Water Action Volunteer:

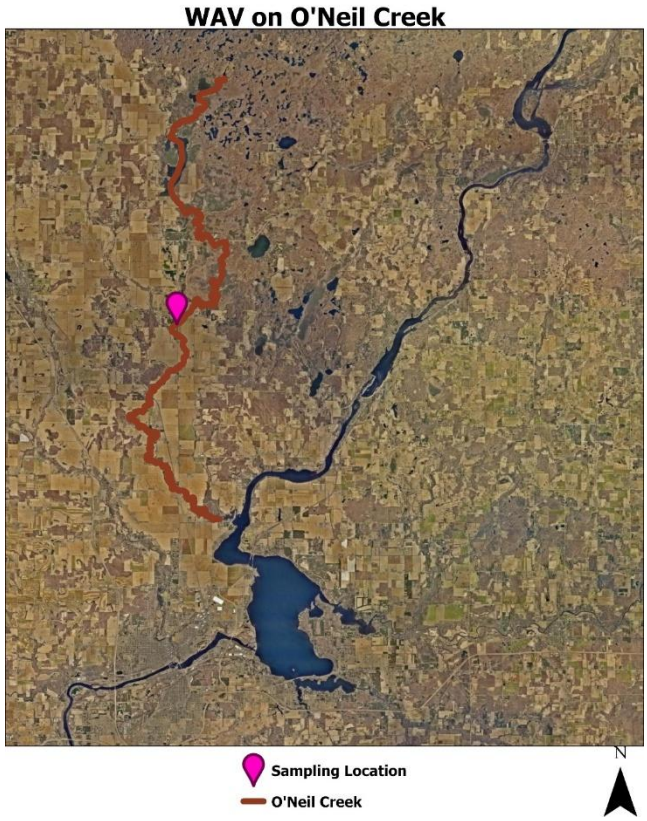
Stream Health of O’Neil Creek

Summary 2026

Data from: WAV database

Background:

Water Action Volunteers (WAV) is a program created by the University of Wisconsin-Madison Extension and Wisconsin Department of Natural Resources. The program's purpose is to increase citizen engagement with streams while collecting high-quality, consistent data. O'Neil creek is the stream of focus for the Lake Wissota Stewardship project. O'Neil creek drains into the western portion of Lake Wissota via the Chippewa River channel.



Map 1: O'Neil creek in relation to Lake Wissota. WAV monitoring site is marked.

Through the structure of WAV, as a water body is monitored, there is a gradual increase in the amount of data that can be collected. Importantly, baseline data is needed first. O'Neil creek is in the second year of collecting baseline data.

Six aspects of stream health are evaluated for baseline data: **dissolved oxygen, water and air temperature, transparency, streamflow, macroinvertebrate presence, and aquatic invasive species.**

Data is collected once a month from June to September. Water quality is measured every monitoring session, in contrast, macroinvertebrates are only required to be monitored during the June and September sessions.

Transparency:

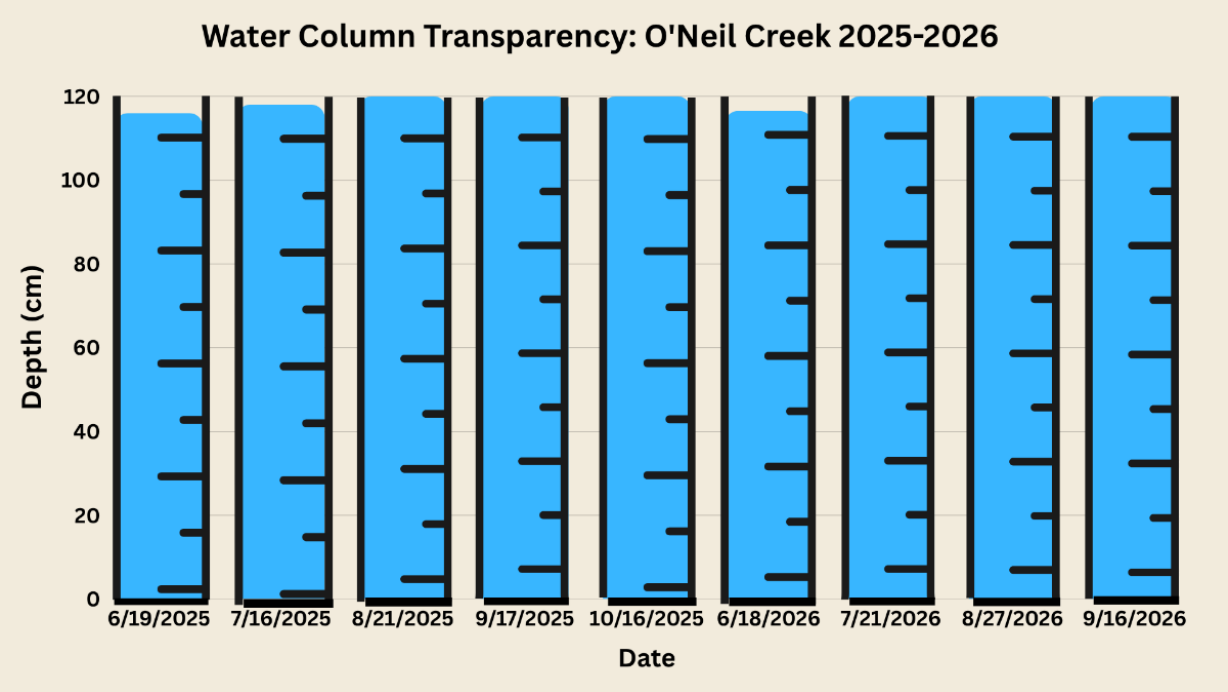


Figure 1: Water column transparency values for O'Neil creek. All measurements were made in 120 cm tubes. Values are an average of two readings.

Water column transparency measures the extent of light penetration. Sunlight is essential for photosynthetic life. Decreased transparency can suggest suspended solids from runoff or erosion (1). Transparency is measured by collecting flowing water in a 120 cm clear tube; a Secchi disk is printed within the bottom of the tube. The monitor peers down noting if the disk is visible. If not, water is released from the tube until the Secchi disk is visible and that value is recorded. The method is repeated twice and the value is averaged.

All measurements on O'Neil creek measured above 100 cm (Figure 1). This indicates clear water with limited sediment suspension from runoff or erosion.

Temperature and Oxygen:

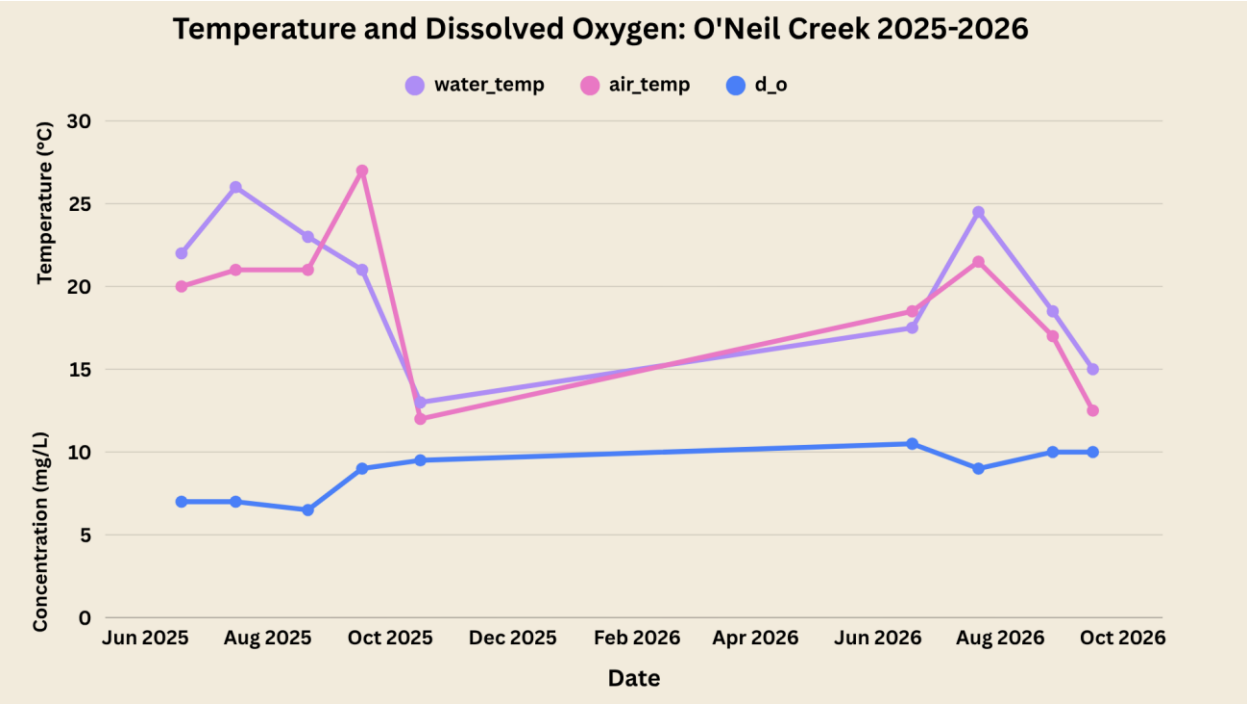


Figure 2: Water and air temperature in ℃ and concentrations of dissolved oxygen in mg/L. Temperatures were measured using a thermometer. Dissolved oxygen was determined using a Hach kit.

In most ecosystems, species are dependent on specific temperature ranges. O'Neil creek is considered a warm water stream, so trout or other cold-water species are not a management priority (4). Peak temperatures measured around 25℃ (77 ℉) (Figure 2). The creek is well within a warm water range (5).

In addition, water temperature influences the concentrations of dissolved oxygen. Colder water holds more dissolved oxygen (1). In O'Neil creek, as expected, the dissolved oxygen value inversely followed water temperature (Figure 2).

Oxygen concentrations vary from photosynthetic production rates and riffle zone aeration (1). 5 mg/L is the minimum dissolved oxygen allowed for aquatic environments with life; all measurements were above that value (1).

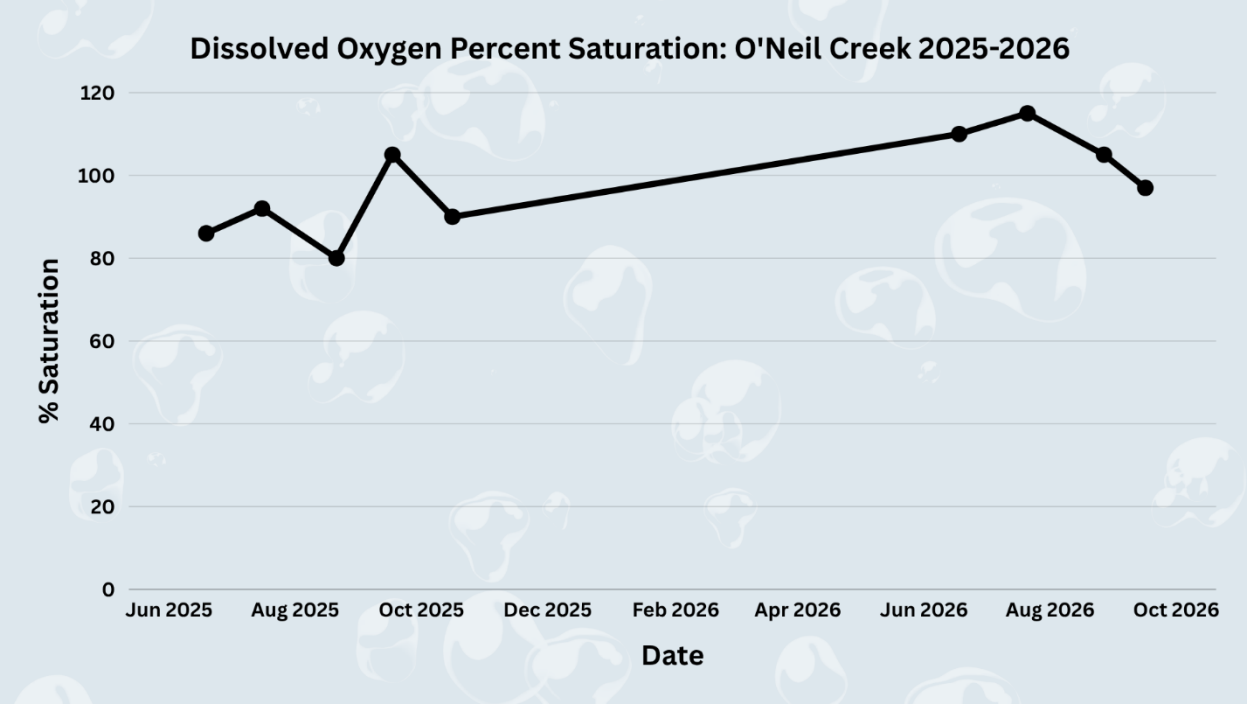


Figure 3: Dissolved oxygen percent saturation on O'Neil creek from 2025-2026. Values were determined by comparing dissolved oxygen concentrations and water temperature values.

Percent saturation is the amount of dissolved oxygen in the water compared to the amount of oxygen the water should ideally hold in those conditions. Over 100% saturation represents a highly photosynthetic system that is actively producing oxygen. Values from 71-90 are considered good, while 91-100 are excellent (1). On all testing days, water conditions were at least good, with many being excellent (Figure 3). Concentrations above 120% suggest algal bloom events, which have not been observed in O'Neil creek during monitoring.



Image 1: Measuring stream width.

Streamflow

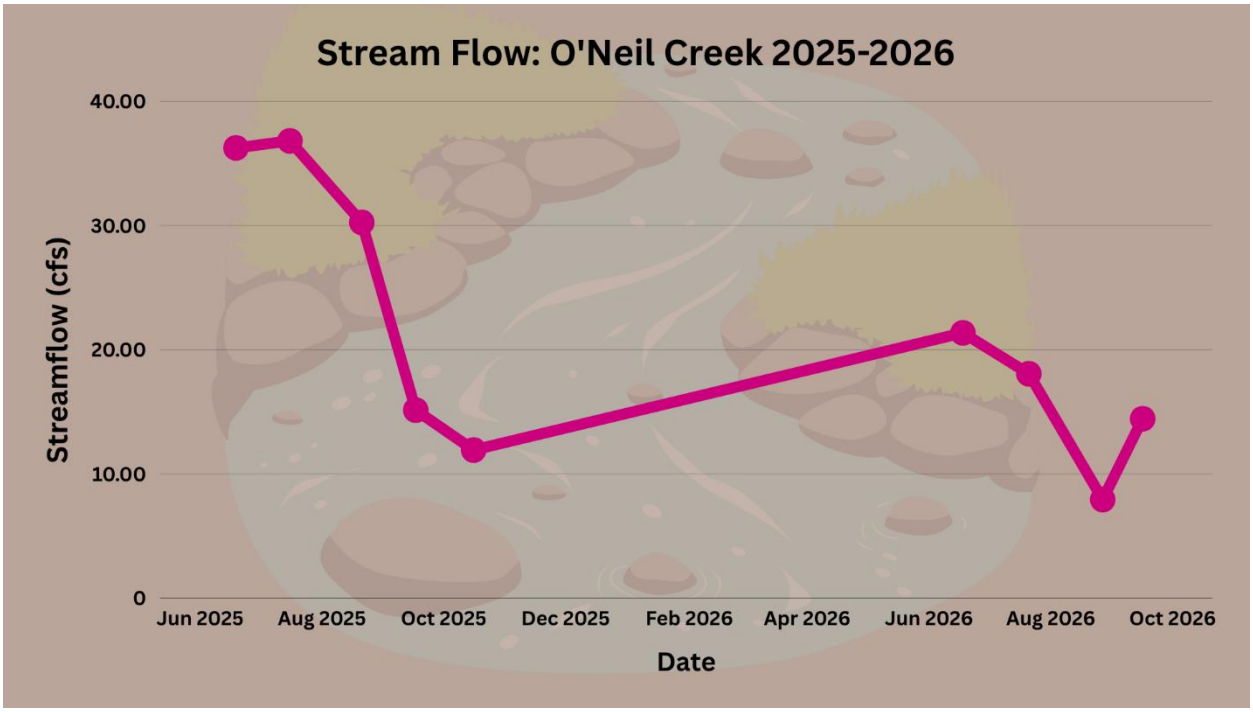
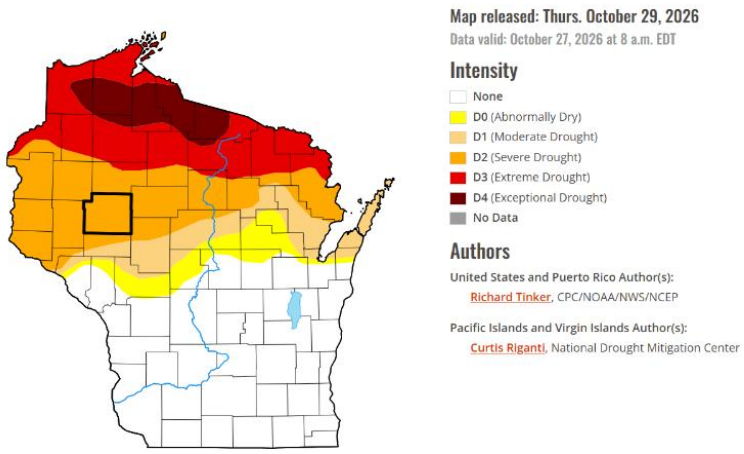


Figure 4: Stream flow values on O'Neil Creek from 2025-2026. Flow was determined using the float method and stream width and depth. Values are an average of 4 trials.

The width of the stream was measured and 20 locations across the width were measured for depth (Image 2). From there, 20 ft down the flow path was marked. A tennis ball was thrown and allowed to float down the 20 ft path. It was timed; four trials were run. These values were combined to determine stream flow in cubic feet per second.

Stream flow noticeably decreased between the two years (Figure 4). Water levels in 2026 were low due to drought-like conditions, rainfall for the Chippewa County is down 25% this year (3). Less water flowed because there was less in the stream.



Map 2: Drought conditions across the state of Wisconsin in 2026. Chippewa County is outlined in black. The county is in extreme drought.

Macroinvertebrate Presence

Table 1: Presence and absence data for the species most sensitive to pollution. Macroinvertebrates were collected in D-frame nets and sorted by hand.

Most Sensitive Species				
Date	**Stonefly Larva**	**Dobsonfly Larva**	**Alderfly Larva**	**Water Snipe Fly Larva**
6/19/2025	PRESENT	PRESENT	ABSENT	ABSENT
8/21/2025	PRESENT	ABSENT	ABSENT	ABSENT
10/16/2025	PRESENT	ABSENT	ABSENT	ABSENT
6/18/2026	PRESENT	ABSENT	ABSENT	ABSENT
7/21/2026	PRESENT	ABSENT	ABSENT	ABSENT
9/16/2026	PRESENT	ABSENT	ABSENT	ABSENT

Table 2: Presence and absence data for the somewhat sensitive to pollution species. Macroinvertebrates were collected in D-frame nets and sorted by hand.

Somewhat Sensitive Species									
Date	**Caddisfly Larva**	**Dragonfly Larva**	**Water Penny Larva**	**Crayfish**	**Crane Fly Larva**	**Mussel/clam**	**Mayfly Larva**	**Damselfly Larva**	**Riffle Beetle**
6/19/2025	PRESENT	ABSENT	ABSENT	ABSENT	ABSENT	PRESENT	PRESENT	PRESENT	ABSENT
8/21/2025	PRESENT	ABSENT	ABSENT	PRESENT	ABSENT	ABSENT	PRESENT	PRESENT	ABSENT
10/16/2025	ABSENT	ABSENT	ABSENT	ABSENT	PRESENT	PRESENT	PRESENT	PRESENT	ABSENT
6/18/2026	PRESENT	ABSENT	ABSENT	PRESENT	ABSENT	PRESENT	PRESENT	PRESENT	ABSENT
7/21/2026	PRESENT	ABSENT	ABSENT	PRESENT	ABSENT	PRESENT	PRESENT	PRESENT	ABSENT
9/16/2026	PRESENT	ABSENT	ABSENT	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT

Table 3: Presence and absence data for species that are somewhat tolerant of pollution. Macroinvertebrates were collected in D-frame nets and sorted by hand.

Somewhat Tolerant Species				
Date	**Black Fly Larva**	**Non-red Midge Larva**	**Snail (right side opening)**	**Amphipod or Scud**
6/19/2025	ABSENT	ABSENT	ABSENT	PRESENT
8/21/2025	ABSENT	PRESENT	PRESENT	PRESENT
10/16/2025	ABSENT	ABSENT	ABSENT	PRESENT
6/18/2026	ABSENT	PRESENT	ABSENT	PRESENT
7/21/2026	ABSENT	ABSENT	PRESENT	PRESENT
9/16/2026	ABSENT	PRESENT	PRESENT	PRESENT

Table 4: Presence and absence data for the species most tolerant to pollution. Macroinvertebrates were collected with D-frame nets and sorted by hand.

Most Tolerant Species					
Date	**Snail (left side opening)**	**Isopod or Aquatic Sowbug**	**Bloodworm Midge Larva**	**Leech**	**Tubifex Worm**
6/19/2025	ABSENT	PRESENT	ABSENT	ABSENT	PRESENT
8/21/2025	ABSENT	PRESENT	PRESENT	ABSENT	ABSENT
10/16/2025	ABSENT	ABSENT	ABSENT	ABSENT	ABSENT
6/18/2026	ABSENT	PRESENT	ABSENT	ABSENT	ABSENT
7/21/2026	PRESENT	PRESENT	PRESENT	ABSENT	ABSENT
9/16/2026	ABSENT	PRESENT	ABSENT	PRESENT	PRESENT

Macroinvertebrates, bugs in most cases, can survive in various water quality conditions. Their presence or absence can indicate areas of pollution or human disturbance (1). Macroinvertebrates are collected using D-frame nets by irritating riffles, undercut banks, snags, and leaf packs.

Generally, if a species was present it was found during most monitoring trials. Repeated measures are important with macroinvertebrates because of their size, seasonal changes, and general chance. Overall, species from all four categories were found during each monitoring session. These presence/absence values were then converted to a biotic index score.



Image 2: A Riffle Beetle in the sorting tray.

Biotic Index Score

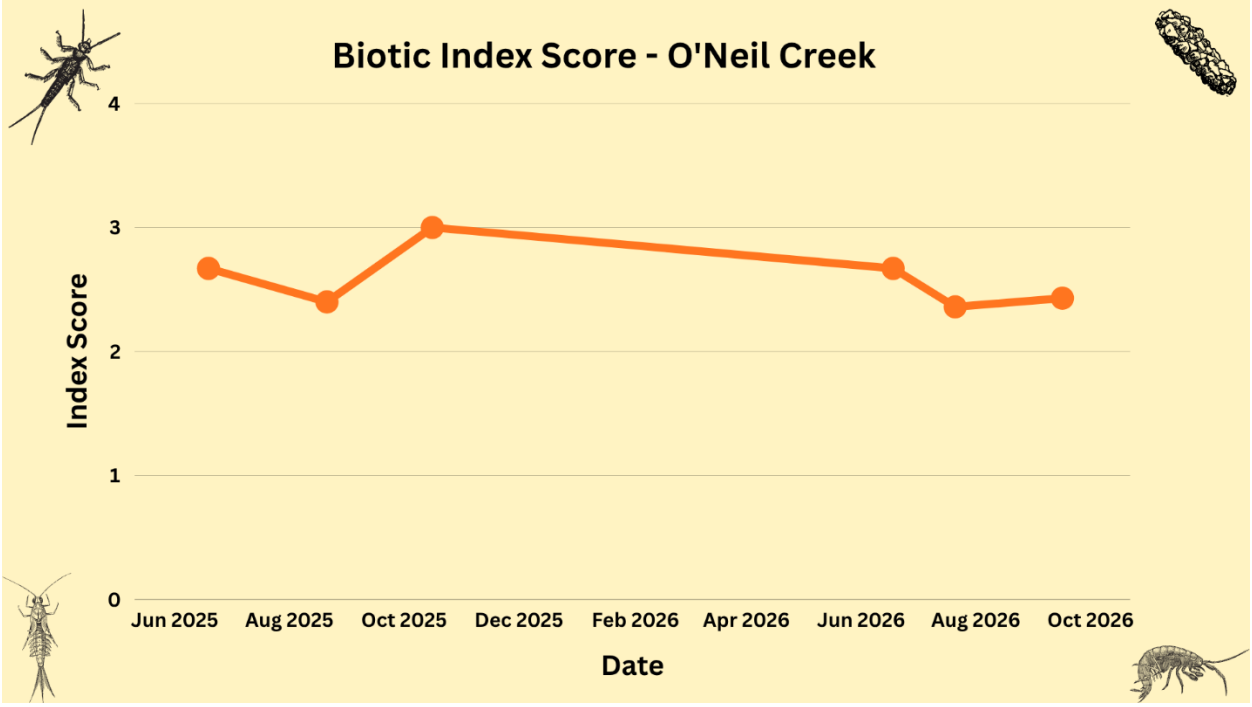


Figure 6: Biotic index score for O'Neil Creek. Values are based on normalized presence/absence data.

Each tolerance group comes with a different weight. Most sensitive species are valued at x4, with the most tolerant species at x1. The total number of families found within a tolerance group is multiplied by its factor. That multiplied value is then divided by the total number of families found to determine the biotic index. On O'Neil creek, values range from 2.36 to 3 (Figure 6). Values from 2.6-3.5 are in good health. Values from 2.1-2.5 are in fair health (1).

Aquatic Invasive Species:

None of the WAV targeted aquatic invasive species have been found in O'Neil Creek during monitoring.



Image 3: Hope Donnellan (winter) and Dailyn Wold (summer) LWSP '26 interns sorting macroinvertebrates.

Summary

Based on the transparency, water temperature, dissolved oxygen concentrations, and biotic index score O'Neil creek is overall in good health. There have been no major findings to indicate water quality concerns. However, data collecting will not stop here. Future LWSP interns will continue monitoring O'Neil creek for water quality measures.

References:

1. Baseline Stream Monitoring – Water Action Volunteers. UW-Extension. https://wav.extension.wisc.edu/monitoring/baseline/
2. Chippewa County, WI | U.S. Drought Monitor (2026, Nov. 5) https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?fips_55017
3. How Much Rain Has Wisconsin Had in 2026? County by County. AGSIST. (2026, Nov. 3) https://agsist.com/rain/wisconsin
4. Water Detail - O'Neill Creek, McCann Creek and Fisher River Watershed (LC21). WI DNR. https://apps.dnr.wi.gov/water/waterDetail.aspx?WBIC=2168900
5. Wisconsin's Riverine and Lake Natural Communities. Wisconsin DNR. https://dnr.wisconsin.gov/topic/Rivers/NaturalCommunities.html