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“Assessment of Seasonal Variation in Physicochemical Properties of Ken River Water in Panna District of Madhya Pradesh”

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Abstract: To examine the magnitude of water first-rate decline in the Ken River of Panna, this take a look at examined the seasonal variation of physicochemical parameters of water, diagnosed capacity pollution assets, and clustered the tracking months with similar traits. Water samples have been collected in four wonderful seasons to assess temperature, pH, dissolved oxygen (DO) awareness, five-day biochemical oxygen call for (BOD), chemical oxygen call for (COD), electrical conductivity (EC), chloride ion (Cl) awareness, general alkalinity (TA), turbidity, overall dissolved solids (TDS) attention, general suspended solids (TSS) concentration, and overall hardness (TH) the use of widespread strategies. The analytical results revealed that 40% of water first-class indices have been inside the permissible limits counseled by way of different businesses, excluding EC, Cl concentration, TA, turbidity, DO attention, BOD, and COD in all seasons. Statistical analyses indicated that 52% of the contrasts were substantially exceptional at a ninety-five% self-assurance c programming language. The issue evaluation provided the exceptional healthy among the parameters, with four elements explaining 94.29% of the whole variance. TDS, BOD, COD, EC, turbidity, DO, and Cl had been particularly chargeable for pollutants loading and have been due to the full-size amount of commercial discharge and toxicological compounds. The cluster analysis showed the seasonal exchange in floor water great, which is commonly a trademark of pollutants from rainfall or different assets. However, the values of various physicochemical houses numerous with seasons, and the highest values of pollution were recorded within the wintry weather.

Keywords: Physicochemical Properties, BOD, COD, Turbidity, TDS.

Introduction:

Water is fundamental to lifestyles on our planet, but this valuable resource is more and more in call for and below chance. The earth's surface is made of 70% water consisting of rivers, beels, lakes, streams, seas, oceans, floor water and these types of forms are very crucial in life cycle [1]. Of the waters occupying 70% of the earth's floor, most effective 3% is taken into consideration clean water [2]. Among the freshwater, approximately 5% of them or zero.15% of the complete international

water is with no trouble reachable for useful purposes [3]. Clean water is essential for nature and human beings alike. However, surface waters are subjected to significant pressures - estimates suggest that during growing countries surface water might also already be tormented by extreme pollution because of its easy accessibility for disposal of wastewater [4]. Once water is contaminated, it's very tough, expensive, and regularly not possible to dispose of the pollution. Still today, eighty in step with cent of world wastewater releases untreated into the water our bodies, containing the entirety from human waste to notably poisonous industrial discharges [5]. The disposal of untreated wastewater of various industries, urban wastes and agrochemical wastes in low land, open water our bodies has reached an alarming scenario in Panna which is increasing daily [6,7]. Pollution of freshwater ecosystems can affect the habitat and fine of existence of fish and other flora and fauna[8,12].

Water is a natural aid this is essential for human survival, however, in recent times, industrialization has contributed immensely to the pollution of rivers in Nigeria via the discharge of wastewater into nearby water bodies [8]. This has resulted within the deterioration of water quality, affecting parameters which includes temperature, pH, turbidity, overall dissolved substances, hardness, electrical conductivity, dissolved oxygen, biochemical oxygen demand etc. This will have bad effect on the aquatic biota and people who depend upon those resources. Seasonal variations may have substantial effect on the water homes of rivers considering the amount of precipitation, dilution rate and waft velocity of the river [9,12]. A wide variety of studies have been executed to decide effect of wet and dry seasons on the water physico-chemical residences of rivers in Panna [8,10]. The river originates in the Kaimur Range near the village of Ahirgawan in the Katni district, a neighboring district to Panna. The Ken River enters the Panna district and flows for approximately fifty-five km thru the Panna Tiger Reserve, where it forms a important a part of the environment. It meanders thru the park, developing beautiful gorges and waterfalls, consisting of the well-known Raneh Falls and Pandav Falls. The river additionally serves because the boundary among the Panna and Chhatarpur districts in some regions. Ken River flows across the Panna Tiger Reserve, helping its natural world and atmosphere in Panna district [11,13].

Materials and Methods:

Study region:

The Ken River's altitude and latitude range alongside its direction, but a trendy range may be supplied. The Ken River basin is located among 23°07' and 25°50' North latitude. This variety covers its whole duration from its foundation in Madhya Pradesh to its confluence with the Yamuna River in Uttar Pradesh. The Panna district itself lies between 23.45°N and 25.10°N, so the river's range inside the district falls inside this variety [5,13]. The river originates at an elevation of approximately 550 meters (1,800 feet) in the Kaimur Range near Ahirgawan village. It joins the Yamuna River at a far lower elevation, about ninety-five meters [13].

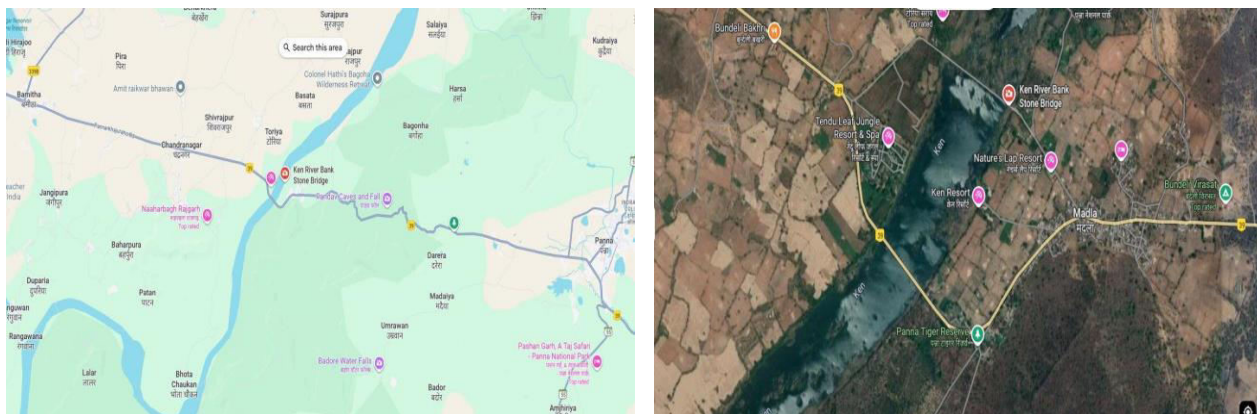


Figure 1: Google Map of Ken River in Panna District of Madhya Pradesh, India

Sites of sample collection:

Samples were collected from three sampling sites of Ken River for water, plankton and sediment

Site I - Deeper portion of the river. Site II - Marshy and shores region. Site III – Near bridge.

Collection and Preservation of Samples

Samples of water and sediment were manually collected from the three sampling sites in plastic/ glass sterilized containers were brought under iced conditions in insulated corrugated boxes.

Observations recorded at monthly intervals (for entire period i.e. 4 months)

Physico-chemical parameters of water viz. pH, temperature, dissolved oxygen (DO), conductivity, total dissolved solids, salinity, total alkalinity, total hardness, biochemical oxygen demand (BOD), chemical oxygen demand (COD), transparency, turbidity were analysed by standard protocol manual.

Results:

Physico-chemical parameter of water:

The water quality is directly related to the health of the water body. So, proper management in water quality of aquatic environment is very much essential. As water pollution is an important issue in India as most of the rivers, wetlands, reservoirs and ground water sources are reeling with stress of pollution which are having considerable negative impact on human health and aquatic life.

pH: Maximum mean values of pH recorded in August at site I (7.25) and site III (7.35) and in June (6.37) at site II and it was minimum in May (6.96, 5.97, 6.81) at site I, site II and site III, respectively. The pH value ranged 5.97 to 7.35 both temporally and spatially. The mean values differed significantly during different months within the

sites and also between the sites ($p < 0.05$)

Table1:pHofwaterat different sites (May-August,2024).

Month	SiteI	SiteII	SiteIII	Average
May	6.96 ^{c,1} ±0.01	5.97 ^{b,3} ±0.01	6.81 ^{b,2} ±0.01	6.58±0.01
June	7.14 ^{b,2} ±0.03	6.37 ^{a,3} ±0.02	7.29 ^{a,1} ±0.02	6.93±0.02
July	7.22 ^{a,2} ±0.00	6.21 ^{ab,3} ±0.003	7.34 ^{a,1} ±0.00	6.92±0.01
August	7.25 ^{a,2} ±0.02	6.27 ^{ab,3} ±0.00	7.35 ^{a,1} ±0.01	6.95±0.00
Average	7.14±0.01	6.21±0.01	7.20±0.00	

*The values (mean ± standard error) with different alphabetical superscripts (a, b, c...)

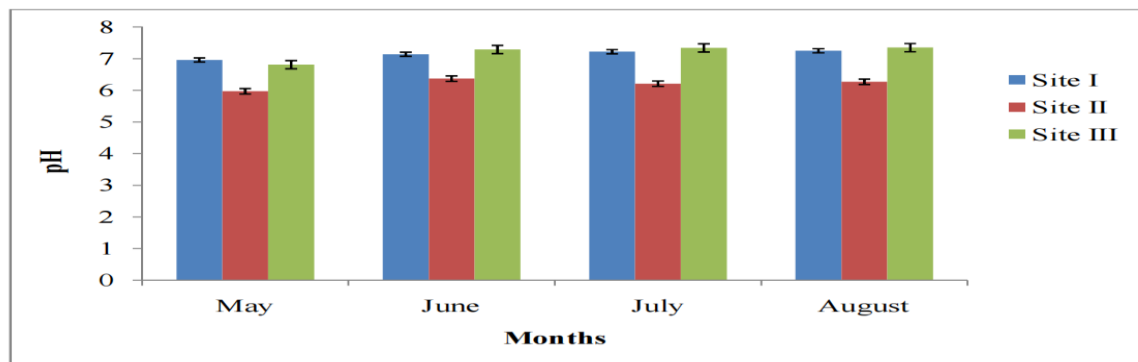


Figure 2: pH of water at different sites (May-August,2024)

Temperature: Maximum mean value of water temperature ($^{\circ}\text{C}$) recorded in June at site I (34.96) and site II (35.67) and in May at site III (35.28 $^{\circ}\text{C}$) and it was minimum in July (29.01, 30.00 and 30.02 $^{\circ}\text{C}$, respectively) at all the sites (Table 4, Fig.7). The water temperature ranged from 29.01 to 35.67 $^{\circ}\text{C}$ both temporally and spatially. The mean values differed significantly during different months with in the sites and also between the sites ($p < 0.05$).

Table 2: Water temperature ($^{\circ}\text{C}$) at different sites (May - August, 2024).

Month	SiteI	SiteII	SiteIII	Average
May	33.82 ^{b,3} ±0.13	34.57 ^{b,2} ±0.16	35.28 ^{a,1} ±0.12	34.56±0.14
June	34.96 ^{a,3} ±0.32	35.67 ^{a,1} ±0.11	35.11 ^{a,2} ±0.13	35.25±0.18
July	29.01 ^{d,2} ±0.00	30.00 ^{d,1} ±0.00	30.02 ^{b,1} ±0.00	29.68±0.00
August	31.02 ^{c,2} ±0.00	31.00 ^{c,3} ±0.00	31.53 ^{b,1} ±0.00	31.18±0.00
Average	32.20±0.12	32.81±0.08	32.99±0.06	

*See table3 for legends

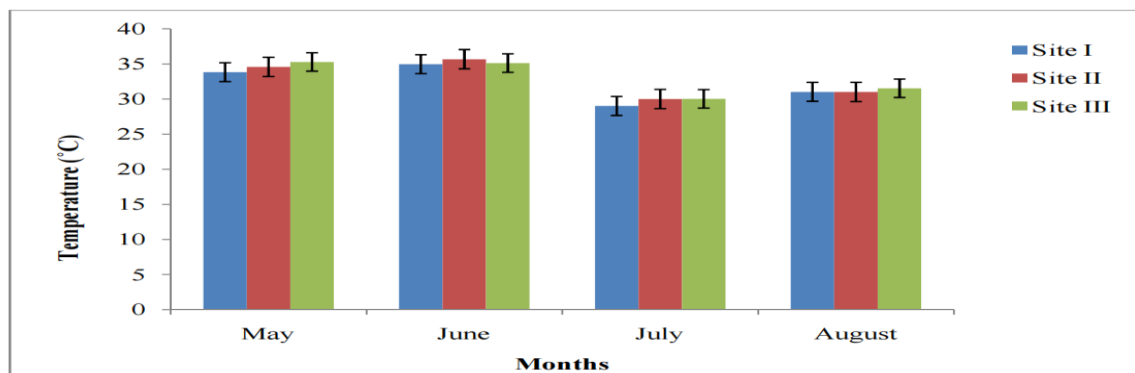


Figure 3: Water temperature (°C) at different sites (May- August, 2024).

Dissolved oxygen: The maximum mean value of dissolved oxygen was recorded in August (8.00, 6.89 and 7.78 mg l⁻¹) at site I, site II and site III, respectively whereas minimum value recorded in May (6.78 and 6.56 mg l⁻¹) at site I, site III and in June (5.43 mg l⁻¹) at site II, respectively (Table 5, Fig.8). The dissolved oxygen ranged from 5.43 to 8.00 mg l⁻¹ both temporally and spatially. The mean values differed significantly during different months within the sites and also between the sites ($p < 0.05$).

Table 3: D.O (mg l⁻¹) of water at different sites (May - August, 2024)

Month	Site I	Site II	Site III	Average
May	6.78 ^{d,1} ±0.01	5.82 ^{c,3} ±0.02	6.56 ^{d,2} ±0.02	6.39±0.01
June	6.96 ^{c,1} ±0.37	5.43 ^{d,3} ±0.08	6.88 ^{c,2} ±0.09	6.42±0.18
July	7.93 ^{b,1} ±1.50	6.53 ^{a,3} ±0.06	7.24 ^{b,2} ±1.56	7.23±1.04
August	8.00 ^{a,1} ±0.30	6.89 ^{b,3} ±0.23	7.78 ^{a,2} ±0.28	7.56±0.27
Average	7.42±0.54	6.17±0.09	7.12±0.24	

*See table 3 for legends

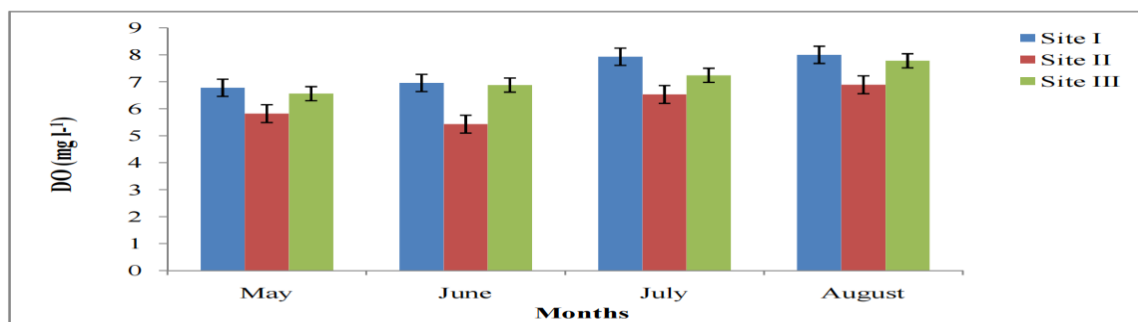


Figure 4: D.O (mg l⁻¹) of water at different sites (May- August, 2024)

Total Dissolved Solids (TDS): The maximum mean value of TDS was recorded in July (303.00, 346.81 and 328.51 mg l⁻¹) at all the sites whereas it was minimum in May (162.36, 233.36 mg l⁻¹) at site I and site II and in June at (202.56 mg l⁻¹) site III, respectively (Table 7, Fig.10). The TDS ranged from 162.36 to 346.81 mg l⁻¹ both temporally and spatially. The mean values differed significantly during different

months within the sites and also between the sites ($p < 0.05$).

Table 4: TDS (mg l^{-1}) of water at different sites (May-August, 2024)

Month	SiteI	SiteII	SiteIII	Average
May	$162.36^{d,3} \pm 0.26$	$233.36^{c,1} \pm 0.26$	$209.34^{c,2} \pm 0.25$	201.69 ± 0.25
June	$191.13^{c,3} \pm 0.66$	$235.33^{c,1} \pm 0.13$	$202.56^{d,2} \pm 0.89$	209.67 ± 0.56
July	$303.00^{a,3} \pm 0.39$	$346.81^{a,1} \pm 9.55$	$328.51^{a,2} \pm 0.44$	326.11 ± 3.46
August	$247.21^{b,3} \pm 5.63$	$287.72^{b,1} \pm 5.62$	$262.37^{b,2} \pm 4.21$	265.77 ± 5.15
Average	225.93 ± 4.80	275.81 ± 1.35	250.70 ± 1.44	

*See table 3 for legends

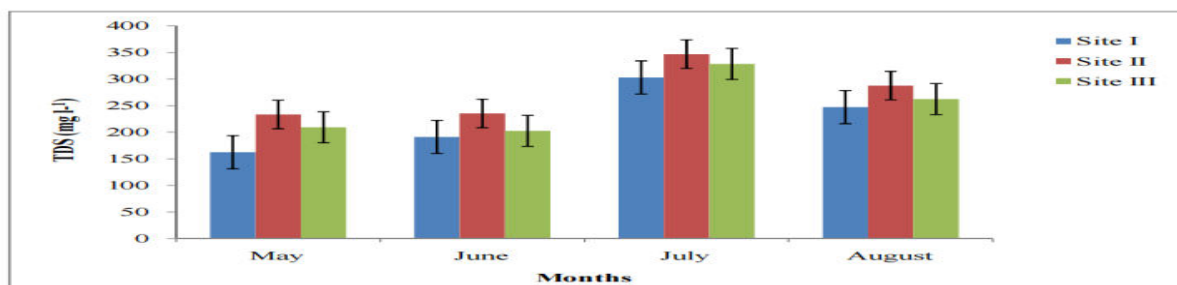


Figure 5: TDS (mg l^{-1}) of water at different sites (May- August, 2024)

Salinity: Month-wise average salinity value recorded higher in summer particularly in June (0.08) whereas, average salinity recorded almost constant (0.06 ppt.) for rest of the months. Site-wise average salinity value recorded highest in site II (0.08 ppt) as compared with site I (0.06) and site III (0.05). However, overall salinity of water was well below the optimum limit of freshwater (≤ 0.5 ppt). Based on these observations it can be stated Ken River as a freshwater lake.

Table 5: Salinity (ppt) of water at different sites (May- August, 2024)

Month	SiteI	SiteII	SiteIII	Average
May	$0.06^{a,1} \pm 0.01$	$0.08^{a,1} \pm 0.01$	$0.05^{a,1} \pm 0.01$	0.06 ± 0.01
June	$0.08^{a,1} \pm 0.26$	$0.09^{a,1} \pm 0.02$	$0.06^{a,1} \pm 0.01$	0.08 ± 0.1
July	$0.06^{a,1} \pm 0.00$	$0.08^{a,1} \pm 0.00$	$0.05^{a,1} \pm 0.00$	0.06 ± 0.0
August	$0.05^{a,1} \pm 0.00$	$0.07^{a,1} \pm 0.00$	$0.05^{a,1} \pm 0.00$	0.06 ± 0.00
Average	0.06 ± 0.06	0.08 ± 0.01	0.05 ± 0.06	

*See table 3 for legends

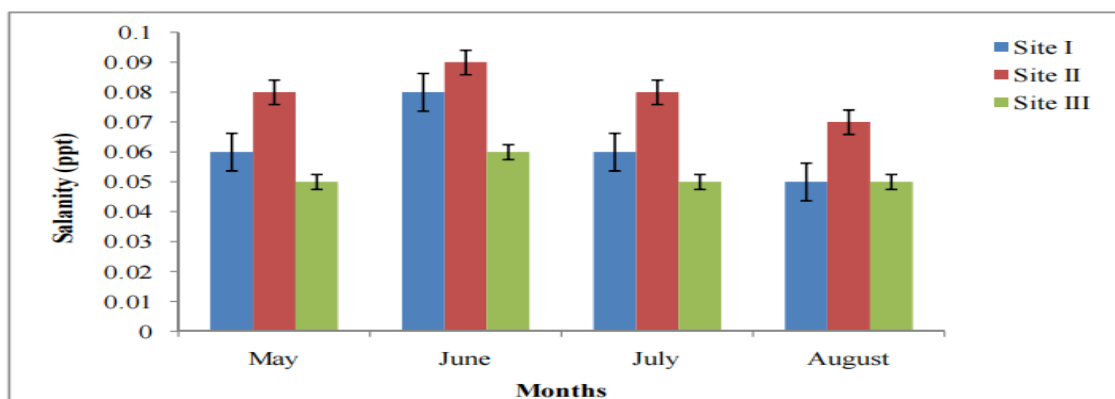


Figure 6: Salinity (ppt) of water at different sites (May- August, 2024)

Total alkalinity: The maximum mean value of alkalinity was recorded in August (134.17, 120.66 and 130.54 mgCaCO₃l⁻¹) and which was minimum in May (112.33, 105.66 and 105.32 mgCaCO₃l⁻¹) at site I, site II and site III, respectively (Table 9, Fig.12). The alkalinity ranged from 105.32 to 134.17 mg CaCO₃ l⁻¹ both temporally and spatially. The mean values differed significantly during different months within the sites and also between the sites ($p < 0.05$).

Table 6: Total alkalinity (mgCaCO₃ l⁻¹) of water at different sites (May - August, 2024)

Month	Site I	Site II	Site III	Average
May	112.33 ^{c,1} ±1.76	105.66 ^{c,2} ±2.90	105.32 ^{d,2} ±2.98	107.77±2.55
June	127.00 ^{a,1} ±10.26	116.33 ^{c,2} ±3.71	117.89 ^{c,b} ±3.76	120.41±5.91
July	127.93 ^{a,1} ±1.50	118.00 ^{c,3} ±5.29	121.56 ^{b,2} ±1.42	122.50±2.74
August	134.17 ^{a,1} ±0.61	120.66 ^{c,3} ±2.40	130.54 ^{b,2} ±0.68	128.46±1.23
Average	125.36±3.53	115.16±3.58	118.83±2.21	

*See table 3 for legends

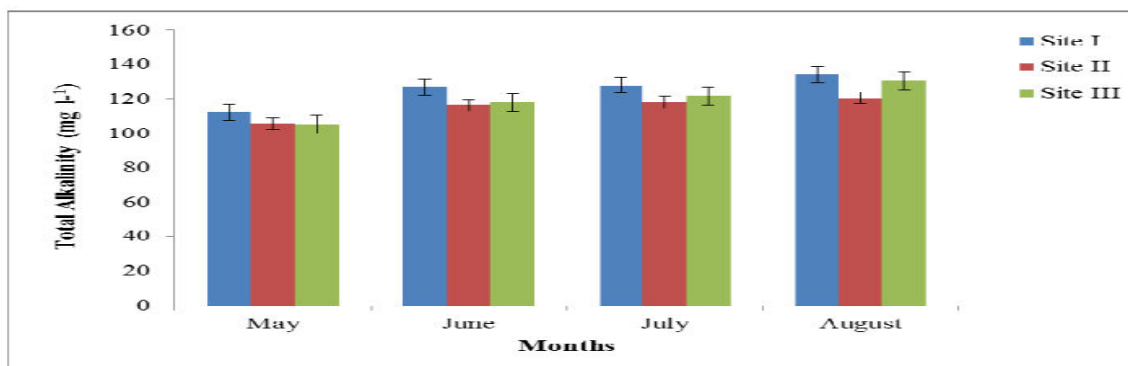


Figure 7: Total alkalinity (mgCaCO₃l⁻¹) of water at different (May-August, 2024)

Total hardness: The maximum mean value of total hardness was recorded in August (107.22, 95.15 and 102.60 mg CaCO₃) and it was minimum In May (88.67, 79.00 and 92.50 mg CaCO₃) at site I, site II and site III, respectively. The hardness ranged from

79.00 to 107.22 mg CaCO₃ both temporally and spatially. The mean values differed significantly during different months within the sites and also between the sites ($p < 0.05$).

Table 7: Total hardness (mg CaCO₃l⁻¹) of water at different sites (May-August, 2024)

Month	SiteI	SiteII	SiteIII	Average
May	88.67 ^{d,2} ±0.35	79.00 ^{d,3} ±1.15	92.50 ^{c,1} ±0.38	86.72±0.63
June	98.44 ^{c,1} ±1.85	85.75 ^{c,3} ±4.16	94.50 ^{b,2} ±1.89	92.90±2.30
July	104.35 ^{b,1} ±0.66	89.00 ^{b,3} ±8.08	100.50 ^{a,2} ±0.66	97.95±3.13
August	107.22 ^{a,1} ±7.72	95.15 ^{a,3} ±6.11	102.60 ^{a,2} ±7.86	101.66±7.23
Average	99.67±2.40	87.23±4.88	97.53±2.70	

*See table 3 for legends

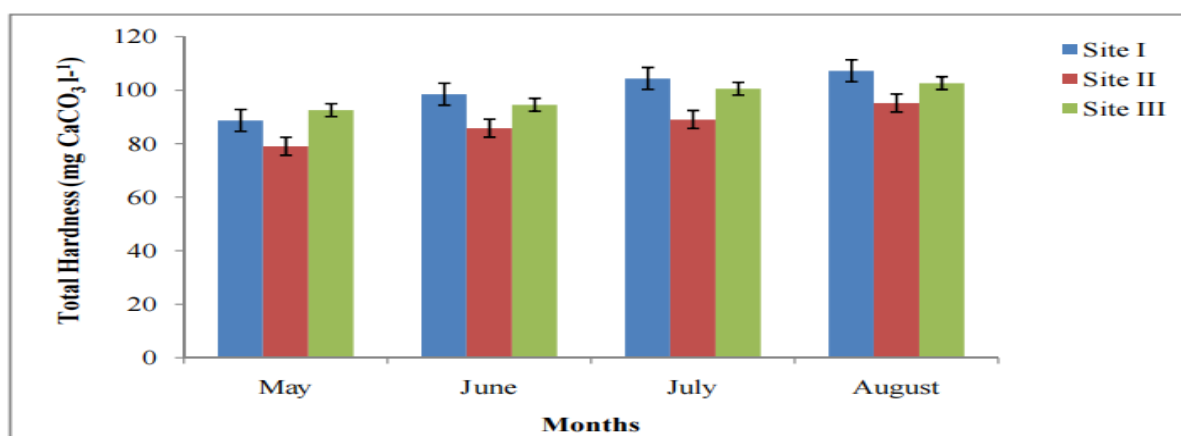


Figure 8: Total hardness (mg CaCO₃l⁻¹) of water at different sites (May-August, 2024)

Chemical oxygen demand (COD): Chemical oxygen demand is an indicator of the oxidation of reduced chemicals in water. It is generally used to indirectly measure the amount of organic constituents present in water. Generally, the lower chemical oxygen demand level indicates a low level of pollution, while the high level of chemical oxygen demand points out the high level of pollution of water.

Table 8: COD (mg l⁻¹) of water at different sites (May-August, 2024)

Month	SiteI	SiteII	SiteIII	Average
May	28.50 ^{a,2} ±3.66	32.66 ^{a,1} ±3.48	27.46 ^{a,2} ±2.65	29.54±3.26
June	26.33 ^{b,2} ±2.60	28.67 ^{b,1} ±29.20	25.83 ^{b,3} ±0.98	26.94±10.93
July	18.37 ^{c,3} ±0.88	24.55 ^{c,1} ±1.45	19.77 ^{c,2} ±2.83	20.90±1.72
August	16.16 ^{d,3} ±2.33	19.98 ^{d,1} ±1.20	18.53 ^{c,2} ±1.67	18.22±1.73
Average	22.34±2.37	26.47±8.83	22.90±2.03	

*See table 3 for legends

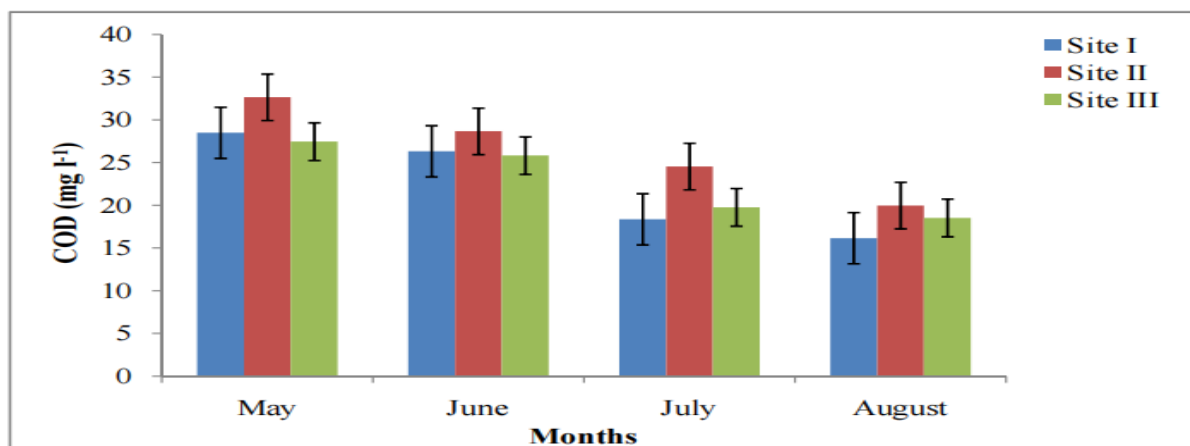


Figure 9: COD (mg l⁻¹) of water at different sites (May- August, 2024)

Biochemical oxygen demand (BOD): The maximum mean value of BOD was recorded in May (13.89, 28.76, 17.96 mg l⁻¹) and it was minimum in August (8.41, 16.70, 10.54 mg l⁻¹) at site I, site II and site III, respectively (Table 20, Fig. 23). BOD ranged from 8.41 to 28.76 mg l⁻¹ both temporally and spatially. The mean values differed significantly during different months within the sites and also between the sites ($p < 0.05$). The mean values of BOD were recorded below the permissible limit (<30 mg l⁻¹ recommended by EPA 1986). Month wise average BOD value recorded higher in summer (May and June) (20.20 and 17.13 mg l⁻¹, respectively) and lower in monsoon (July and August) (13.01 and 11.88 mg l⁻¹, respectively). Site-wise average BOD value recorded highest at site II (22.63 mg l⁻¹) and lowest at site I (10.86 mg l⁻¹). The BOD revealed positive correlation with water temperature and COD whereas negative correlation with DO.

Table 10: BOD (mg l⁻¹) of water at different sites (May- August, 2024)

Month	Site I	Site II	Site III	Average
May	13.89 ^{a,3} ±0.01	28.76 ^{a,1} ±2.42	17.96 ^{a,2} ±2.38	20.20±1.60
June	11.90 ^{b,3} ±11.04	25.91 ^{b,1} ±2.27	13.57 ^{b,2} ±2.36	17.13±5.22
July	9.22 ^{c,3} ±2.85	19.16 ^{c,1} ±1.47	10.66 ^{c,2} ±1.64	13.01±1.99
August	8.41 ^{c,3} ±0.06	16.70 ^{d,1} ±1.65	10.54 ^{c,2} ±1.56	11.88±1.09
Average	10.86±3.49	22.63±1.95	13.18±1.99	

*See table 3 for legends

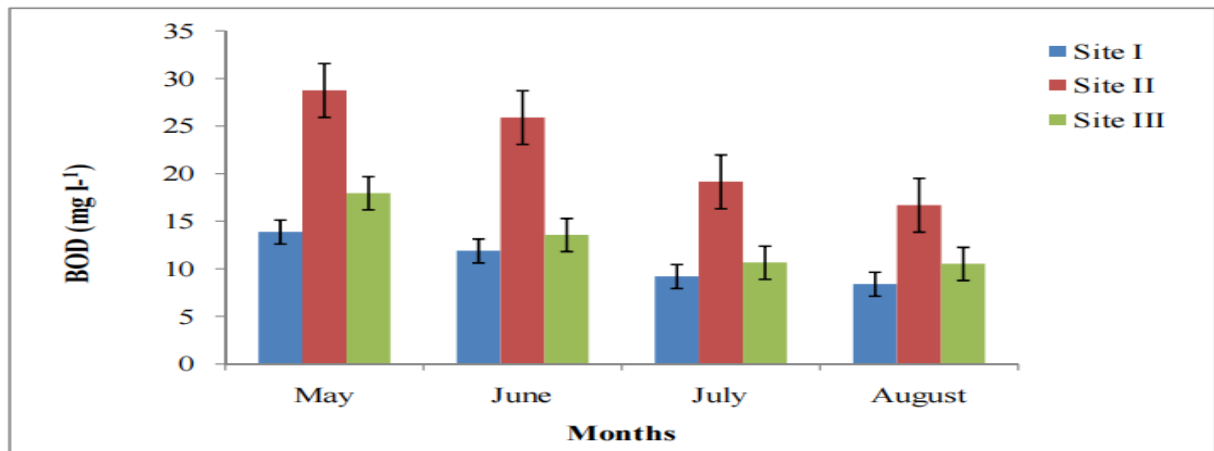


Figure 10: BOD (mg l⁻¹) of water at different sites (May- August, 2024)

Transparency: The maximum mean value of transparency recorded in May (32.80, 27.67, 31.45 mg l⁻¹) and minimum in August (25.78, 23.21, 23.40mg l⁻¹) at site I, site II and site III, respectively (Table 21, Fig.24). The transparency ranged from 23.21 to 32.80 cm both temporally and spatially. The mean values differed significantly during different months within the sites and also between the sites ($p < 0.05$).

Table 10: Transparency (cm) of water at different sites (May - August,2024)

Month	SiteI	SiteII	SiteIII	Average
May	32.80 ^{a,1} ±1.04	27.67 ^{a,2} ±0.46	31.45 ^{a,1} ±1.01	30.64±0.83
June	30.65 ^{b,1} ±0.23	25.05 ^{b,2} ±0.40	30.76 ^{b,1} ±0.24	28.82±0.29
July	27.54 ^{c,1} ±0.62	23.42 ^{c,2} ±0.38	26.32 ^{c,1} ±0.45	25.76±0.48
August	25.78 ^{d,1} ±0.42	23.21 ^{c,2} ±0.37	23.40 ^{d,2} ±0.33	24.13±0.37
Average	29.19±0.57	24.59±0.39	27.98±0.50	

*See table 3 for legends

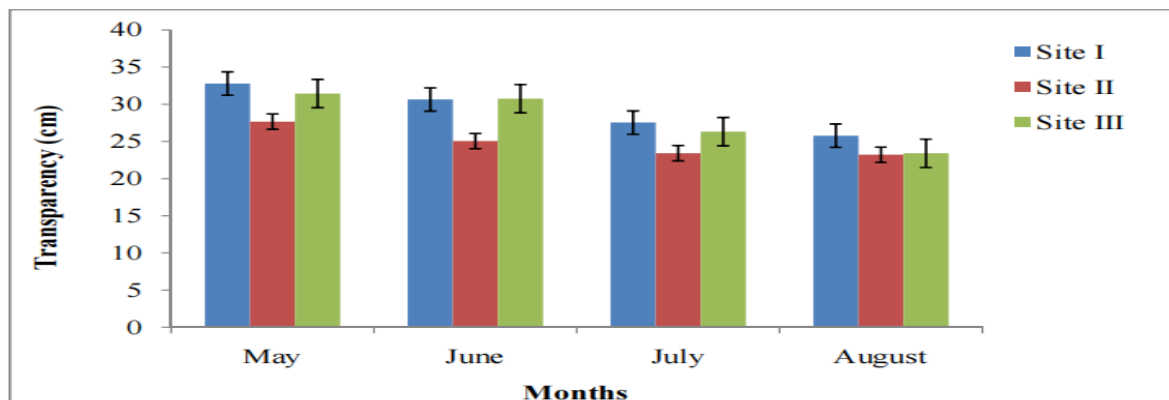


Figure 11: Transparency (cm) of water at different sites (May- August, 2024)

Turbidity: Turbidity reduces the amount of light penetration in water due to the presence of various suspended particles such as clay, silt, plankton, algae etc. These suspended particles absorb more light and results in rising of the water temperature. The turbidity is the measure of suspended sediment such as silt, clay, organic matter and microscopic organisms in water sample. The maximum mean value of turbidity was recorded in August (23.32, 24.83, 22.55 NTU) and it was minimum in May (15.56, 21.51, 14.54 NTU) at site I, site II and site III, respectively (Table 22, Fig. 25).

Table 11: Turbidity (NTU) of water at different sites (May- August, 2024)

Month	SiteI	SiteII	SiteIII	Average
May	15.56 ^{c,2} ±0.48	21.51 ^{a,1} ±0.19	14.54 ^{c,2} ±0.50	17.20±0.39
June	19.54 ^{b,2} ±0.33	23.15 ^{b,1} ±0.24	16.34 ^{b,2} ±0.38	19.69±0.31
July	22.21 ^{b,3} ±0.38	24.67 ^{c,1} ±0.20	21.30 ^{a,2} ±0.45	23.19±1.03
August	23.32 ^{a,3} ±0.42	24.83 ^{d,1} ±0.33	22.55 ^{a,2} ±0.49	23.56±0.41
Average	20.15±0.40	23.54±0.24	18.68±0.45	

*See table 3 for legends

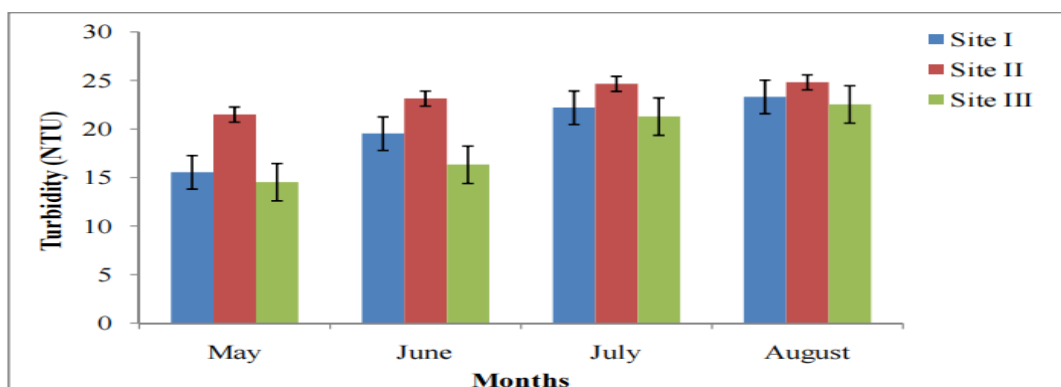


Figure 12: Turbidity (NTU) of water at different sites (May- August, 2024)

Discussion:

Both seasonal and spatial variation in physico-chemical parameters of water had been located in Ken River. Most of the water first-rate parameters recorded higher in summer (May and June) as compared with monsoon (July and August) which can be due to the dilution of water for the duration of rainy season [3,12]. There changed into an inverse dating determined between water temperatures and dissolved oxygen content in Ken River. The better price of TDS recorded at Site II may be due to excessive inflow of heavy natural and inorganic depend on this site. Salinity become well under the choicest limits for freshwater (0.5ppt) indicates Ken River as a freshwater lake. Overall chloride content material of Ken River recorded better while, maximum value recorded at site II may be due to excessive influx of sewage water

and business effluents in this site [8,13].

Site II recorded lowest alkalinity in addition to pH for the duration of the examine period in comparison with site I and site III which may be because of better charge of decomposition of organic count number changing the vicinity acidic in addition to lower alkaline. Higher alkalinity in monsoon season suggests life of loose carbon dioxide observed by using high rate of decomposition of home sewage motivated by high temperature. Higher quantity of agriculture runoff, city discharge and industrial effluent would possibly have extended the hardness in water during monsoon [11,14]. COD mounted good sized negative correlation with DO and effective correlation with water temperature and BOD [6,15]. The mean values of COD had been recorded were above the permissible limit. The high COD discovered the presence of higher quantity of non-biodegradable oxygen demanding pollution in wetland water [6,16]. In present examine higher BOD discovered in the course of summer months can be because of better degree of decomposition of organic depend through the cardio organisms stimulated by means of better temperature. Important physico-chemical parameters of water (temperature, transparency, turbidity, conductivity, pH, salinity, TDS, chloride, hardness, general alkalinity, DO, BOD, COD, Site - smart average pH cost recorded highest at Site I (7.20) and lowest at Site II (6.21). The pH fee ranged from 6.21 to 7.35 both temporally and spatially [15,17]. Our statistical data revealed that water temperature ranged from 29.01 to 35.67 0C. Month-clever average water temperature recorded maximum in June (35.25 0C) and lowest in July (29.68 0C). Site-wise average water temperature recorded highest at Site III (32.99 0C) and lowest at Site I (32.20 0C). The DO ranged from five.43 to eight.00 mg l-1. Month-wise average DO cost recorded higher in monsoon (July and August) (7.23 and 7.56 mg l-1, respectively) compared with summer time (May and June) (6.39 and 6.42 mg l-1, respectively). Site-wise average DO fee recorded highest at site I (7.42 mg l-1) and lowest at site II (6.17 mg l-1).

Water is a herbal aid that is critical for human survival, but, in recent times, industrialization has contributed immensely to the pollutants of rivers in Nigeria through the release of wastewater into nearby water our bodies [7,18,24]. This has resulted inside the deterioration of water excellent, affecting parameters which include temperature, pH, turbidity, general dissolved materials, hardness, electrical conductivity, dissolved oxygen, biochemical oxygen demand etc [11,15,22]. This can have poor effect on the aquatic biota and human beings who depend upon these sources. Seasonal versions may have huge effect at the water residences of rivers thinking about the amount of precipitation, dilution price and flow velocity of the river [8,19,23]. The conductivity ranged from 80.30 to 128.88 $\mu\text{S cm}^{-1}$. Month-smart average electric conductivity value recorded higher in summer time (May and June) (128.10 and 108.28 $\mu\text{S cm}^{-1}$, respectively) in comparison with monsoon (July and August) (83.12 and 90.94 $\mu\text{S cm}^{-1}$, respectively). Site-sensible average electric conductivity cost recorded highest at site II (107.32 $\mu\text{S cm}^{-1}$) and lowest at site online I (99.84 $\mu\text{S cm}^{-1}$). The TDS ranged from 162.36 to 346.81 $\mu\text{S cm}^{-1}$. Month-sensible average TDS

fee recorded better in monsoon (July and August) (326.11 and 265.77 μ S cm⁻¹) in comparison with summer (May and June) (201.69 and 209.67 μ S cm⁻¹). Site-sensible average TDS cost recorded highest in site II (275.81 μ S cm⁻¹) and lowest at site I (225.93 μ S cm⁻¹). Our study explored that The salinity of wetland water ranged from 0.05 to zero.09 ppt. Month-wise common salinity price recorded better in summer time especially in June (zero.08), common salinity recorded nearly steady (zero.06 ppt.) for rest of the months [20,21]. Site-sensible average salinity price recorded highest in site II (0.08 ppt) compared with Site I (zero.06) and site III (zero.05). The overall alkalinity ranged from one zero five.32 to 134.17 mg l⁻¹ both temporally and spatially. Site-clever average general hardness cost recorded highest in site I (99.67mg l⁻¹) and lowest in Site II (87.23mg l⁻¹). The COD ranged from 16.16 to 32.66 mg l⁻¹ both temporally and spatially. Month- sensible average COD cost recorded higher in summer (May and June) (29.54 and 26.94 mg l⁻¹, respectively) and decrease in Monsoon (July and August) (20.90 and 18.22 mg l⁻¹, respectively). Site-clever common COD fee recorded maximum at site II (26.47mg l⁻¹) and lowest in site I (22.34 mg l⁻¹). The BOD ranged from eight.41 to 28.76 mg l⁻¹ each temporally and spatially. Month- clever average BOD price recorded better in summer time (May and June) (20.20 and 17.30 mg l⁻¹, respectively) and decrease in Monsoon (July and August) (13.01 and 11.88 mg l⁻¹). Site-clever common BOD price recorded maximum at site II (22.63 mg l⁻¹) and lowest at site I (10.86 mg l⁻¹).

Conclusion

Like different River in India Ken River additionally reeling via some herbal and anthropogenic activities like siltation, weed infestation, pollution, encroachment and so on. Which can be affecting its indigenous biodiversity. Data regarding water great, fish range, nice evaluation of fish of Ken River is poorly documented. To fill the space, the prevailing examines turned into performed to assess the water satisfactory, plankton, populace, fish variety and capture composition, biology, fine evaluation of fish flesh and heavy steel attention in water, sediment and fish flesh on a few selected commercially critical fishes. Seasonal variation influenced most of the parametersinvestigated between the dry and wet season. Theconcentration of most physicochemical parameters was higher in the dry season compared to the wet season while the downstream station recorded highermean values of investigated parameters compared to the other stations.

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