Oxygen and Temperature

SpringsWatch volunteers used a handheld YSI ProODO meter at each of the monitoring stations in the Jackson Blue Springs System to collect monthly measurements of water temperature and dissolved oxygen. Team leaders calibrated and maintained water quality meters according to manufacturer instructions and Florida Department of Environmental Protection Standard Operating Procedures (FDEP, 2017).

2.2.2 Specific Conductance

SpringsWatch volunteers used a handheld YSI EcoSense EC300A meter at each of the monitoring stations in the Jackson Blue Springs System to collect monthly specific conductivity readings at each of the monitoring stations. Team leaders calibrated and maintained water quality meters according to

manufacturer instructions and Florida Department of Environmental Protection Standard Operating Procedures (FDEP, 2017). If either the initial or post-sampling calibration failed, the associated data were excluded from this report and subsequent analyses.

2.3 Water Clarity

2.3.1 Diffuse Attenuation Coefficient (k) and Percent Transmittance

Photosynthetically Active Radiation (PAR) underwater light transmission and attenuation coefficients were measured at the monitoring sites during ecological assessments. Volunteers used an Apogee brand MQ-200 underwater quantum sensor to measure PAR energy reaching the water surface and at depth intervals of one foot and two feet. Figures and results are from collections where percent transmittance is greater than 10% and less than 100% due to near-zero or above 100 values; all other values were flagged and omitted from this report and analyses. Figure 2 provides an image of the Apogee PAR meter. Light extinction (attenuation) coefficients will be calculated from these data using the Lambert-Beer equation (Wetzel 2001):

$$Iz = Io(e^{-kz})$$

Where:

Iz = PAR at depth z

Io = PAR at the water surface

k = diffuse attenuation coefficient, m-1

z = water depth, m

2.4 Submerged Aquatic Vegetation Survey

Submerged aquatic vegetation (SAV) was monitored monthly at both stations. SpringsWatch volunteers took two photographs at each station in two different locations, which they sent to FSI for analysis.

Results & Discussion

This section summarizes field data collected as part of the ecosystem monitoring conducted at Jackson Blue Spring in 2025. Data collected by Florida SpringsWatch volunteers included water quality field parameters, light measurements, and SAV photography. 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 Jackson Blue Springs system.

3.1 Water Quality

Figure 4 through 9 present water quality field parameter results collected from the two stations along the Jackson Blue Spring run in 2025.

3.1.1 Dissolved Oxygen

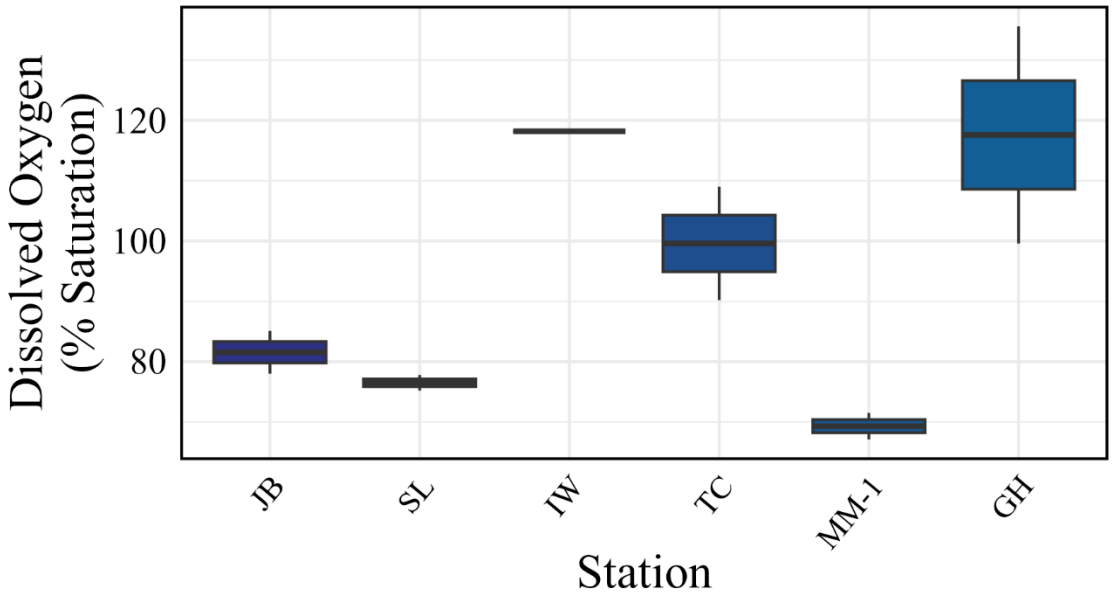


Figure 4: DO% across Jackson Blue SpringsWatch Stations

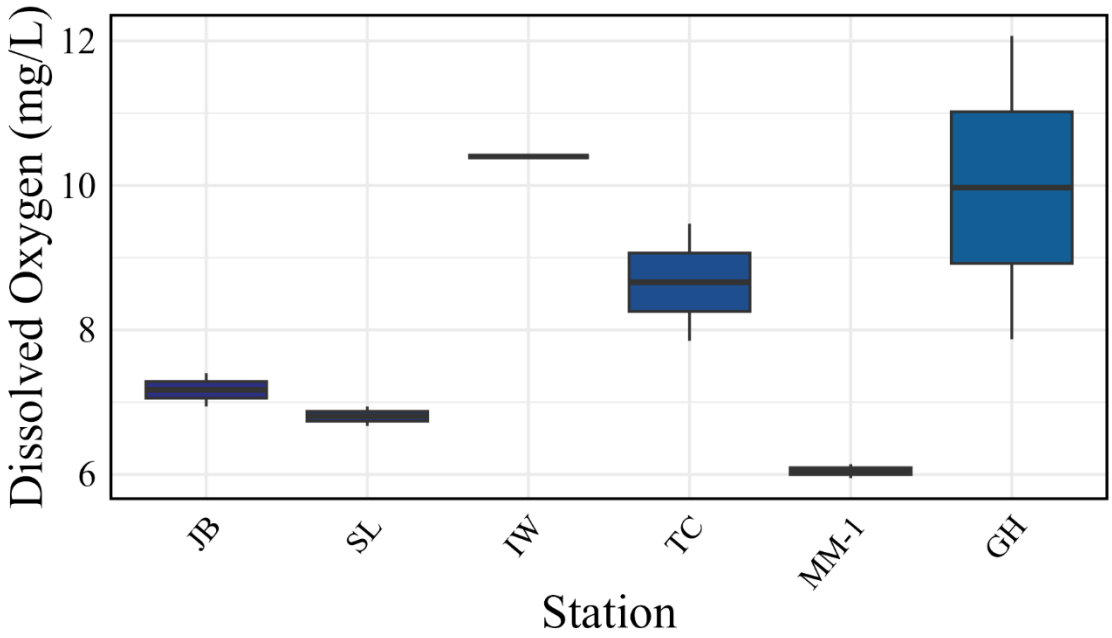


Figure 5: DO (mg/L) across Jackson Blue SpringsWatch Stations

Figures 4 and 5 show Dissolved Oxygen measurements across our two sampling stations. In 2025 we measured high variation across sampling sites down the spring run, this could be due to the multiple smaller spring inputs along the run.

3.1.2 Temperature

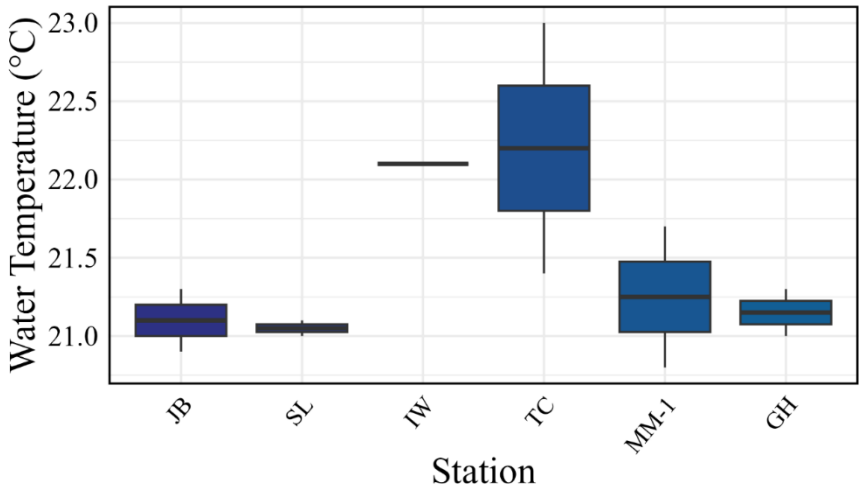


Figure 6: Temperature across Jackson Blue SpringsWatch Stations

Figure 6 shows water temperature measurements taken across the 6 sampling stations. In 2025 temperature was typically between 21 and 23 degrees Celsius.

3.1.3. Specific Conductivity

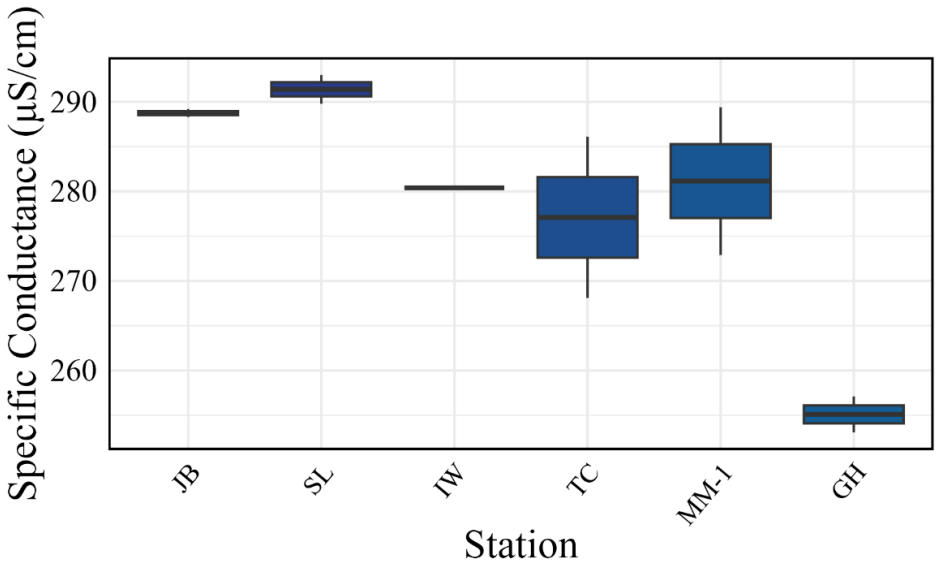


Figure 7: SpC across Jackson Blue SpringsWatch Stations

Figure 7 shows Specific Conductivity measurements taken across the 6 sampling stations. Due to the Jackson Blue system having no influence from tidal activity, the Specific Conductivity measurements were relatively similar across all stations fluctuating between 250-300 uS/cm.

3.2 Clarity and Light Measurements

3.2.1 Light Measurements

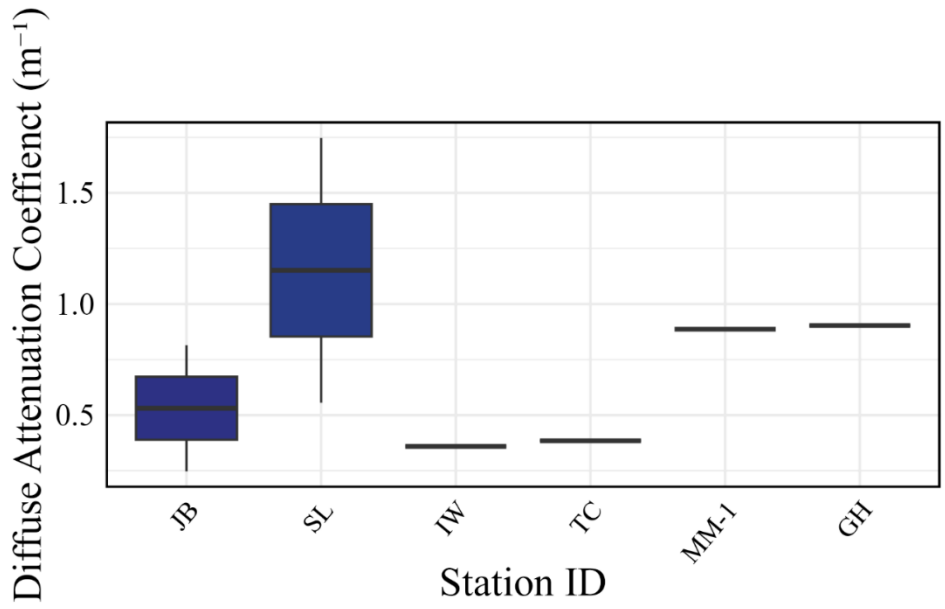


Figure 8: Diffuse Light Attenuation Coefficient Measurements across Jackson Blue SW Stations

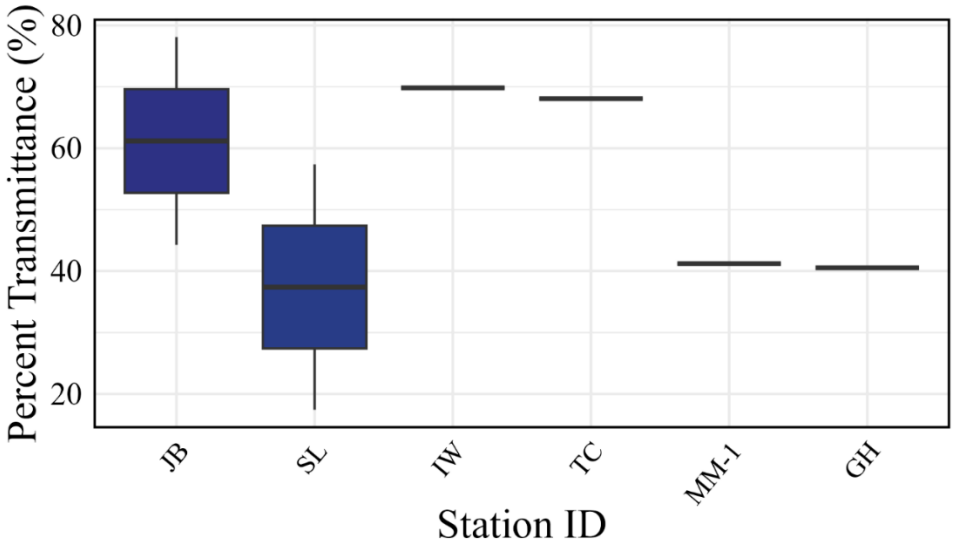


Figure 9: Percent Light Transmittance Measurements across Jackson Blue SW Stations

Figures 8 and 9 show light measurements collected by SpringsWatch volunteers using PAR meters.

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. The diffuse attenuation coefficient (k) is 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.

The measurements collected in 2025 show a wide array of values collected across the 6 sampling stations.

3.3 Submerged 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.

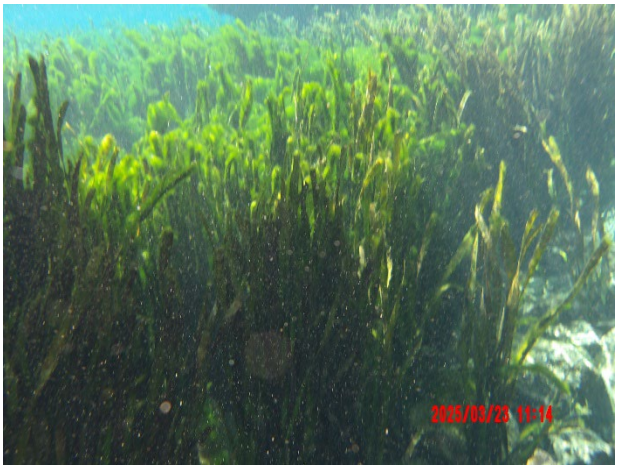
Below are some bottom photos taken by SpringsWatch volunteers in Jackson Blue showing native species such as *Vallisneria sp*. and other aquatic macrophytes like filamentous algae.



Vallisneria.sp. Covered with Green filamentous algae



A large Vallisneria bed near the headspring



Vallisneria.sp. Covered with Green filamentous algae



Rocky bottom devoid of SAV

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