Workshop Proceedings

Development of an Ecosystem Heath Report Card for Lake Naivasha, Kenya

Sharing Best Practices in the Development of Water Pollution Assessments from Laguna Lake, Philippines and Chilika Lake, India, to Lake Naivasha, Kenya

Enashipai Resort & Spa, Naivasha
25th – 27th September, 2018

Participating partners:

including Sanivation and Kwa Muhia Environmental Group

Overview

The issue of pollution of fresh and coastal waters and the harmful impacts on human health, ecosystem health and economies rank high on national development agendas in the context of the 2030 Agenda for Sustainable Development and its Sustainable Development Goals (SDGs). Countries have been developing and implementing approaches to combat land-based pollution and there are lessons to be shared in the adoption of success stories between countries. UN Environment, through its Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA) and through its Freshwater Ecosystems Unit, have been facilitating the implementation of initiatives and exchange of best practices through its Programme of Work. In addition, in December 2017 at the 3rd United Nations Environment Assembly (UNEA), UN Member States mandated UN Environment in a comprehensive Resolution to help implement a Framework for Freshwater Ecosystem Management to help countries protect and restore their water-related ecosystems in line with the 2030 Agenda, including through addressing water pollution.

The Philippines and India's experiences in addressing water pollution: Pollution in these countries have been receiving highest level of political attention for clean-up and remediation in recent years. With the support of UN Environment, through funding from the Global Environment Facility (GEF), national stakeholders with responsibility for environmental management, along with local and internationally-based academia, have been contributing to pollution mitigation in coastal ecosystems. Among the key tools that have been developed from the collaborations have been ecosystem health scorecards. Scorecards have been developed for Laguna de Bay in the Philippines and Chilika Lake in India. The scorecard has proven to be a very effective tried and tested tool based on application in other parts of the world, to assemble environmental quality data and integrate them into a coherent communication package that all audiences can relate to and form the basis for assessment and feedback on the effect of efforts to combat pollution.

About Lake Naivasha: Lake Naivasha, located in west-central Kenya, is described as a Rift Valley lake that is part of the volcanic features in the Great Rift Valley that intersects the west-central part of the country. The lake is ecologically diverse, supporting a wide variety of aquatic and terrestrial species and its proximity to Nairobi has made it a very popular tourism hotspot in Kenya. The adjacent areas surrounding the lake have, however, seen heavy agricultural development with significant investment in floral and other horticultural products for the export market. Given the tourism, agricultural and other investments around the lake, and the consequent growth in job opportunities, the population has risen dramatically and with it, environmental and public health challenges.

Effluent from the communities surrounding the lake are of concern, emanating from untreated wastewater and solid waste, notably plastics, along with discharges from agricultural activities in terms of irrigation runoff and other non-point source flows from crop and livestock production in the wider surrounding areas. The pollution in the lake is considered a growing environmental and socioeconomic concern and there have been over the years many efforts to address the issue. However, there is emerging innovation in human effluent recycling, recycling of irrigation discharges and disposal methods

to address plastic pollution. The lake has been extensively researched and there is a wide body of knowledge on water quality and environmental status along with study of socio-economic conditions.

Exchange of best practice using the ecosystem health scorecard approach: In the context of environmental quality data collected, there is a recognized need for a means to integrate the most relevant body of data that remains 'disaggregated' into consolidated information products that can be easily accessed and used by stakeholders for decision-making, whether community, farmers and other enterprises, and regulatory authorities. The Ecosystem Health Scorecard provides a framework to facilitate this data integration into a format that can be linked to the process for reporting on the Sustainable Development Goal (SDG) targets, in particular targets 6.3.1 on wastewater, 6.3.2 on ambient water quality, and 6.6 on water-related ecosystem health. These are supported by cross-sectoral frameworks such as integrated water resources management (6.5.1) approaches, and by the Framework for Freshwater Ecosystem Management, which uses principles of the 2030 Agenda to assist countries in protecting and restoring their water-related ecosystems and can be adapted to fit local contexts such as for Lake Naivasha.

Core funding for the technical exchange was from the UN Environment Programme of Work project 525.1 *'Addressing the Nutrient Challenge through an Effective Global Partnership on Nutrient Management (GPNM)*, the '*GEF Global Nutrient Cycle Project'*; and '*Strengthening the normative basis for planning, monitoring and managing water quality for aquatic ecosystems'*, the Freshwater Ecosystems Unit Project. Support was provided under GEF-International Waters Learning Exchange and Resources Network (IW LEARN) for participation of two participants associated with related GEF projects in the Caribbean and Romania.

Workshop participants

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Pre-workshop Symposium - UN Environment, 24 September

On Monday, 24 September, the participants gathered at UN Environment for an interactive exchange with representatives from the Philippines, India and Kenya, UN Environment and other relevant stakeholders on efforts to beat water pollution.

Welcome Remarks:

Maxwell Gomera – UN Environment
H.E. Uriel Norman Garibay – Ambassador and Permanent Representatives to UN Environment and UN-Habitat, the Philippines
H.E. Suchitra Durai – Ambassador and Permanent Representative to UN Environment and UN-Habitat, India
Birguy Lamizana – UN Environment
Joakim Harlin – UN Environment

- Amb. Garibay from the Philippines highlighted the importance of preventing pollution from land-based sources and establishing water pollution assessment tools such as the Ecosystem Report Health Card. He also highlighted the experience from the Philippines in this field.
- Amb. Durai from India highlighted the important momentum revolving around the issue of pollution in India and outlined some of the ongoing initiatives across the country, including in and around the Chilika Lake.
- Birguy Lamizana from UN Environment highlighted the crucial role and some of the activities of the Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities (GPA) and its Partnerships on marine litter, nutrient management and wastewater, in tackling land-based pollution.
- Joakim Harlin, UN Environment, focused on the activities of the organization in the field of freshwater, highlighting the link with land-based pollution.

Challenges of land-based pollution in coastal lake ecosystems in Laguna de Bay, the Philippines and Chilika Lake, India, actions to address pollution and application of ecosystem health report card tools to aid decision making.

- Adelina Santos Borja, from the Lake Laguna Development Authority (LLDA) introduced the work of the Authority and explained the history of the Ecosystems Health Report Card in the Laguna de Bay, the Philippines, from its inception to the implementation phase.
- Christopher Cox, UN Environment, introduced the history and implementation of the Ecosystems Health Report Card in the Chilika Lake, India.
- Agnes Mbugua, Ministry of Water, Government of Kenya, highlighted the current situation in Kenya with regards to using the principle of integrated water resources management (IWRM) to reduce land-based pollution.

Workshop participants travel to Enashipai Resort & Spa, Naivasha

DAY 1: 25 September

Welcome remarks and agenda review

Welcome Remarks: Christopher Cox - UN Environment

Participants were welcomed, the aims and objectives of the workshop outlined, the agenda explained and collaborating partners acknowledged.

Challenges at Lake Naivasha. Setting the scene, overview of the Lake, its ecosystem services and challenges

Kamau Mbogo – Imarisha Naivasha

Main challenges discussed include:

a. Rapid population growth because of increased industries around Lake Naivasha;
b. Climate change effects related to changes in hydrology seems to be affecting most of the Rift Valley lakes; effects observed especially with respect to lake levels;
c. Unplanned development along the riparian land has been leading to lake water mismanagement and pollution;
d. Lack of enforcement of existing policies and regulations, laws and non-compliance among local stakeholders;
e. Increasing demands for natural resources and ecosystem services has been leading to over-abstractions, deforestation and water pollution;
f. Changes in land-use that includes more intense agricultural production, horticulture, real estate development and tourism enterprises.

Lake ecosystem impacts from poor management practices includes:

a. Reduced water quality of the lake;
b. Reduced diversity of bird species;
c. Changes in micro-fauna found within the lake.

Panel discussion: perspective of local authorities, users, agriculture stakeholders, recreational/tourism, community

Discussion points in this panel were around population and developmental issues, environmental and water quality issues, including biodiversity, economic and social outlooks and gaps in information for decision making and community mobilization.

Panelists: Mark Kariuki, on behalf of hotel industry; Ed Morrison, Lake Naivasha Riparian Association; Faith Mutua, Water Resources Authority; Vincent Odongo, Egerton University and William Ojwang, World Wildlife Fund for Nature.

Moderator: Lis Mullin Bernhardt – UN Environment

1. Overview of monitoring the lake

    a. Monitoring water quality and quantity is conducted by the Water Resources Authority (WRA) along main rivers and tributaries; this is via a mix of manual, automated and telemetric stations;
    b. The flow to the lake has a very quick response after rainfall events; this often brings sediment carried from upland areas;
    c. All lakes in the Rift Valley area have seen an increase in the water level in recent years;
    d. Currently there is no groundwater monitoring. A network of ground water monitoring stations will be beneficial to understand the storage potential of the catchment and enhance understanding of flows to the lake ecosystem.

2. What is happening with the water levels of the lake and why is the water level higher than in previous years

    a. There has been observed increase in sediment deposition to the lake which may be contributing to increasing water levels. This has been proposed by the Water Resources Authority;
    b. Tectonic plate movement has been theorized as a possible contributing factor (as per article published in a local newspaper);
    c. There has been a sustained increase in rainfall over the region in recent years; this has been equivalent to an increase by about 5% per year. It should be noted however that this is within the observed natural variability in long-term rainfall patterns;

d. Inter-basin transfers can cause a substantial influence on water flows; this could be a contributing factor.

3. Issues of deforestation

    a. Although a factor in terms of deposition of sediment into the lake, deforestation itself does not appear to have been resulting in a substantial impact on water flows from the catchment areas;
    b. Fences have been constructed within the water catchment areas in the Aberdare Mountains to reduce encroachment and deforestation by local people;
    c. The population growth around the lake has resulted in extensive land use transformation with negative impacts on natural water resources and augmented land-based pollution.

4. Issues of over abstraction of water
    a. There is a lack of transparency in how water abstractions from waterbodies are managed;
    b. Employ strict measures possible for abstraction.

5. Water quality issues in the lake
    a. There is available water quantity data for the lake and can be accessed;
    b. Water quality monitoring is expensive and limits investment;
    c. There is need to understand the groundwater flows around the lake. There is no empirical evidence to suggest that pollution from the flower farms is being transmitted to the lake through groundwater flows. There is limited overland runoff that makes its way directly into the lake from the areas in flower production as the gradient tends to slope away from the lake;
    d. Not much research has been done on nutrient pollution in the lake;
    e. Only 30% of the population in Naivasha town is connected to the sewer system. The untreated wastewater is generally assumed to flow into the lake resulting in contamination.

6. Biodiversity challenges
    a. In the 1970s there were 150 species of flora and fauna;
    b. In 2009 only 80 species of flora and fauna were documented;
    c. Water hyacinth is flourishing in the lake;
    d. Invasive species have been introduced into the lake for commercial exploitation and now dominate the fish diversity; there are no recorded indigenous fish species in the lake;
    e. There are reduced fish catches due to illegal fishing and unsustainable fishing methods;
    f. Collapse of the fishing industry in the short-term is predicted due to over-harvesting; catches are yielding younger and younger fish reducing possibility for recruitment;

g. There have been calls to designate fish breeding areas through collaboration with local fishermen and the fisheries department.

The Laguna Lake experience

Adelina Santos-Borja – Laguna Lake Development Authority

Presentation on the environmental and pollution challenges threatening Laguna De Bay and the work of the Laguna Lake Development Authority in addressing these challenges, including the development of the Ecosystem Health Report Card. The following are the key highlights:

a. The lake is a multiple use resource providing a range of ecosystem services that include fisheries, irrigation, transportation, power generation potential, recreation, industrial cooling and drinking water);
b. The multiple threats facing the lake include flooding, expansion of informal settlements, proliferation of invasive species, inappropriate fertilizer usage, mining and quarrying activities;
c. Domestic waste is the highest source of pollution in the lake and the adjacent Manila Bay; The tendency has been to consider the lake as a vast septic tank for wastewater rather than a natural treatment system if managed carefully;
d. The LLDA is working to help the local government to connect with funding sources to expand wastewater treatment capacity for communities around the lake;
e. The Authority launched an environmental user fee system to influence the adoption of better practices based on the polluter-pay principle. Higher costs are levied to polluting industries that do not have wastewater treatment plants;
f. The Laguna De Bay Ecosystem Health Report Card serves as a tool for communicating the issues of the lake health in terms of water and environmental quality to stakeholders in a language that can be easily understood.

Field trip on Lake Naivasha and adjacent flower production operation

Participants were taken on a tour of the lake by boat to see points of interest in the lake with focus on key pollution issues in the lake and from where they emanate, discuss the issues of over-exploitation of fisheries resources and commercial and urban development around the lake. The tour was led by Mbogo Kamau of Imarisha Naivasha.

This was followed by a trip to the Kongoni River Farm constructed wetland where participants were shown an example of how nature-based solutions are being applied in treatment of irrigation water discharges from flower production systems. The tour was led by Ed Morrison of the Lake Naivasha Riparian Association.

DAY 2: 26 September

Panel Discussion: Mapping out the challenges to be addressed in development of the Lake Naivasha Ecosystem Health Report Card

Discussion points in this panel included an overview of methodology of scorecard development in the Philippines and India experience, approaches to gain stakeholder engagement, data assessment and integration methods and how all this came together toward regulation and decision making. Reflections on comparable approaches to apply to Lake Naivasha were discussed.

Panelists: Vincent Odongo, Egerton University; Ramesh Ramachandran, National Centre for Sustainable Coastal Management of India; Adelina Santos-Borja, Laguna Lake Development Authority; Alice Mutie, Kenya Marine & Fisheries Research Institute

Moderator: Birguy Lamizana - UN Environment

1. How long did it take to develop the Chilika Lake Ecosystem Health Report Card?

    - The process took over a year;
    - The first report card was developed in 2013;
    - 3 report cards have been completed to date.

2. Who spearheaded the development of the Laguna De Bay Report Card?

    - The Laguna Lake Development Authority (LLDA) spearheaded the pilot project that brought together institutions to develop the Ecosystems Health Report Card;
    - There is ambition to produce the report card annually but there have been challenges in acquisition of data from the fisheries stakeholders. This was the cause of delay of the 2013 report card publication to 2016.

3. Does Kenya report on the SDG indicators related to water quality?

    - Currently an estimated 33% of water bodies in Kenya meet good water quality standards;
    - The country has not provided any water quality data to GEMSTAT since 1988.

4. How were the Laguna Lake Development Authority and Chilika Development Authority able to bring key stakeholders on board?

- All key stakeholders participated in scoping workshops that informed the process of development. The government in both cases had the political will which helped bring the stakeholders together; in the case of the Philippines; this was further driven by a Supreme Court decision that mandated the clean-up of Manila Bay;
- External support institutions notably UN Environment and the University of Maryland were instrumental to the work;
- Engagement of private sector stakeholders was encouraged and played a key role in the development of the report card.

5. Data acquisition and analysis considerations

- It is imperative to have reliable data to make the process work. Consistent and good quality data supported the efforts to develop the Laguna Lake Ecosystem Health Report Card. This was facilitated by a protocol on data sharing; the LLDA is open to share data and most data can be found on their websites: http://llda.gov.ph/
- In Naivasha; the various agencies collect their own data. However, the data is not centralized or synthesized, or easily shared among the stakeholder agencies;
- There is need to identify what aspects of water, biodiversity and environmental quality need to be monitored, to identify what data needs to be collected;
- The Dutch Embassy in Kenya contributed to the creation of a water data sharing system for the WRA through a recently completed project; that same system may possibly be used for sharing data for Lake Naivasha;
- Adopt a citizen Science approach by building the capacity of the local stakeholders to enrich the data pool and to ensure sustainability of the project.

6. Recommendations for the Replication of Ecosystem Health Report Card in Lake Naivasha

- Identify the value of ecosystem goods and services supplied by the lake;
- Identify the threats to the ecosystem goods and services resulting from human influences;
- Identify an overall lead agency in the coordination of the conservation efforts;
- Expand and deepen involvement of key stakeholders;
- Source resources / funding to maintain monitoring water quality and quantity relevant for the report card;
- Enhance commitment of all relevant agencies to equally contribute and lead efforts in their areas of competence.

Working groups session: Putting the Lake Naivasha Ecosystem Health Scorecard framework together

It was agreed that the data parameters of interest for the development of the report card may be divided into two broad categories; (i) water quality indicators and (ii) biodiversity indicators. In this regard the workshop participants were separated into two working groups to deliberate on inter-alia: trends in the indicator observations and what are the causal drivers, environmental impacts, the status of data collection and data availability, who holds the data, challenges in data collection. The working groups were free to widen the discussion as relevant.

DAY 3: 27 September

Working Groups Presentations

The following are the main points raised in the group discussions and reported back to plenary:

Group One: Water Quality

1. What is the problem? What are the drivers/threats leading to water pollution?
    - Improper waste disposals (solid, industrial, domestic);
    - Erosion in upland areas and sedimentation into the lake;
    - Non-point source pollution from all areas surrounding the lake;
    - Fluctuation in water levels;
    - Degradation in land use in upland and adjacent areas of lake;
    - Riparian encroachment by various forms of development;
    - Over abstraction from the lake;
    - Eutrophication within the lake;
    - Weak law enforcement.

2. What are the ecosystem services and beneficiaries?

    Ecosystem services
    - Micro-climate regulation;
    - Fisheries provisioning;
    - Biodiversity provisioning;
    - Potable water supply (domestic/industry);

    Beneficiaries
    - Real estate / residential development sector;
    - Horticultural (commercial) sector;
    - Other commercial sector;
    - Fisheries sector;

- Agricultural sector;
- Tourism and recreation sector.

3. What are the key parameters (indicators) to be considered in the **Ecosystems Health Report Card** and which agencies are custodian?
    - Total coliforms Source: Water Resources Authority (WRA);
    - Chemical Oxygen Demand (COD) Source: WRA;
    - Biological Oxygen Demand (BOD) Source: WRA;
    - Biological indicators Source: WRA;
    - Total Suspended Solids (TSS) Source: WRA;
    - Water column transparency Source: Kenya Marine & Fisheries Research Institute (KMFRI/WRA);
    - Nutrients; Nitrates and Phosphates Source: WRA;
    - Dissolved Oxygen (DO) Source: KMFRI/WRA;
    - Daily lake level measurements Source: WRA;
    - Land use patterns Source: WRA;
    - Heavy metal concentrations.

4. What do we measure and how?
    - The WRA monitors water quality and quantity parameters listed above through the various Water Resource Users Associations (WRUAs) in the region.

5. Suggested lead agency to convene stakeholders in the development of the report card
    - Imarisha Naivasha

6. Suggested constituents for a Technical Working Group
    - WRA;
    - Academia;
    - NGOs;
    - Community network.

7. Potential funding sources for the development of the **Ecosystems Health Report Card**
    - World Wide Fund for Nature (WWF);
    - Dutch Embassy;
    - Global Environment Facility (GEF);
    - Private sector;
    - Government of Kenya;
    - Water Services Trust Fund (WSTF).

Group Two: Biodiversity

1. What is the variation in the turbidity level of the lake?
    - Transparency using the Secchi Disk method ranges between 25 - 75 cm

2. What are the challenges?

    - Pollution from various sources; agriculture, domestic wastewater, discharges from the tourism sector;
    - Expansion of invasive species – water hyacinth, fish (crayfish);
    - Harmful algal blooms;
    - Siltation and sedimentation;
    - Overfishing;
    - Degradation of riparian lands;
    - Change in land use to degrading forms;
    - Decline of bird populations;
    - Unregulated water use;
    - Increasing human-wildlife conflicts.

3. What are the ecosystem services?

    - Tourism/Recreation;
    - Fisheries;
    - Horticulture;
    - Water use – Domestic, industry;
    - Agriculture;
    - Maintaining Biodiversity;
    - Recreation and landscape beauty value;
    - Reservoirs – Energy Production.

4. What are the impacts?

    - Endangerment of livelihood security;
    - Loss of biodiversity;
    - Increasing turbidity;
        - Agricultural productivity
        - Impact on sustainability
        - Horticulture

5. What are the key parameters (indicators) to be considered in the report card and which agencies are custodian?

    - Fisheries; catch, size, biodiversity – Source: KEMFRI/Fisheries Dept.;
    - Zooplankton / Phytoplankton - Source: Naivasha Basin Sustainability Initiatives (NBSI);
    - Transparency - Source: WRA/KEMFRI;
    - Bird species presence and abundance; based on counts of indicator species, e.g. goliath heron, purple heron, African darter, African skimmer, fulvous whistling duck, red-knobbed coot) - Source: Nature Kenya;
    - Vegetation including wetland cover (use of the normalized vegetation density index – NDVI);
    - Benthic invertebrate fauna i.e. chironomids

Development of roadmap to the replication of the ecosystem health scorecard to Lake Naivasha and way forward

The workshop participants convened in plenary to consider the outputs of the working groups and consolidate into an agreed approach.

Moderator: Christopher Cox – UN Environment

A. Agreed that the name of the outputs will be the Lake **Naivasha Ecosystem Health Report Card**

B. Based on the ecosystem characteristics, assessment and monitoring requirements and management response the lake was divided into four zones:
    i. Freshwater inflow zone (north);
    ii. Urban influence zone (east);
    iii. Deep water zone (south);
    iv. Fish breeding zone (west).

C. Summary of desired outcomes the report card aims to contribute to:
    i. Enhancement of best practices by industry; notably by the flower industry;
    ii. Control of expansion of invasive species;
    iii. Control of nutrient loading and eutrophication;
    iv. Mitigation of upland erosion and sedimentation;
    v. Reduction of degradation of surrounding lands;
    vi. Reduction of further encroachment of riparian areas;
    vii. Reduce unregulated water use and polluting inflows;
    viii. Reducing the potential for human-wildlife conflict;
    ix. Enhancement of law enforcement and compliance;
    x. Reduction of overfishing.

D. Ecosystem services and goods that will stand to benefit from adoption of the report card:
   i. Tourism, hospitality and recreation value;
   ii. Aesthetics (landscape) value;
   iii. Fisheries production;
   iv. Potable water supply (domestic/industry);
   v. Agricultural, horticultural and small-scale farming productivity;
   vi. Cultural services – pastoralism (e.g. Maasai practices).

E. What are the impacts expected if nothing is done?
   i. Increasing pollution and turbidity that will result in biodiversity loss in the lake and the terrestrial biodiversity that is connected;
   ii. Overall worsened health of the lake with loss of revenues to all stakeholders; includes hospitality and business interests, farmers, fishers, the community in general and the Government of Kenya.

F. Agreed key indicators for consideration:

Water quality, fisheries and biodiversity were the three main classes of indicators to be considered as contained in the summary table below:

Indicators	Available?	Who Is collecting?	Frequency of Collection	Duration of records
WATER QUALITY				
Total Nitrate/Nitrates (Should be simple) – to get info, set the challenge,	Yes	KEMFRI WRA Academia (Leicester University, UON, Egerton University, ITC, Western Ontario) Naivasha Basin Sustainability Initiative	Monthly (9 stations) Quarterly (1 station) Project-based Project-based	2016 2009
Total Phosphate/Phosphates	Yes	KEMFRI WRA Academia (Leicester University, UON, Egerton University, ITC,	Monthly (9 stations) Quarterly (1 station) Project-based	2016 2009

Indicators	Available?	Who Is collecting?	Frequency of Collection	Duration of records
		Western Ontario) Naivasha Basin Sustainability Initiative	Project-based	
Dissolved Oxygen	Yes	KEMFRI WRA Academia (Leicester University, UON, Egerton University, ITC, Western Ontario) Naivasha Basin Sustainability Initiative	Monthly (9 stations) Quarterly (1 station) Project-based Project-based	2010 2009
Transparency	Yes	KEMFRI Academia (Leicester University, UON, Egerton University, ITC, Western Ontario) Naivasha Basin Sustainability Initiative	Monthly (9 stations) Project-based Project-based	2010
Chlorophyll A	Yes	KEMFRI Academia (Leicester University, UON, Egerton University, ITC, Western Ontario)	Monthly (9 stations)	2017
Total/faecal coliforms	Yes	WRA Academia (Leicester University, UON, Egerton University, ITC, Western Ontario)	Quarterly (1 station) Project-based	2009 to present
FISHERIES				
Catch per Unit Effort	Yes	KEMFRI/Fisheries Department	Yearly (1 station),	

Indicators	Available?	Who Is collecting?	Frequency of Collection	Duration of records
(CPUE) size of nets and fish you catch			Monthly (4 stations)	
Species diversity	Yes	KEMFRI/Fisheries Department	Yearly (1 station), Monthly (4 stations)	
Size/maturity	Yes	KEMFRI/Fisheries Department	Yearly (1 station), Monthly (4 stations)	
BIODIVERSITY				
Phytoplankton/Zooplankton	Yes	Academia (Leicester University, UON, Egerton University, ITC, Western Ontario)	Project-based	
Benthic invertebrate fauna	Yes	Academia (Leicester University, UON, Egerton University, ITC, Western Ontario)	Project-based	
Bird count	Yes	Nature Kenya/National Museums of Kenya (NMK)	Twice-a-year	
Hippo population	Yes	Kenya Wildlife Service (KWS)/NMK	Twice-a-year	
Flora (Vegetation around the lake, and land-use changes using NDVI)	Yes	Academia (Leicester University, UON, Egerton University, ITC, Western Ontario)	Project-based	

Debriefing

A debriefing was convened at UN Environment on Friday, 28 September, after returning from Naivasha and to take stock of the progress made during the meeting, discuss the highlights, and way forward.

Action items arising from the meeting

	Action Items	Lead responsibility	Timeframe
1.	Designate lead stakeholder convener in development of health card	Kamau Mbogo, Imarisha	On-going
2.	Draft a letter introducing the activity with request for relevant organization participation and commitment to provide for data as needed	Kamau Mbogo, Imarisha	07/10/2018
3.	Draft and present action items from the workshop	UN Environment	07/10/2018
4.	Identify additional stakeholders to engage	Kamau Mbogo, Alice Mutie, Beatrice Mwangi, Mark Kariuki	15/10/2018
5.	Prepare 'explainer' PowerPoint presentation as a communication tool to be used for stakeholder engagement	UN Environment	15/10/2018
6.	Draft a concept note/Proposal (max. 10 pages) to elaborate the proposed initiative with emphasis on: - Challenges/Opportunities - Link with SDGs - Proposed budget - Identify key stakeholders	William Ojwang, WWF	15/10/2018
7.	Create an email list of the relevant stakeholders	UN Environment	15/10/2018
8.	Assemble the Technical Working Group	Beatrice Mwangi - WRA, Alice Mutie - KMFRI, Jessica Kahura - NEMA, Kamau Mbogo - Imarisha, Paul Ruoya - LNBN William Ojwang - WWF, Vincent Odongo – Egerton University	31/10/2018
9.	Prepare a relevant MoUs with partner organizations to define roles in report card development	Kamau Mbogo, Imarisha	30/11/2018
10.	Commence data collection necessary for development of the Health Report Card	Kamau Mbogo, Imarisha	30/11/2019
11.	Convene next technical workshop - Review the data inputs and consider gaps - Define the indicator threshold limits and score values - Designate partner roles and further workplans	All stakeholders	02/02/2019

Workshop participants

More photos at the Global Partnership on Nutrient Management Flickr photo site:
https://www.flickr.com/photos/140082532@N06/albums/72157701617036404/with/44072740395/

For the Workshop agenda download at:
http://www.nutrientchallenge.org/sites/default/files/Agenda%20and%20Program%20LLDA-Naivasha%20exchange_25-27%20Sept%2018.pdf