Water Quality Assessment of Lakes in Yangon

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Outlines

- Introduction
- Problem Statement
- Water Quality Parameters
- Results and Discussion
- Conclusions

Introduction

Inya Lake

Kandawgyi Lake

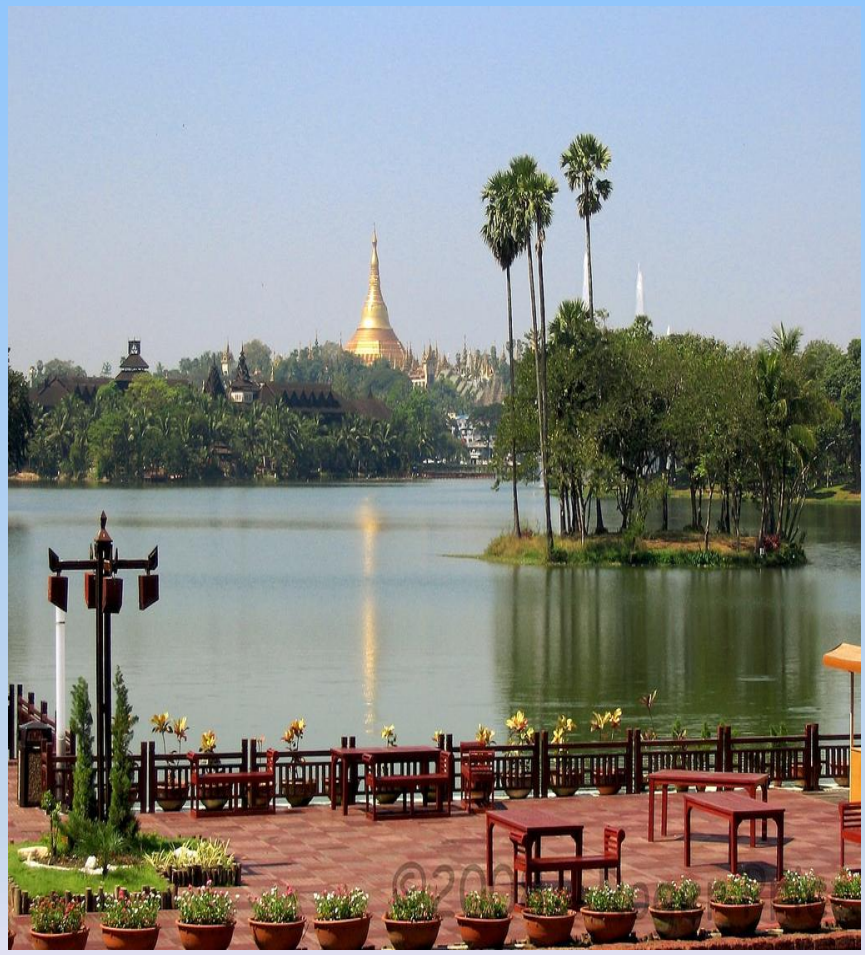
Location of Lakes in Yangon

Kandawgyi Lake

Inya Lake

Kandawgyi Lake

- popular recreational area
- Catchment area : 1.421 km^2
- Water surface area :160 acre (65 Ha)
- Average Depth :6 ft
- Maximum Depth : 12 ft



❑ Algae blooming

Inflow

- Domestic Wastewater
- Storm Water

Inya Lake

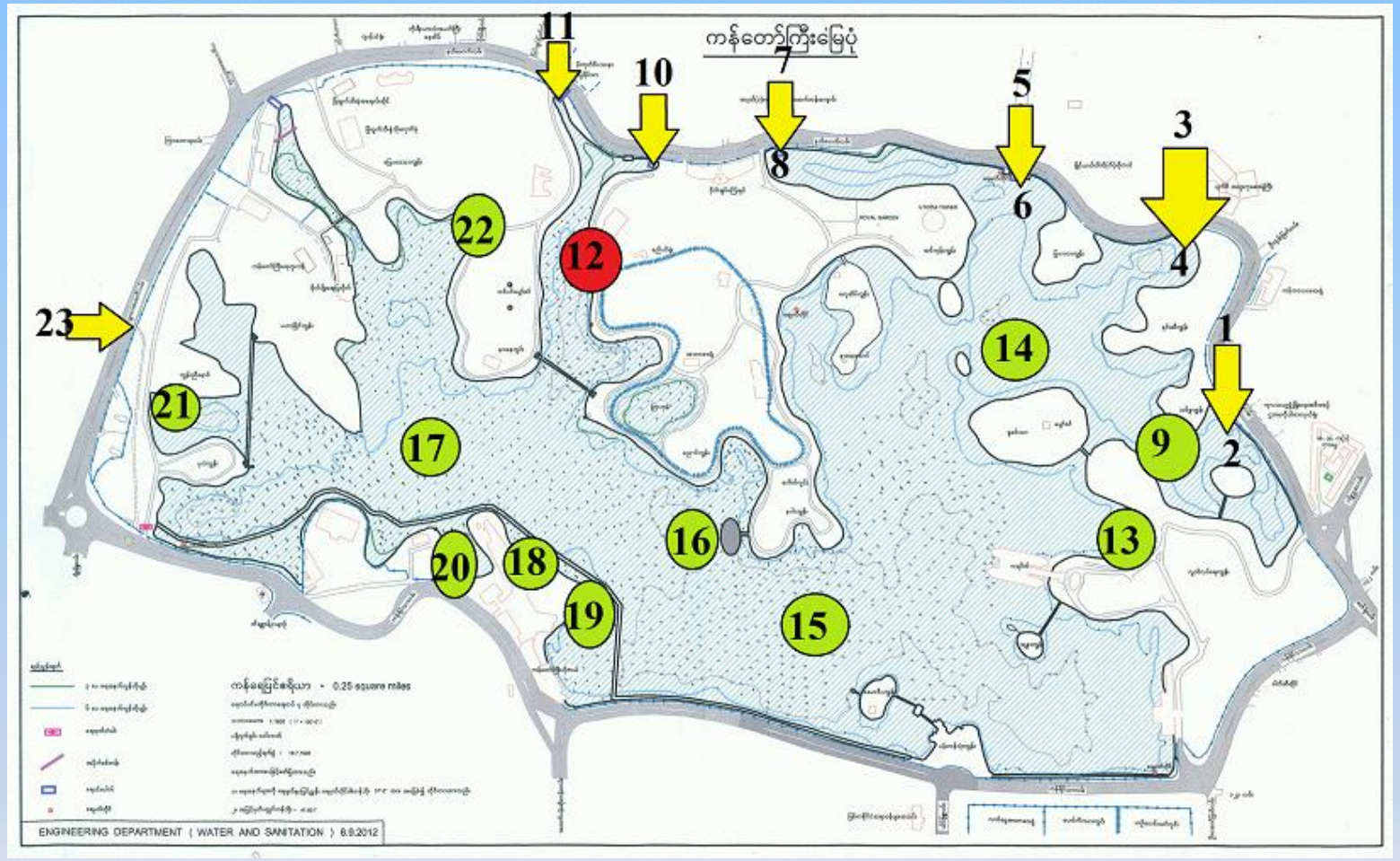
- Popular recreational area
- Distribute to Kandawgyi Lake
- Catchment area:3 sq-miles
- Water surface area:1.5 sq miles
- Water holding capacity : 4000 MGal

Parameters to be analysed

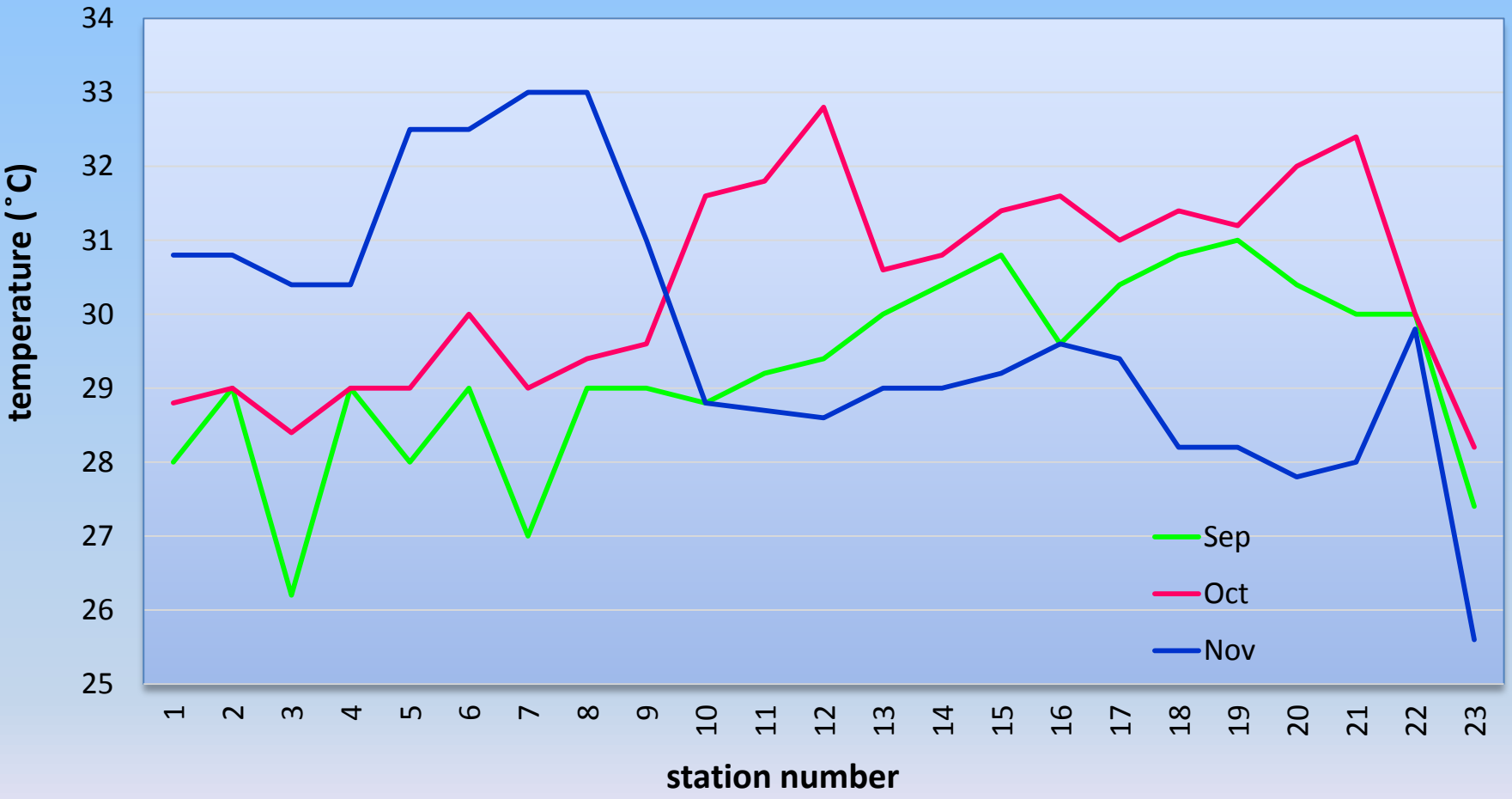
- Temperature
- Chemical oxygen demand
- Biochemical oxygen demand
- Total alkalinity
- Total solids
- Total suspended solids
- Total dissolved solids
- Nitrogen (NH_3 + NO_3)
- Phosphorus

Kandawgyi Lake

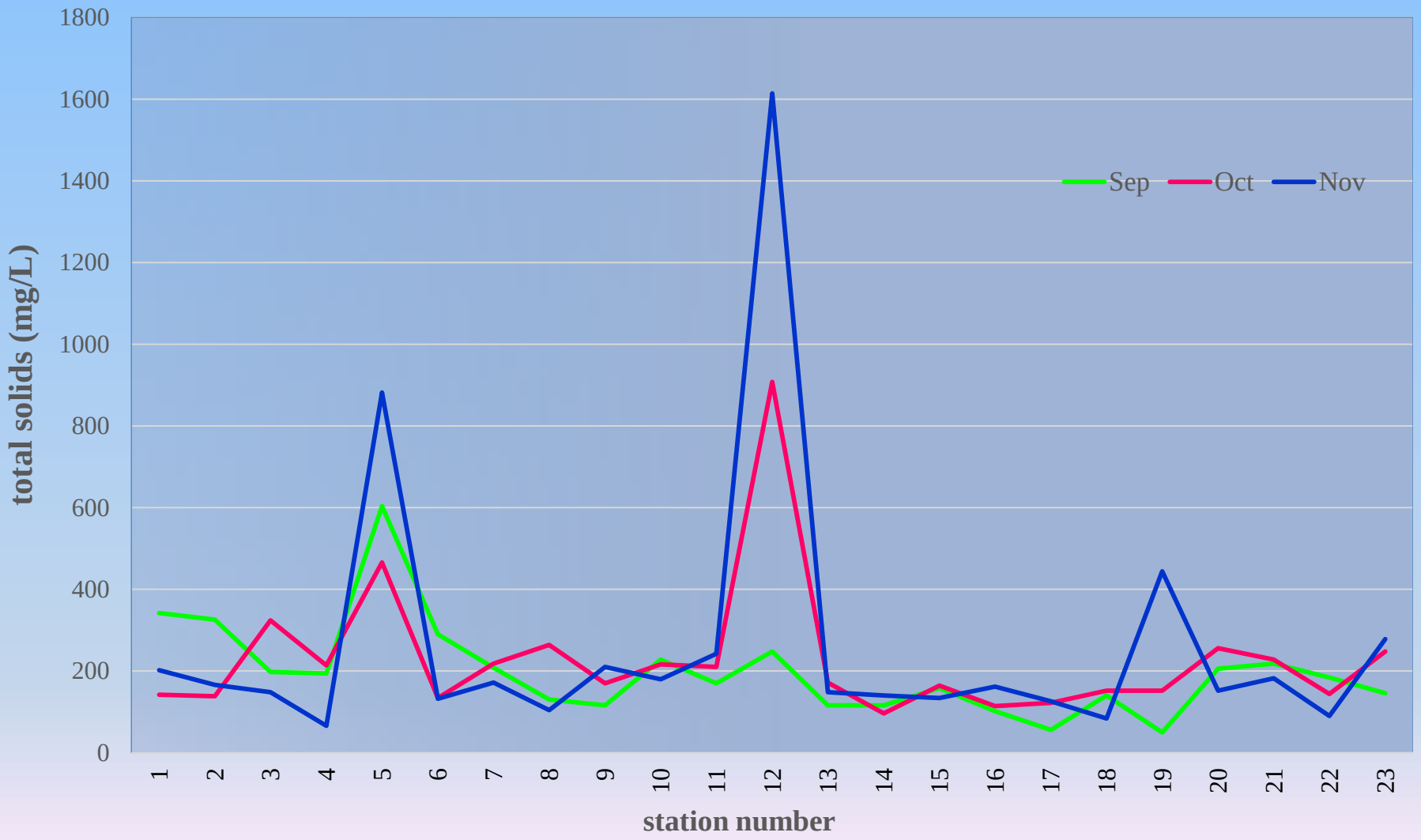
Location of Inlets and Sampling Stations



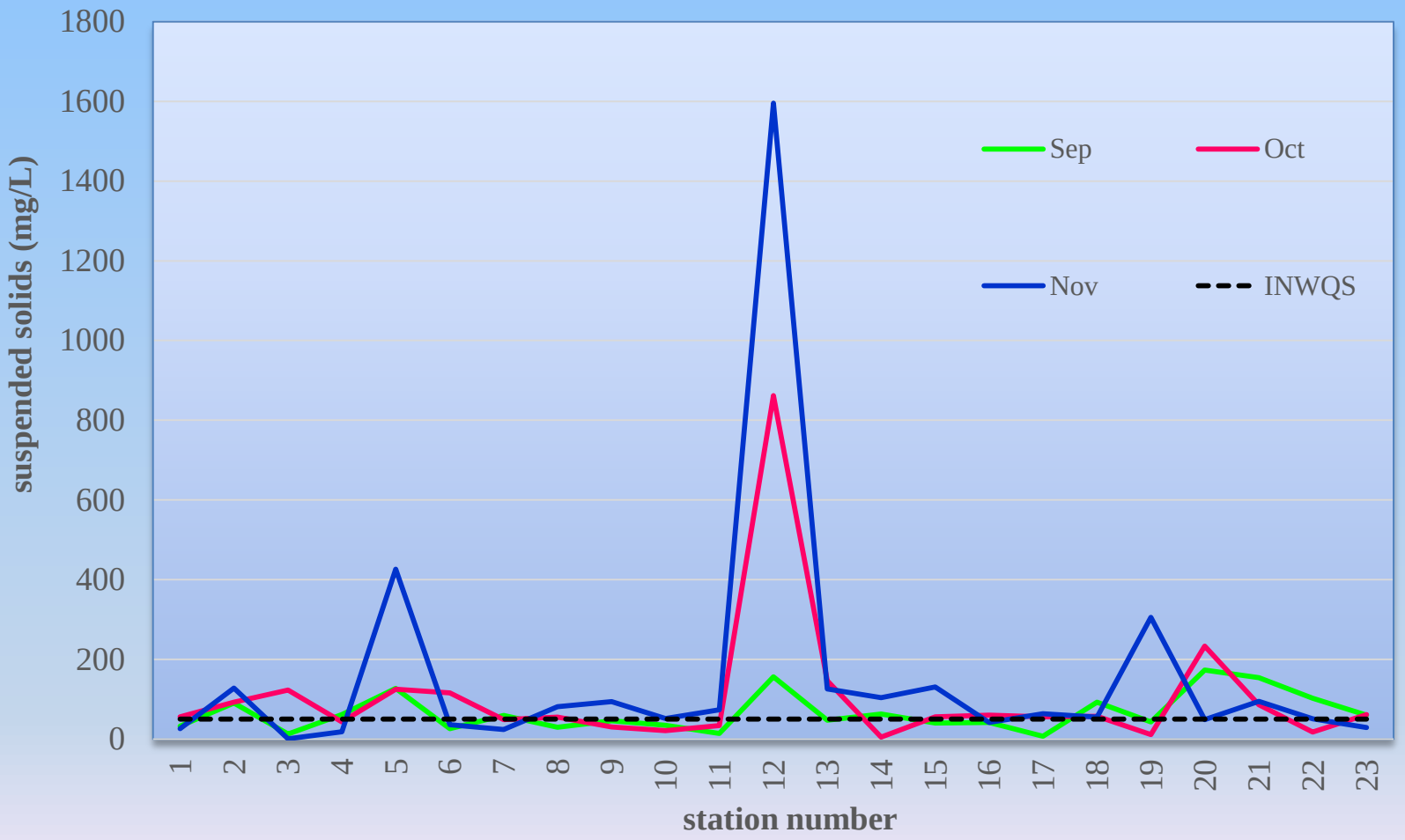
Temperature Variations



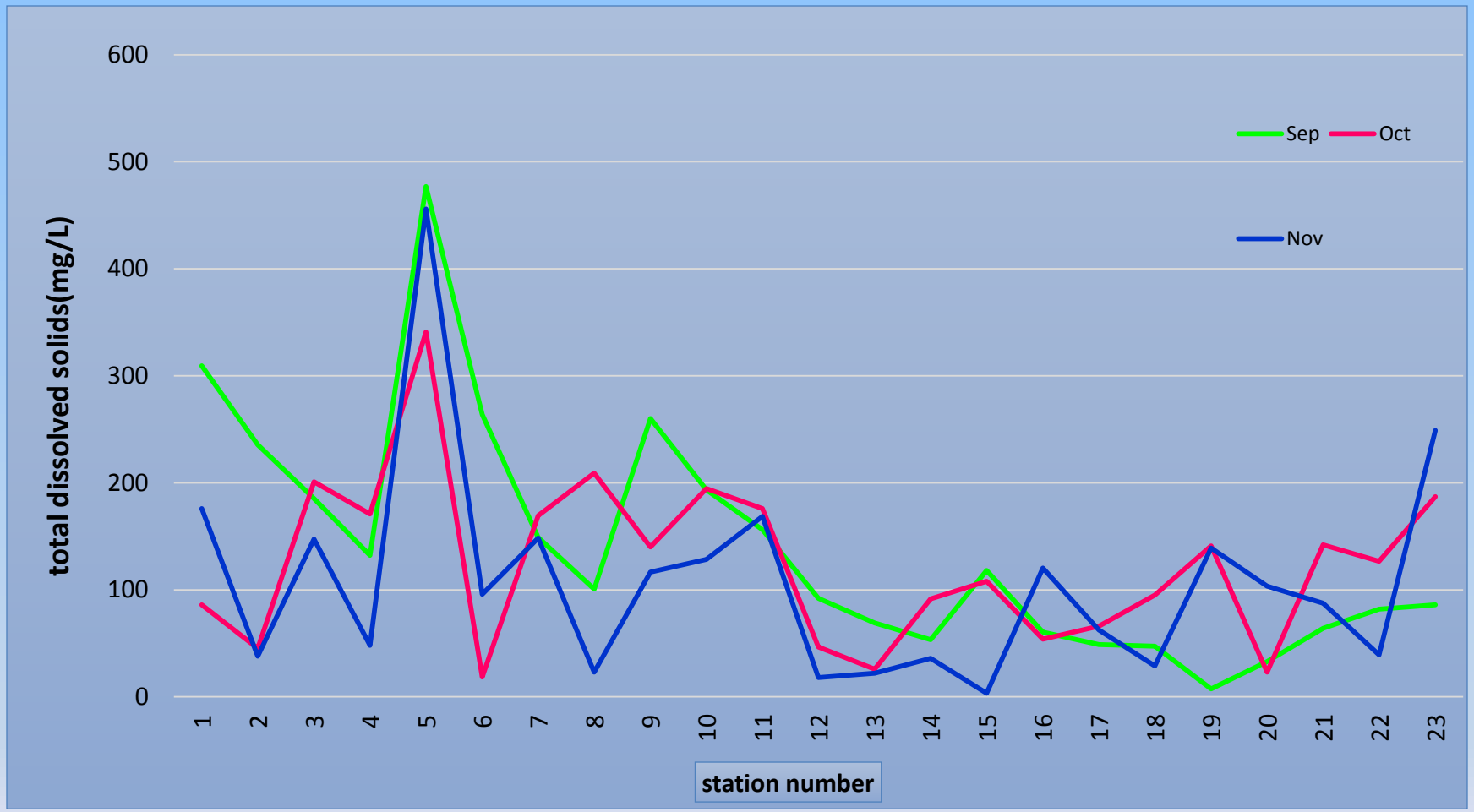
Total Solids



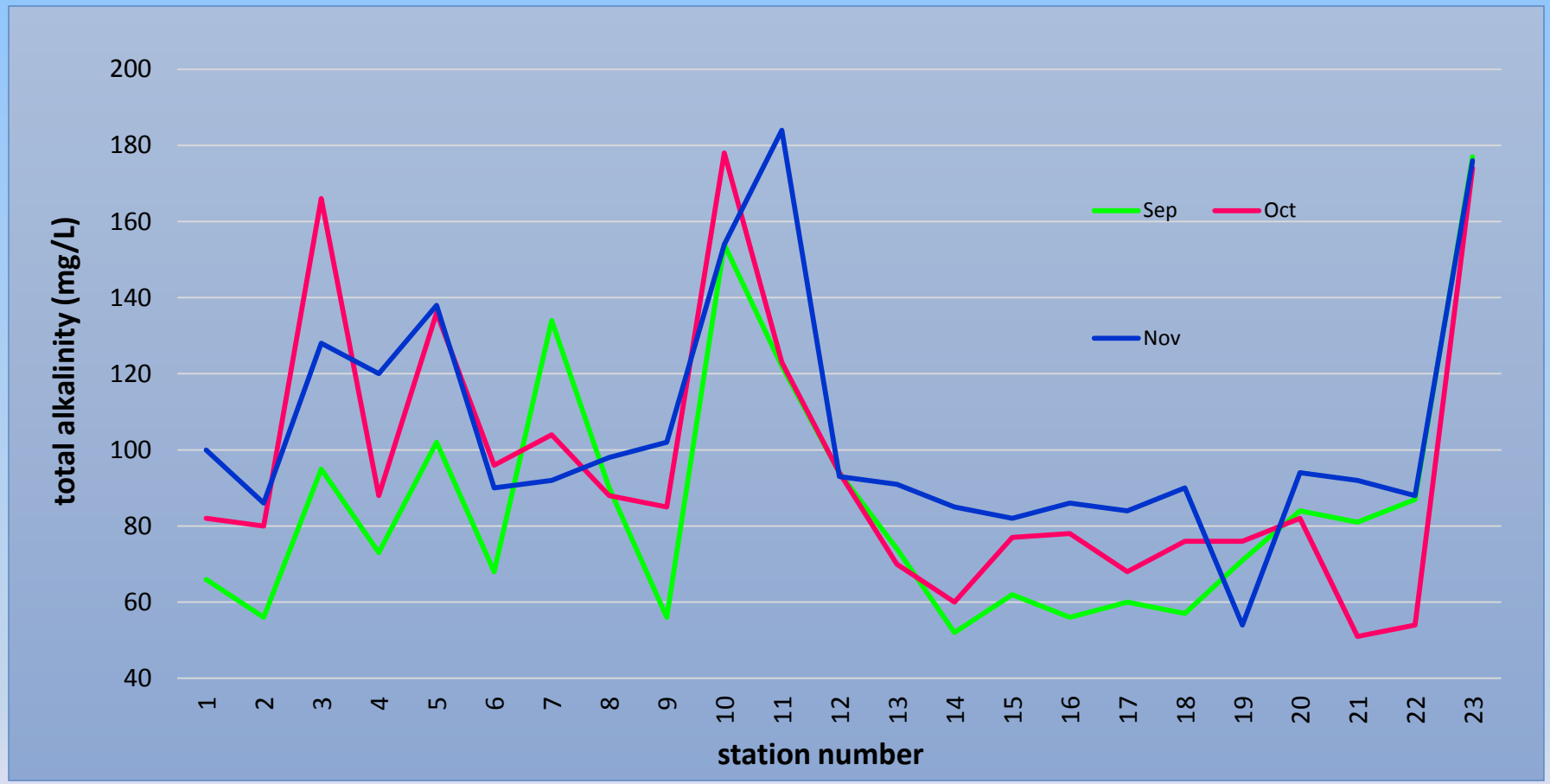
Total Suspended Solids



Total Dissolved Solids

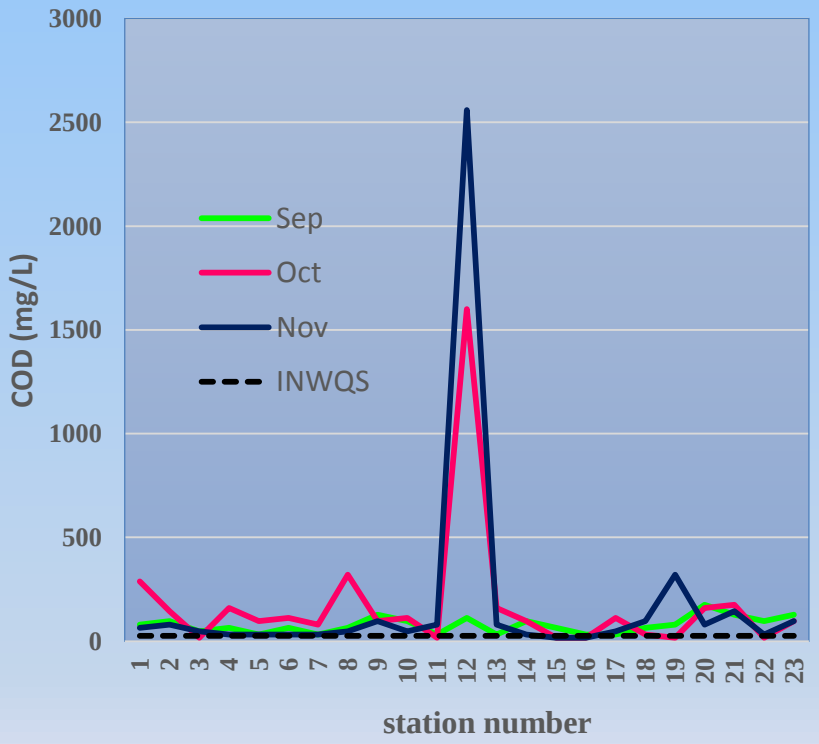


Total Alkalinity

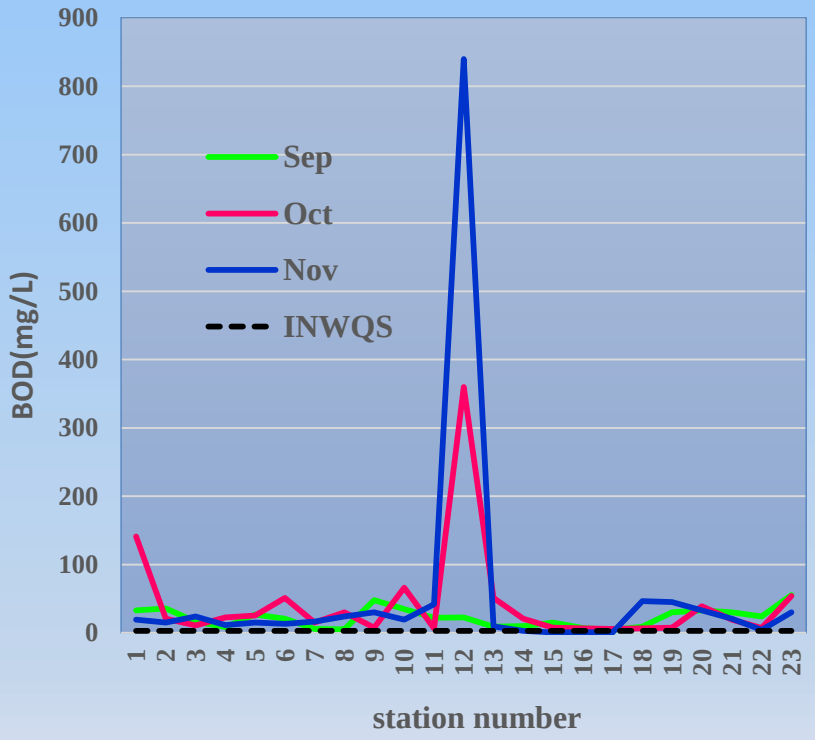


Oxygen Demand

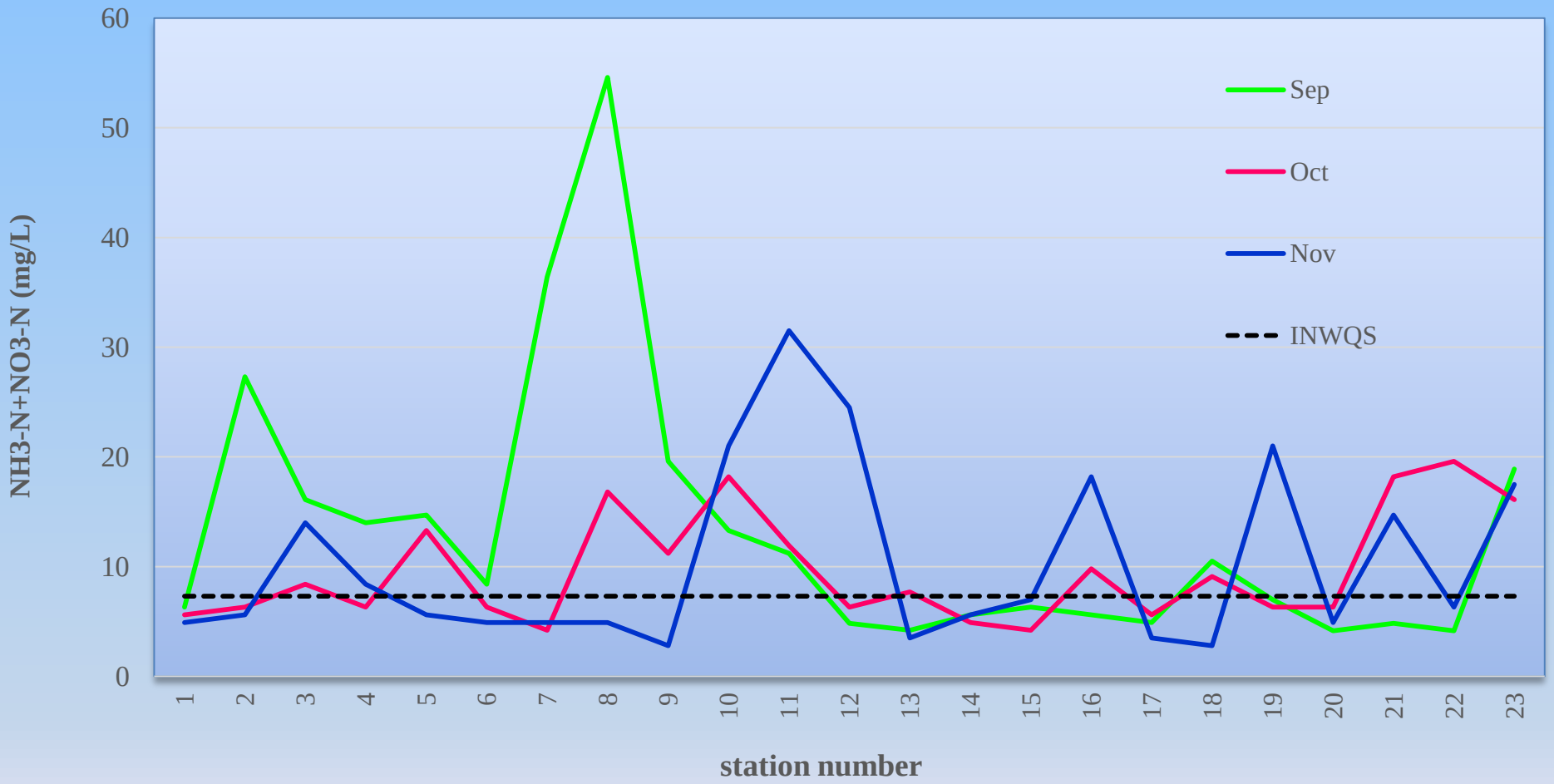
(a) COD concentration Of Kandawgyi Lake



(b) BOD concentration Of Kandawgyi Lake

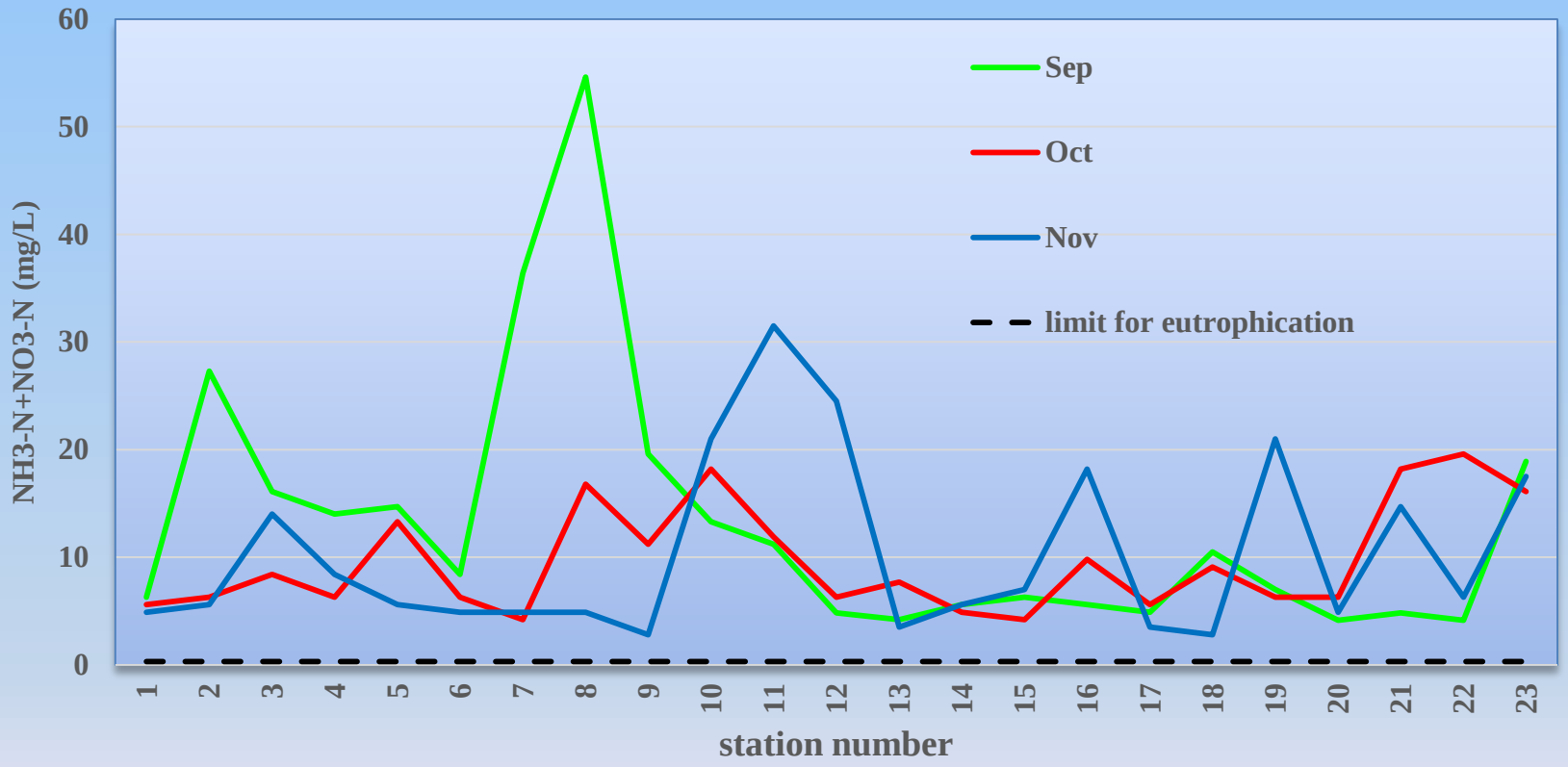


Nitrogen Concentration(NH3-N+NO3-N) for recreation

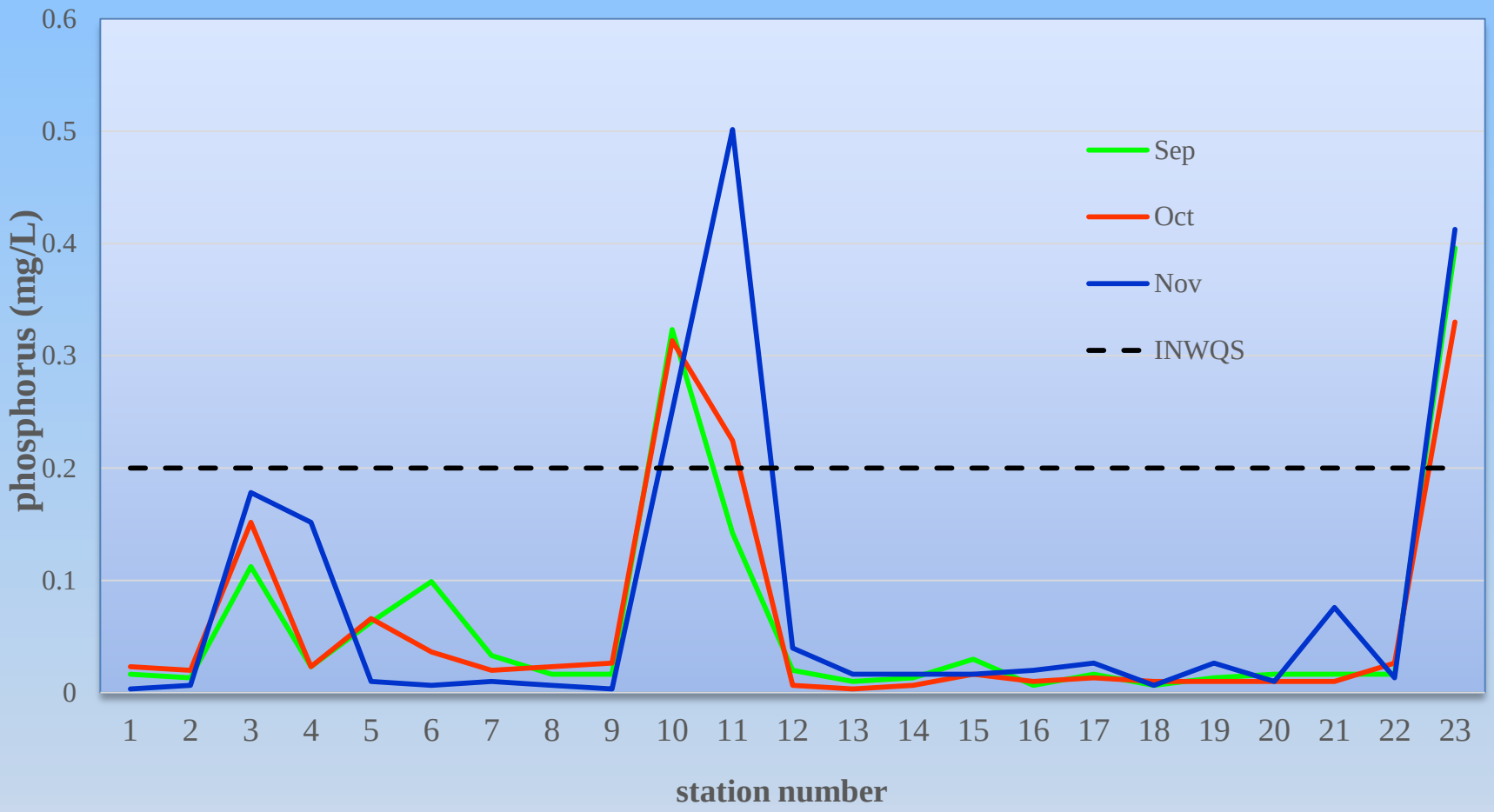


Nitrogen Concentration (NH3-N+NO3-N)

It is compared with the limit for eutrophic state (ammonia+nitrate=0.3 mg/L) of a lake in New York (source: NYS Citizens Statewide Lake Association Program, 2006).

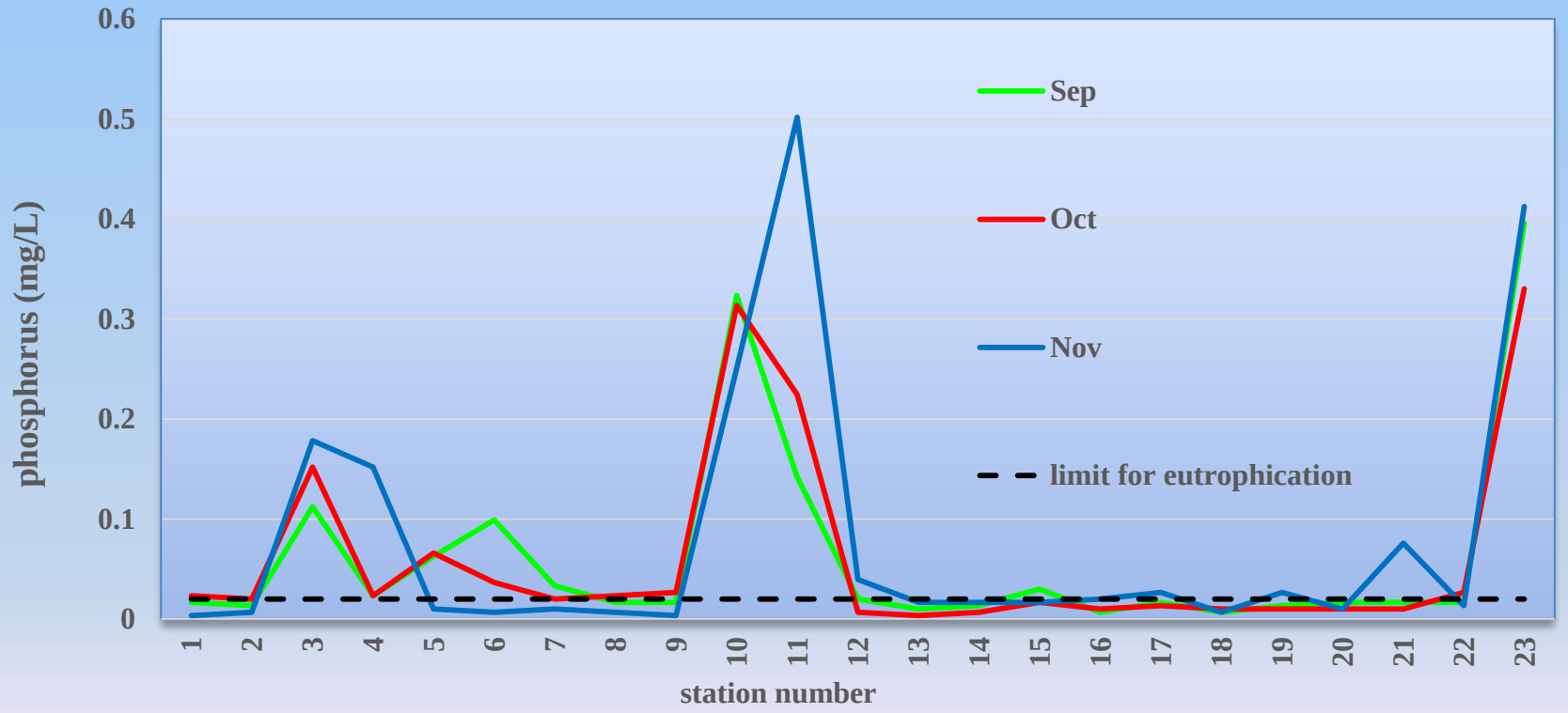


Phosphorus concentration for recreation



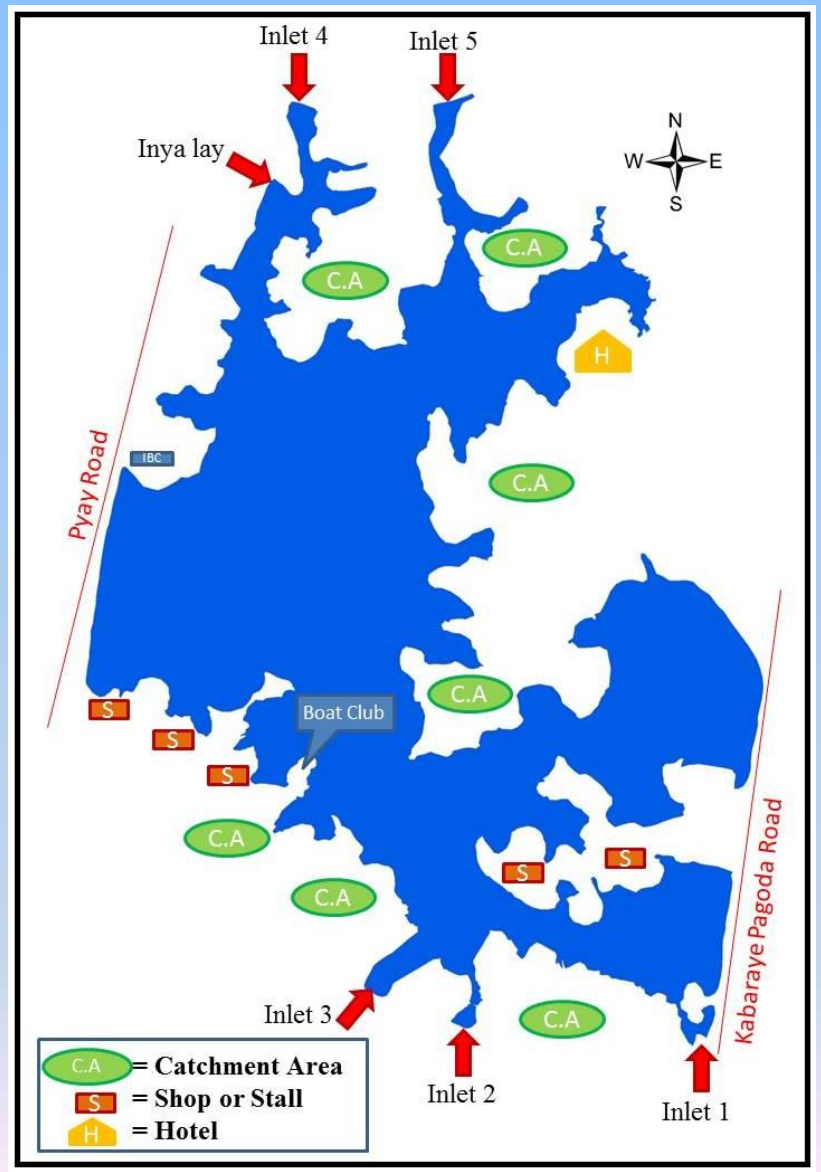
Phosphorus Concentration

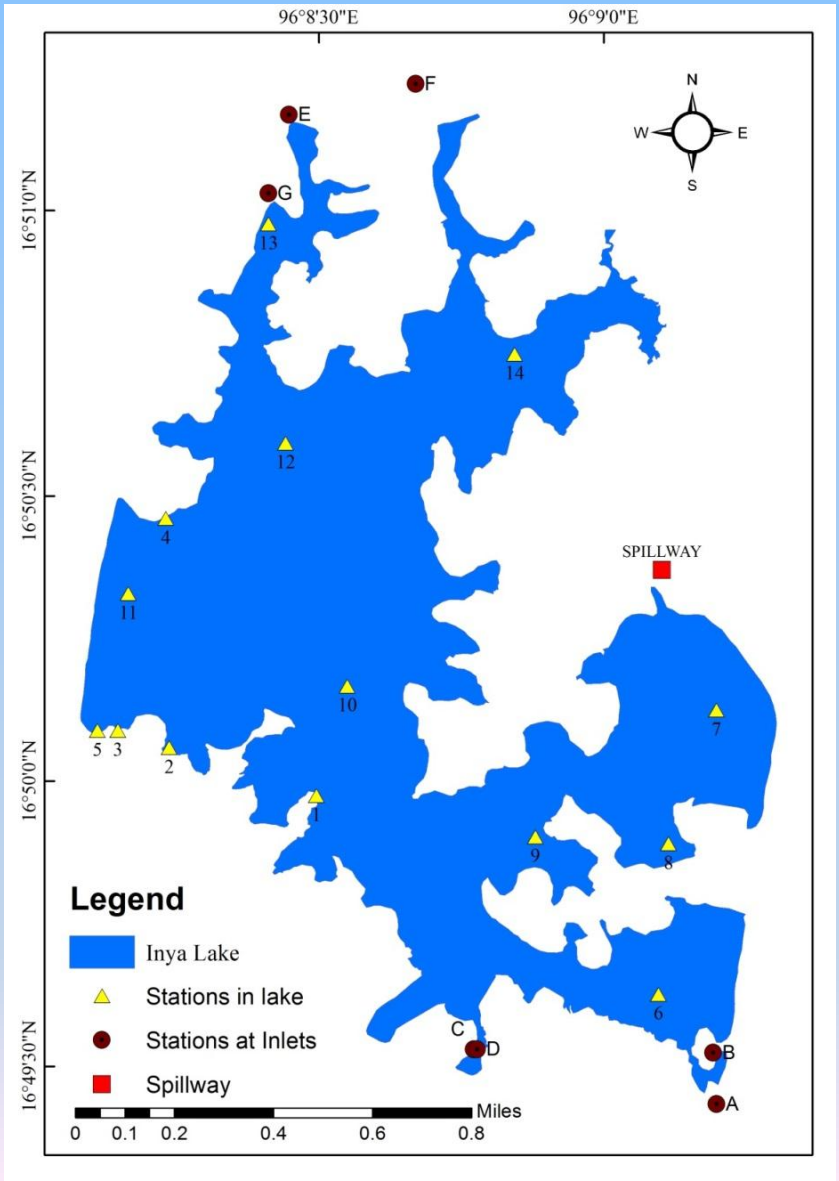
It compared with the limit for eutrophic state (0.02 mg/L) of a lake in New York (source: NYS Citizens Statewide Lake Association Program, 2006).



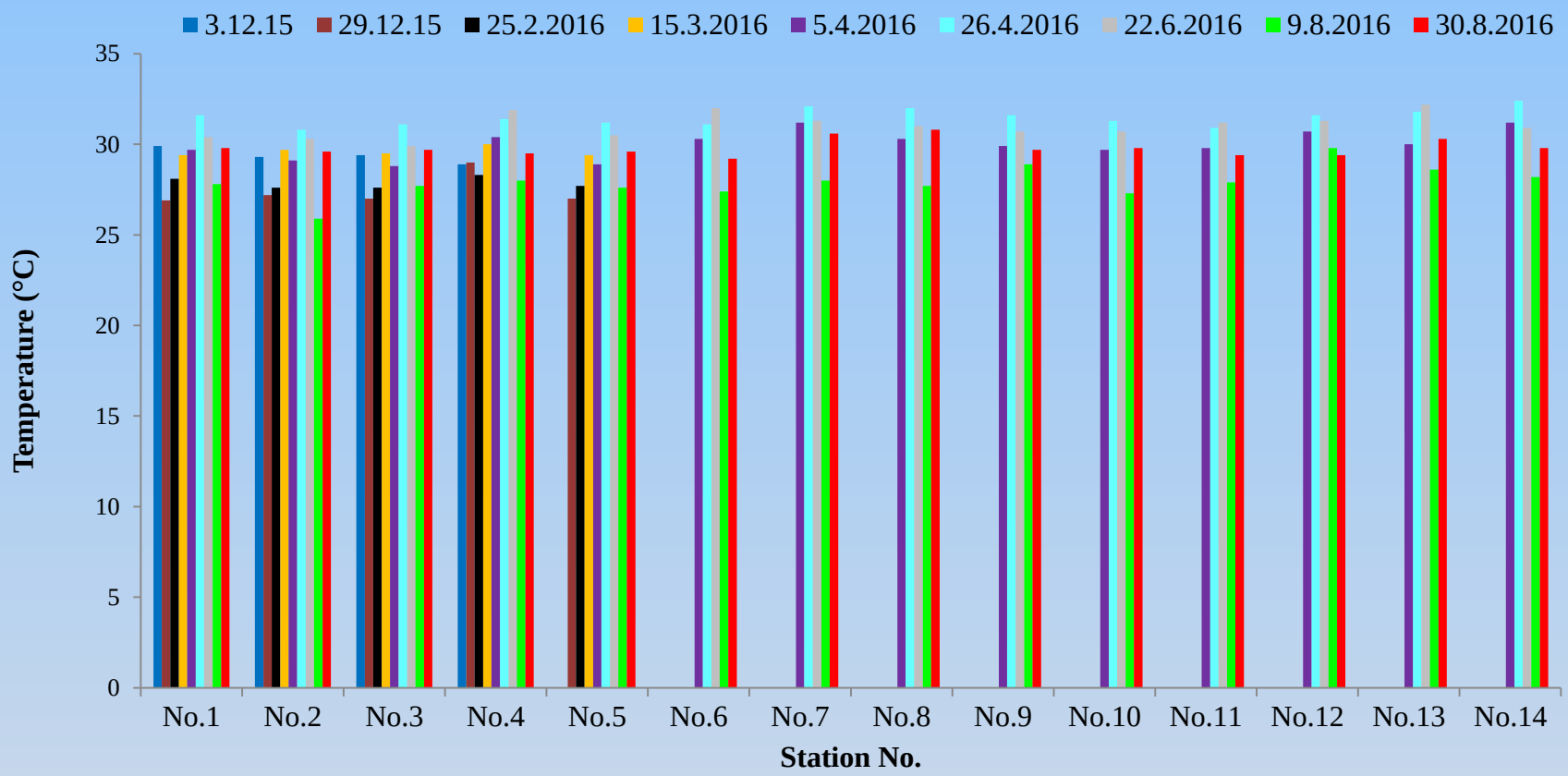
Inya Lake

Sampling Stations of the study area

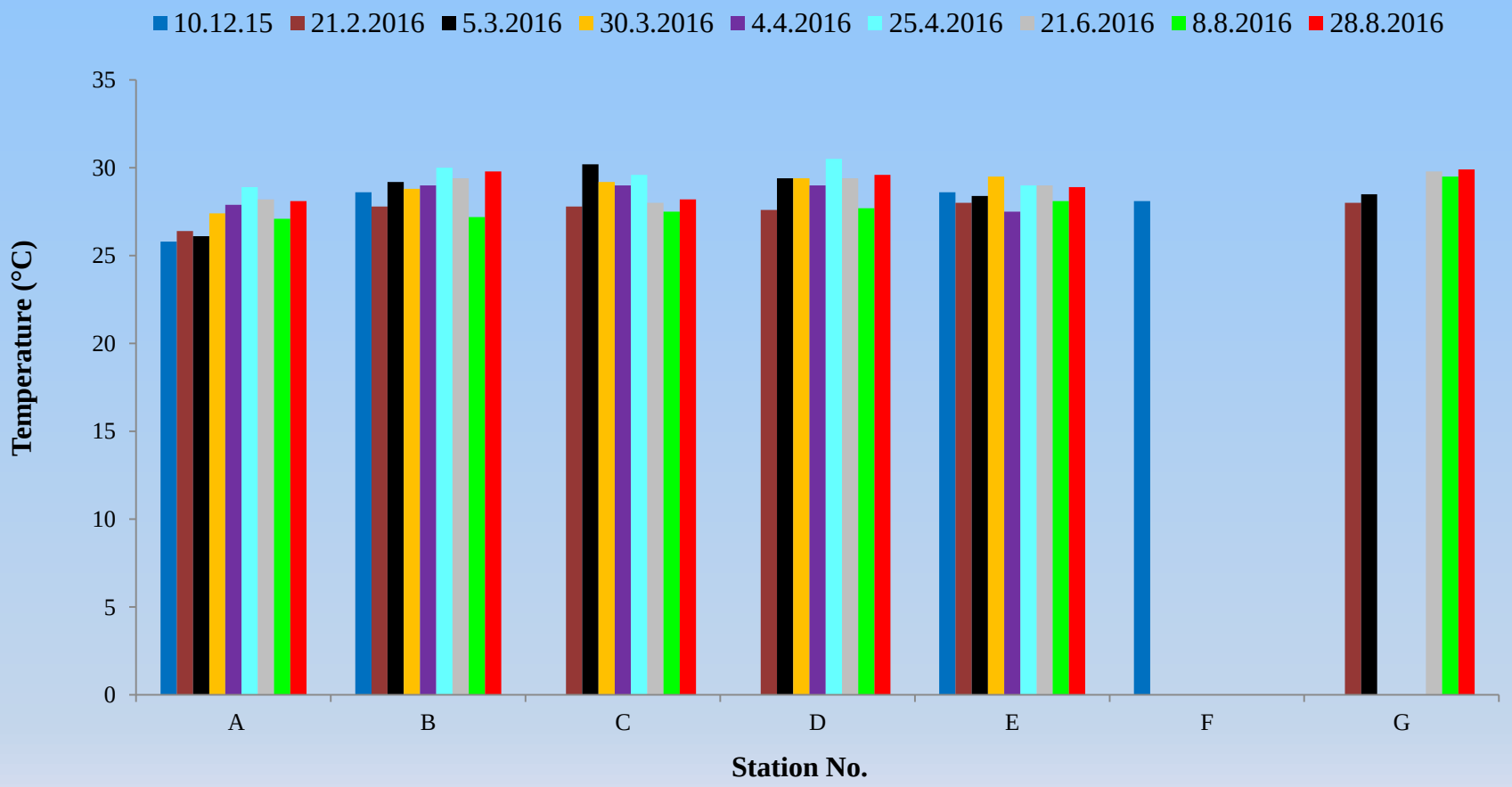




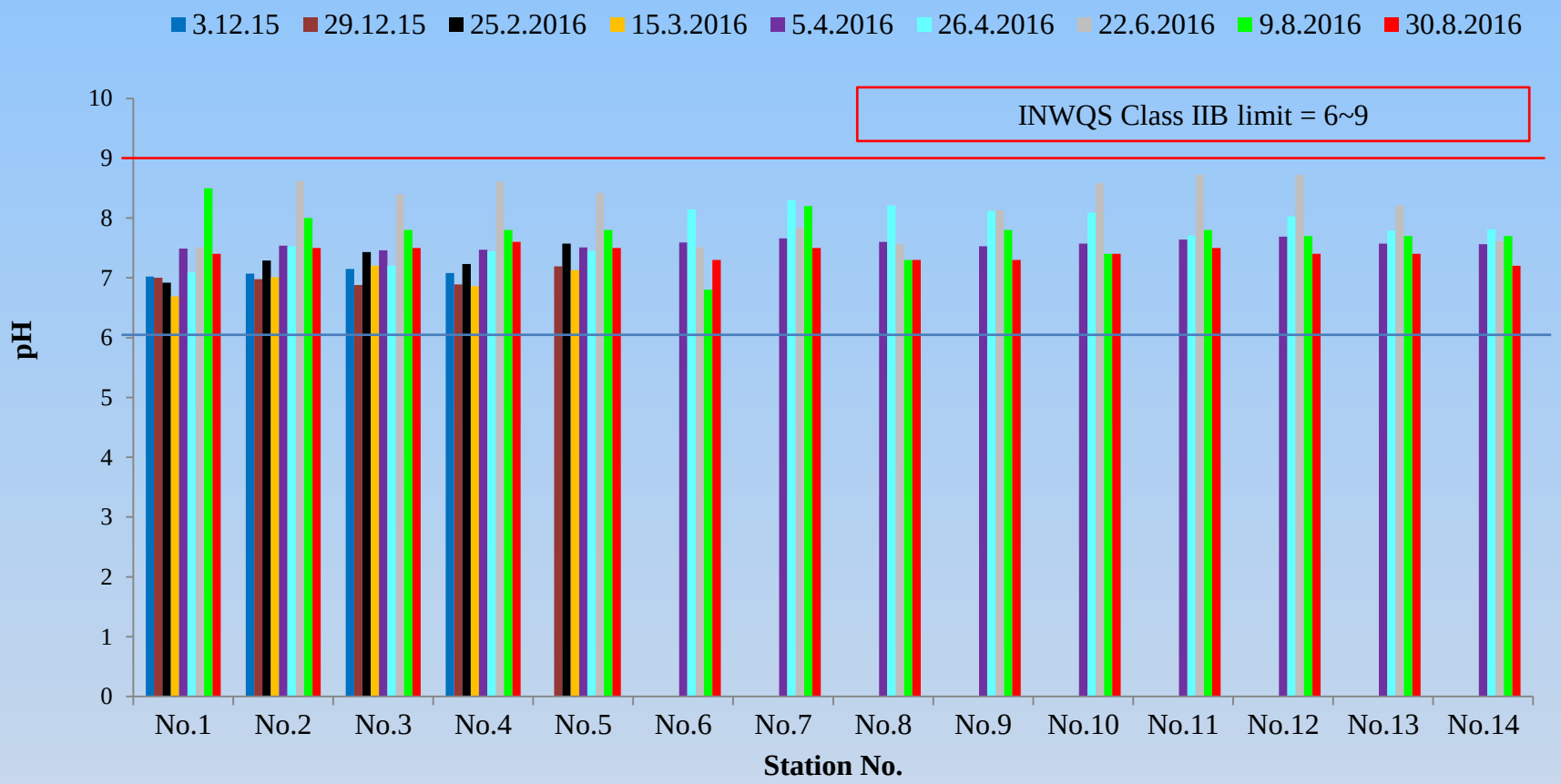
Temperature
(In-lake Stations)



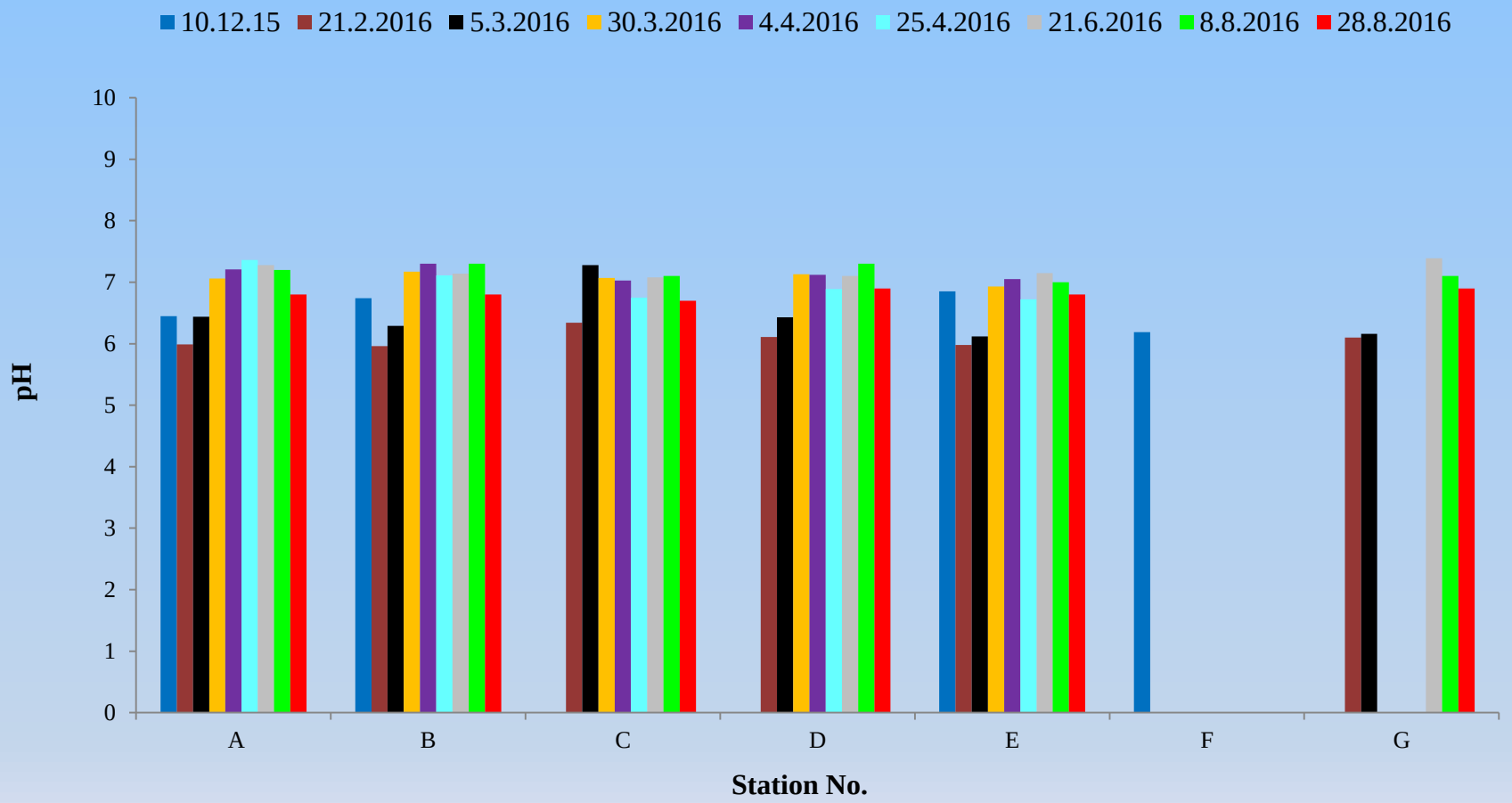
Temperature (Inlet Stations)



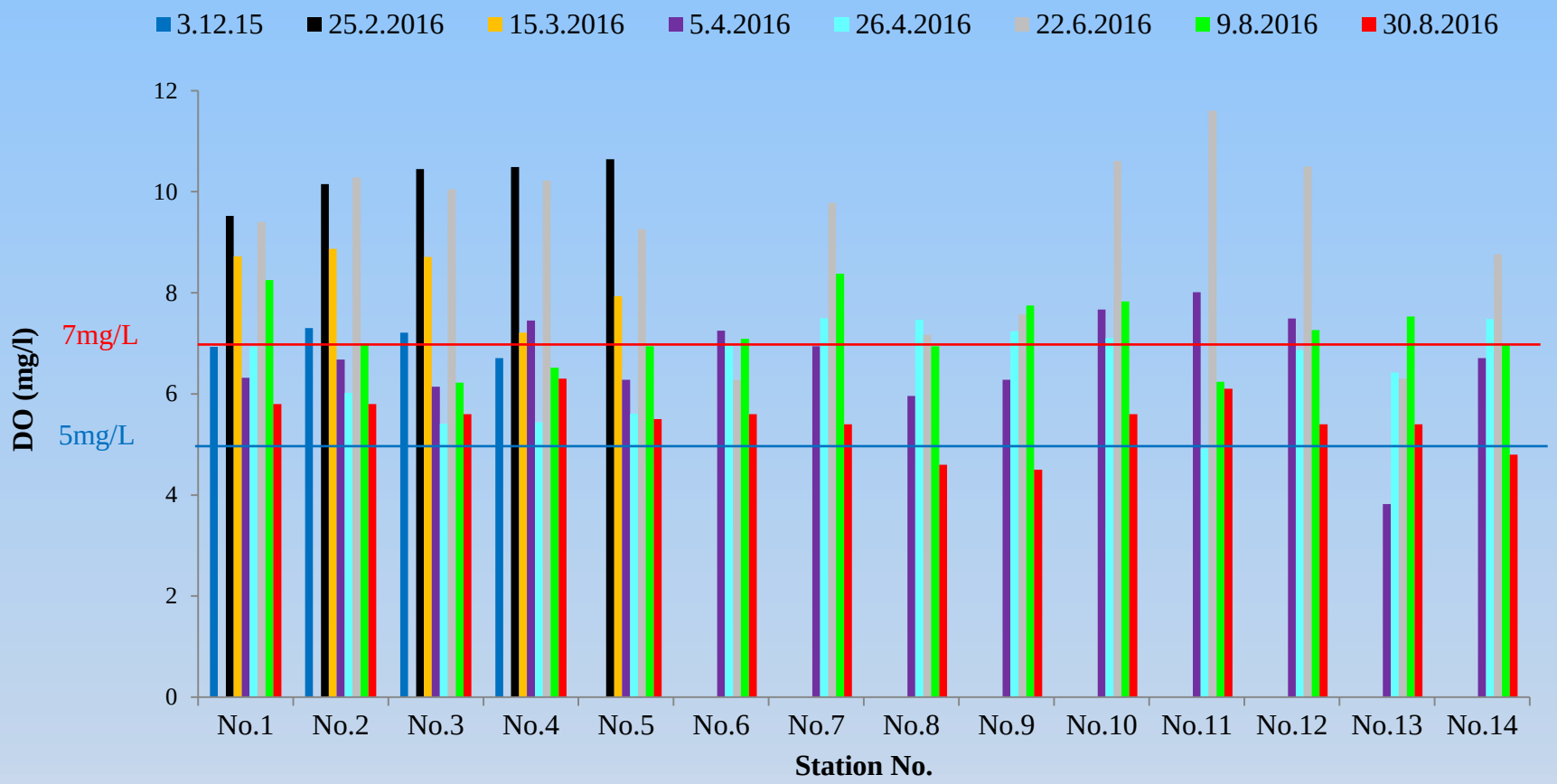
pH (In-lake Stations)



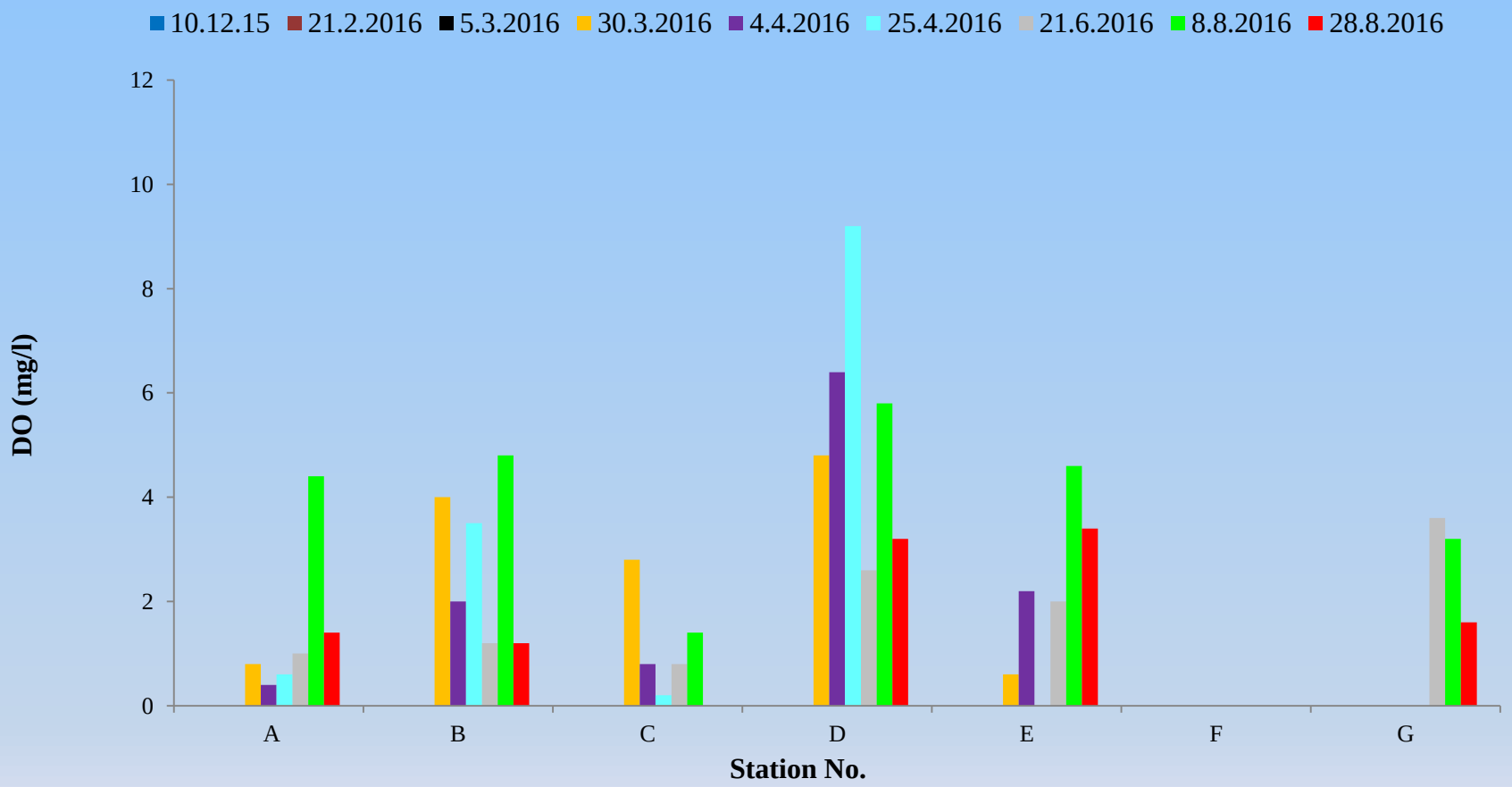
pH (Inlet Stations)



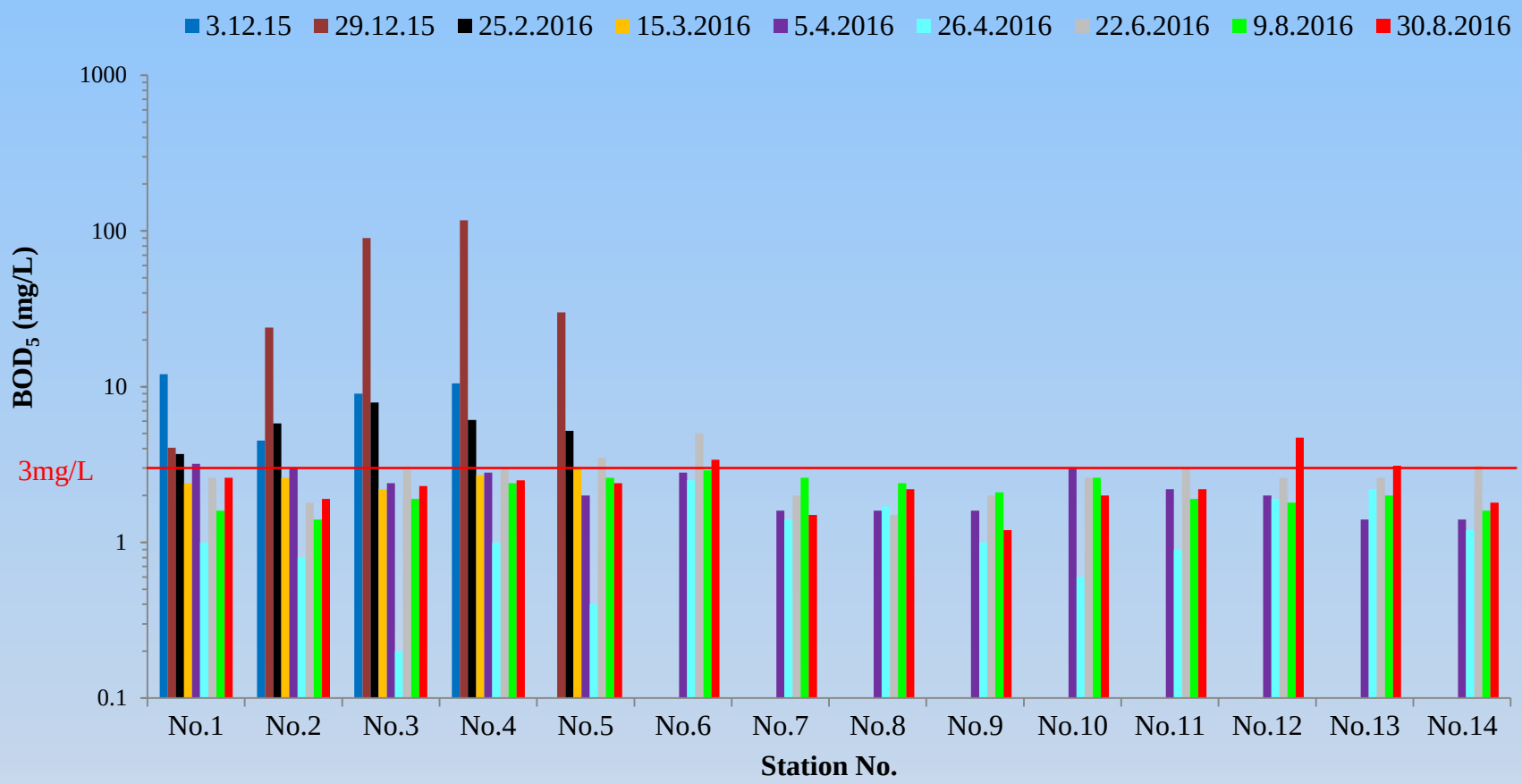
DO (In-lake Stations)



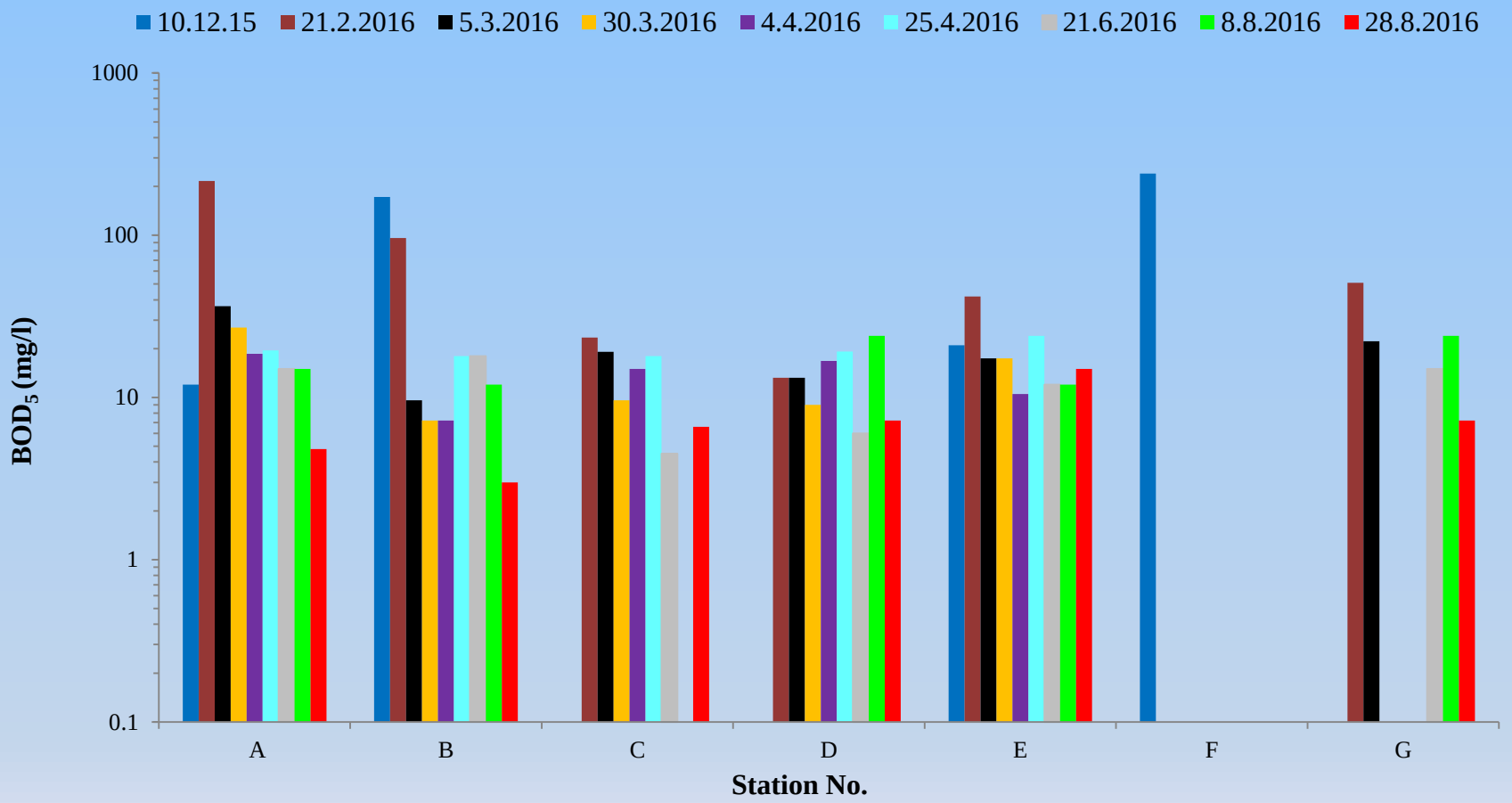
DO (Inlet Stations)



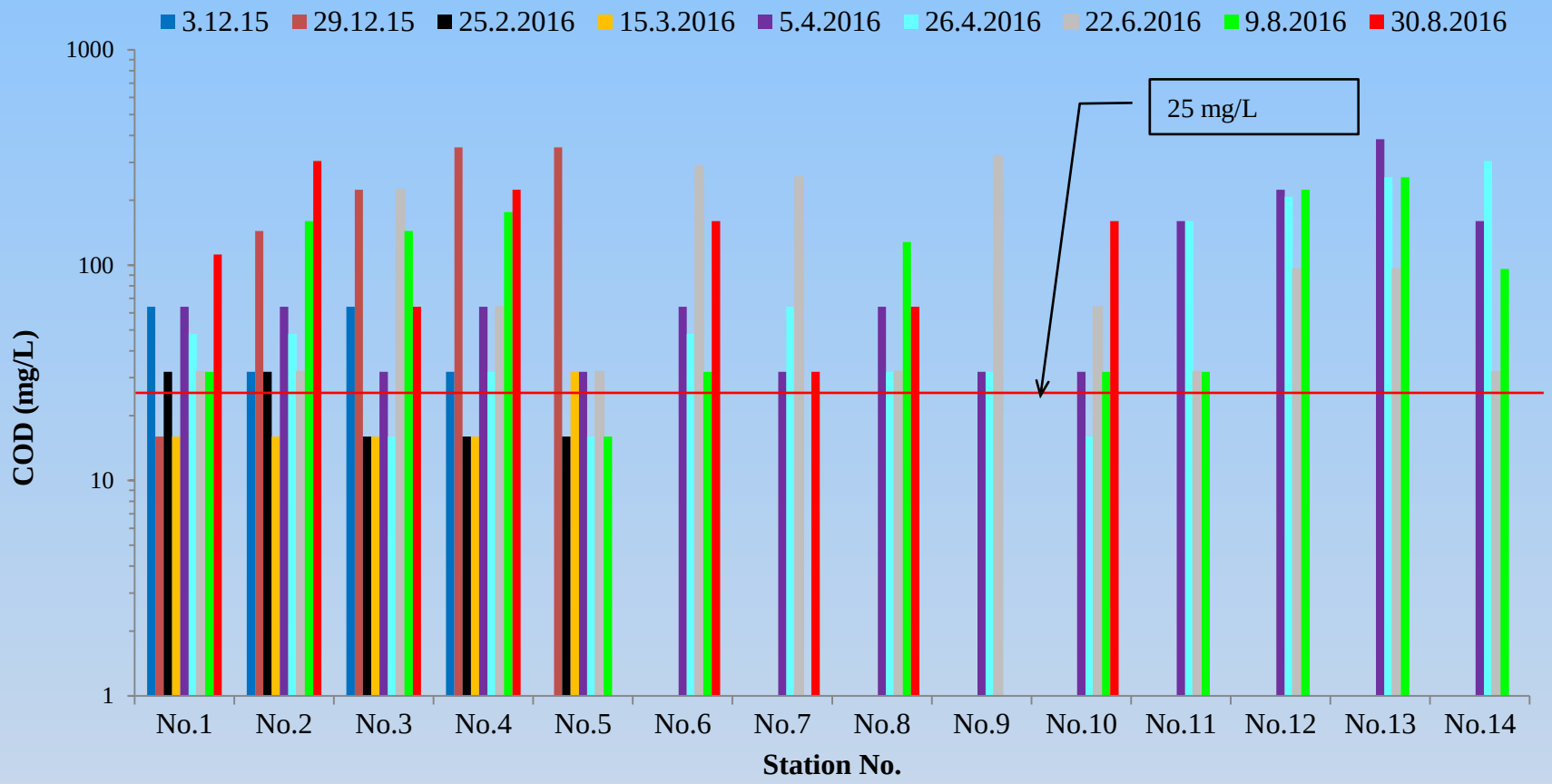
BOD (In-lake Stations)



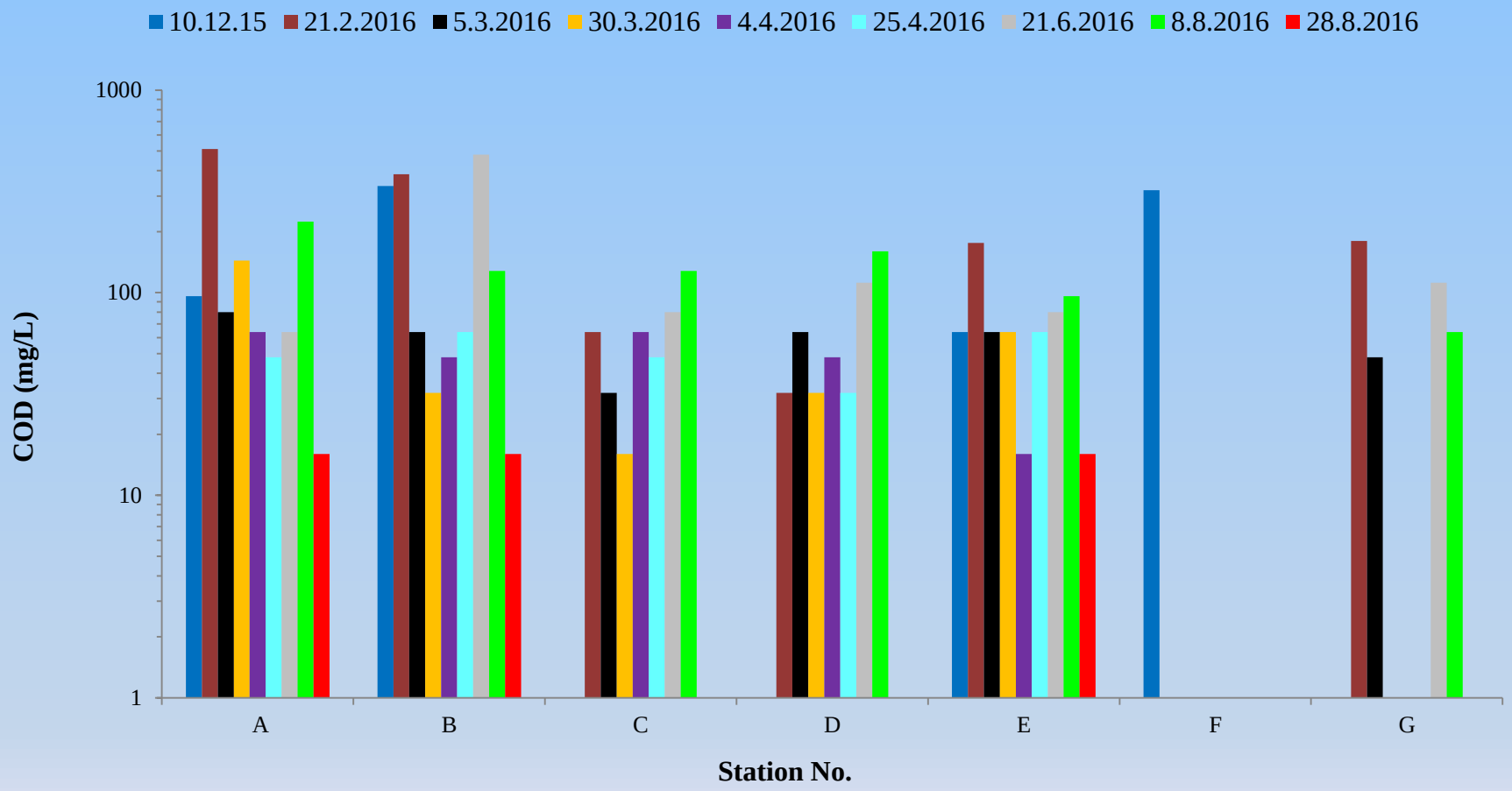
BOD (Inlet Stations)



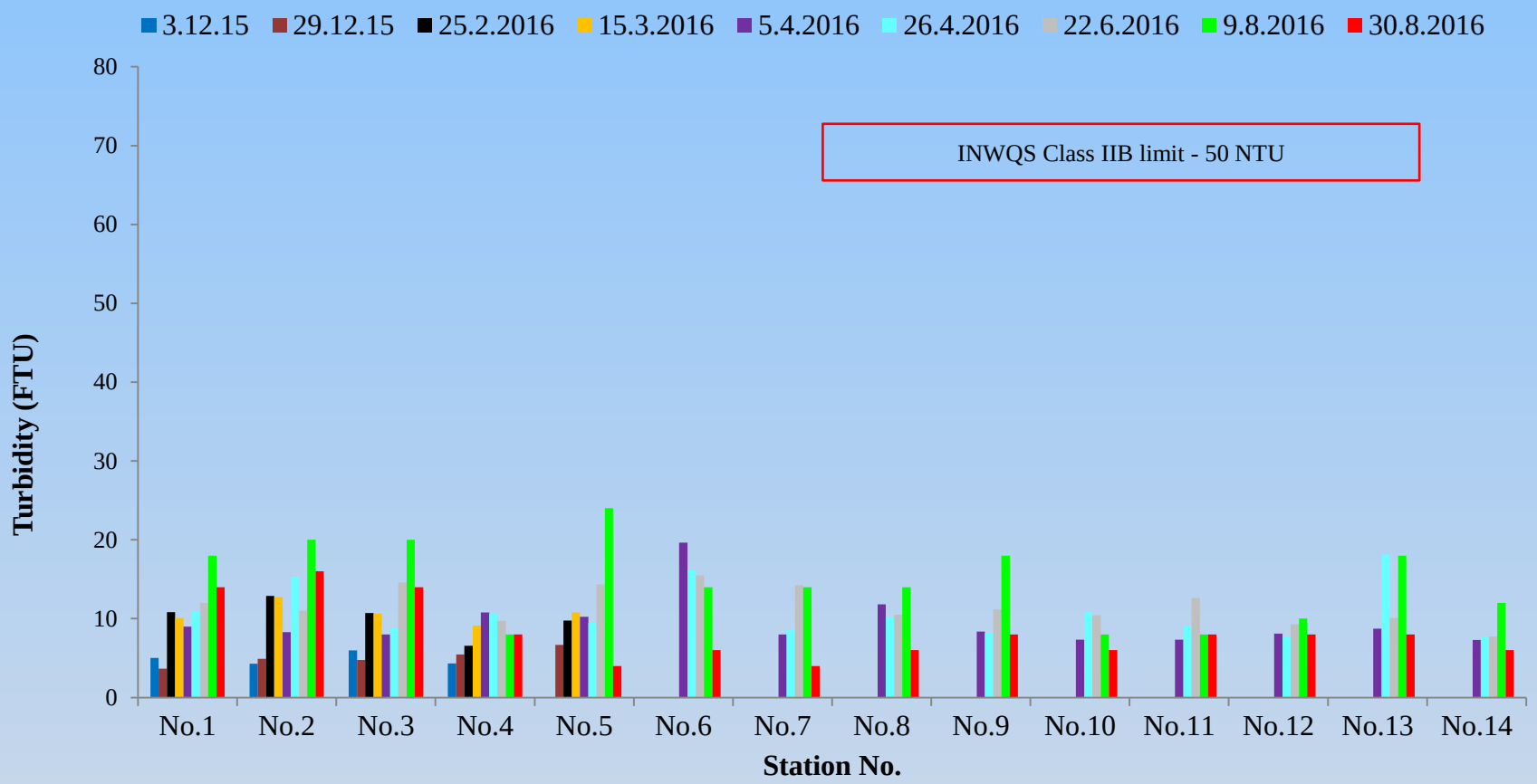
COD (In-lake Stations)



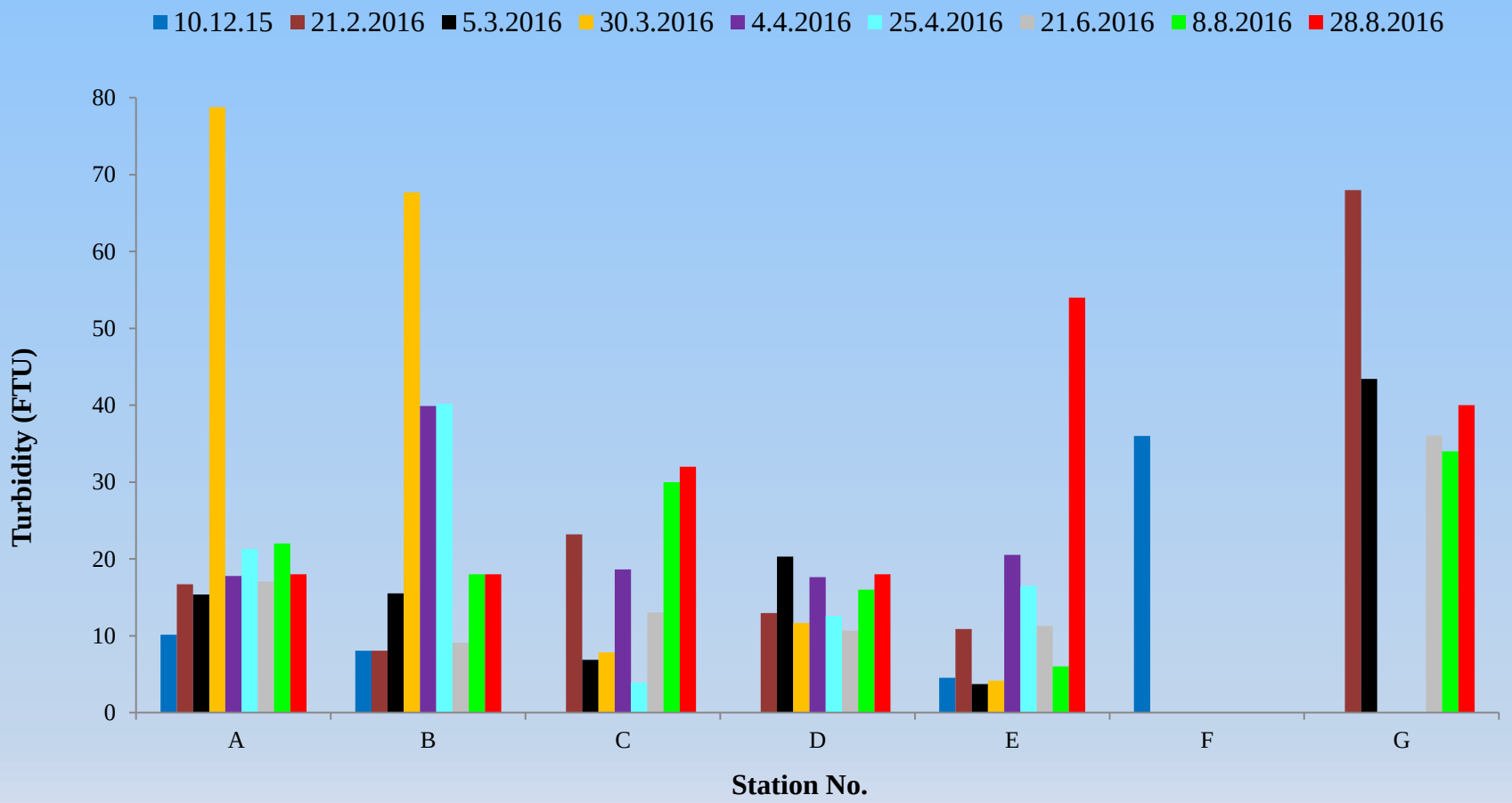
COD (Inlet Stations)



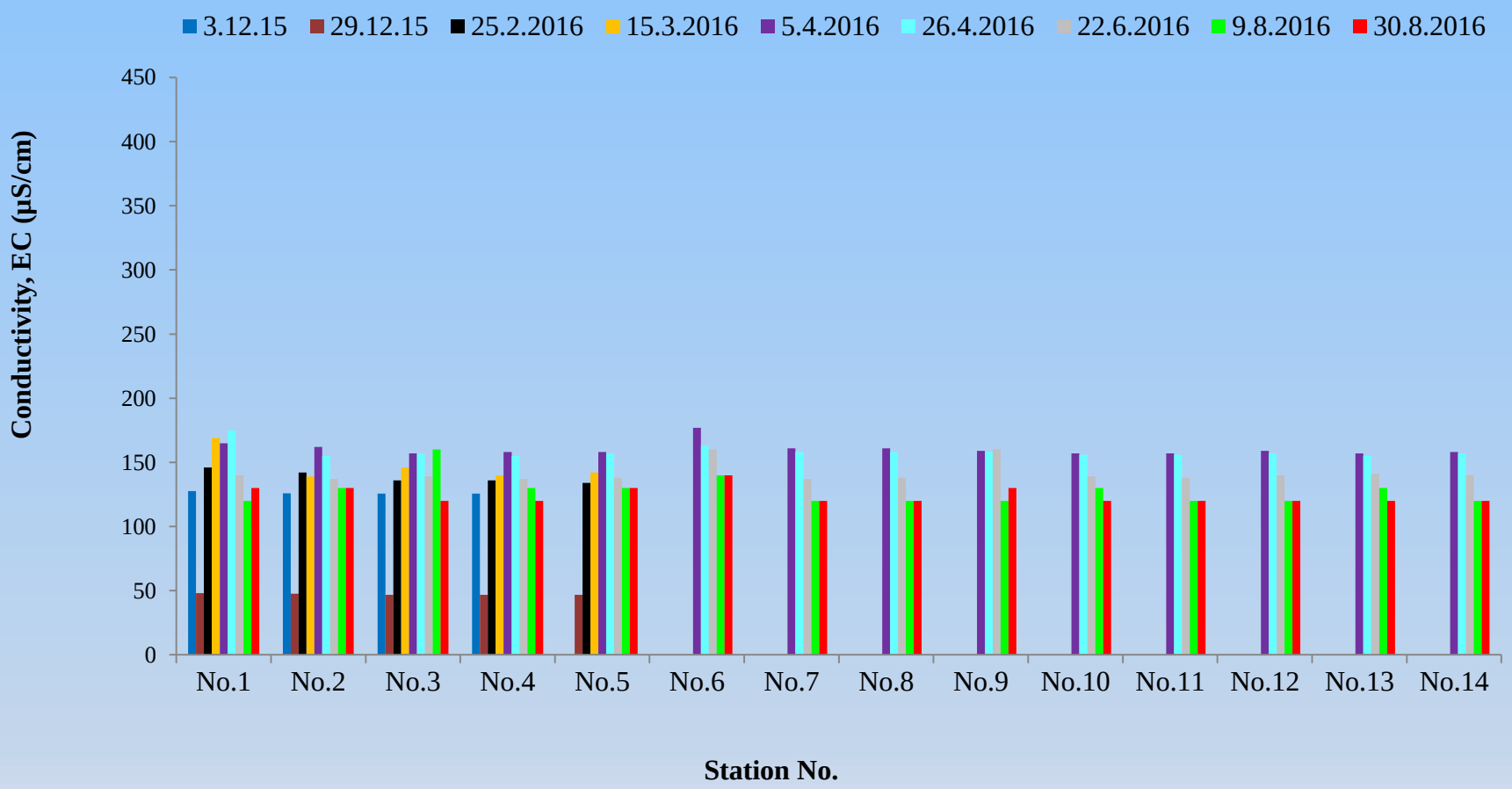
Turbidity (In-lake Stations)



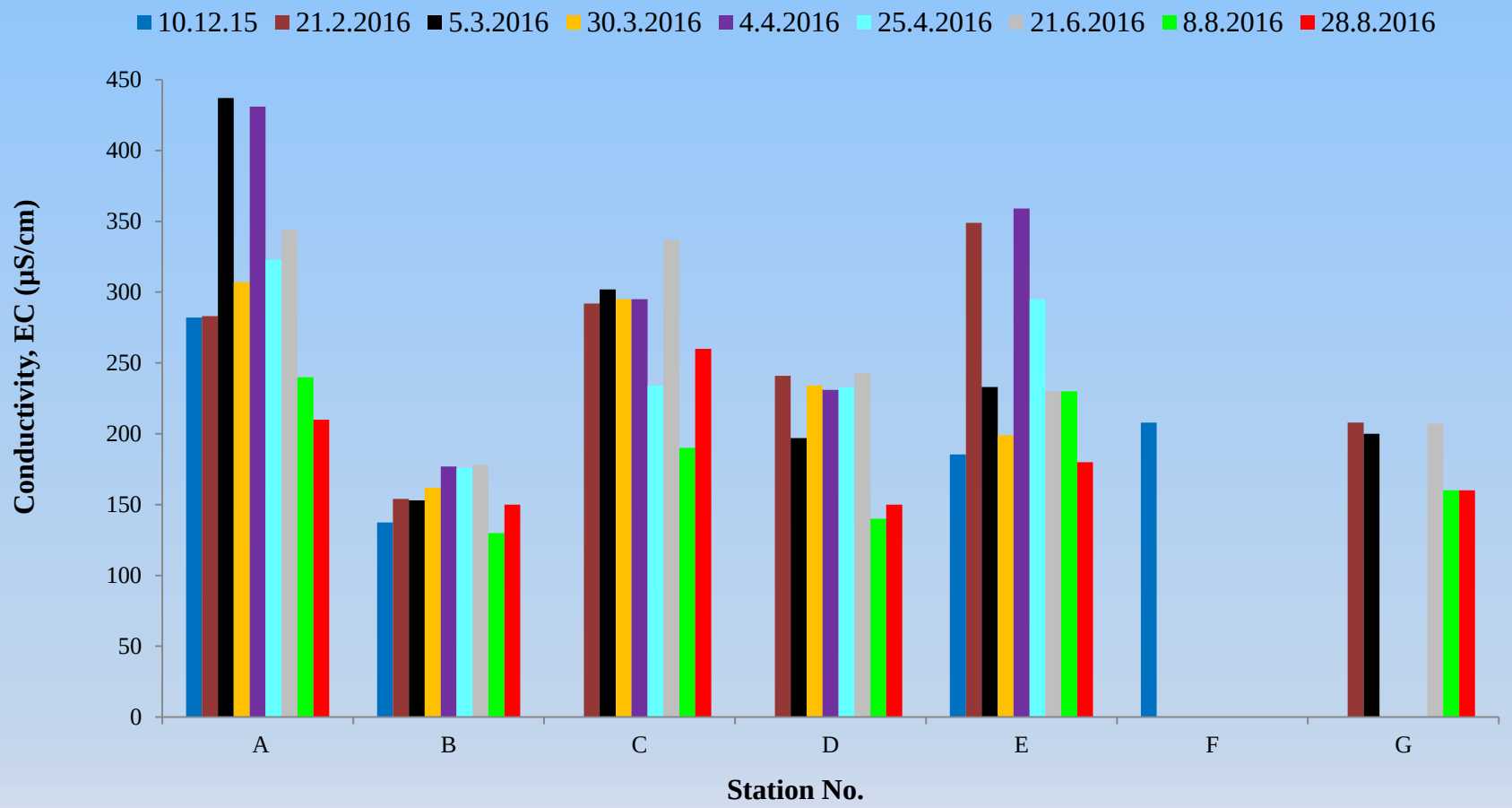
Turbidity (Inlet Stations)



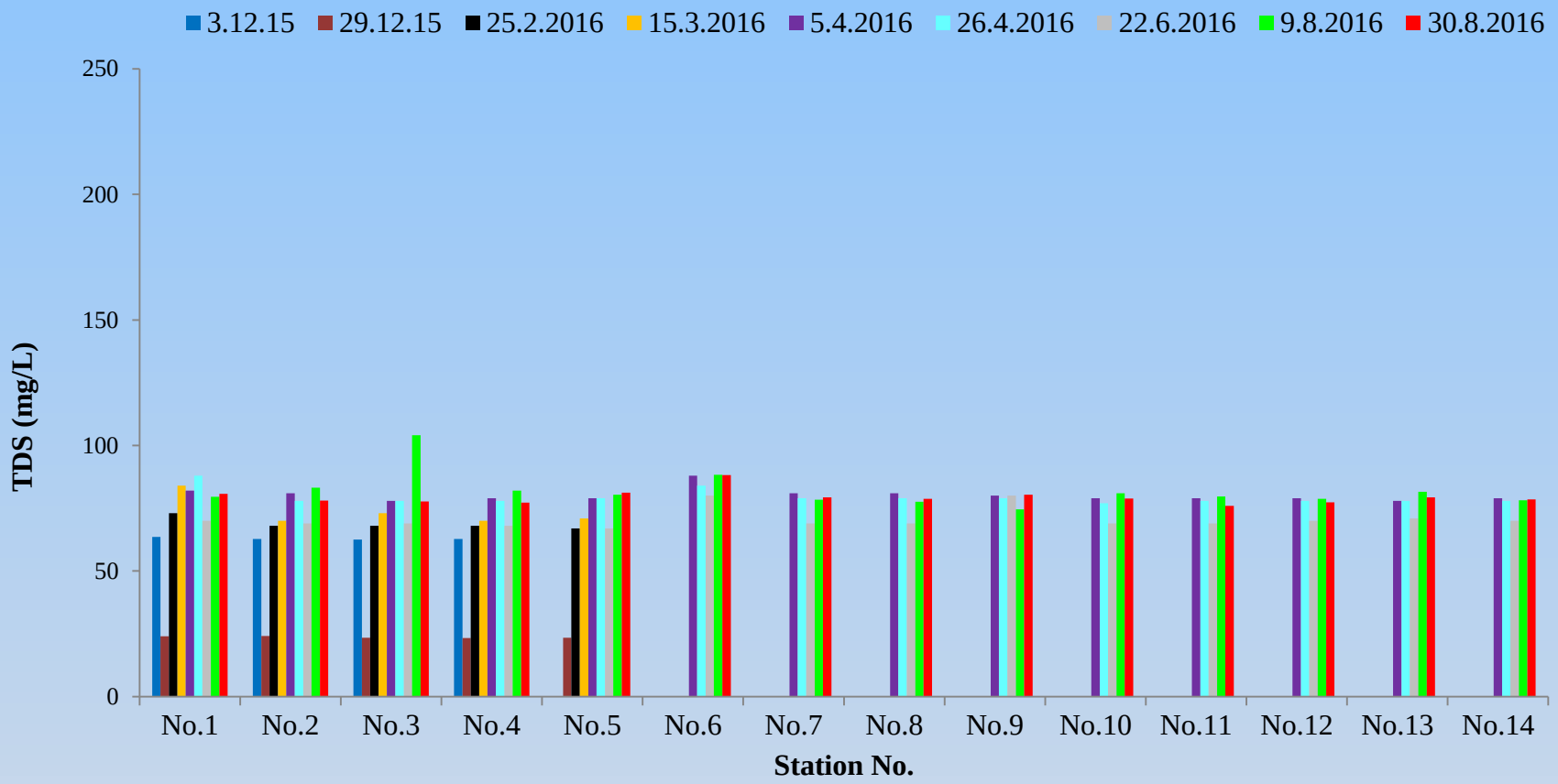
Electrical Conductivity (In-lake Stations)



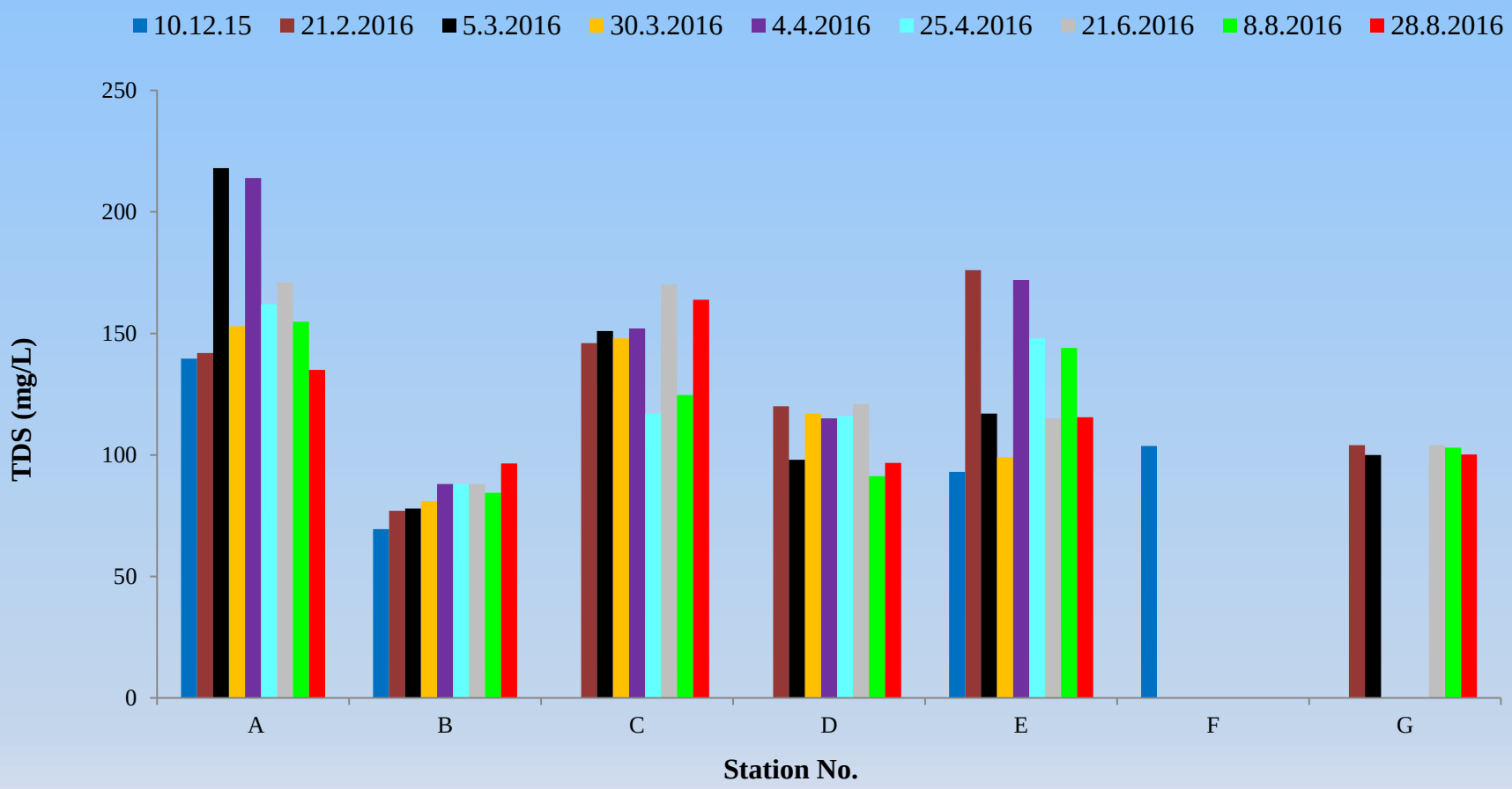
Electrical Conductivity (Inlet Stations)



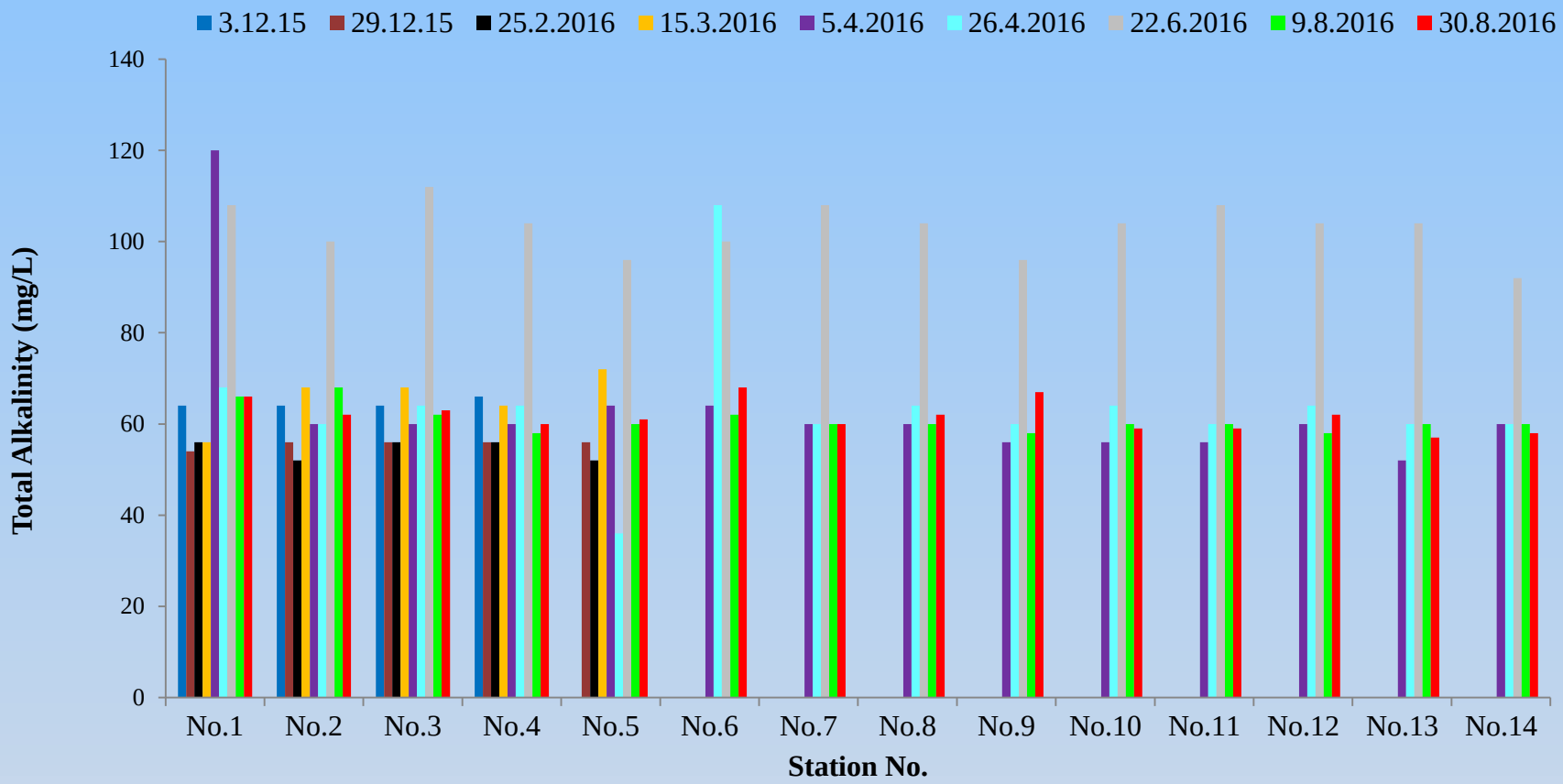
TDS Variation
(In-lake Stations)



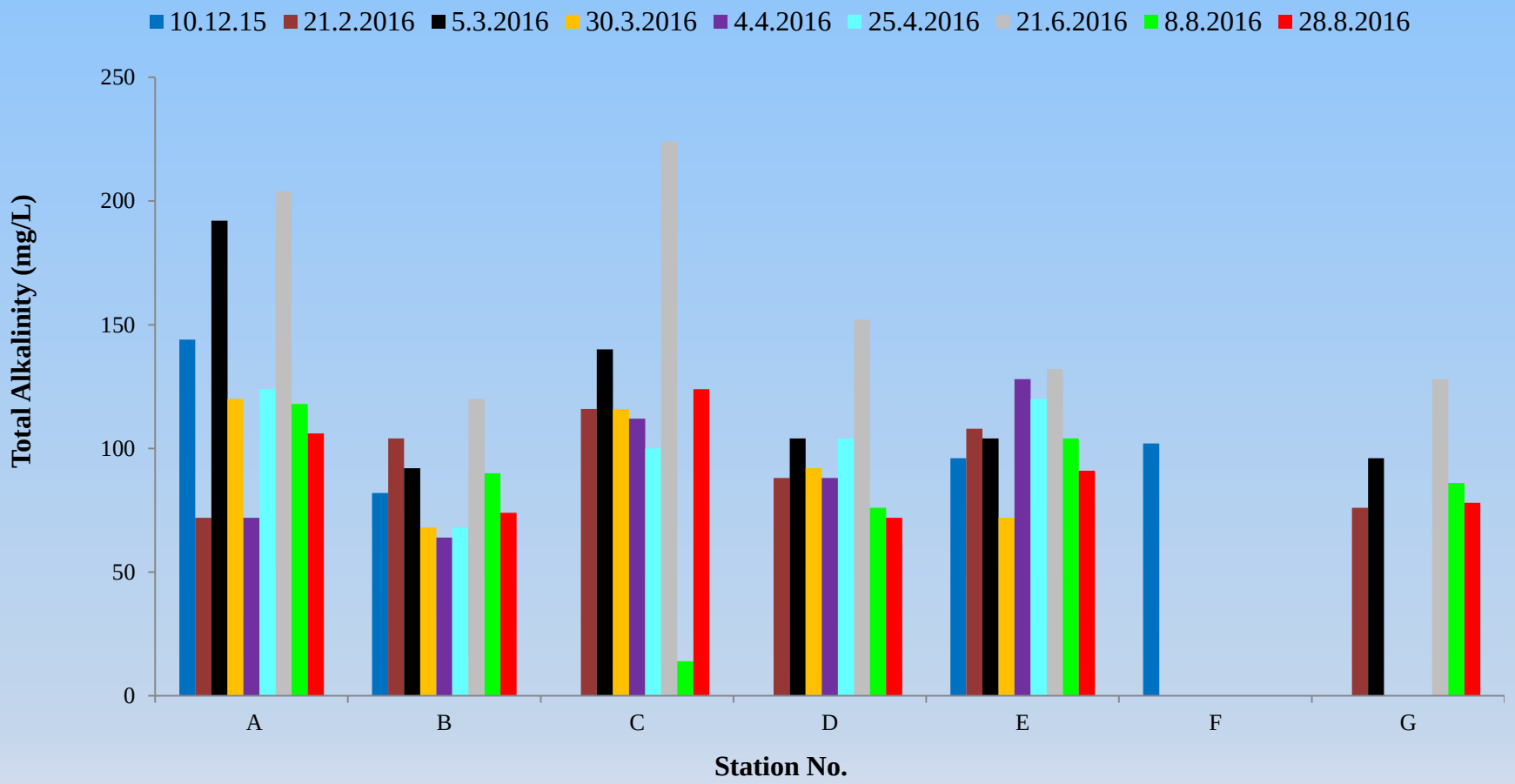
TDS Variation
(Inlet Stations)



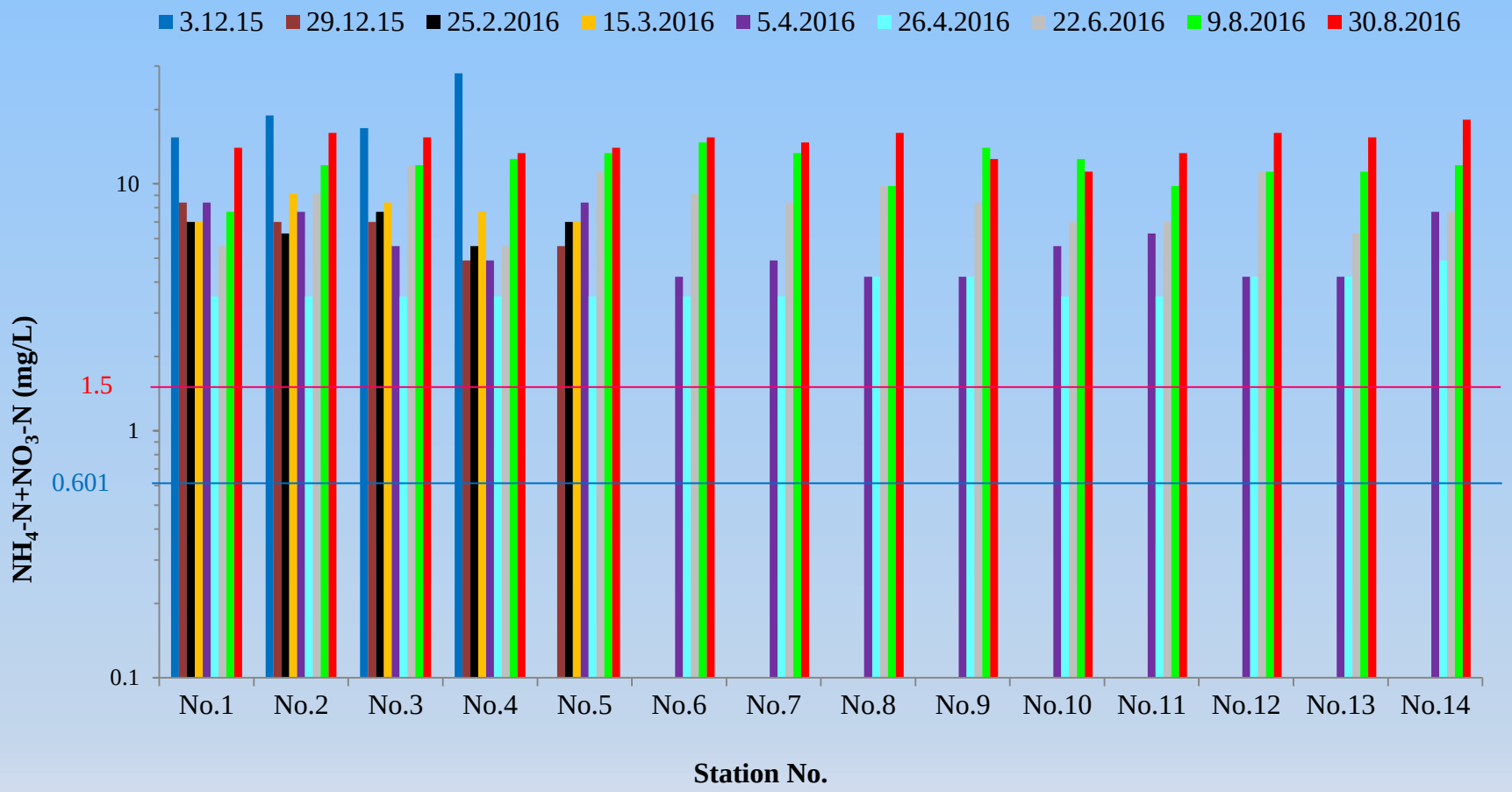
Total Alkalinity
(In-lake Stations)



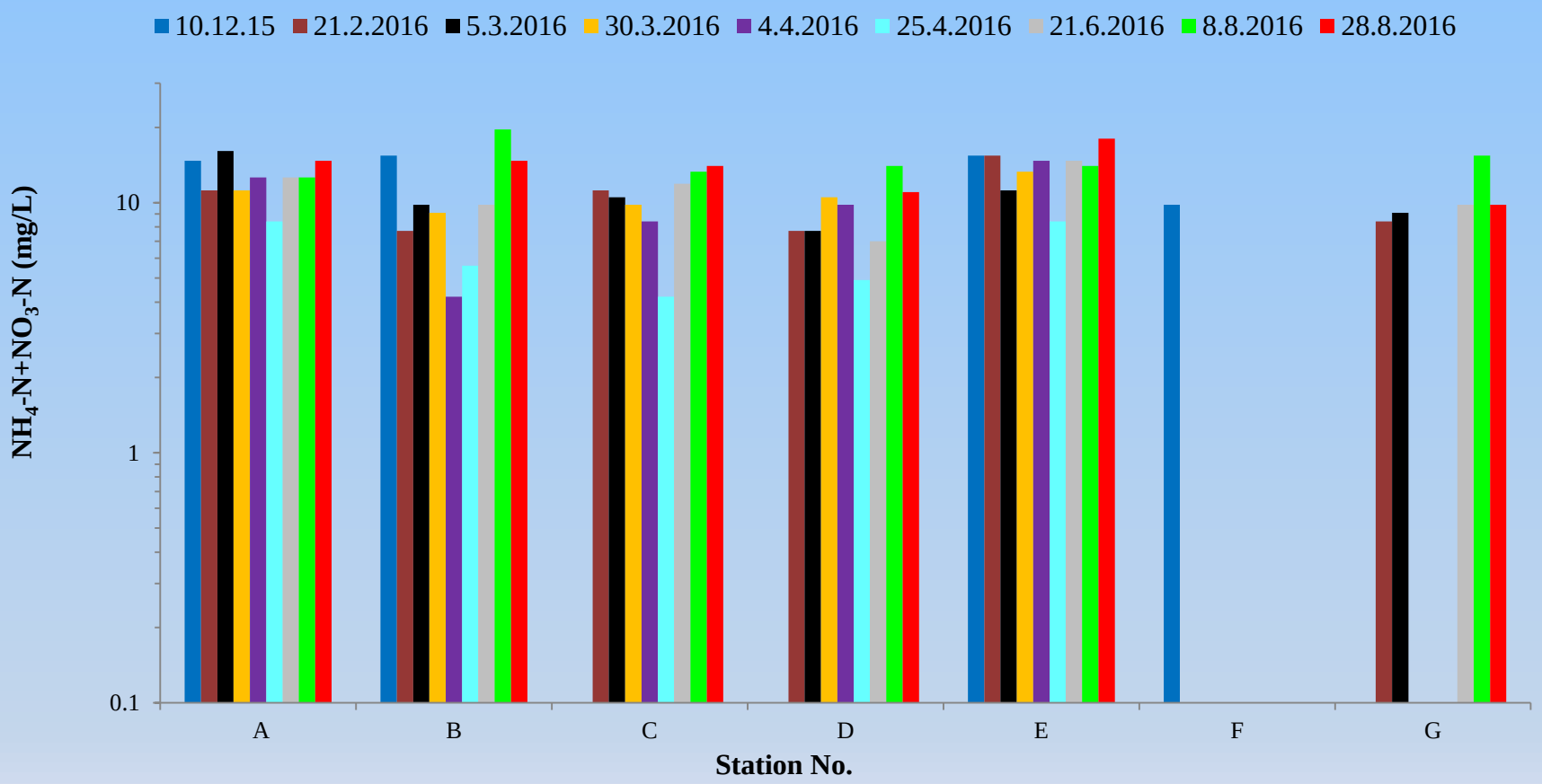
Total Alkalinity (Inlet Stations)



Nitrogen Concentration (In-lake Stations)



Nitrogen Concentration (Inlet Stations)



Trophic State Index

Waterbody classification based on tropic states

- ***oligotrophic***
- ***Mesotrophic***
- ***Eutrophic***
- ***hypereutrophic***.

Trophic State Index (TSI)

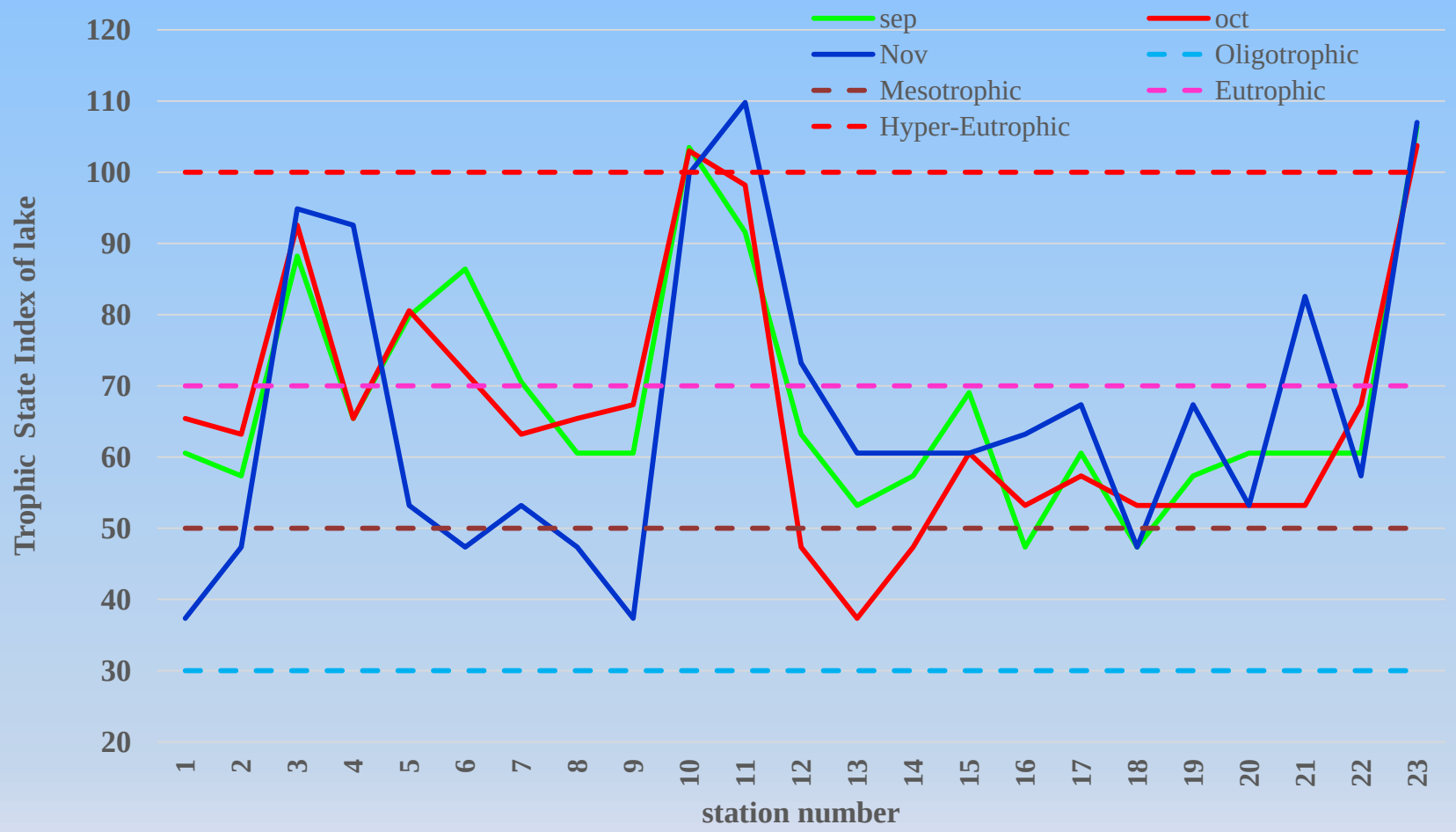
TSI for Phosphate (PO4) TSI = 14.42 In PO4 (µg/L) + 4.15

- TSI < 40 ⇒ Oligotrophic lake
- 40 <TSI < 50 ⇒ Mesotrophic lake
- 50 <TSI values = 70 ⇒ Eutrophic lake
- TSI values > 70 ⇒ Hypereutrophic lake

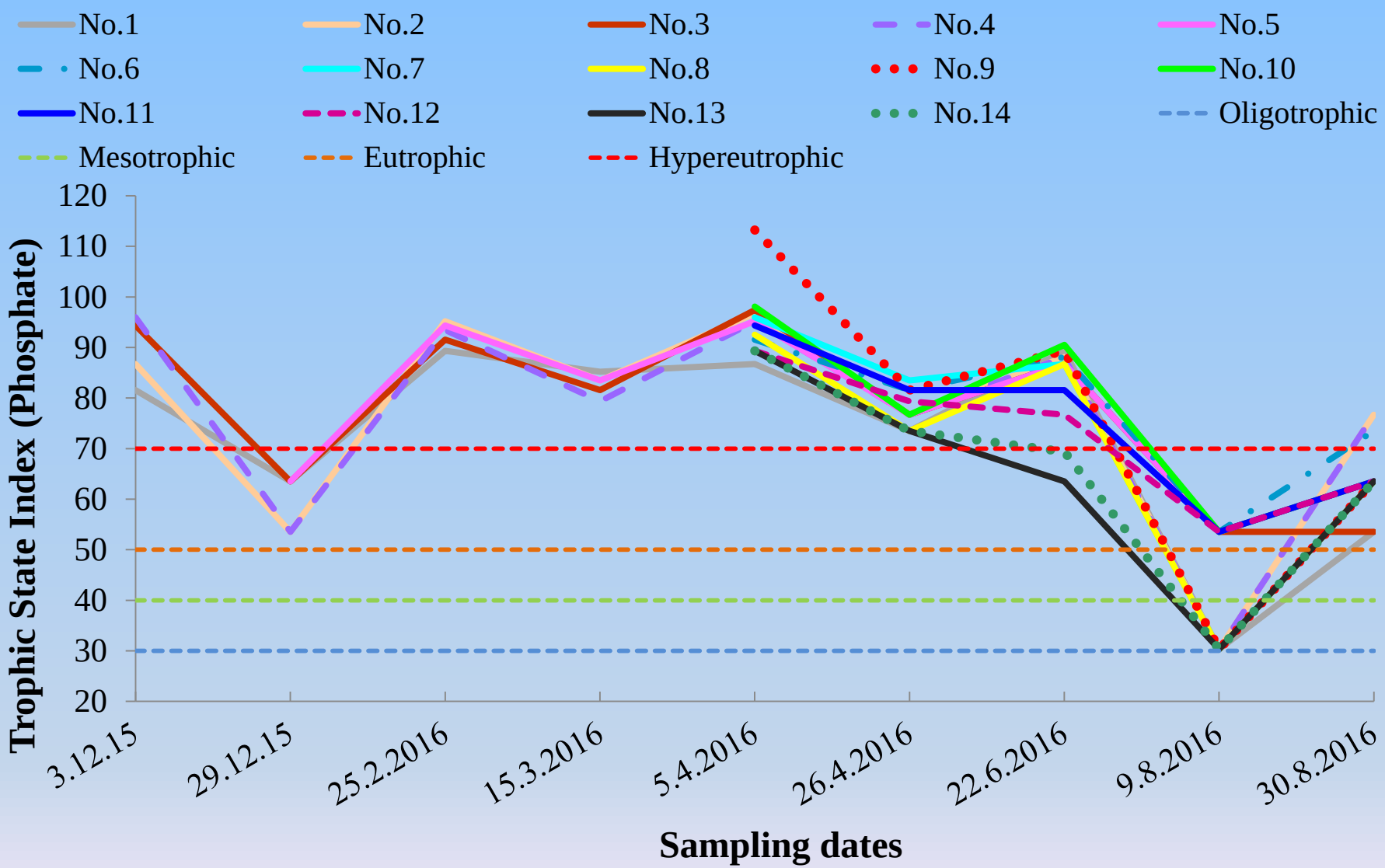
Source : Omkar Singth, 2008,12th world lake conference

Eutrophy	TS 50-60	Lower boundary of classical eutrophy: Decreased transparency, anoxic hypolimnion during the summer, macrophyte problems evident, warm-water fisheries only.
	TSI 60-70	Dominance of blue-green algae, algal scums probable, extensive macrophyte problems.
Hypereutrophy	TSI 70-80	Heavy algal blooms possible throughout the summer, dense macrophyte beds, but extent limited by light penetration. Often would be classified as hypereutrophic.
	TSI > 80	Algal scums, summer fish kills, few macrophytes, dominance of rough fish.

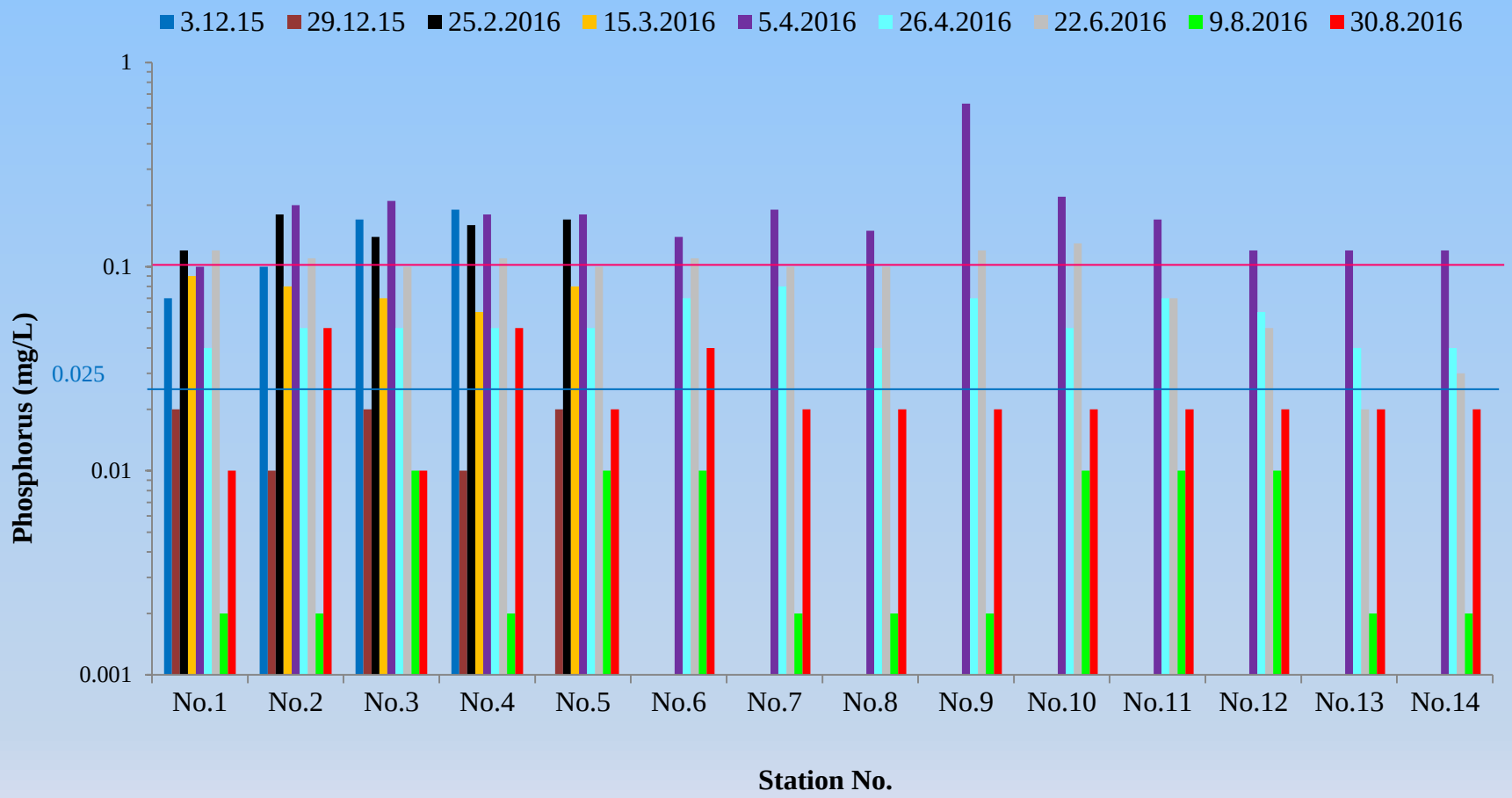
Eutrophication Status Based on Phosphate Concentration in Kandawgyi Lake



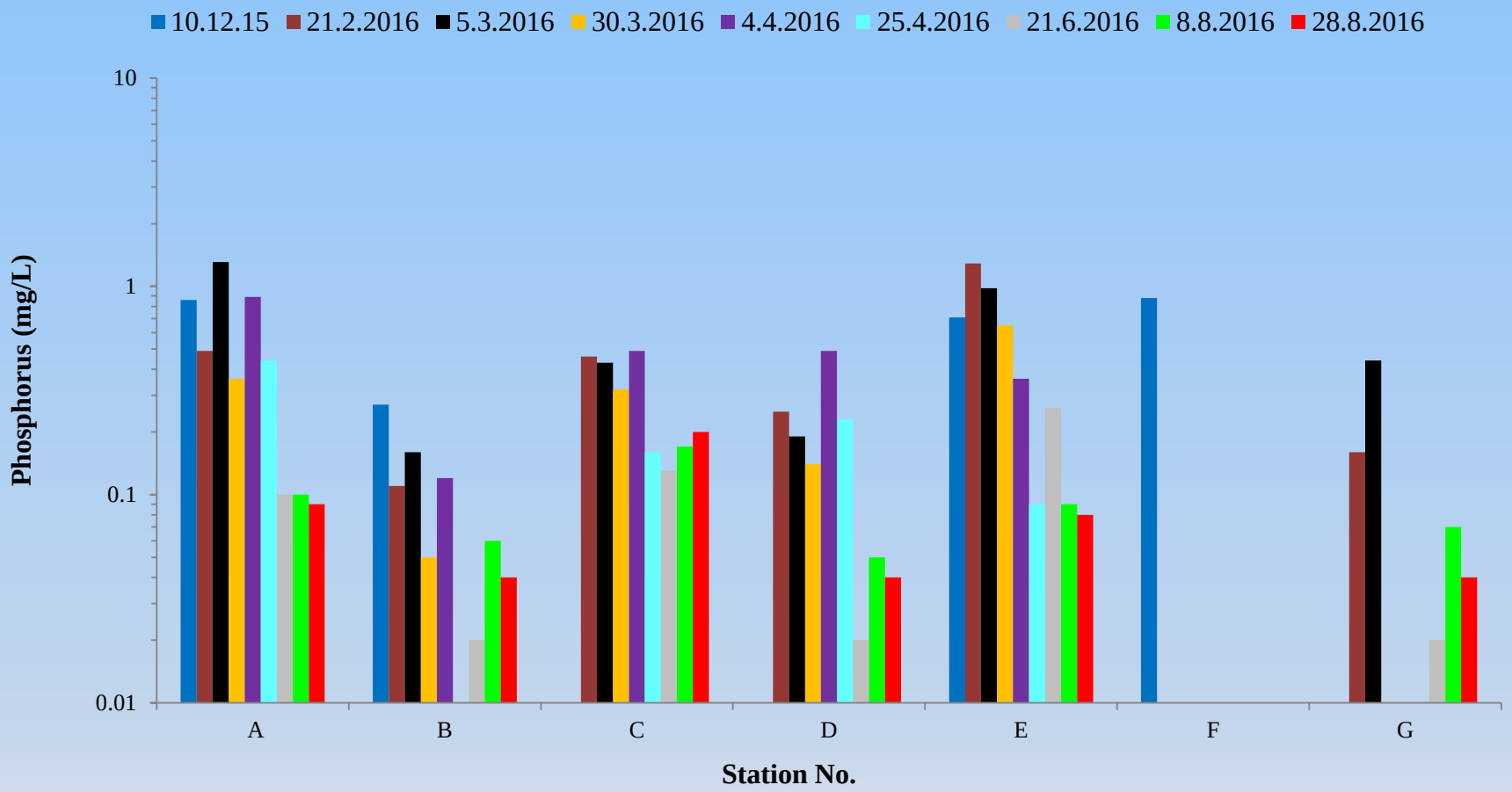
TSI of In-lake stations



Phosphorus in Inya Lake (In-lake Stations)



Phosphorus concentration in Inya Lake (Inlet Stations)



Discussion & Conclusion

- in situ measurements & laboratory analysis, compared with INWQS Malaysia Std. for in-lake W.Q
- Most of assessed parameters of Kandawgyi lake are greater than the acceptable limits of INWQS
- pH, DO, BOD & Turbidity of Inya lake are in the acceptable limits of INWQS
- BOD and COD are much greater than the limit of the compared standard (especially in inlet drain waters)
- Dilution process is occurred in the wet season in Inya lake.

Conclusions

- In both lakes, TSI values are within eutrophic state in most of the stations and are within hyper-eutrophic state in some stations.


Thank You for your kind attention