
# GLEON 17 Chuncheon, South Korea
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# GLEON 17 Poster Session






*1. Chris G. McBRIDE, David P. Hamilton and Kohji Muraoka*

**University of Waikato, New Zealand: GLEON update**

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The University of Waikato (New Zealand) has continued to expand its buoy monitoring network. Our oldest monitoring buoy (Rotorua) is rapidly approaching a decade of deployment, and our network now includes 15 sites across both major islands of New Zealand, encompassing lakes large and small, deep and shallow. Our buoy data have been utilised for a range of lake management and restoration initiatives, for example, monitoring the effect of inflow alum dosing on hypolimnetic oxygen demand in Lake Rotorua. We have partnered with an information technology company, Waiora Pacific, to produce an interactive, web-based tool for data management and investigation. 'Takiwa Lakes' combines GIS web services with On-line Analytical Processing (OLAP), and is capable of displaying any and all data relating to all New Zealand lakes > 1 ha (n = 3800). Takiwa Lakes brings together high-frequency buoy feeds with geospatial layers (e.g. topography, aerial photography), ecological databases (e.g. invasive fish database), processed remote sensing images, lake bathymetry, and a number of other layers. Our long-term goal for Takiwa Lakes is to incorporate interactive and biophysical catchment and lake models, in order to provide a 'one-stop-shop' for lake monitoring, modelling, and management.

*2. Todd R. MILLER[1], Mathew Smith[2], Victor Jimenez[3]*

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**New Site: Bradford Beach Buoy for Real- Time Forecasts of Microbial Contamination**

Bradford Beach on Lake Michigan in Milwaukee, WI (USA) is one of the Great Lakes' most popular beaches. It is also subject to microbial contamination due to combined stormwater and sewage overflows in the city of Milwaukee. During the summer, routine sampling for microbiological analyses typically occur only once per day, but levels of the indicator organism *Escherichia coli* have been shown to fluctuate by orders of magnitude throughout the day. To address this we have deployed a buoy at Bradford Beach equipped with water quality sensors measuring variables that have been shown to be predictors of *E. coli* levels in past modeling efforts. These include wave height/direction, turbidity, wind speed/direction, water temperature, dissolved oxygen, and chlorophyll. The goal of this project is to use these data to make hourly forecasts of *E. coli* levels at Bradford Beach in order to protect public health. The buoy was launched in September of this year for a two-month test run. Preliminary data will be shown.

*3. Ana M. MORALES-WILLAMS[1], Alex Alder[2], Michael J. Lannoo[3,4]*

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[4]Iowa Lakeside Laboratory Regents Resource Center, Okoboji, IA, USA

**New Site: West Okoboji Lake, Okoboji, Iowa, USA**

We are pleased to announce our new site and data buoy at Iowa Lakeside Laboratory Regents Resource Center on West Okoboji Lake (Okoboji, Iowa, USA). West Okoboji and its adjacent chain of lakes have a rich limnological history. The earliest reconnaissance studies of these lakes were published by Birge and Juday in 1922, and regular monitoring records exist dating back to the early 1960's. One of only 34 natural lakes in the state of Iowa, West Okoboji is a glacial lake positioned near the Iowa-Minnesota border. It is a mesotrophic, dimictic system with a watershed that is primarily cropland and grassland. The new buoy compliments two long term monitoring programs, the volunteer-run Cooperative Lakes Area Monitoring Project (CLAMP) and the Iowa Lake Survey (Iowa Department of Natural Resources). "Okobuoy" is equipped with a weather station, surface pH, $CO_2$, temperature, dissolved oxygen, and conductivity sensors as well as a 26 m temperature and dissolved oxygen chain (2 m intervals). In its first four months of deployment, its data have incorporated into multiple outreach and educational activities at Iowa Lakeside Lab and Iowa State University and will soon be uploaded to DataOne. Given the extensive long-term limnological record in West Okoboji, we anticipate many opportunities for research and collaboration.

*4. P.E., Ndimele[1]; F.G., Owodeinde[1]; K.S., Chukwuka.[2] and C.A., Kumolu-Johnson.[1]*

**The Physico-chemistry and Heavy metal Concentrations in fish (*Oreochromis niloticus*, Linnaeus, 1758) from industrial effluent-polluted aquatic ecosystem in Lagos, Nigeria**

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Some physico-chemical parameters and heavy metal content of water, sediment and *Oreochromis niloticus* from a section of the Lagos Lagoon complex were studied for ten months (July, 2012 – April, 2013) spanning wet and dry seasons. Three sampling stations were used; Ologe, which is the closest to the effluent discharge point from Agbara Industrial Estate, Ijon is located upstream before the point of discharge of industrial effluent, Etegbin is downstream and have a lot of human activities like selling, recreation, washing etc. The heavy metals investigated are Cu, Zn, Pb and Fe while the physico-chemical parameters are

temperature, pH, conductivity, total dissolved solids (TDS), total suspended solids (TSS), salinity, dissolved oxygen (DO), biological oxygen demand (BOD), chemical oxygen demand (COD), and alkalinity. All the physico-chemical parameters except temperature and biological oxygen demand exhibited significant ($p<0.05$) monthly variation. However, four (conductivity, total suspended solids, total dissolved solids and salinity) of the ten physico-chemical parameters investigated representing 40% showed significant ($p<0.05$) seasonal variation. All the heavy metals studied showed significant ($p<0.05$) monthly and seasonal variation in sediment and tissue of *Oreochromis niloticus*. However, only Zn showed significant ($p<0.05$) monthly and seasonal variation in the water column of the sampling stations. The range of concentrations of the four heavy metals in the tissue of *Oreochromis niloticus* are: Zn (2.20±1.51 – 22.33±8.80 mg/kg), Fe (12.63±4.68 – 357.00±86.45 mg/kg), Cu (1.33±0.75 – 107.33±59.36 mg/kg) and Pb (0.10±0.03 – 1.23±0.98 mg/kg). The values of copper and iron obtained in this study are higher than the limits recommended by World Health Organisation, Nigeria's Federal Environmental Protection Agency and United States Environmental Protection Agency. This study shows that copper and iron concentrations of Ologe Lagoon, Etegbin and Ijon are increasing. Therefore, there is need for regular monitoring of heavy metals in these water bodies to promptly detect sudden increases and take necessary steps to prevent its harmful effects on man.

*5. Jason D. STOCKWELL[1]*

**New GLEON Buoy at Hyper-Eutrophic Shelburne Pond, Vermont, USA**

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Shelburne Pond is a 182-ha, shallow, hyper-eutrophic system prone to annual cyanobacteria blooms and periodic summer fish kills. A new buoy was deployed in April 2015 and GLEON site status was requested in August 2015. The buoy will support GLEON-related research, teaching at graduate, undergraduate, and high school levels, and community outreach. A brief overview of Shelburne Pond and the specifications of the new buoy will be provided.

*6. David RICHARDSON[1], Michael Forcella[2], John Thompson[3], Kathleen C. Weathers[4], and Albert K. Smiley[5].*

**New Site: Mohonk Lake, Shawangunk Ridge, New York, USA**

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Mohonk Lake (41.766°N, 74.158°W) is one of five Sky Lakes formed on the Shawangunk Ridge, New York, United States of America. The Sky Lakes are clear, mountain lakes with small watersheds. Mohonk Lake, a mesotrophic and predominantly rain-fed lake, has a 2.5 watershed to surface area ratio with few inflows. Mohonk resides within private lands owned by the Mohonk Mountain House (MMH), a resort sitting on the edge of the lake. The MMH is nested within the Mohonk Preserve (MP), a 2,800+ hectare protected area. Trout and other game fish have been stocked for visitors to MMH since 1871. Long-term data include daily lake temperature and pH which have been collected year round since the late 1970s, and daily weather data, beginning in the mid-1890s, are some of the longest and most consistent weather records in northeastern North America. Data from the lake are collected and maintained by conservation scientists and citizen scientists from the Mohonk Preserve. Mohonk Lake and two other Sky Lakes (Minnewaska and Awosting) are part of an on-going study looking at the effect of newly introduced fish into lakes that previously had been fishless. We are installing environmental sensors at the location of long-term data collection on Mohonk Lake including weather sensors (wind speed, direction, air temperature, and PAR) and in-lake sensors (oxygen, total algae, conductivity, pH, thermistor chain). These data will enable Mohonk Lake to be part of local, regional, and global studies of lake metabolism, climate change, and storm event impacts on lake dynamics.