2021 Environmental Monitoring for Lake Wynonah and Fawn Lake

Prepared for:

Lake Wynonah P.O.A.

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Sampling Procedures and Analytical Methodology

Water samples and water quality data were collected on July 20 and August 31, 2021. The parameters that were used for the monitoring are listed in Table 1 below. The sampling location in the lake was what is believed to be the deepest point. Only one sampling site for the lake was selected. Due to the size of the lake, one site was sufficient to obtain a representative sample of the water quality for the lake.

Table 1 – Water Quality Parameters Measured for 2021

Dissolved Oxygen (DO)	Total Phosphorus
Dissolved Oxygen Saturation (%)	Secchi Disk Transparency
Temperature	Chlorophyll *a*
pH	Phytoplankton
Conductivity	Zooplankton

The parameters in Table 1 are indicators of the health of a water body and the ability to support aquatic life. These parameters also help to determine a lake's trophic state and relate interactions between the chemical and biological components of a lake and the ecosystem. The analyses performed during the monitoring process were conducted in accordance with Standard Methods, 1995. Dissolved oxygen and temperature were measured using a YSI Model 57 meter at half meter depths to the deepest point on the lake. Conductivity and pH were measured at one-meter depths using a YSI ProPlus multi meter. Water samples taken from incremental depths were collected with a Wildco beta plus horizontal water sampler equipped with a stainless-steel messenger.

Total phosphorous concentration was measured from composite samples. Water samples for total phosphorous were placed in sample bottles containing preservative and then stored on ice while in the field. The samples were delivered to the lab for analysis the day of sampling. The samples were analyzed using the colorimetric ascorbic acid method (Standard Methods, 1992, Method 4500-P E).

Biological characteristics of the lake will be ascertained through the analysis of chlorophyll *a* and the identification of major species of phytoplankton and zooplankton. The composite water taken for the total phosphorous sample was also used to take samples for the chlorophyll *a* and phytoplankton analyses. A determined volume of water was filtered in the field for chlorophyll *a* analysis. The filter papers were then placed in glass vials and stored on ice while in the field until they could be frozen. Once frozen, the samples were shipped to Dr. Gregory Boyer of the Biochemistry Department, SUNY-ESF for analysis using the Welschmeyer fluorometric method.

Samples for the identification of Phytoplankton and zooplankton populations were collected following Standard Methods (Method 10200 B). The composite phytoplankton sample was preserved with two percent by volume M3 and stored in a cool, dark location until it was sent to Dr. Ken Wagner at Water Resource Services, Inc. for identification and enumeration. Phytoplankton will be identified to the lowest practical taxon and counted using a Sedgewick-Rafter chamber and a microscope equipped with a Whipple grid. The Zooplankton sample was collected over a 30-meter net tow from the entire water column using a 60 µm mesh plankton net. The Zooplankton sample was preserved with fifteen percent by volume buffered formalin solution (Lind, 1979). The zooplankton sample will also be identified and enumerated by Dr. Ken Wagner.

Parameters Measured During the 2021 Water Quality sampling

Dissolved Oxygen (DO)

The amount of oxygen present in the water and the profile of this oxygen throughout the water column are important indicators as to the health of a lake. By studying this one parameter, a large amount of information can be determined. The DO content of water results from photosynthesis, diffusion at the air-water interface and distribution by wind-driven mixing. The amount of oxygen produced through photosynthesis is related to the amount of plant and algal life and thus the productivity of the lake. The profile of the DO in the water column can give insight into the mixing patterns and effectiveness of mixing processes in a lake. The DO will fluctuate with changes in temperature and changes in photosynthetic activity and diffusion. Surface waters are often supersaturated with DO during daylight hours. Oxygen is used continuously by the pond biota in respiration, but during the day photosynthesis normally produces oxygen faster than it is used in respiration so that DO concentrations remain high. Phytoplankton die-offs and sudden destratification of the water body can cause rapid oxygen depletion. If the DO falls below 4.0 mg/L, most desirable aquatic organisms will be stressed and may even die.

Dissolved Oxygen Saturation

Water containing the amount of DO which it should theoretically hold at a given temperature, pressure, and salinity is said to be saturated with oxygen. Likewise, waters containing less than or more than the theoretical concentration are said to be under saturated or supersaturated with oxygen, respectively. The degree of oxygen saturation of water is expressed as percent saturation and water that is saturated with oxygen is at 100 percent. The amount of oxygen that can dissolve in water decreases with increasing temperature and salinity and with increased dissolved solids, therefore, dissolved oxygen saturation provides a better means of comparing oxygen concentrations from different sampling dates and depths in the water column.

Temperature

Sufficient and accurate temperature data are important. Temperature directly and indirectly exerts many fundamental effects on limnological phenomena such as lake stability, gas solubility and biotic metabolism. One of the most important relations of the temperature to water is the decrease in the solubility of oxygen in water as the temperature increases. Temperatures in a lake are a function of ambient air temperatures and the physical characteristics of the water itself. The turbidity of a water body can inhibit light from passing through the water column and warming the water. Light energy or the heat generated from the light is absorbed exponentially with depth, so most heat is absorbed within the upper layer of water. Since heat is absorbed more rapidly near the surface of a water body and the warm upper waters are less dense than cool lower water, bodies of water may stratify thermally. This occurs when differences in density of upper and lower strata become so great that the two cannot be mixed by wind action.

pH

The pH of a solution is a measure of its hydrogen ion activity and is expressed as the logarithm of the reciprocal of the hydrogen ion concentration. It is important to remember that a change of one pH unit represents a tenfold change in hydrogen ion concentration. The pH scale ranges from 1.0 to 14.0 standard units. A pH of 7.0 indicates neutral conditions, while waters with a pH less than 7.0 are said to be acidic and those with a pH greater than 7.0 are said to be basic. The pH of most natural waters falls in the range of 4.0 to 9.0, and much more often in the range of 6.0 to 8.0. The desirable range for fish production is 6.5 to 9.0. The acid death point for fish is around 4.0 or less. In water bodies, deviation from the neutral pH 7.0 is primarily due to the hydrolysis of salts of acids and bases. Dissolved gases such as CO_2, H_2S, and NH_3 also have a significant effect on pH values. The majority of natural water bodies have a somewhat alkaline or basic pH due to the presence of carbonates. Values for pH and the changes in these values are important, since they may reflect biological activity and changes in natural chemistry of waters, as well as pollution.

Conductivity

Conductivity or specific conductance is a measure of water's capacity to conduct an electric current. Conductivity is the reciprocal of resistance for which the standard unit is an ohm. Since conductivity is the inverse of resistance, the standard unit for conductivity is the *mho*. In low-conductivity natural waters, the standard unit is the *micromho*. Because the measurement is made using two electrodes that are one centimeter apart, conductivity is generally reported as micromhos per centimeter (µmhos/cm). Different ions vary in their ability to conduct electricity, but, in general, the greater the concentration of ions in natural water, the higher the conductivity. Temperature also affects conductivity. Conductivity will generally increase two to three percent per degree Celsius. For comparison of values, conductivity is usually corrected to one standard temperature which is most often 25°C. The most useful information that can be gathered from conductivity readings is the estimation of the total concentration of dissolved ionic matter in the water, which in turn relates to water fertility.

Total Phosphorus

Phosphorous is a key metabolic nutrient and the supply of this element often regulates the productivity of natural waters. Total phosphorous is the sum of all forms of phosphorous present. Phosphorous is present in water in several soluble and particulate forms, including organically bound phosphorous, inorganic polyphosphates and inorganic orthophosphates. Orthophosphates, which are ionized forms of orthophosphoric acid (H_3PO_4), are the simplest forms of phosphorous present. The pH of the water will affect the degree of ionization and thus the amount of orthophosphates present. The natural source of phosphorous to waters is from leaching of phosphate containing rocks and from organic matter decomposition. Additional sources are found in manmade fertilizers, domestic sewage and detergents. Inorganic and organic phosphates may reach waters through effluent and runoff. Phosphorous is lost from the water by chemical precipitation to sediment and by adsorption on clays or sediment with high pH and carbonate levels. Phosphorous is usually found in low concentration in natural waters, but is used readily by plants for growth. The element present in the lowest concentration relative to demand is the element limiting the process at a given time. This is why phosphorous is usually said to be the limiting factor of plant and algal growth and if found in excess is most likely to cause excessive plant growth or algal "blooms".

Secchi Disk Transparency

Visibility is a measure of the depth to which one can see into the water. The Secchi disk is a simple device used to estimate this depth. The disk is a weighted circular plate, 20 cm in diameter, with a painted surface consisting of alternate opposing black and white quarters. The disk is attached to a depth-calibrated chord attached to a ring in the center of the disk, so the disk is horizontal when lowered into the water. To determine the Secchi disk visibility, the disk is lowered into the water until the disk disappears and the depth is noted. The disk is lowered further then slowly raised until it is visible again and this depth is noted. The final Secchi depth is the average of these two readings. Secchi depth corresponds to the depth where light penetration is ten percent or less and approximates the lower level of photosynthetic activity. The transparency is based on the transmission of light through the water and is related to the amount of natural light, amount of inorganic suspended solids and the amount of organic suspended solids. The Secchi disk measures the turbidity of water. Plankton is usually the major source of turbidity, so Secchi depth can give an estimate of plankton density. When compared with data on chlorophyll *a*, particulate organic matter and phytoplankton counts, Secchi depth correlates most with particulate organic matter. Particulate organic matter is a measurement which includes living zooplankton and phytoplankton as well as dead organic particles. For northern lakes, a Secchi depth of greater than 30 feet is considered oligotrophic while the eutrophic lakes may have a reading of 3 to 4 feet or less during summer algal blooms (Moore, 1988). Secchi depths of less than two meters are usually considered undesirable for recreational lake uses and even lower values may indicate the onset of an algal bloom.

Chlorophyll *a*

Chlorophyll is a green pigment in algae and other green plants that is essential for the conversion of sunlight, carbon dioxide and water to sugar that may then be used as food. Chlorophyll *a* is a type of chlorophyll present in all types of algae, sometimes in direct proportion to the biomass of the algae. The values may also be used to characterize the age, structure, quantification of the phytoplankton and photosynthetic rates.

Trophic State Indices

The trophic state of a lake is a relative expression of the biological productivity of the lake. The Trophic State Index (TSI) developed by Carlson (1977) is among the most commonly used indicators of lake trophic state. This index is actually composed of three separate indices based on concentrations of total phosphorous, chlorophyll *a* and the Secchi depth readings from a variety of lakes.

Mean values of total phosphorous, chlorophyll *a*, and Secchi depth for an individual lake are logarithmically converted to a scale of relative trophic state ranging from 1 to 100. A TSI of less than 35 indicates oligotrophic conditions, a TSI between 35 and 50 indicates mesotrophic conditions and a TSI greater than 50 indicates eutrophic conditions. Oligotrophic comes from the Greek for “poorly nourished” and describes a lake of low plant productivity and high transparency. Mesotrophic comes from the Greek for “moderately nourished” and describes a lake of moderate photosynthetic activity and transparency. Eutrophic comes from the Greek for “well-nourished” and describes a lake of high photosynthetic activity and low transparency. Hypereutrophic, or excessively productive lakes, have TSI values greater than 70. Higher numbers are associated with increased probabilities of encountering nuisance conditions such as aesthetic problems i.e. algal scums.

Lake Wynonah Monitoring

Date: 7-20-21 **Location:** Dam **Weather:** Partly Sunny, West 0-5mph

Secchi Depth: 4.6 m **Chlorophyll *a*:** 4.52 µg/l **Nitrate:** <1.0 mg/L **Total Phosphorus:** 0.008 mg/L

Depth (m)	Temp (ºC)	Dissolved Oxygen (mg/L)	Dissolved Oxygen %Saturation	Specific Conductance (µs/cm)	Conductivity (µs/cm)	Total Dissolved Solids (g/L)	Salinity (ppt)	pH
Surface	27.9	8.2	105.56	150.8	158.8	0.098	0.07	7.8
1	27.9	8.2	105.56	150.6	158.3	0.098	0.07	7.8
2	27.8	8.0	102.96	150.7	158.3	0.098	0.07	7.8
3	27.8	8.2	105.53	150.7	158.1	0.098	0.07	7.7
4	27.6	8.2	105.26	150.7	158.0	0.098	0.07	7.7
5	24.9	7.8	96.06	149.7	152.8	0.098	0.07	7.7
6	21.1	8.5	98.04	148.6	143.0	0.097	0.07	7.7
7	17.5	9.4	101.29	146.6	125.7	0.095	0.07	7.7
8	15.3	10.1	104.12	145.8	119.8	0.095	0.07	7.6
9	13.9	10.2	102.00	144.8	113.7	0.095	0.07	7.6
10	11.9	10.3	98.56	144.5	108.6	0.095	0.07	7.6
11	10.8	10.1	94.22	144.9	104.7	0.094	0.07	7.5
12	9.6	9.6	87.04	144.8	101.4	0.094	0.07	7.3
13	8.1	8.6	75.17	144.8	98.8	0.094	0.07	7.3
14	7.9	8.0	69.56	145.1	97.2	0.094	0.07	7.2
15	7.1	7.1	60.53	145.2	96.0	0.095	0.07	7.2
16	7.0	6.1	51.87	146.0	95.7	0.095	0.07	7.2
17	7.0	5.5	46.77	146.0	95.3	0.095	0.07	7.1
18	6.9	5.1	43.26	146.2	95.2	0.095	0.07	7.1
19	6.9	4.9	41.56	146.2	95.1	0.095	0.07	7.1
20	6.8	4.5	38.07	146.4	95.1	0.095	0.07	7.0
21	6.8	4.2	35.53	146.2	95.0	0.095	0.07	6.9
22	6.7	4.0	33.75	146.0	95.0	0.094	0.07	6.9
23	6.6	3.8	31.98	145.8	94.9	0.094	0.07	6.9
24	6.6	2.0	16.84	145.7	94.8	0.094	0.07	6.8
25	6.6	1.2	10.10	145.6	94.8	0.094	0.07	6.8

Lake Wynonah Monitoring

Date: 8-31-21 **Location:** Dam **Weather:** Overcast, wind light and variable

Secchi Depth (m): 5.0 **Chlorophyll *a*:** 2.29 µg/l **Nitrate:**<1.0 mg/L **Total Phosphorus:** <0.00717 mg/L

Depth (m)	Temp (ºC)	Dissolved Oxygen (mg/L)	Dissolved Oxygen %Saturation	Specific Conductance (µs/cm)	Conductivity (µs/cm)	Total Dissolved Solids (g/L)	Salinity (ppt)	pH
Surface	27.5	9.0	115.24	155.6	162.2	0.101	0.07	7.5
1	27.5	8.9	113.96	155.5	161.7	0.101	0.07	7.5
2	27.2	8.7	110.97	155.5	161.5	0.101	0.07	7.5
3	27.1	8.7	110.83	155.4	161.4	0.101	0.07	7.5
4	27.1	8.7	110.83	155.6	161.2	0.101	0.07	7.4
5	26.9	8.4	106.73	155.4	159.8	0.101	0.07	7.1
6	25.5	7.1	88.20	155.3	156.0	0.101	0.07	6.8
7	21.9	8.0	93.57	154.7	143.5	0.101	0.07	6.7
8	18.2	9.2	100.55	153.7	134.2	0.100	0.07	6.6
9	16.0	10.1	105.65	152.8	126.7	0.098	0.07	6.7
10	13.8	10.1	100.80	151.7	119.5	0.099	0.07	6.8
11	11.9	9.5	90.90	151.5	113.7	0.098	0.07	6.7
12	10.2	8.1	74.52	150.5	108.3	0.098	0.07	6.6
13	9.0	6.8	60.77	151.3	105.3	0.098	0.07	6.5
14	8.1	4.6	40.21	151.2	102.5	0.098	0.07	6.4
15	7.9	4.3	37.39	151.2	100.8	0.098	0.07	6.4
16	7.5	3.1	26.68	151.5	100.0	0.098	0.07	6.4
17	7.0	2.0	17.00	152.0	99.7	0.098	0.07	6.3
18	7.0	1.6	13.61	152.0	99.2	0.099	0.07	6.3
19	7.0	1.2	10.20	152.4	99.6	0.099	0.07	6.3
20	7.0	1.0	8.50	152.5	99.3	0.099	0.07	6.2
21	7.0	0.8	6.80	152.0	99.0	0.098	0.07	6.2
22	6.9	0.6	5.09	151.6	98.7	0.098	0.07	6.1
23	6.9	0.4	3.39	151.3	98.6	0.098	0.07	6.1
24	6.9	0.4	3.39	151.1	98.5	0.098	0.07	6.1
25	6.8	0.3	2.54	151.0	98.3	0.097	0.07	6.1

Figure 1-Lake Wynonah Dissolved Oxygen July

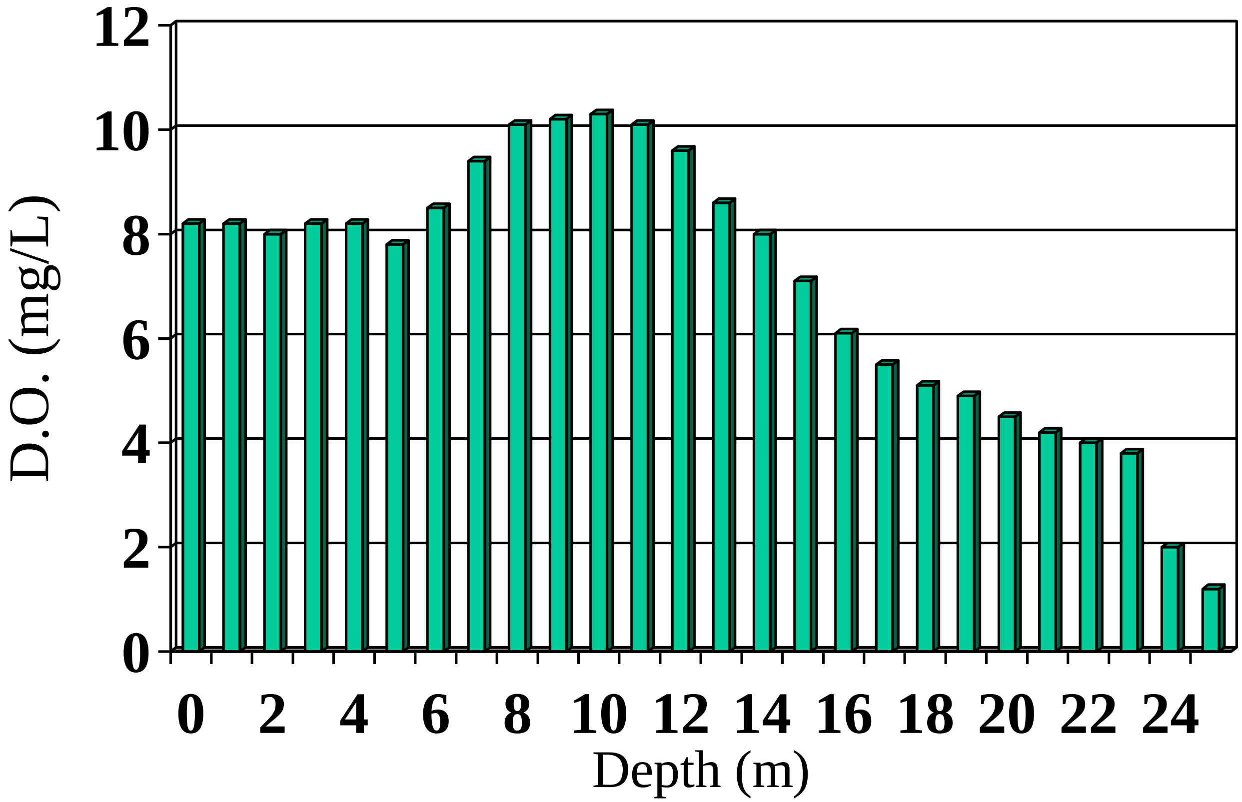

Figure 2- Lake Wynonah D.O. Percent Saturation July

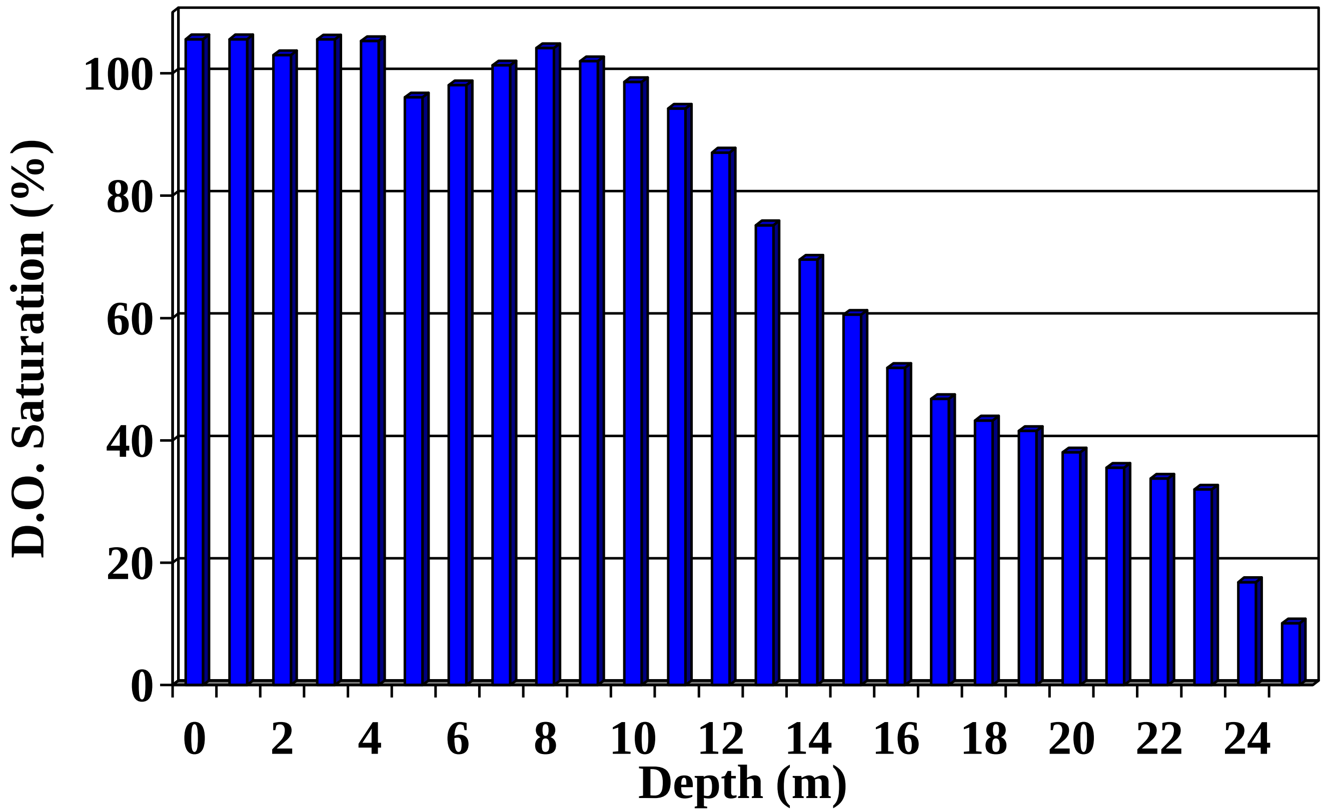

Figure 3 - Lake Wynonah Dissolved Oxygen August

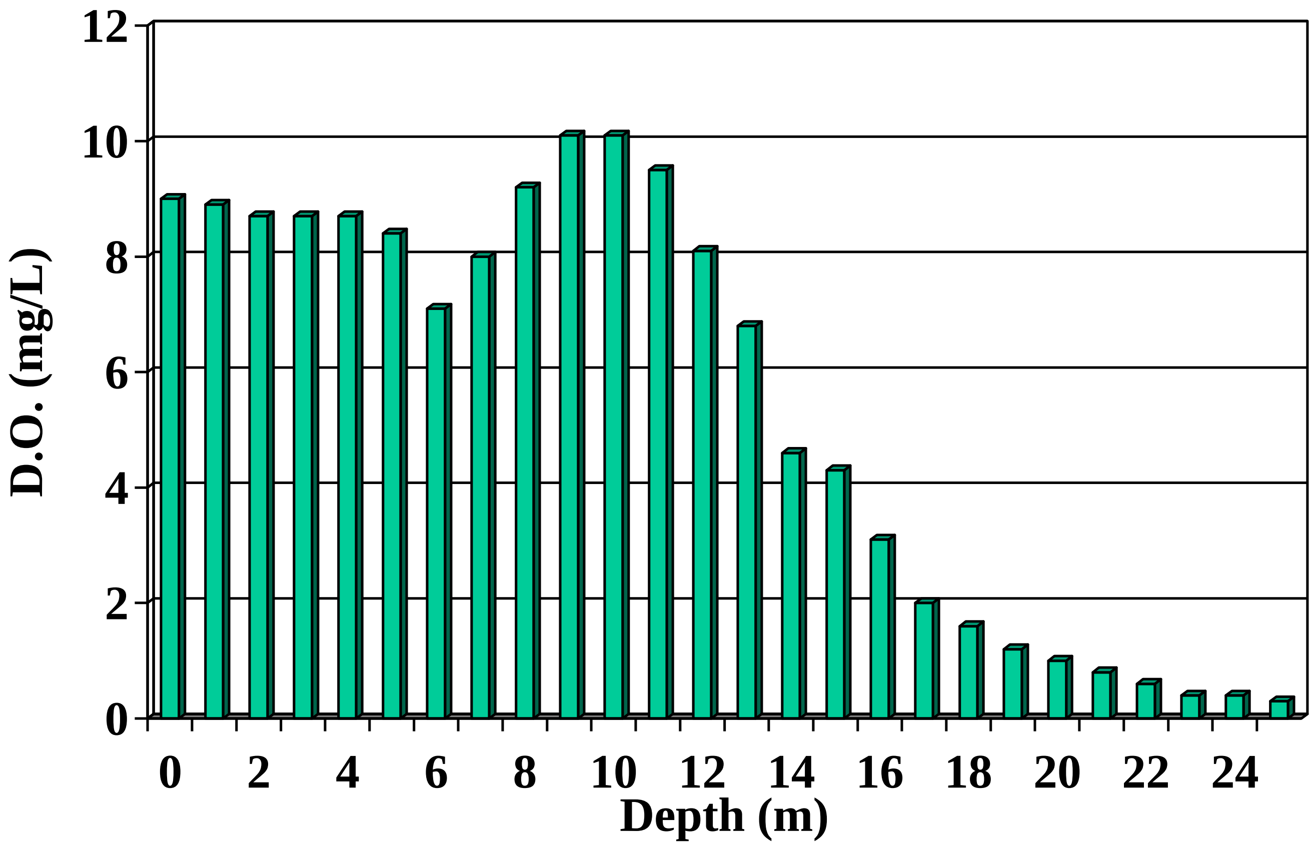

Figure 4 - Lake Wynonah D.O. Percent Saturation August

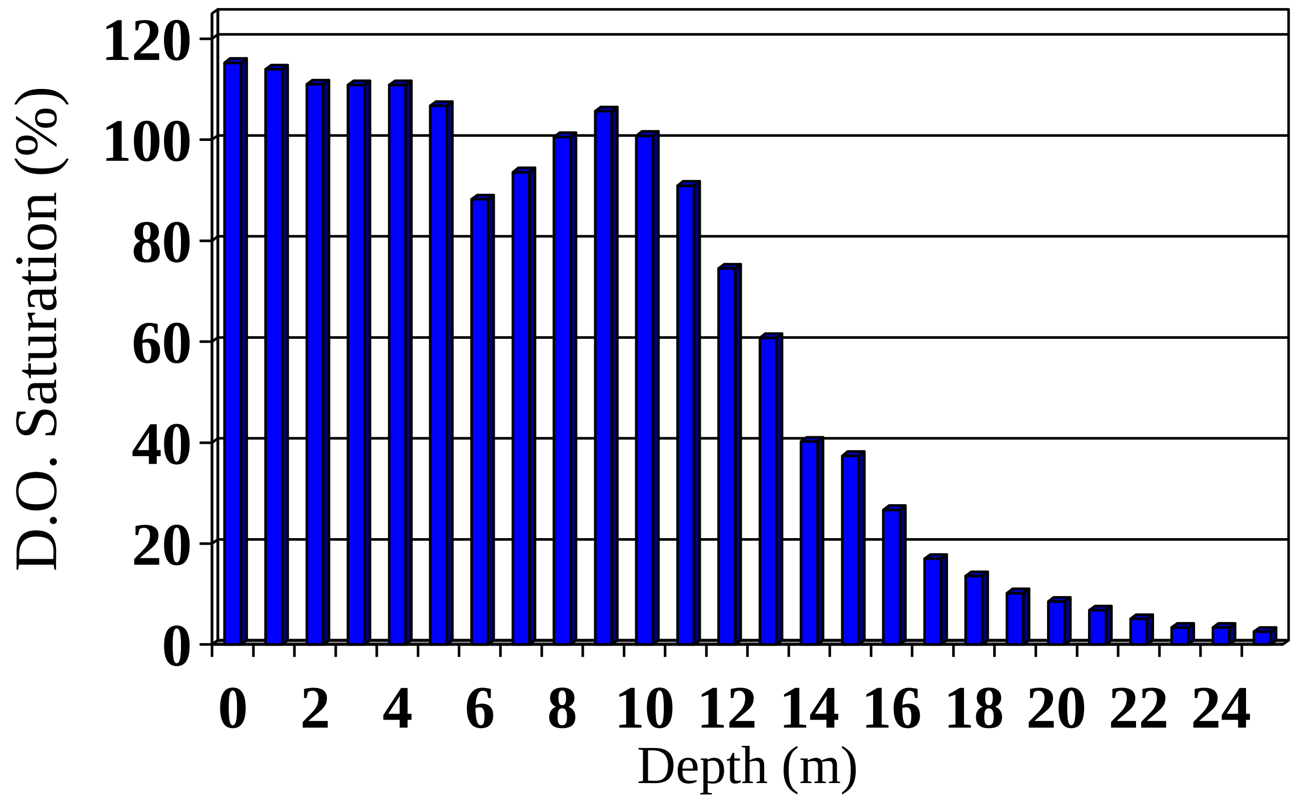

Figure 5 - Lake Wynonah Temperature Data July

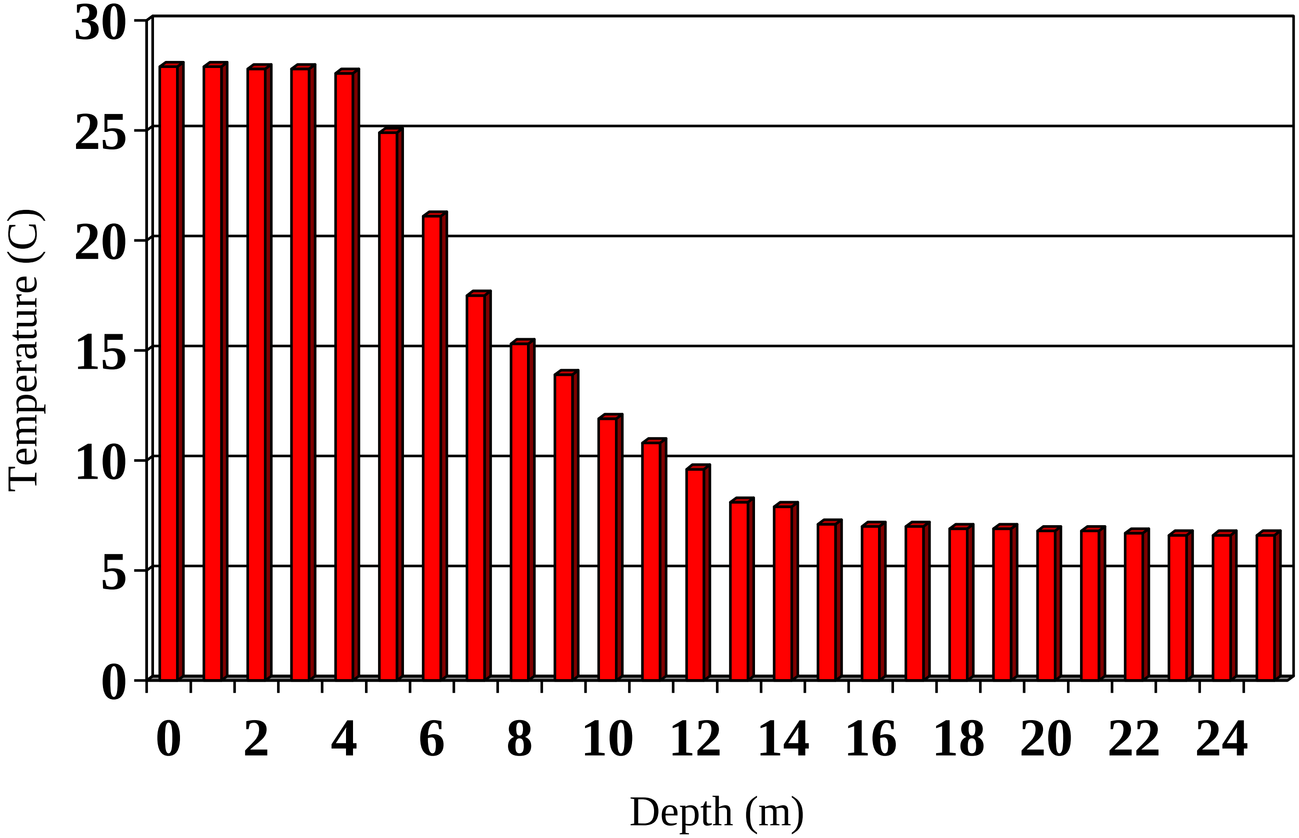

Figure 6 - Lake Wynonah Temperature Data August

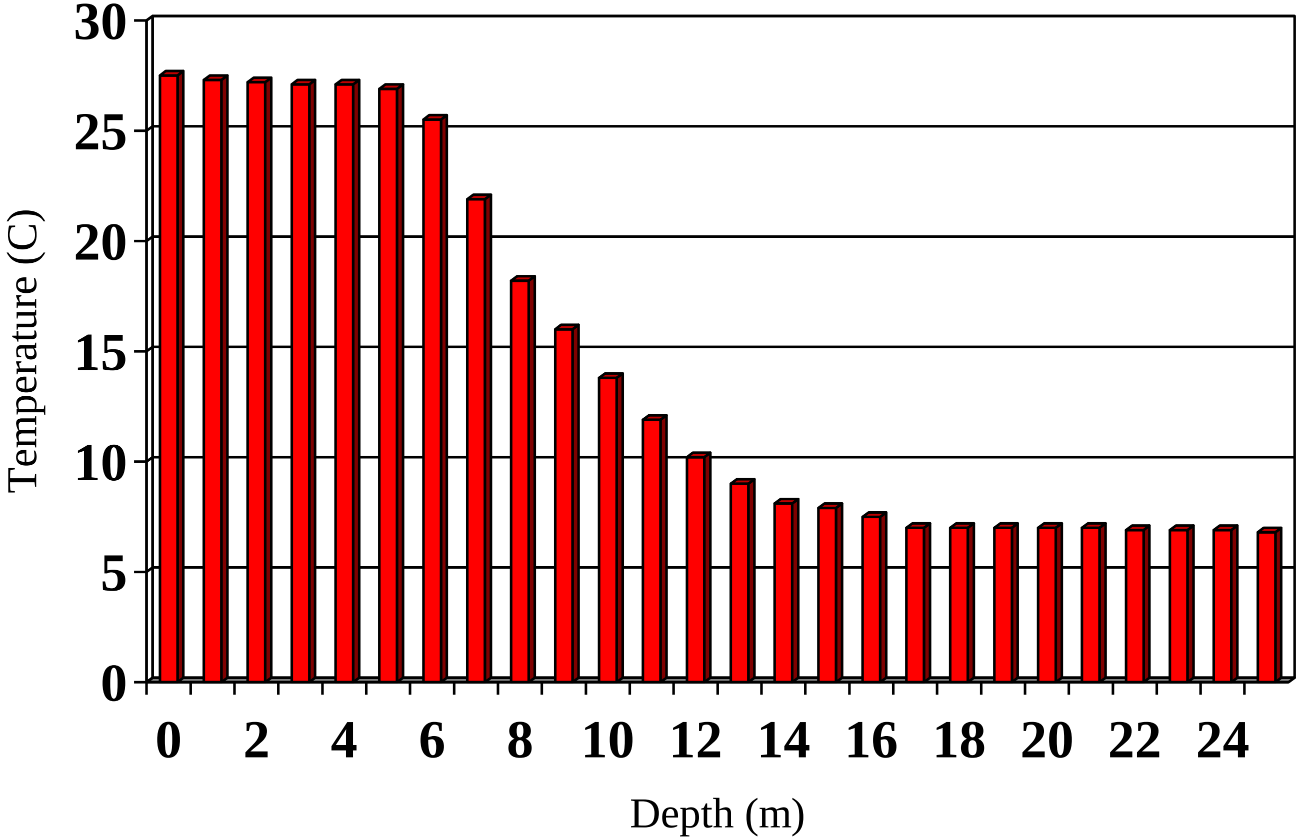

Figure 7 - Lake Wynonah pH Data July

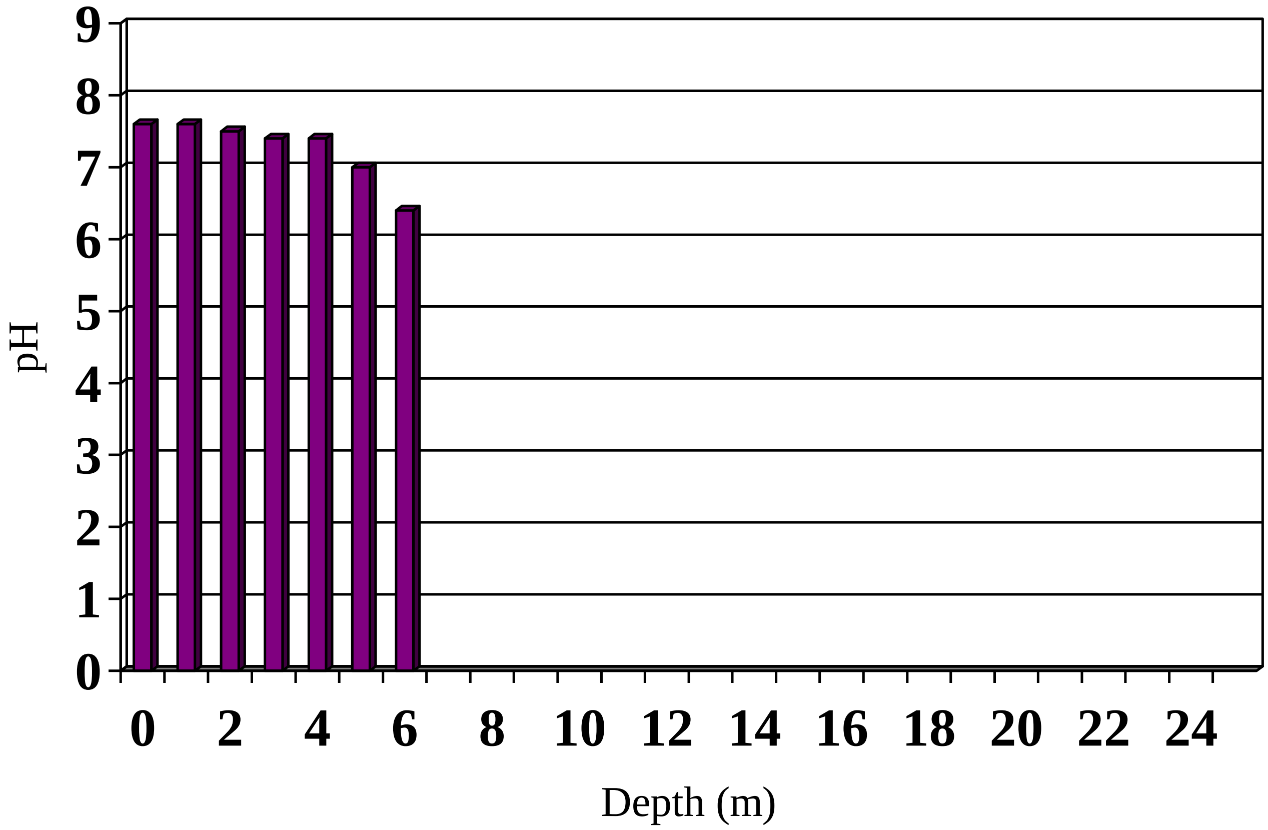

Figure 8 - Lake Wynonah pH Data August

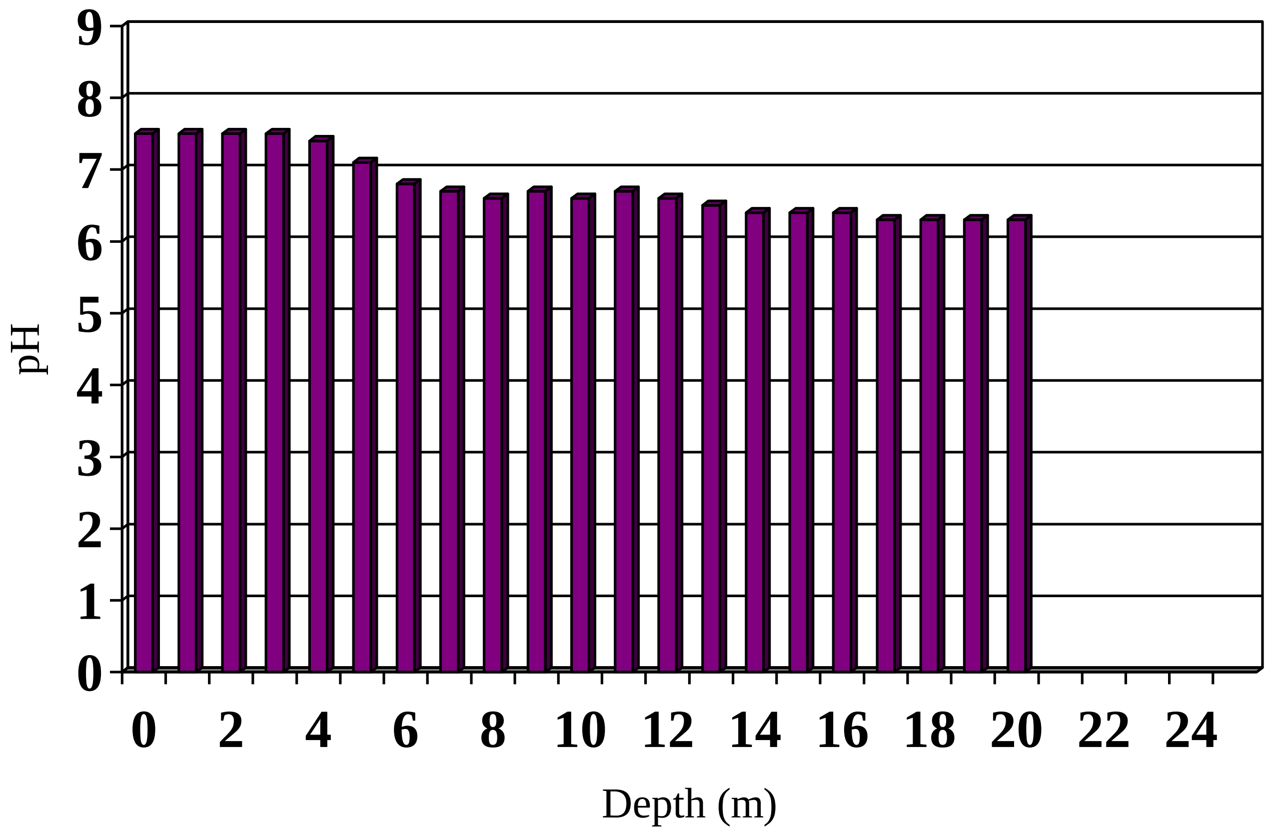

Figure 9 - Lake Wynonah Conductivity Data July

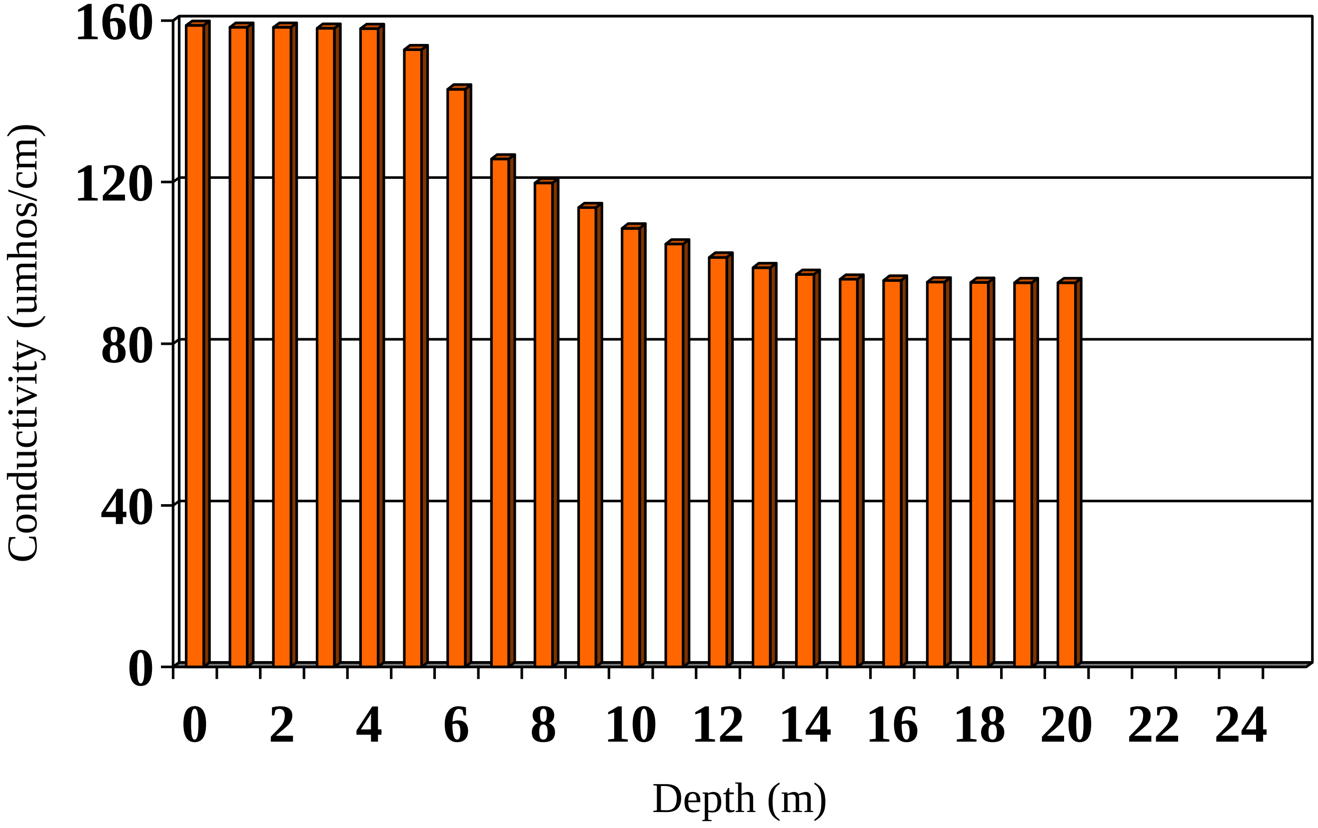

Figure 10 - Lake Wynonah Conductivity Data August

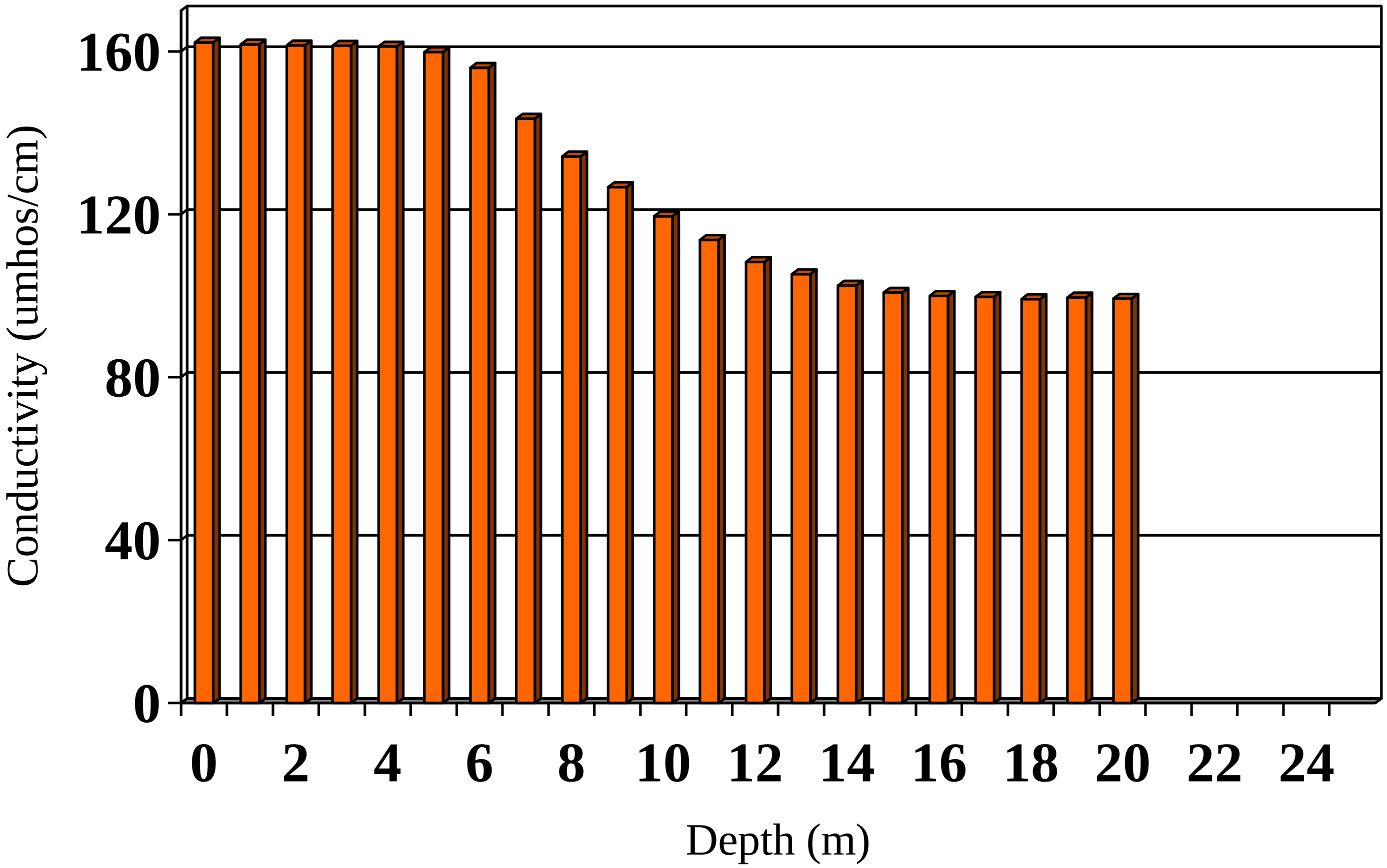

Table 2- Lake Wynonah Monitoring Summary – TSI Indicators and Lab Data

Date	Total Phosphorous (mg/L)	Secchi Depth (m)	Chlorophyll-a (µg/L)
7/20/21	0.008	4.6	4.52
8/31/21	<0.00717	5.0	2.29

Table 3 – Trophic State Indices for Lake Wynonah

Calculated Trophic State Indices for	Annual TSI Values
	2021
Total Phosphorus	32.2
Secchi Depth	37.4
Chlorophyll *a*	42.6

Fawn Lake Monitoring

Date: 7-20-21 **Location:** Dam **Weather:** Partly Sunny, South 0-5mph
Secchi Depth (m): 4.6 **Chlorophyll *a*:** 1.64 µg/l **Nitrate:** 1.071 mg/L **Total Phosphorus:** 0.013 mg/L

Depth (m)	Temp (ºC)	Dissolved Oxygen (mg/L)	Dissolved Oxygen %Saturation	Specific Conductance (µs/cm)	Conductivity (µs/cm)	Total Dissolved Solids (g/L)	Salinity (ppt)	pH
Surface	27.0	7.8	99.24	195.3	203.5	0.123	0.09	7.7
1	27.1	7.9	100.64	195.3	203.6	0.127	0.09	7.6
2	27.1	7.9	100.64	195.3	203.5	0.127	0.09	7.6
3	27.1	7.7	98.09	195.3	203.5	0.127	0.09	7.5
4	26.1	7.7	96.49	196.0	200.0	0.127	0.09	7.3
5	21.0	6.6	76.04	203.9	189.8	0.133	0.10	7.1
6	18.0	3.3	36.54	208.5	184.0	0.136	0.10	6.9
7	17.0	0.8	8.54	213.9	181.1	0.139	0.10	6.7
8	15.5	0.4	4.14	220.1	179.5	0.143	0.10	6.6
9	14.5	0.3	3.04	253.3	200.5	0.166	0.12	6.2

Fawn Lake Monitoring

Date: 8-31-21 **Location:** Dam **Weather:** Sunny, Southwest 0-5mph
Secchi Depth (m): 3.5 **Chlorophyll *a*:** 4.72 µg/l **Nitrate:** <1.0 mg/L **Total Phosphorus:** 0.015 mg/L

Depth (m)	Temp (ºC)	Dissolved Oxygen (mg/L)	Dissolved Oxygen %Saturation	Specific Conductance (µs/cm)	Conductivity (µs/cm)	Total Dissolved Solids (g/L)	Salinity (ppt)	pH
Surface	26.8	8.5	107.73	180.3	185.1	0.117	0.08	7.6
1	26.8	8.4	106.46	181.3	186.5	0.118	0.08	7.6
2	26.8	8.4	106.46	181.3	186.5	0.118	0.08	7.7
3	26.3	7.1	89.30	181.7	186.5	0.118	0.08	7.3
4	25.9	4.5	56.25	182.6	185.6	0.119	0.09	6.8
5	24.5	0.6	7.33	186.7	183.9	0.122	0.09	6.6
6	22.0	0.3	3.52	203.9	190.2	0.133	0.10	6.5
7	18.9	0.3	3.39	217.3	193.3	0.142	0.10	6.6
8	17.0	0.3	3.20	271.4	229.5	0.178	0.13	7.0
9	15.9	0.25	2.61	335.5	275.0	0.218	0.16	7.3

Figure 11- Fawn Lake Dissolved Oxygen July

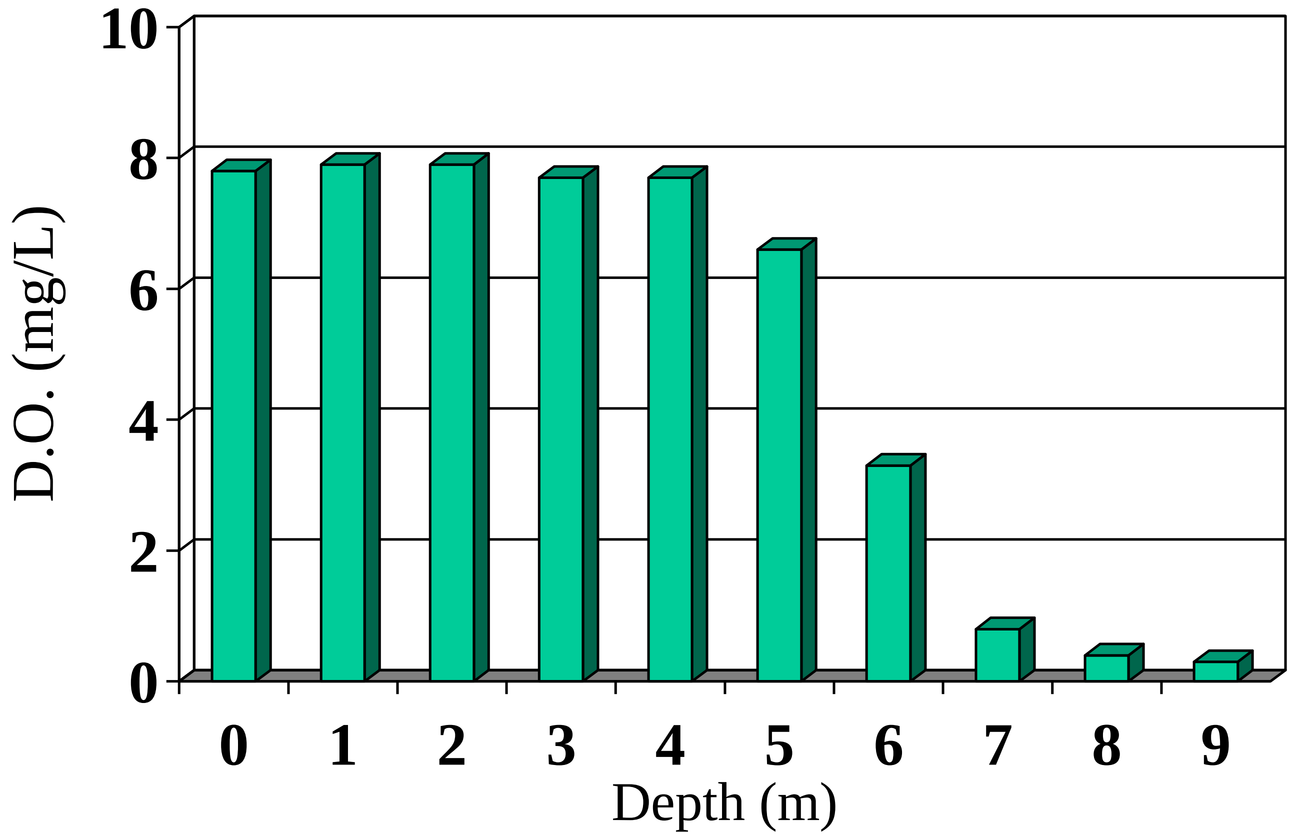

Figure-12 Fawn Lake D.O. Percent Saturation July

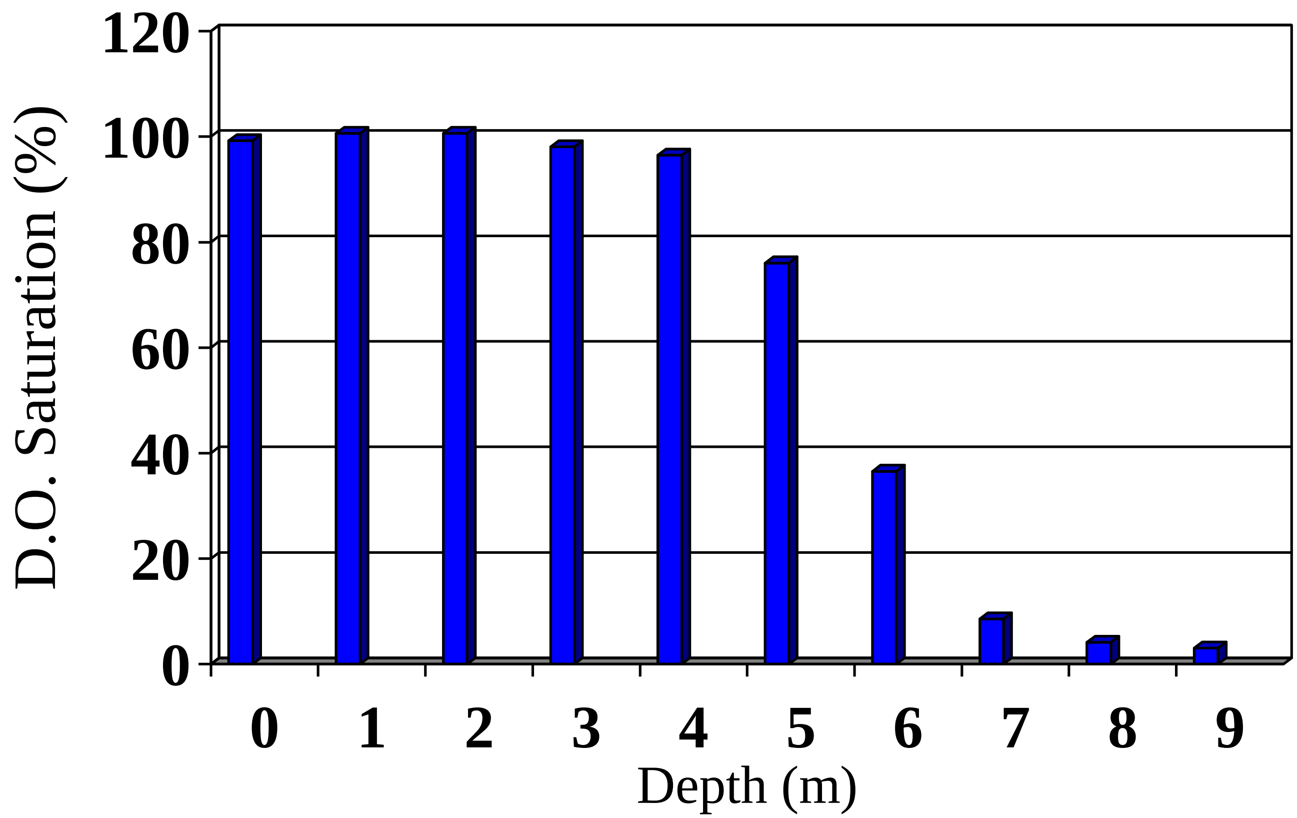

Figure 13 - Fawn Lake Dissolved Oxygen August

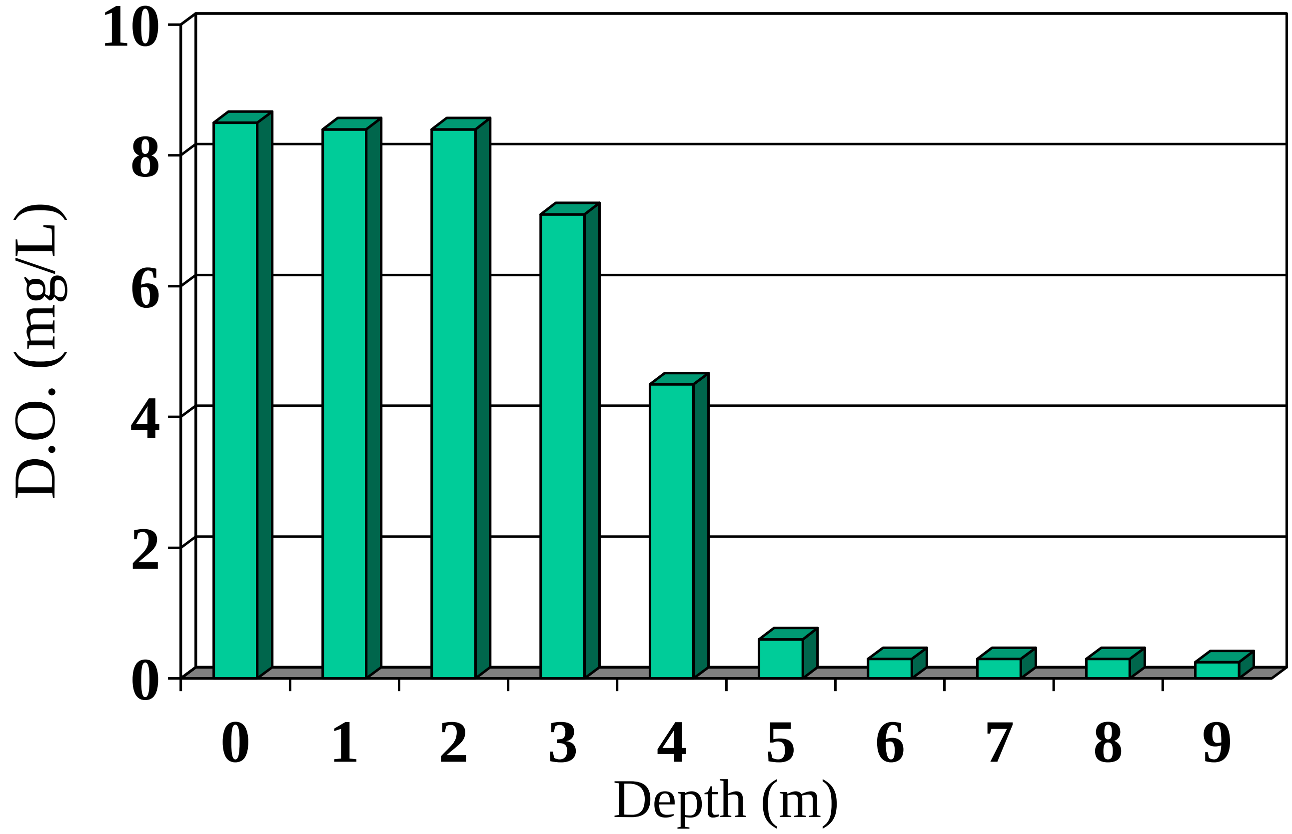

Figure 14 - Fawn Lake D.O. Percent Saturation August

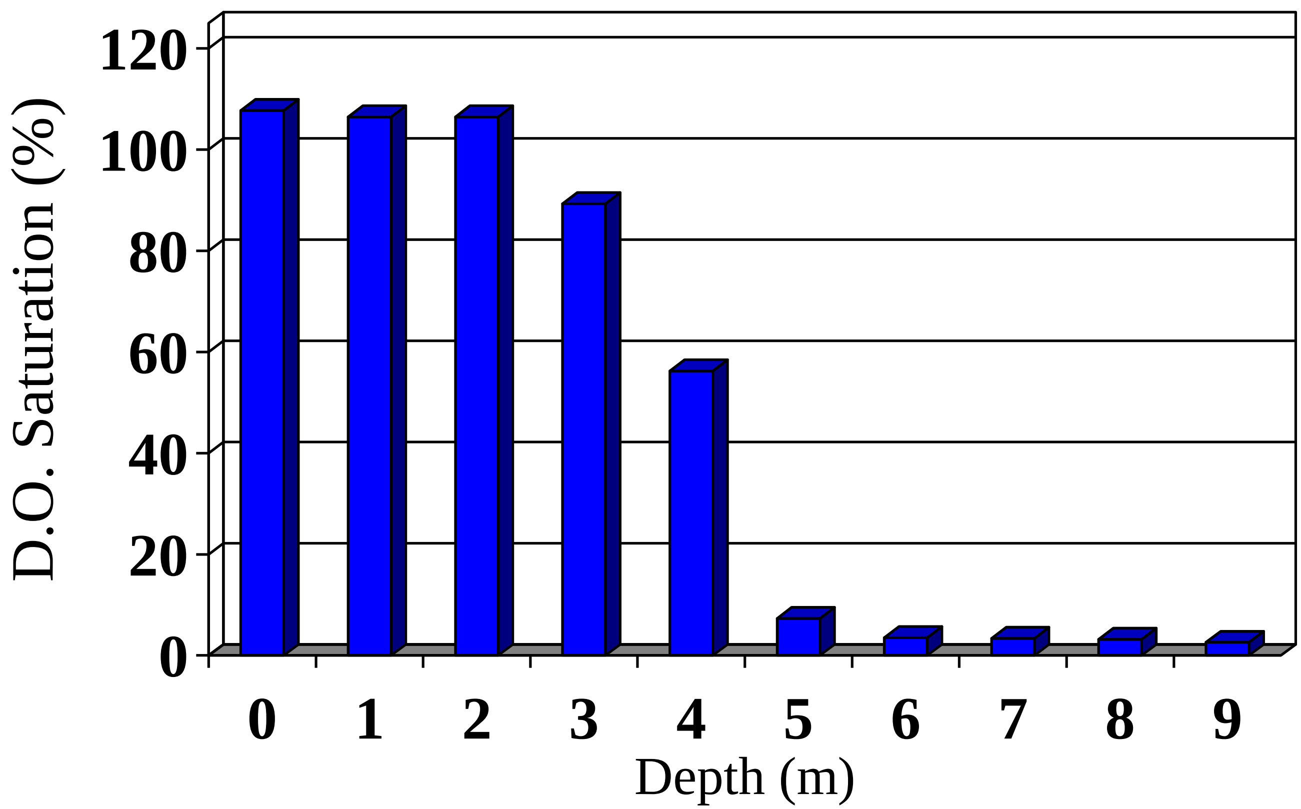

Figure 15 - Fawn Lake Temperature Data July

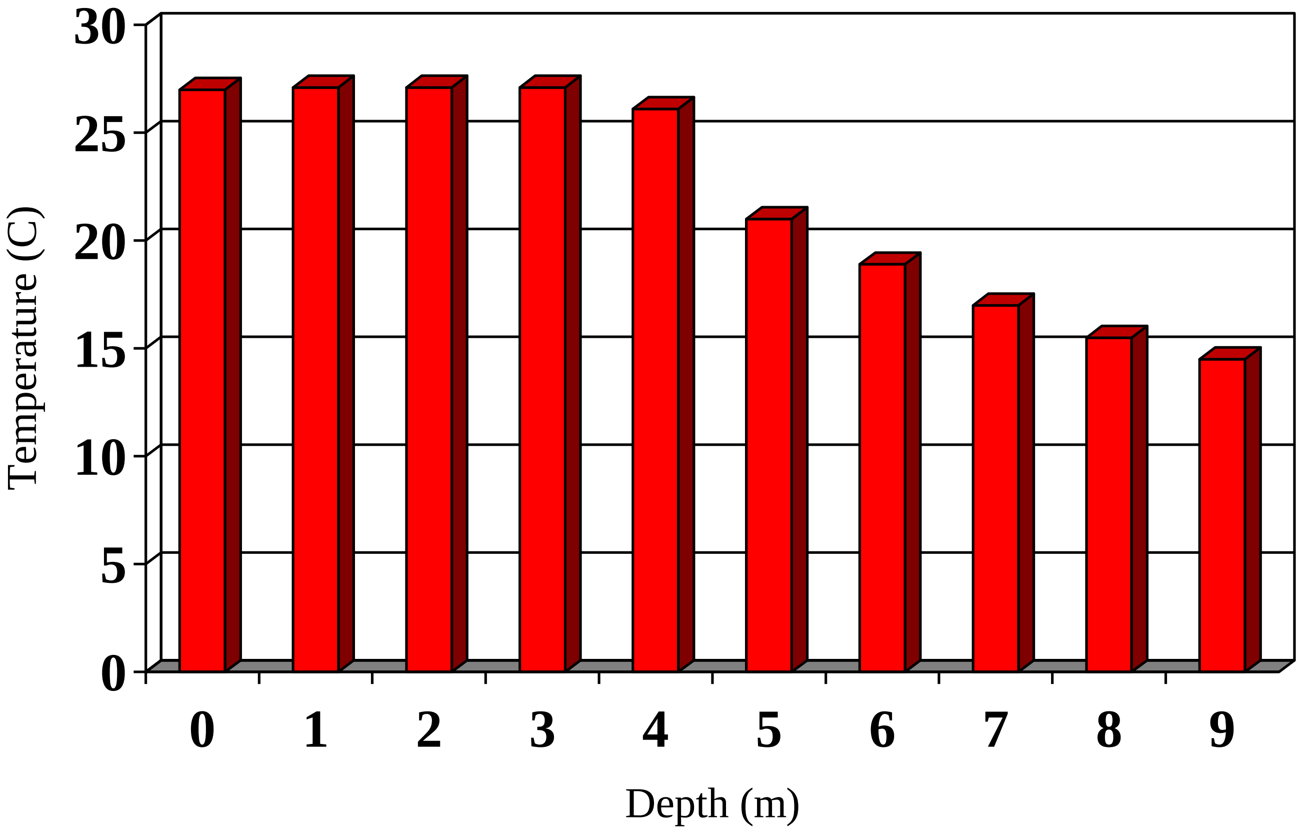

Figure 16 - Fawn Lake Temperature Data August

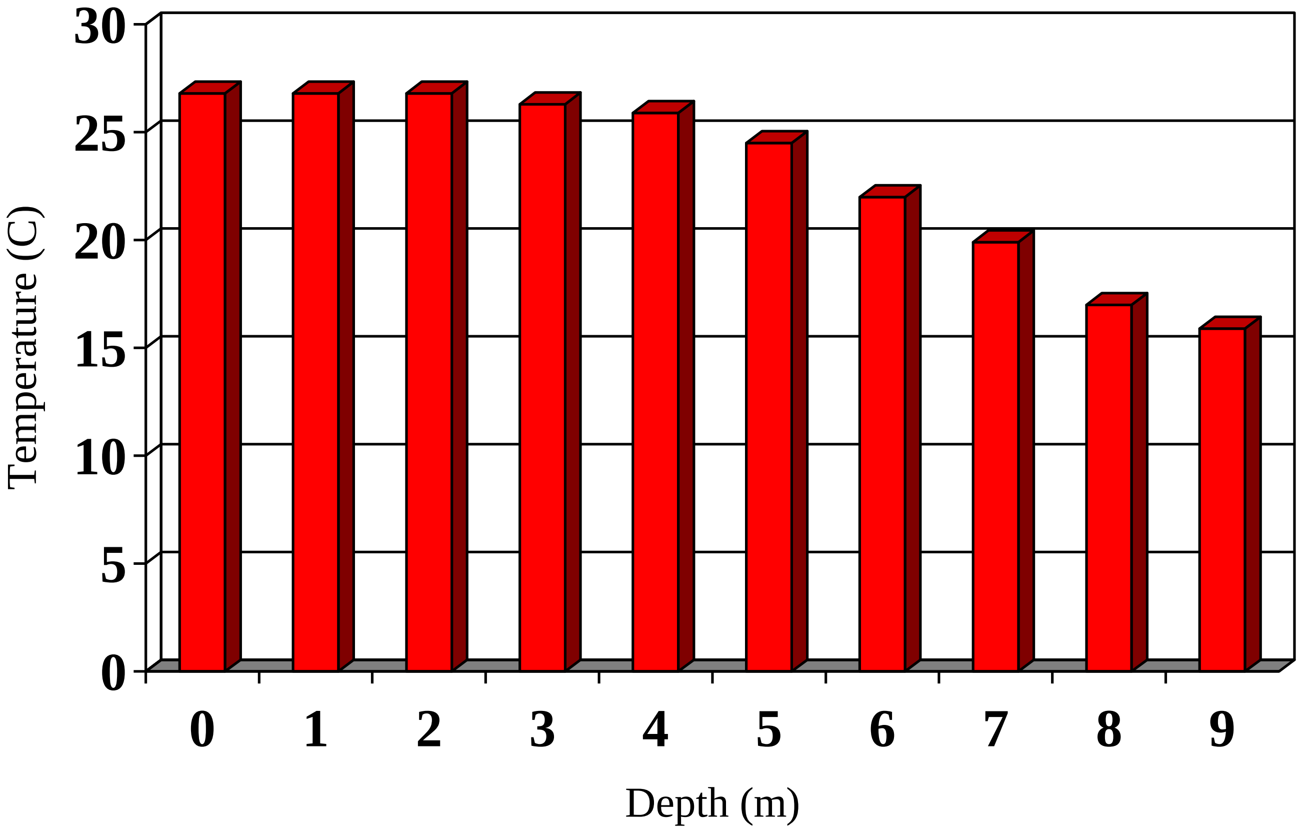

Figure 17 - Fawn Lake pH Data July

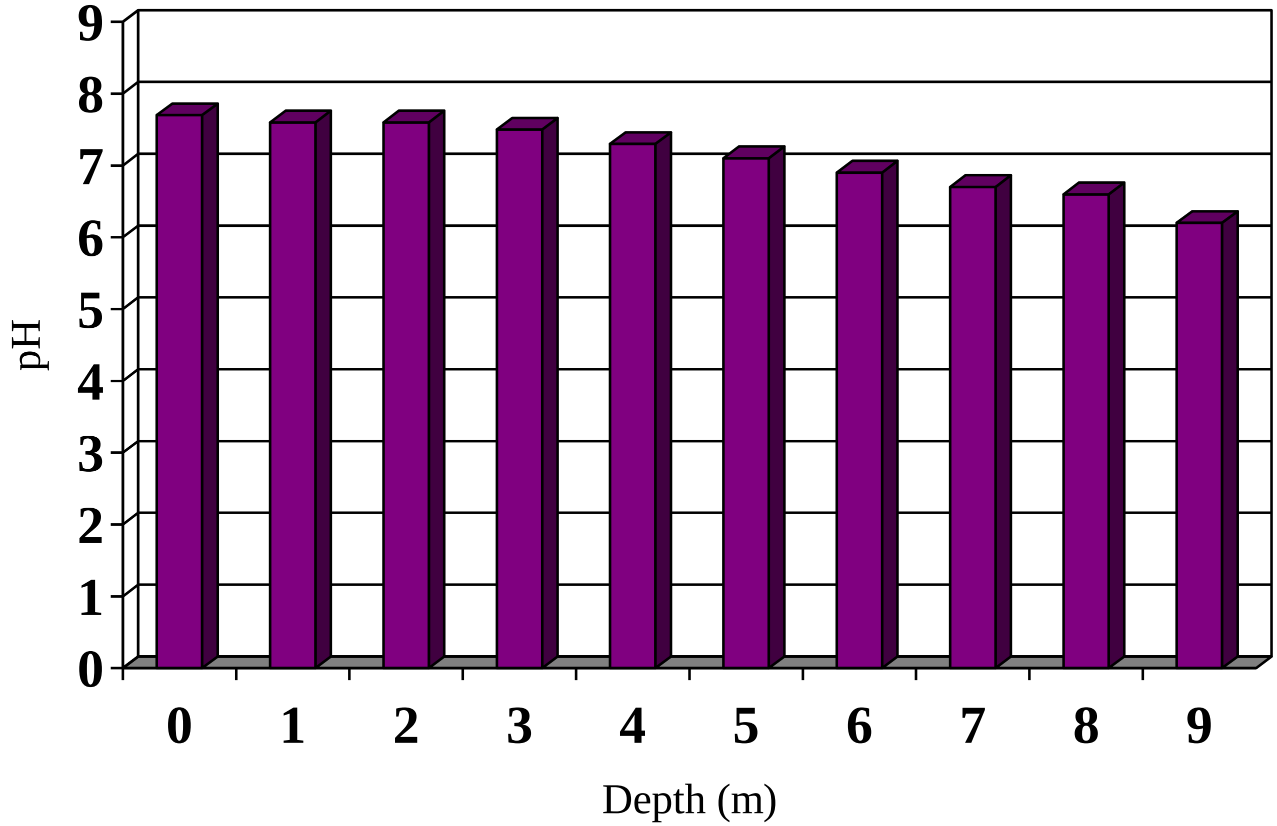

Figure 18 - Fawn Lake pH Data August

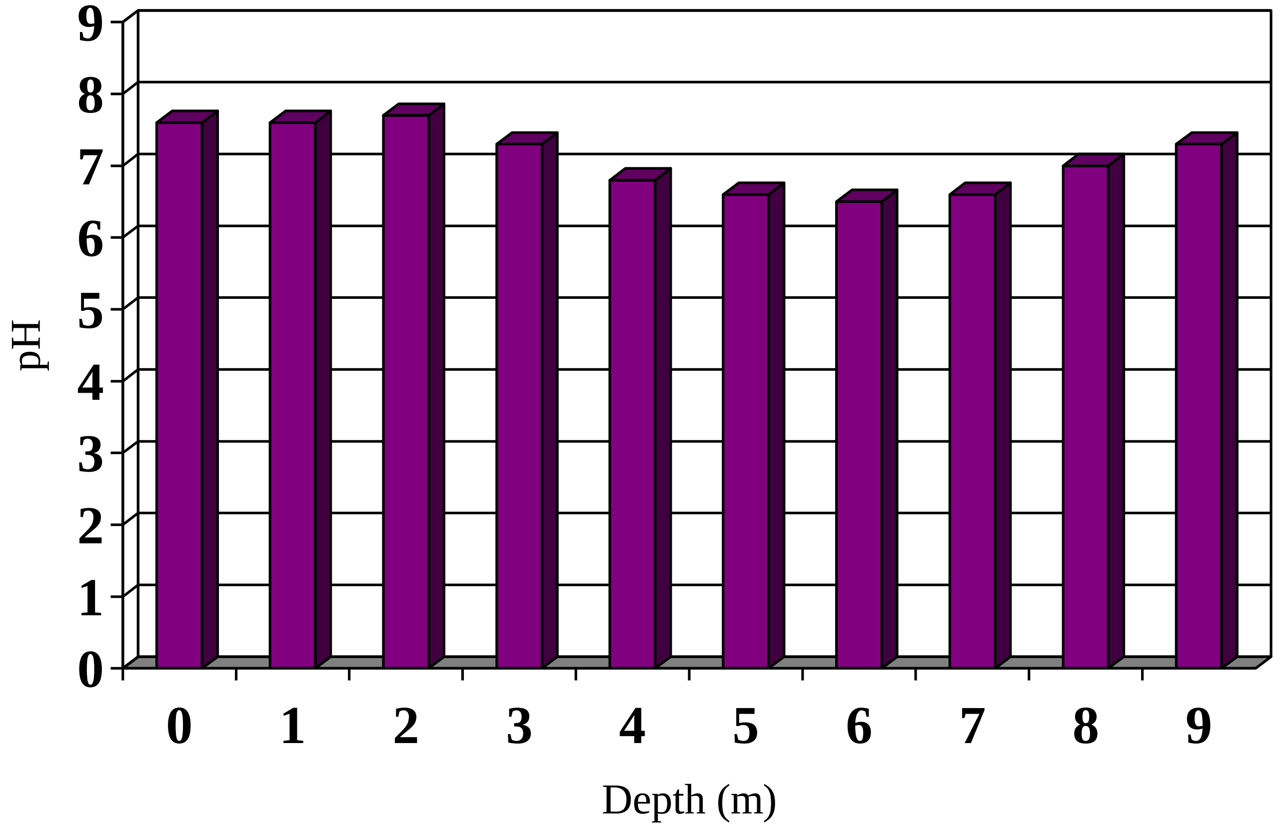

Figure 19 - Fawn Lake Conductivity Data July

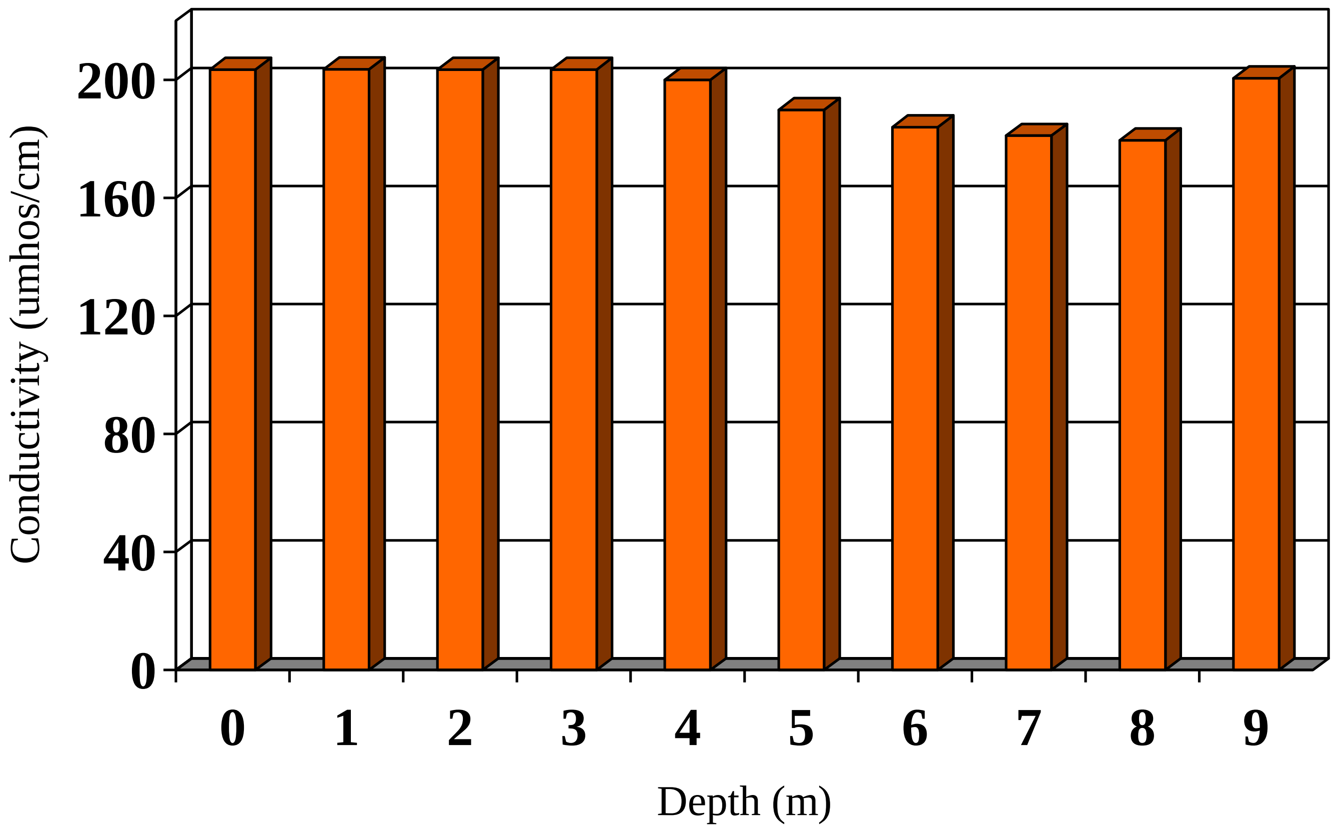

Figure 20 - Fawn Lake Conductivity Data August

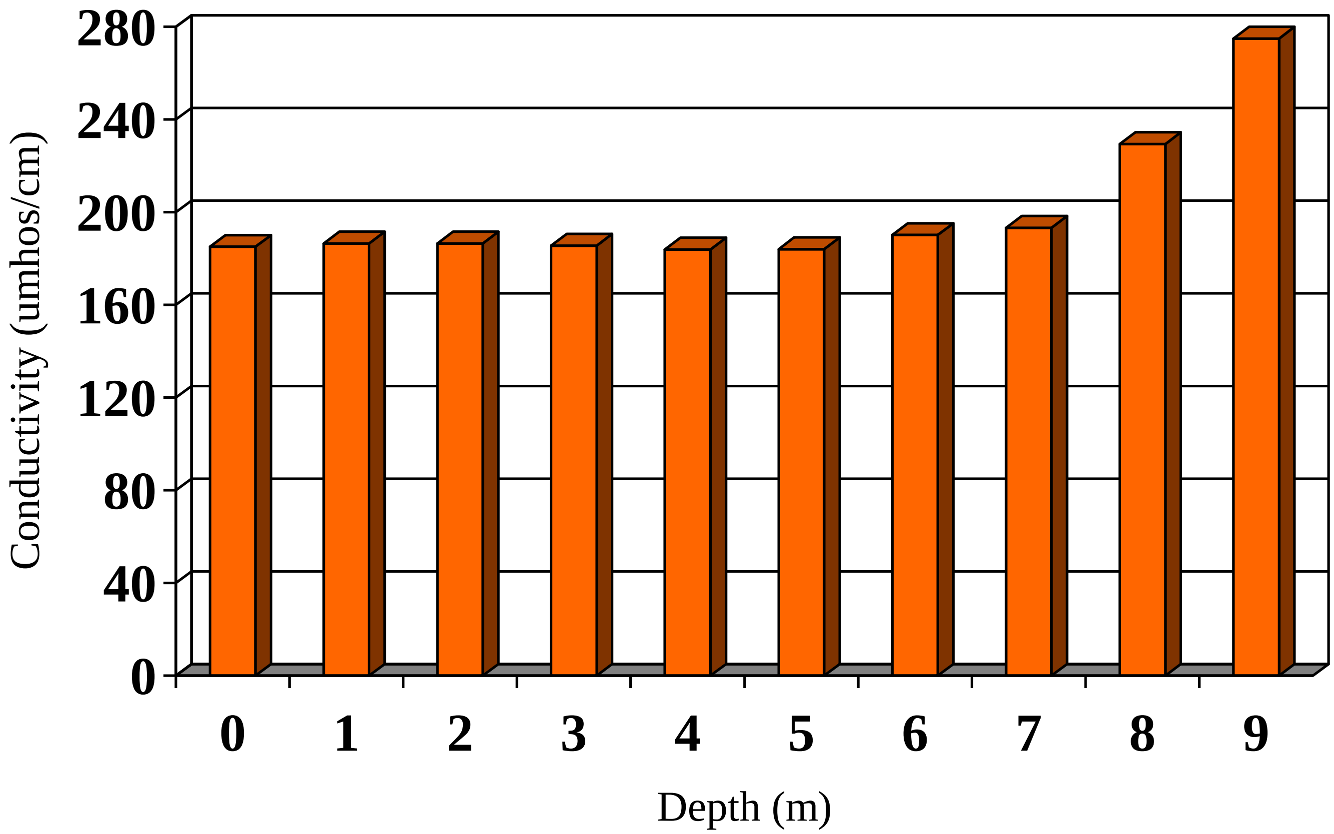

Table 4 –Bimini Lake Monitoring Summary – TSI Indicators and Lab Data

Date	Total Phosphorous (mg/L)	Secchi Depth (m)	Chlorophyll-a (µg/L)
7/20/21	0.013	4.6	1.64
8/23/21	0.015	3.5	4.72

Table 5 – Trophic State Indices for Fawn Lake

Calculated Trophic State Indices for	Annual TSI Values 2021
Total Phosphorus	42.2
Secchi Depth	39.8
Chlorophyll *a*	41.9

Water Quality Synopsis for Lake Wynonah and Fawn Lake

The results of the water quality monitoring during the summer of 2021 show that Lake Wynonah and Fawn Lake have excellent water quality for recreation. Lake water quality is evaluated based on the productivity of the water body. Lakes like Lake Wynonah and Fawn Lake that have multiple purposes such as fishing, swimming and boating need to have water quality that will allow for the production of a desirable fishery while allowing for desirable swimming and boating as well. Although lakes with very low productivity have very clear water that is desirable for swimming and boating, they usually have poor fish populations due to low productivity. Conversely, lakes with very high productivity have diverse fisheries but often have undesirable water quality for swimming and boating. Lake Wynonah and Fawn Lake have water quality that allows for a productive fishery without the problems found in lakes with higher productivity such as noxious algae blooms.

Productivity is classified based on a model called Trophic State Index (TSI). TSI's are calculated using the water quality data collected and give a "rating" for certain water quality parameters that indicate the health or condition of the lake. The three trophic state water quality parameters used are: total phosphorus, Secchi depth and chlorophyll *a*. Phosphorus is a key nutrient used by plants and algae to grow. Phosphorus is needed to produce the food at the lower end of the food chain for the fish population, but too much is a bad thing. High levels of phosphorus are associated with noxious algae blooms. Secchi depth is a measure of water clarity. A numerically higher secchi depth reading indicates better water clarity. The last parameter is chlorophyll *a*. Chlorophyll is found in algae and therefore; the more chlorophyll present usually means more algae is present.

A calculation is performed after the data is collected to determine a number that is the TSI and will be between 1 and 100. A trophic state index of less than 35 indicates that the lake would have low nutrients and low productivity. These lakes would have clear water for swimming, but their fish population is usually slow growing and less than desirable from a fishing perspective. A TSI of 35 to 50 indicates a lake that would have moderate nutrients and productivity. These lakes are considered most desirable for recreation as they have good water quality for swimming, boating and fish productivity. This season the average TSI numbers for Lake Wynonah were as follows: total phosphorus-32.2, secchi-37.4 and chlorophyll *a*-42.6. The TSI numbers for Fawn Lake were: total phosphorous-42.2, secchi-39.8, and chlorophyll-41.9. These TSI values show that the water quality for Lake Wynonah and Fawn Lake are quite favorable. There are enough nutrients present to support healthy aquatic life without causing undesirable conditions in the lake. The other parameters measured during the season; such as oxygen levels, pH, conductivity and dissolved/suspended solids all indicate that Lake Wynonah and Fawn Lake are healthy thriving waterbodies.

The environmental monitoring program for Lake Wynonah and Fawn Lake is a great asset. Establishing an extensive database allows for a detailed evaluation of changing water quality conditions that occur throughout a given season. The collection of monthly data on a seasonal basis provides a database of irreplaceable information. Therefore, it is recommended that the monitoring program be continued in 2022. The monitoring program should include both chemical and biological water quality characteristics. A monitoring database can be used to determine if annual information is following a long-term trend or is the result of annual climatological variations. This information can then be used to evaluate management options.