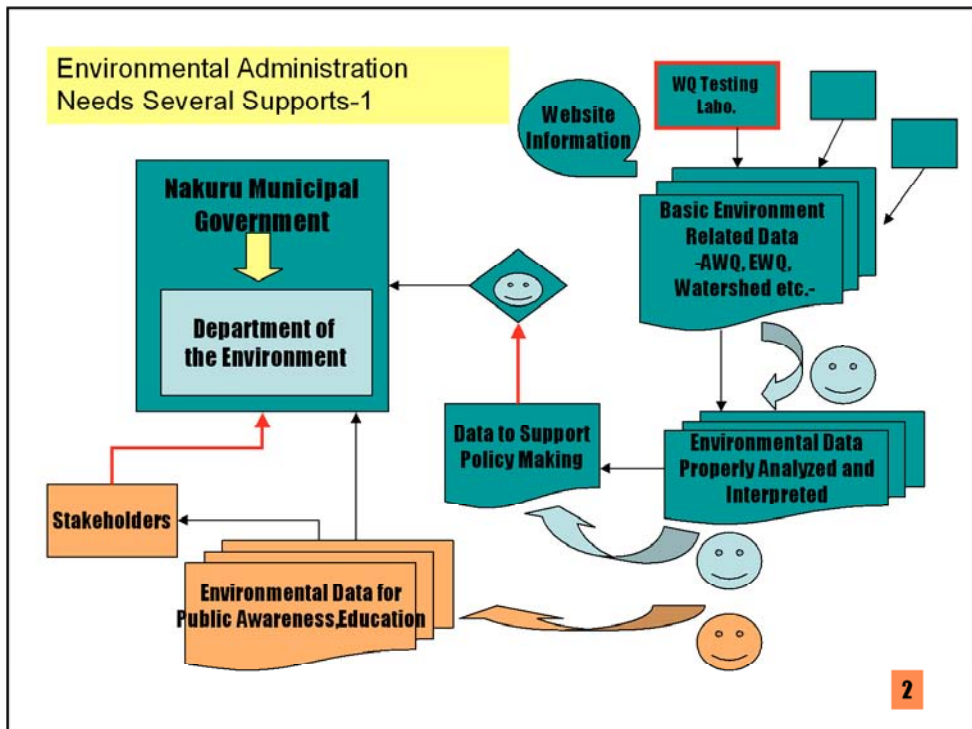


4. 調査団説明資料(MCN/DOE、DEC)

4-1 DEC (ナクル郡環境委員会) への説明資料 (4/6)

(作成：今井団長)



Environmental Administration Needs Several Supports-2

Points of Analysis

Strong will and initiatives of administration

What have been actually done by MCN, KWS, MOWRD, WQTL etc.

Mobilization of the capacity available in Kenya, Nakuru

Utilization of available data, information produced in Kenya so far

Findings of the JICA Mission so far

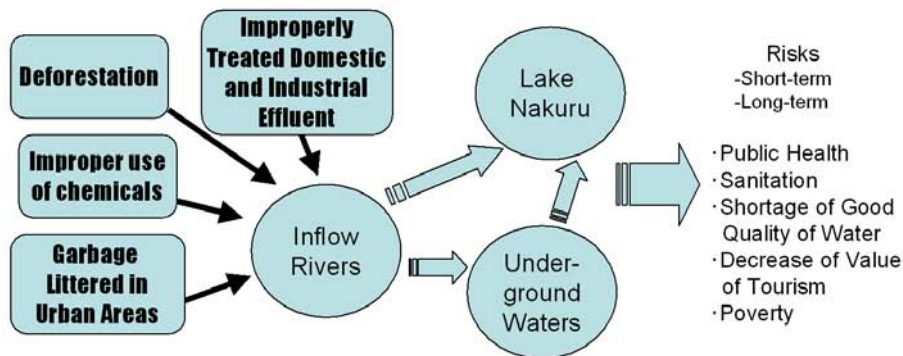
- Several initiatives have been taken by MCN, KWS and MWRD.
- "Will" seems to be getting gradually stronger

- Establishment of the Department of the Environment
- Lake water monitoring supported by KWS
- Pollution sources monitoring supported by MOWRD
- Several research and studies carried out by universities
- Environmental education, public awareness
- Watershed management analysis using satellite images

- The capacities in various institute, NGOs etc. have been mobilized to some extent.
- Collaborations of MCN with related agencies, institutes and NGOs have been made to some extent in some areas.

- Limited utilization of available data has been made.
- Much more efforts might be made to create data of environment science which support environmental management at MCN and enhance the awareness of stakeholders.
- Much more collaboration of concerned institutes, NGOs etc. might be needed.

Lake Nakuru does not exist in isolation. It is under the pressures of socio-economic activities in catchment area and expansion of urban activities.

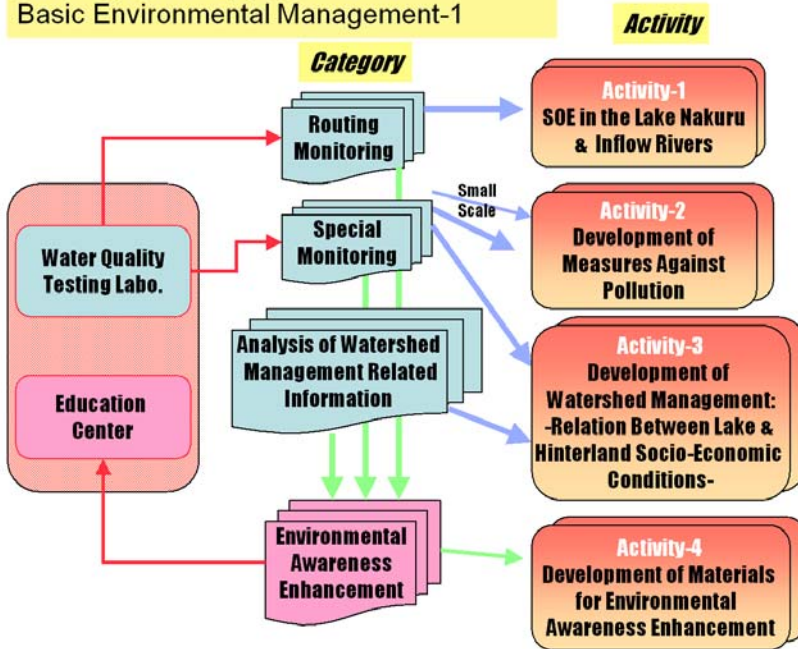


□ Lake Nakuru, if properly managed, provides a good base for sustainable development of Nakuru city and Nakuru region.

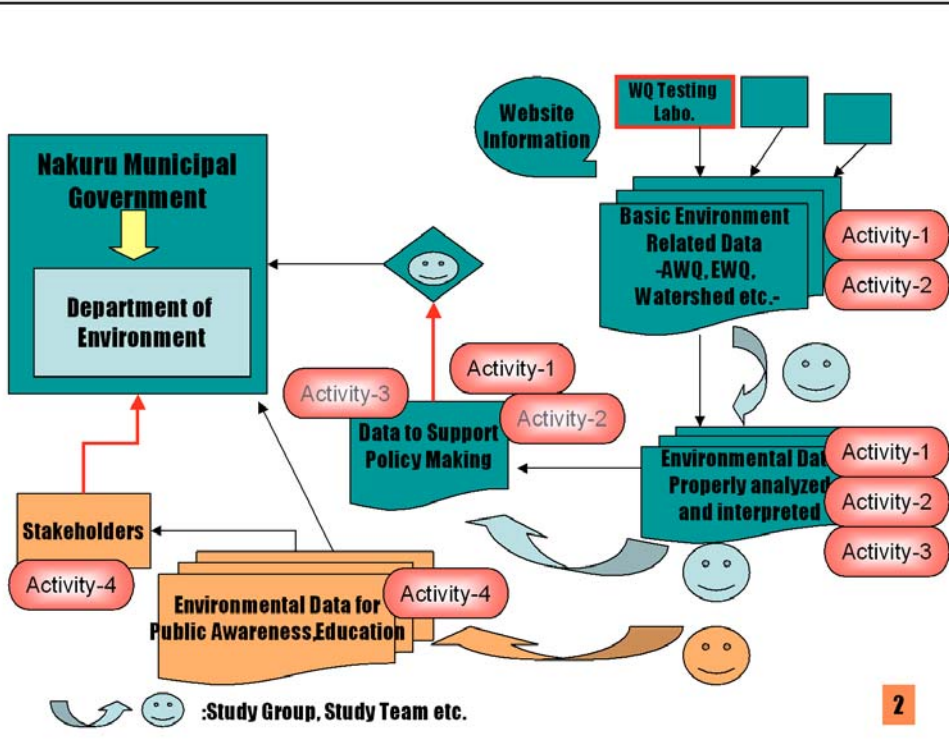
□ Citizens, farmers, industrial companies etc. in Nakuru region could share the benefit from the good management of water environment including lake Nakuru.

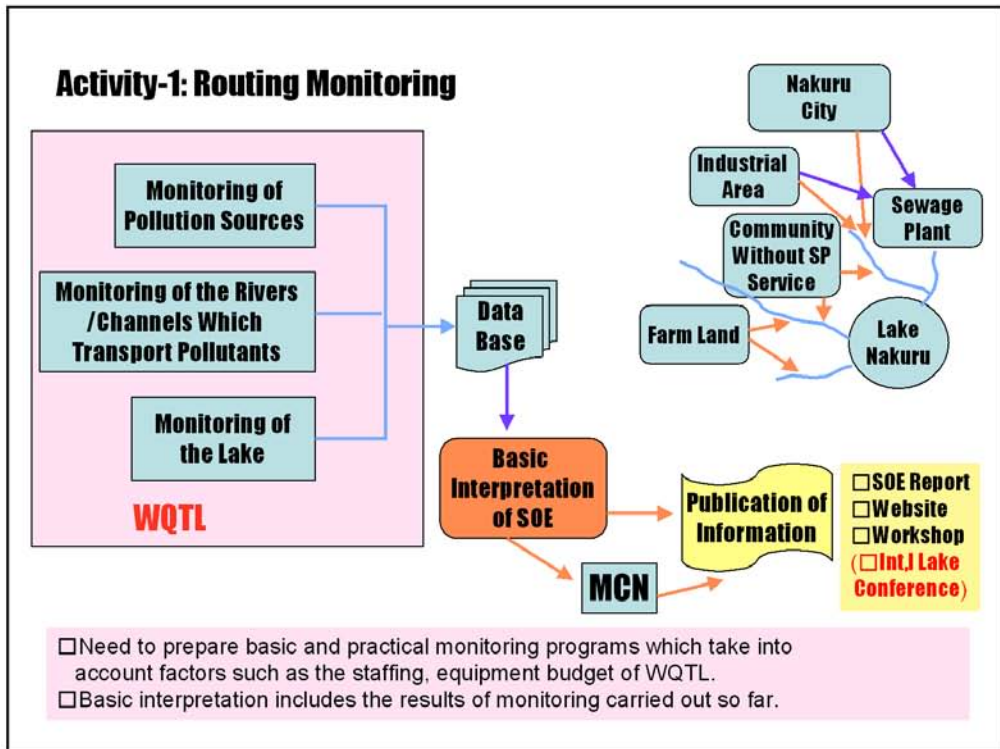
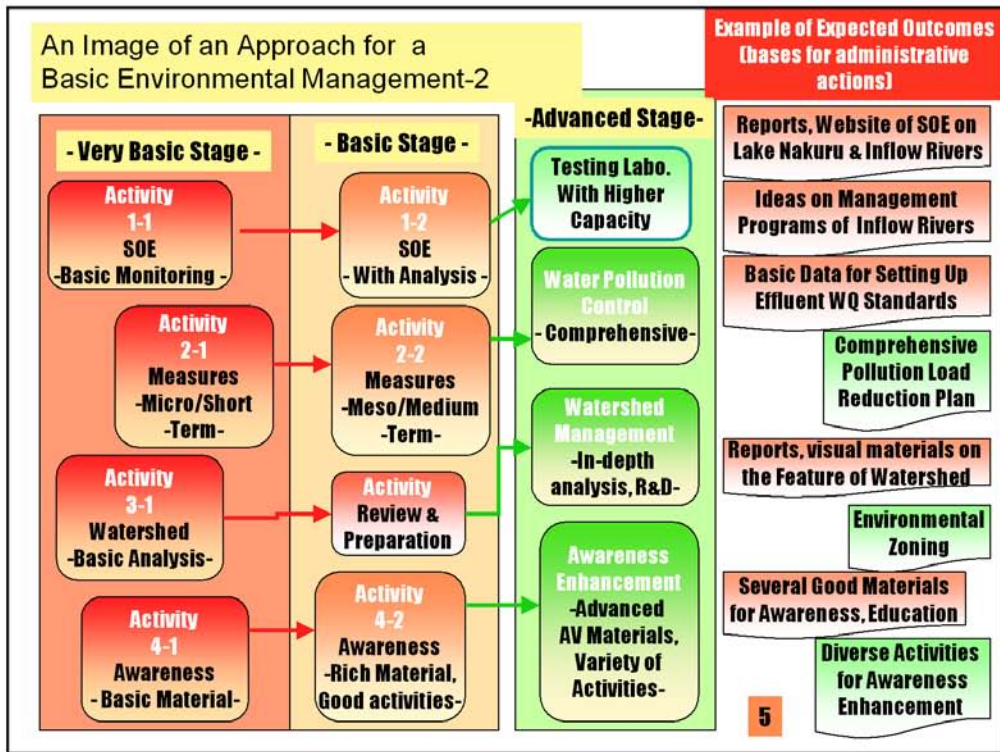
□ Without proper environmental management, various risks will emerge and root out the sound base for people's life.

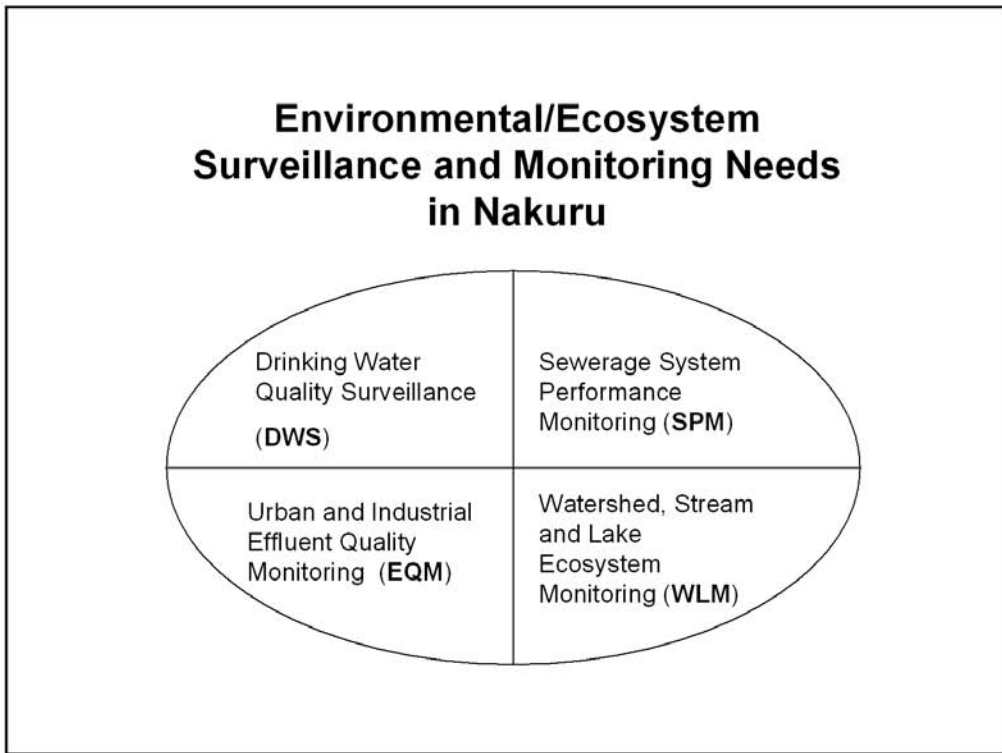
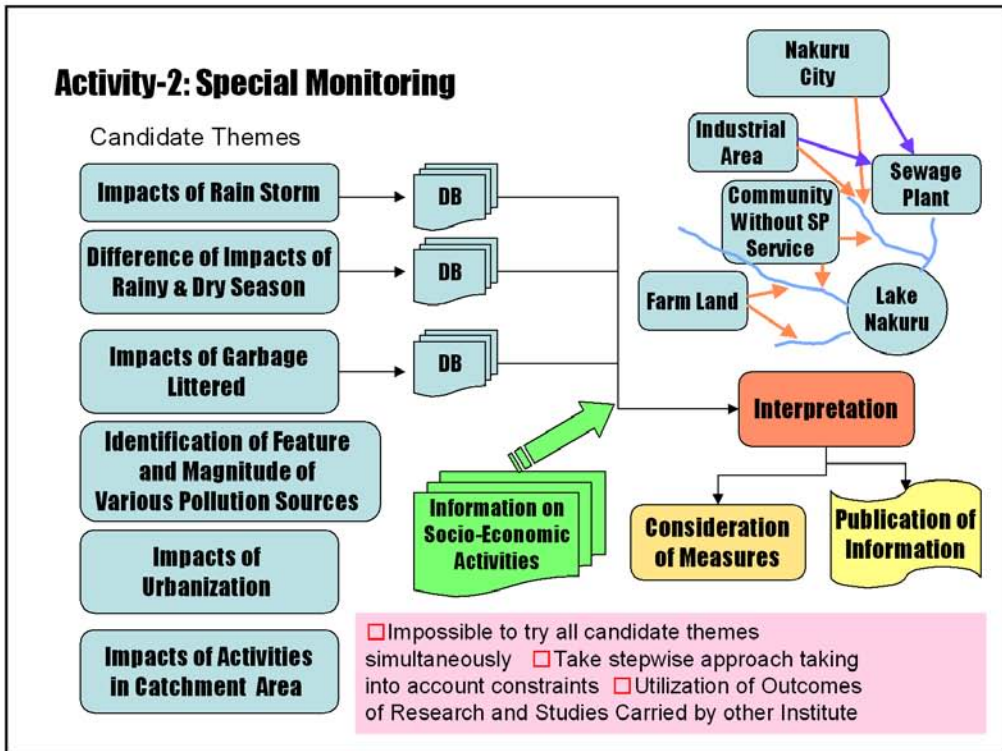
An Image of an Approach for a Basic Environmental Management-1



Nakuru Municipal Government

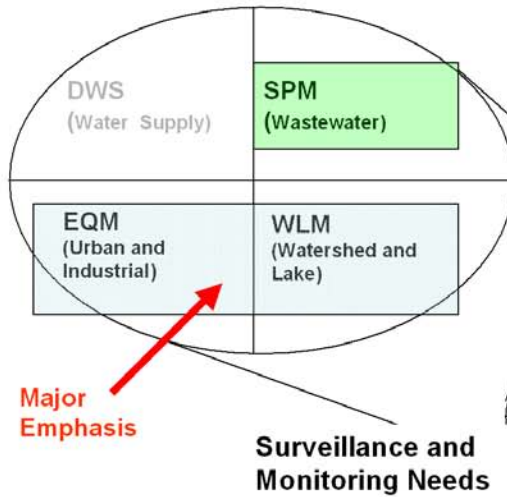






Role, capacity, focus and impact

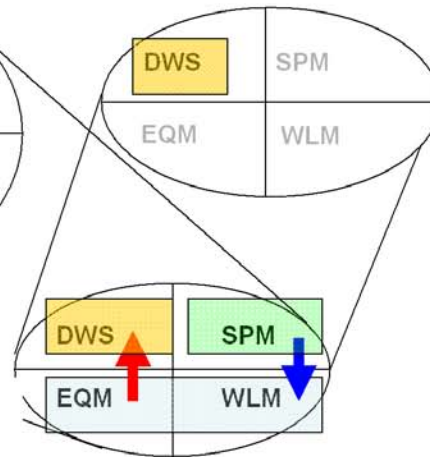
Water Quality Testing Lab.



Major
Emphasis

Surveillance and
Monitoring Needs

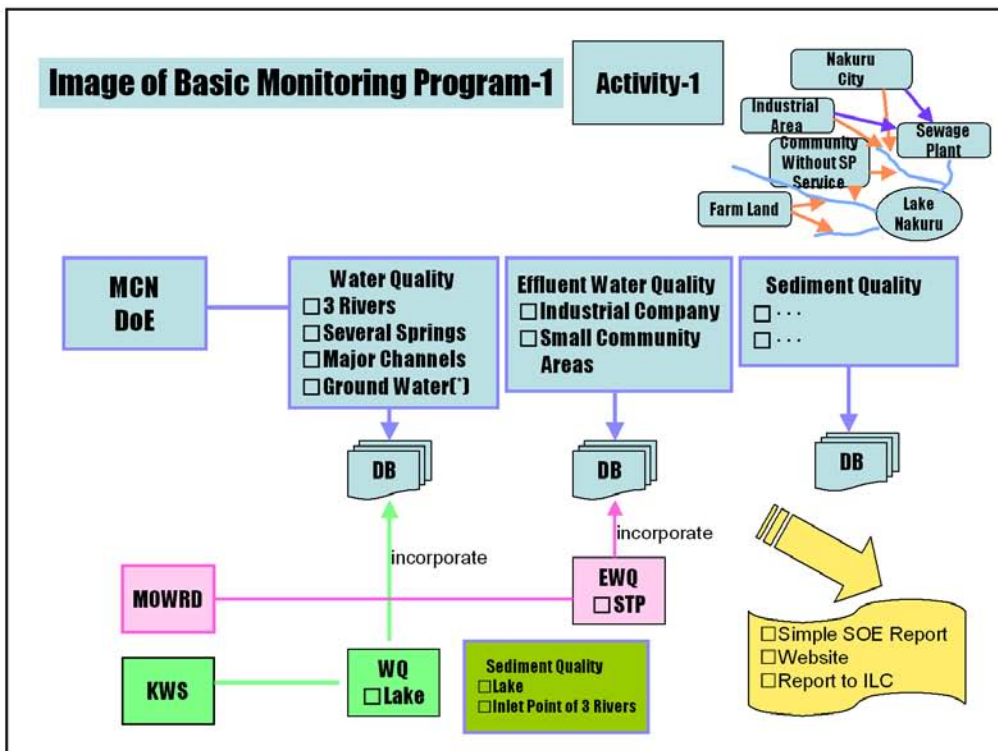
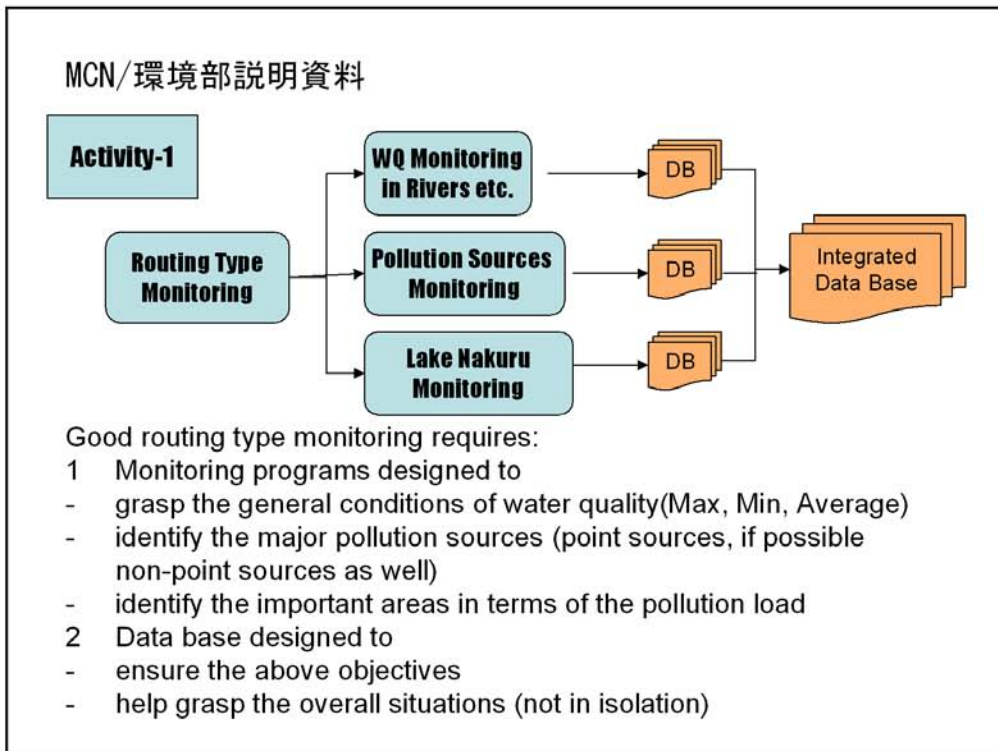
Water Supply Company

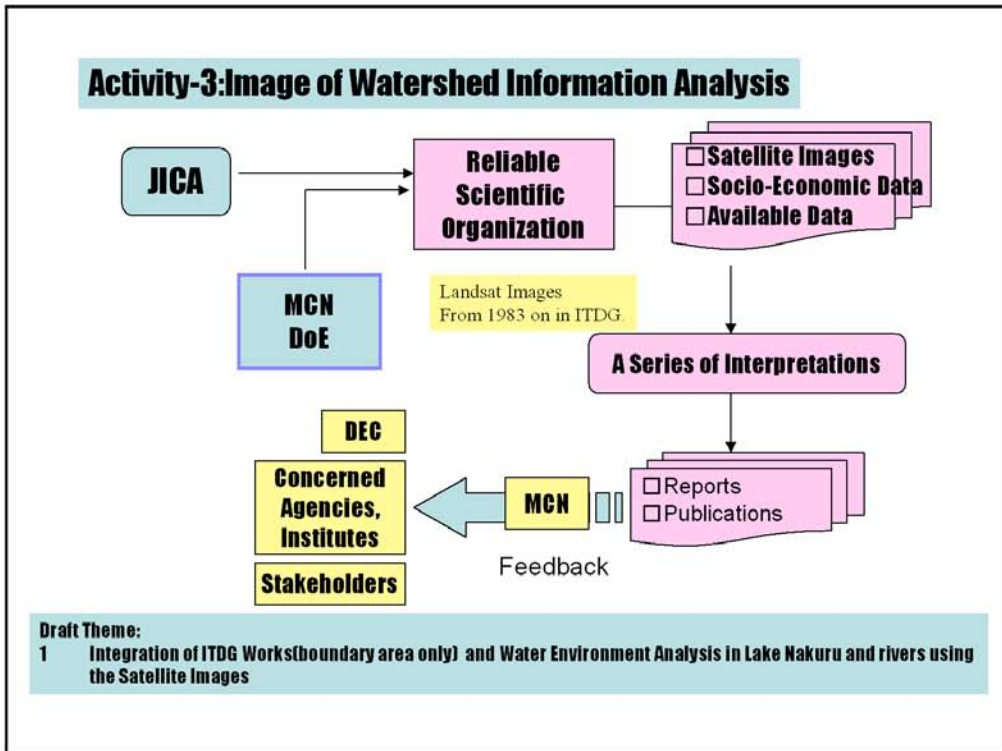
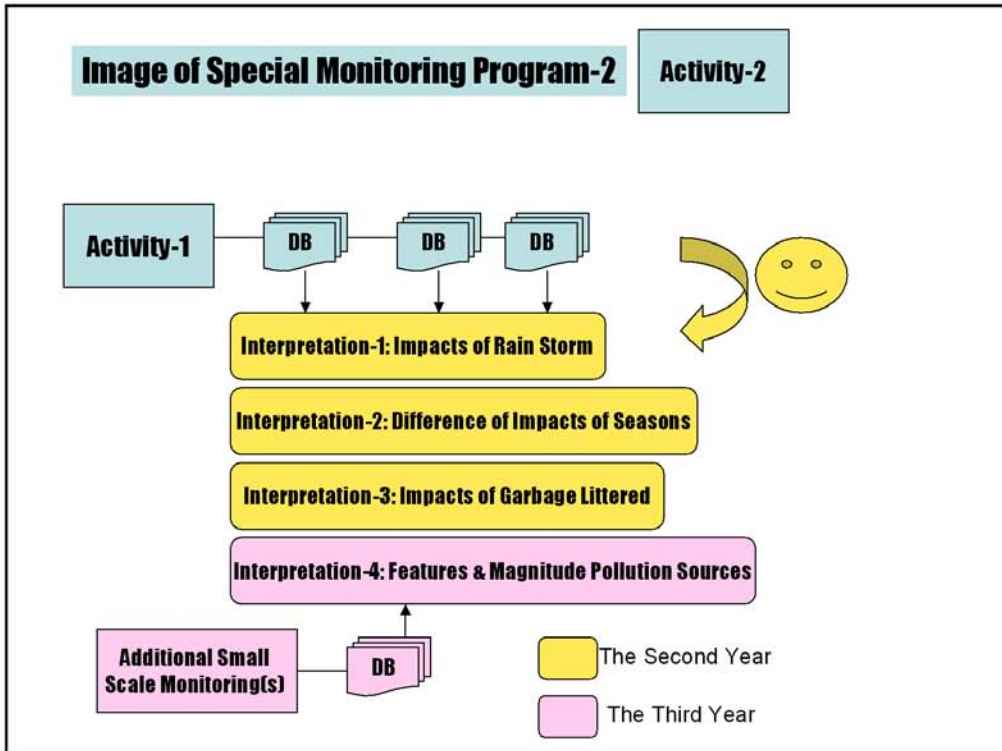


The JICA Mission's Objectives

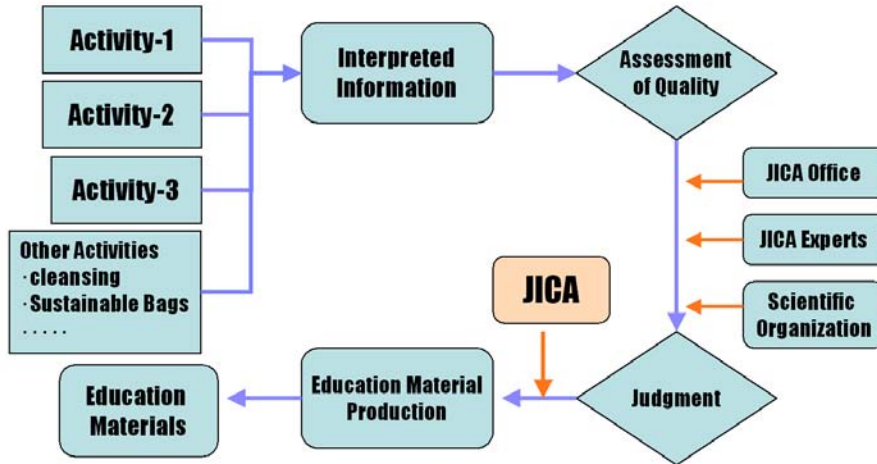
- 1 to analyze the performance & progress made so far
- 2 to analyze the several points described in " Environmental Administration Needs Several Supports-2"
- 3 to identify the real needs (appropriate activities) worth considering assistance
- 4 to meet the groups, institutions etc. which will play a role in bridging the administration and environmental science
- 5 to try to make an analysis in an integrated manner based on the results of above 1 to 4

4-2 MCN/DOE (ナクル市環境部) 説明資料 (4/7)





Activity-4: Image of Material Production for Public Awareness



Note: Activity-4 will take place at later stage of this cooperation program or after the completion of this cooperation program.

5. エガートン大学からの説明資料

5 エガートン大学によるンジョロ川流域管理に係る研究 (4/7)

作成 : William A. Shivoga, PhD
Department of Environmental Science
Egerton University

以下説明資料 (PPT) からの抜粋

Multidisciplinary Research for Sustainable Management of Rural Watersheds: Rehabilitation of River Njoro Watershed, Kenya

Egerton & Moi Universities, Dep't of Fisheries, Kenya Wildlife Service, UC-Davis, Utah State Univ., Univ. of Wyoming



Project Background

- **Kenya-Driven Project**
 - Country-PI's and Stakeholders are the driving force
- **Integrative solutions**
 - Expertise in various disciplines
 - Expertise among stakeholders
 - Traditional knowledge & expertise
- **Watershed Approach**
 - Composite effect of environmental relationships at a watershed scale
- **Funding**
 - Jointly funded by Kenyan Institutions and Global Livestock & Pond Dynamics CRSPs of USAID



Long-Term Goal Statement

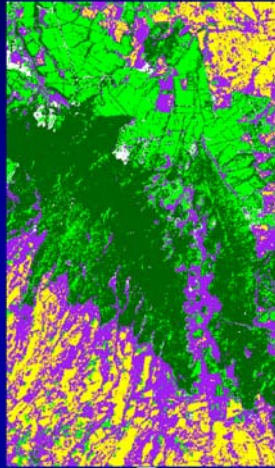
Multidisciplinary approach to develop and demonstrate improved and integrated sustainable management of River Njoro watershed resources **through stakeholder participation at the watershed scale**

Phase One Project (Year 1)

“Problem Model Assessment and Capacity Building”

- **Stakeholder involvement and capacity building among stakeholders in the watershed**
 - Consensus building workshops, meetings/barasas
 - PRA Training
 - Exchange visits
- **Capacity Building at Egerton, Moi, Fisheries, KWS**
 - Physical, human, institutional
 - Regional center of excellence in spatial analysis and watershed characterization in support of sustainable management
 - The project is currently training 11 MSc and 1 PhD students
- **Problem Model Assessment**
 - Initiating research project
 - Support of proposal for long-term research goals

Land Use Change in Eastern Mau

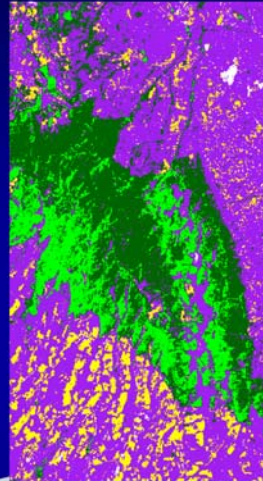


1986 Classified Landsat Image

Land Cover Class

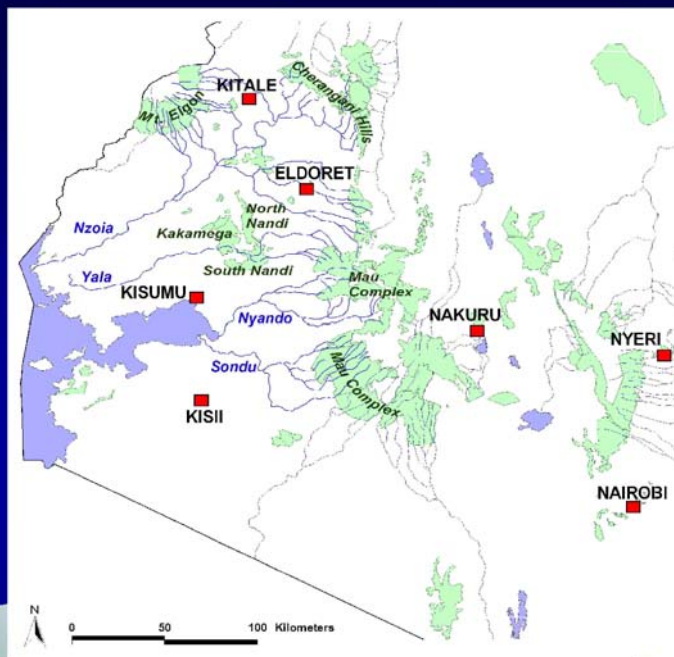
- Agriculture (Large scale)
- Bare Ground
- Mixed Small Scale Farms /pasture
- Indigenous Forest
- Plantation Forest

(Baldga *et al.*, 2004)



2003 Classified Landsat Image

Western Kenya: Rivers & Forests



Legend

- Rivers
- Forest reserves
- Main urban centres
- Lakes
- International boundaries

6. クエスチョニア回答(WQTL)

6 クエスチョニア回答
6-1 WQTL からの回答 (クレッチオ氏作成)

**Questionnaire Concerning Water Quality Monitoring
for the Water Quality Testing Laboratory (WQTL)
Managed by MENR, KWS and MCN**

Reply from WQTL Mr. Klecho

Introduction to the questionnaire

The main aim of this Questionnaire is to get relevant and the latest information for:

1. Confirming the possibility for water quality analysis on the view of management, organization and facilities in your Laboratory.
2. Grasping the degree of water quality in Nakuru basin.

Please provide us with the following data:

1. Monitoring Plan

- a. Do you undertake activities concerning water quality analysis in your Organization
 Yes No (If you answer yes, please mark the appropriate option)
 Lake Nakuru Njoro, Makalia or other rivers Drainage,
 Potable water Discharged water from sewage
 Discharged water from factory Effluent from dumping site
- b. Do you have any specific monitoring plan for water quality?
 Yes No (If you answer yes, please explain:) Following proposed in SAPS report. See SAPS report
Please provide the monitoring plan in detail: Frequency, parameters, survey points map
- c. Please provide us with the latest monitoring data on the categories marked in question "a" above.

*As we possess the latest report of the Special Assistance For Project Sustainability For Greater Nakuru Water Supply Project in Kenya (SAPS-2) of May 2002, please provide us with any data or information that you may have after such date.

2. Management and Organization

- a. How many personnel work in your Organization? Please complete the following list.

| ROLE | POSITION | NAME | QUALIFICATION (EDUCATION and TRAINING) |
|----------------|---------------------|----------------|--|
| ADMINISTRATOR | | | |
| ANALYST | MCM Technologist | Andrew KULECHO | Advanced Level of Education Higher Diploma Analytical Chemistry |
| | MCM Technologist | Ngatia WAWERU | Advanced Level of Education Higher Diploma Biology |
| ASSISTANT | MCM | Cyrus NYAKAWAI | Ordinary Level of Education Diploma Chemistry |
| RABORER/TYPIST | MCM laborer | Agnes MUTHONI | Ordinary Level of Education and Typist level |
| CLEANER | MCM Cleaner | Aggrey MRULOLO | Ordinary Level of Education and Laborer level |
| TOTAL NUMBER | | | |

* According to a September 2003 report provided to us by a JICA' environmental

Expert, we consider that the number of personnel working at WQTL is 9 people, with 5 analysts and 4 assistants.

- b. What is the annual budget to execute your activities? Please complete the following list.

| No. | ITEM | BUDGET | NOTE |
|-----|----------------------|--------|------|
| | | | |
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| | See attachment files | | |
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* We have an estimate sheet for WQTL (August 2003) with an approximate estimation of about KSH 6,400,000.

3. Facilities for Water Analysis

- a. Please provide us with your water analytical instruments, equipment and manuals in a list with the following information:

| No. | INSTRUMENTS or EQUIPMENT | PURPOSE of USE (PARAMETER) | CONDITIONS and REQUIRED SERVICE | MANUAL (WITH or WITHOUT) |
|-----|--------------------------|----------------------------|---------------------------------|--------------------------|
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* As we are aware of the latest report on facilities' conditions pertaining to the "Summary Report on the Nakuru WQTL Interim Management Committee Meeting of August 2003,"

please provide us with any data or information that you may have after such data.

b. Frequency of calibration for instruments. Please complete the following list:

| No. | INSTRUMENTS | FREQUENCY of CALIBRATION | CONDITIONS | MANUAL (WITH or WITHOUT) |
|-----|--------------------------|--------------------------|------------|--------------------------|
| 1 | Portable pH Meters | Before every Sampling | No sensors | With |
| 2 | Portable ORP Meters | Before every Sampling | No sensors | With |
| 3 | Conductivity Meters | Before every Sampling | Good | With |
| 4 | Oxygen Meters | Before every Sampling | Good | With |
| 5 | Spectrophotometers | Before every Sampling | Good | With |
| 6 | Spectrophotometers U-200 | Before every Sampling | Bad | |
| | | | | |
| | | | | |

NOTE: Please feel free to make a photocopy of this template if you do not have enough space.

c. Do you gather and process the water quality data?

Yes No (If you answer yes, please mark the appropriate option)

Database system by application software Print binding

Any other method (key in computer, spread sheet and provide to management on request.)

If you possess a data base system, please provide us with information on the said data and data base system.

d. Do you publish any activity report?

Yes No (If you mark yes, please provide the following information)

Frequency : _____ a year, Any other information (data provide on request.)

If you have published any report, please submit it to us.

e. Please mention your problems and issues concerning your activities

-Transport- Major problem

-Management- No keen interest in water quality surveillance –no support.

-No proper co-ordination administratively-staff seem to be nobody given the current situation.

MOU between major institutional essential if not the lab to revert to one institution.

These are all our questions.

We have a plan to upgrade the organization and facilities of the WQTL. We would like to undertake a next step analysis based on your answers to this questionnaire. We would appreciate very sincerely your collaboration in replying to us as soon as possible, no later than a week.

We sincerely thank you for your kindest and most generous cooperation and support.

JICA

Attachment Files

■ Other opinions from Mr. Klecho

1. Monitoring plan

- a) Yes, we undertake activities concerning water quality analysis.
 - We are expected to undertake all the listed activities but due to institution framework problems such as
 - Collaborative management, unsigned MOU, lab ownership dispute etc – it is difficult to accomplish the tasks.
 - Kenya Wildlife Services have facilitated lake water quality and that of its influent streams; including discharge from town sewage treatment works.
 - Ministry of water development – undertake potable water analysis from their provincial laboratory.
 - Discharge from factory and effluent from dumping site have not been monitored since 2000.
- b) No. we don't have any specific monitoring plan for the laboratory under the current management. Each institution, i.e. KWS, ministry of water and Nawass cater for own activity based on own plan.
- c) See attached data.

2. a) We are supposed to be 9 though only the 5 MCN staff report at the WQTL. The 4 technologists/analysts from the ministry, report at their provincial lab.

b) The annual budget based on the SAPS report is Ksh. 6,400,000. This should be sufficient. However, if the scope of activities are to remain the same as before it would be as follows:

| | Kshs. |
|-----------------------|-----------|
| Transport | 250,000 |
| Chemicals | 220,000 |
| Equipment maintenance | 121,965 |
| Telephone | |
| Electricity | 400,000 |
| Building maintenance | 200,000 |
| Glassware replacement | 50,000 |
| Cleaning materials | 13,000 |
| Stationary | 12,000 |
| Total | 1,267,965 |

3(a) See attached list of equipment.

b) Each of the named equipment in 3(a) is calibrated before use.

c) d and e – see questionnaire

WATER QUALITY TESTING LABORATORY- QUIPMENTSTATUS

| No. | EQUIPMENT | MODEL | MANUFATURER | QUANTITY | CONDITION |
|-----|---|-------------------------------|--------------------------|----------|------------------------------------|
| 1. | Low temperature incubator | IN 800 | Yamato scientific | 1 unit | Good |
| 2. | Drying oven | DH62 | -ditto- | 1 unit | Good |
| 3. | Laboratory furnace | FP 32-2 | -ditto- | 1 unit | Good |
| 4. | Water bath | BK-53 | -ditto- | 1 unit | Good |
| 5. | Aspirator | WP25 | -ditto- | 1 unit | Good |
| 6. | Air pump | PD 25 | -ditto- | 1 unit | Good |
| 7. | Air pump | PD-102 | -ditto- | 1 unit | Good |
| 8. | Centrifuge | CR 502 | - ditto- | 1 unit | Good |
| 9. | Spectrophotometer | U-2000 | -ditto- | 1 unit | Good |
| 10. | Atomic Absorption/Flame spectrophotometer | Z-6100 | -ditto- | 1 unit | Power source blown |
| 11. | Microscope | BX 50-3200+BV-PHD-H11 | Olympus optical co. Ltd. | 1 unit | Good |
| 12. | Laboratory PH/ORP meter | 44701-00+AOL-10 | HACH | 1 unit | No probe electrolyte |
| 13. | Plankton counter | MC-707P | Tokyo M.I.CO; inc. | 1 unit | Good |
| 14. | Balance | AG 204 | Mettler-Toledo AG | 1 unit | Good |
| 15. | Balance | PB 3002DR | -ditto- | 1 unit | Good |
| 16. | Balance | AG 204 | -ditto- | 1 unit | Good |
| 17. | Autoclave | SM 32 | Yamato scientific | 1 unit | Good |
| 18. | COD reflux apparatus | HC-407 DY TYPE | Central kagaku corp. | 1 unit | New electrodes required |
| 19. | Current meter | Hiroi electronic type | -ditto- | | |
| 20. | TKN reflux apparatus | (a). DR 3000 (b). Digester | HACH | 1 unit | DR 3000 OK, Digester-out of order. |
| 21. | Automatic Sampler | 800SL | Central Kagaku | 2 units | Good |
| 22. | Portable DO meter | UC-12 | -ditto- | 1 unit | Sensor expired |
| 23. | Portable PH meter | UC-23 | -ditto- | 1 unit | -ditto- |
| 24. | Portable ORP meter | UC-23 | -ditto- | 1 unit | -ditto- |
| 25. | Portable conductivity meter | UC-35 | -ditto- | 1 unit | -ditto- |

WORK PERFORMANCE EVALUATION CHARTS

| | Rivers | L. Nakuru | Factory effluents | Njoro sewage plant | Town sewage plant | Portable water | Other Lakes |
|---------------|----------------|------------------|--------------------------|---------------------------|--------------------------|-----------------------|--------------------|
| | P T S | P T S | P T S | P T S | P T S | P T S | P T S |
| 2002 | | | | | | | |
| Jan | 5 0 0 | 11 0 0 | 18 0 0 | 2 0 0 | 9 0 0 | 16 0 0 | 9 0 0 |
| Feb | 5 1 5 | 11 1 8 | 18 0 0 | 2 0 0 | 9 0 0 | 16 0 0 | 0 0 0 |
| Mar | 5 1 4 | 11 1 7 | 18 0 0 | 2 0 0 | 9 0 0 | 16 0 0 | 0 0 0 |
| Apr | 5 1 5 | 11 1 22 | 18 0 0 | 2 0 0 | 9 0 0 | 16 0 0 | 0 0 0 |
| May | 5 0 0 | 11 1 20 | 18 0 0 | 2 0 0 | 9 1 9 | 16 1 10 | 0 0 0 |
| Jun | 5 0 0 | 11 1 22 | 18 0 0 | 2 0 0 | 9 0 0 | 16 0 0 | 0 0 0 |
| Jul | 5 1 5 | 11 1 11 | 18 0 0 | 2 0 0 | 9 0 0 | 16 0 0 | 0 0 0 |
| Aug | 5 1 5 | 11 1 11 | 18 0 0 | 2 0 0 | 9 0 0 | 16 0 0 | 0 0 0 |
| Sep | 5 0 0 | 11 0 0 | 18 0 0 | 2 0 0 | 9 0 0 | 16 1 0 | 0 0 0 |
| Oct | 5 1 2 | 11 1 1 | 18 0 0 | 2 0 0 | 9 1 9 | 16 0 0 | 9 1 0 |
| Nov | 5 1 2 | 11 1 22 | 18 0 0 | 2 0 0 | 9 0 0 | 16 0 0 | 0 0 0 |
| Dec | 5 0 0 | 11 0 0 | 18 0 0 | 2 0 0 | 9 0 0 | 16 0 0 | 0 0 0 |
| Totals | 60 7 28 | 132 9 134 | 216 0 0 | 24 0 0 | 108 2 18 | 192 2 20 | 18 1 11 |
| 2003 | | | | | | | |
| Jan | 5 0 0 | 11 0 0 | 18 0 0 | 2 0 0 | 2 2 18 | 16 0 0 | 0 0 0 |
| Feb | 5 0 0 | 11 0 0 | 18 0 0 | 2 0 0 | 2 0 0 | 16 0 0 | 0 0 0 |
| Mar | 5 1 0 | 11 0 14 | 18 0 0 | 2 0 0 | 2 0 0 | 16 0 0 | 22 1 26 |
| Apr | 5 0 0 | 11 0 0 | 18 0 0 | 2 0 0 | 2 0 0 | 16 1 0 | 0 0 0 |
| May | 5 1 0 | 11 0 16 | 18 0 0 | 2 0 0 | 2 0 0 | 16 0 0 | 0 0 0 |
| Jun | 5 0 0 | 11 0 0 | 18 0 0 | 2 2 18 | 2 2 18 | 16 0 0 | 0 0 0 |
| Jul | 5 1 3 | 11 1 24 | 18 0 0 | 2 2 18 | 2 2 18 | 16 0 0 | 0 0 0 |
| Aug | 5 1 26 | 11 1 20 | 18 0 0 | 2 2 18 | 2 2 18 | 16 0 0 | 0 0 0 |
| Sep | 5 0 0 | 11 0 0 | 18 0 0 | 2 2 18 | 2 2 18 | 16 0 0 | 0 0 0 |
| Oct | 5 0 0 | 11 0 0 | 18 0 0 | 2 2 18 | 2 2 18 | 16 1 10 | 0 0 0 |
| Nov | 5 1 31 | 11 1 36 | 18 0 0 | 2 2 18 | 2 2 18 | 16 0 0 | 22 2 18 |
| Dec | 5 1 5 | 11 1 3 | 18 0 0 | 2 2 18 | 2 2 18 | 16 0 0 | 22 1 7 |
| Totals | 60 6 65 | 6 93 96 | 216 0 0 | 24 0 0 | 23 16 144 | 192 2 10 | 66 4 61 |
| 2004 | | | | | | | |
| Jan | 5 1 3 | 11 1 14 | 18 0 0 | 2 2 18 | 2 2 18 | 16 0 0 | 4 1 4 |
| Feb | 5 0 0 | 11 0 0 | 18 0 0 | 2 2 18 | 2 1 9 | 16 0 0 | 4 0 0 |
| Mar | 5 1 4 | 11 1 19 | 18 0 0 | 2 0 0 | 2 0 0 | 16 0 0 | 4 1 4 |
| Apr | | | | | | | |
| May | | | | | | | |
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| Aug | | | | | | | |
| Sep | | | | | | | |
| Oct | | | | | | | |
| Nov | | | | | | | |
| Dec | | | | | | | |
| Totals | 15 2 7 | 33 2 33 | 54 0 0 | 6 4 36 | 6 3 27 | 42 0 0 | 12 2 8 |

INFLUENT STREAMS – WATER QUALITY DATA – NOVEMBER 2003

| Stream | Temp °C | PH | Flow m ³ /day | Cond. ms/cm | NH3-N | NO2-N Mg/l | NO3-N Mg/l | TKN mg/l | TN mg/l |
|------------------|---------|------|--------------------------|-------------|-------|------------|------------|----------|---------|
| R. Njoro | 18.9 | 6.78 | 25873 | 0.26 | 0.13 | 0.020 | 0.130 | 1.36 | 1.51 |
| R. Makalia | 23.7 | 7.97 | 540 | 0.27 | 0.27 | 0.044 | 0.176 | 2.25 | 2.47 |
| R. Nderit | 26.6 | 9.19 | 2566 | 0.84 | 0.26 | 0.024 | 0.146 | 1.56 | 1.73 |
| Baharini springs | 28.3 | 9.18 | 4380 | 0.56 | 0.02 | 0.036 | 0.324 | 0.79 | 1.15 |
| Sewage Drain | 22.7 | 9.1 | 7983 | 0.77 | 0.15 | 0.236 | 0.094 | 4.68 | 5.01 |

| Stream | BOD Mg/l | Alk. mg/l | OP mg/l | TP Mg/l | TDS, mg/l | TSS mg/l |
|-----------------|----------|-----------|---------|---------|-----------|----------|
| R.Njoro | 28.4 | 20 | 0.248 | 0.260 | 0.13 | 46 |
| R. Makalia | 45.0 | 30 | 0.300 | 0.405 | 0.13 | 109 |
| R. Nderit | 18.4 | 240 | 0.200 | 0.392 | 1.54 | 104 |
| Baharin Springs | 9.6 | 64 | 0.150 | 0.392 | 0.28 | 0 |
| Sewage Drain | 53.2 | 60 | 4.972 | 5.565 | 0.38 | 16 |

LAKE ELMENTAITA WATER QUALITY DATA – NOVEMBER 2003

| SITE | Temp, °C | PH | Secchi depth, cm | Total depth, m | Sample depth, m | Cond., ms/cm | Sal., mg/l | D.O, mg/l | OP, mg/l | TP, mg/l |
|-------------|----------|-------|------------------|----------------|-----------------|--------------|------------|-----------|----------|----------|
| Del.Camp. | 21.4 | 10.15 | 25 | 0.5 | 0.25 | 27.51 | 15.20 | 9.04 | 0.260 | 0.660 |
| Northwest | 22.8 | 10.01 | - | - | - | 25.80 | 14.00 | - | 0.210 | 0.750 |
| East end | 22.7 | 10.12 | 24 | 0.47 | 0.24 | 20.34 | 10.00 | 6.86 | 0.340 | 0.940 |
| Southeast | 34.6 | - | - | - | 0.0 | 3.64 | 1.30 | - | 0.220 | 0.830 |
| Hot springs | 41.6 | - | - | - | 0.0 | 1.07 | 0.00 | - | 0.640 | 1.845 |

| SITE | NH3-N, mg/l | NO2-N, mg/l | NO3-N, mg/l | TKN, mg/l | TN, mg/l | TDS, g/l | TSS, mg/l | DRY WT, mg/l | Chl'a', mg/m ³ | Alk, g/l |
|-------------|-------------|-------------|-------------|-----------|----------|----------|-----------|--------------|---------------------------|----------|
| Northwest | 0.09 | 0.150 | 0.035 | 2.82 | 2.92 | 12.87 | 62 | 140 | 272 | 6.25 |
| East end | 0.10 | 0.020 | 0.080 | 5.22 | 5.27 | 10.20 | 68 | 10.89 | 101 | 7.00 |
| Southeast | 0.12 | 0.012 | 0.088 | - | - | 5.58 | 46 | - | - | 3.15 |
| Hot springs | 0.02 | 0.015 | 0.020 | - | - | 1.82 | 5 | - | - | - |
| Del.Camp | 0.08 | 0.040 | 0.060 | 1.03 | 1.23 | 13.68 | 53 | 155 | 155 | 7.5 |

LAKE LEVEL=1.3 m

PLANTON COMPOSITION AND DENSITY

| SITE | Microcystis, colonies/ml | Spirulina minor, compressed coils/ml | Spirulina major stretched coils/ml | Anabaena, coils/ml | Rotifers, units/ml |
|------------|--------------------------|--------------------------------------|------------------------------------|--------------------|--------------------|
| Del. Camp. | 112 | 393 | 281 | 618 | 0 |
| Northwest | 225 | 0 | 1798 | 562 | 167 |
| Eastend | 169 | 0 | 731 | 112 | 337 |

LAKE BOGORIA WATER QUALITY DATA – NOVEMBER 2003

| SITE | Temp, °C | PH | Secchi depth, cm | Total depth, m | Sample depth, m | Cond, ms/cm | Alk, g/l | Sal, g/l | DO, mg/l | OP, mg/l | TP, mg/l | NH3-N, mg/l |
|-------|----------|-------|------------------|----------------|-----------------|-------------|----------|----------|----------|----------|----------|-------------|
| NB | 28.5 | 10.09 | 20 | 0.86 | 0 | 94.3 | 37.50 | 81.20 | 4.23 | 5.12 | 9.375 | 0.010 |
| NB | 26.3 | 10.10 | 25 | 1.0 | 0 | 93.00 | 41.25 | 82.0 | 10.50 | 6.83 | 8.090 | 0.030 |
| HS/CB | 31.2 | 10.01 | 33 | 1.0 | 0 | 82.00 | 37.24 | 68.1 | 4.61 | 4.58 | 4.610 | 0.010 |
| AC/SB | 27.6 | 9.98 | 28 | 0.71 | 0 | 83.00 | 39.75 | 68.0 | 17.4 | 5.84 | 6.830 | 0.040 |
| FG/SB | 29.4 | 9.95 | 38 | 0.47 | 0 | 85.15 | 44.50 | 71.0 | 29.1 | 4.75 | 7.615 | 0.020 |

| SITE | NO2-N, mg/l | NO3-N, mg/l | TDS, g/l | TSS, mg/l | TKN, mg/l | TN, mg/l | DRY WT, mg/l | Chl 'a' |
|-------|-------------|-------------|----------|-----------|-----------|----------|--------------|---------|
| NB | 0.010 | 0.015 | 47.15 | 56 | 4.020 | 4.025 | 335 | 211 |
| NB | 0.020 | 0.005 | 46.35 | 35 | 8.130 | 1.055 | 1353 | 221 |
| HS/CB | 0.025 | 0.025 | 39.65 | 40 | 8.420 | 2.270 | 288 | 126 |
| AC/SB | 0.025 | 0.025 | 40.95 | 51 | 13.860 | 6.465 | 395 | 207 |
| FG/SB | 0.025 | 0.000 | 42.70 | 29 | 11.12 | 1.650 | 283 | 166 |

PLANKTON COMPOSITION AND DENSITY

| SITE | Microcystis, colonies/ml | Spirulina minor, compressed coils/ml. | Spirulina Major, stretched coils/ml. | Anabaena Colonies/ml | Rotifers Units/ml |
|-------|--------------------------|---------------------------------------|--------------------------------------|----------------------|-------------------|
| NB | 0 | 1574 | 1012 | 618 | 0 |
| NB | 0 | 731 | 787 | 618 | 0 |
| HS/SB | 169 | 0 | 1068 | 0 | 0 |
| AC/CB | 0.6 | 506 | 899 | 4.6 | 0 |
| FG/SB | 337 | 1124 | 674 | 955 | 0 |

LAKE NAKURU WATER QUALITY DATA – November, 2003

| SITE | Temp, °C | pH | Secchi depth, cm | Total depth, m | Sample depth, m | Cond., ms/cm | Alk, g/l | Sal., g/l | DO, mg/l | OP, mg/l | TP, mg/l | NH3-N, mg/l |
|----------|----------|-------|------------------|----------------|-----------------|--------------|----------|-----------|----------|----------|----------|-------------|
| MON | 28.7 | 10.6 | 25 | 0.44 | 0 | 25.25 | 9.50 | 13.20 | 38.8 | 1.204 | 3.225 | 0.07 |
| DR | 29.1 | 10.6 | 20 | 0.61 | 0 | 31.50 | 12.00 | 17.50 | 33.4 | 1.156 | 3.575 | 0.07 |
| MP | 26.0 | 10.5 | 35 | 0.61 | 0 | 32.02 | 11.66 | 18.30 | 29.4 | 1.144 | 3.250 | 0.02 |
| PP | 25.7 | 10.3 | 28 | 0.59 | 0 | 34.40 | 14.50 | 20.60 | 32.6 | 1.124 | 3.505 | 0.08 |
| BT M & N | 25.1 | 10.4 | 18 | 0.54 | 0 | 31.55 | 11.50 | 17.50 | 34.4 | 0.664 | 3.685 | 0.05 |
| MOM | 26.3 | 10.5 | 12 | 0.56 | 0 | 32.45 | 11.25 | 18.80 | 30.5 | 0.784 | 3.925 | 0.09 |
| MOND | 21.4 | 10.3 | 20 | 0.58 | 0 | 34.25 | 12.25 | 20.20 | 44.6 | 1.208 | 1.285 | 0.05 |
| NYATI | 29.1 | 10.83 | 30 | 0.74 | 0 | 29.75 | 12.25 | 16.30 | 21.7 | 1.056 | 3.815 | 0.05 |

| SITE | NO2-N, mg/l | NO3-N, mg/l | TKN, mg/l | TN, mg/l | TSS, mg/l | TDS, g/l | DRY WT, mg/l | CHL 'a' mg/m ³ |
|--------|-------------|-------------|-----------|----------|-----------|----------|--------------|---------------------------|
| MON | 0.012 | 0.088 | 0.88 | 0.962 | 57 | 4.85 | 130 | 437 |
| DR | 0.016 | - | 3.67 | - | 37 | 13.18 | - | 138 |
| MP | 0.016 | 0.109 | 3.19 | 3.32 | 27 | 13.95 | 45 | 265 |
| PP | 0.012 | 0.138 | 1.40 | 1.54 | 36 | 13.86 | 143 | 506 |
| BT M&N | 0.020 | 0.130 | 2.05 | 2.20 | 81 | 14.20 | 248 | 790 |
| MOM | 0.024 | 0.126 | 1.77 | 1.92 | 90 | 13.60 | 208 | 1390 |
| MOND | 0.032 | 0.068 | 0.95 | 1.95 | 61 | 13.90 | 189 | 506 |
| NYATI | 0.012 | 0.088 | 4.93 | 5.03 | 51 | 13.81 | 118 | 439 |

Lake level=1.8 m

PHYTOPLANKTON COMPOSITION AND DENSITY

| SITE | Chroococcus minutus, colonies/ml | Microcystis aeruginosa, colonies/ml | Spirulina minor, coils/ml | Spirulina major, coils/ml | Anabaena flos-que, coils/ml | Rotifers |
|--------|----------------------------------|-------------------------------------|---------------------------|---------------------------|-----------------------------|----------|
| MOM | 5580 | 450 | 618 | 281 | 562 | 56 |
| PP | 731 | 141 | 609 | 141 | 450 | 0 |
| MON | 94 | 674 | 796 | 225 | 225 | 141 |
| DR | 337 | 506 | 843 | 112 | 112 | 56 |
| MP | 281 | 0 | 506 | 167 | 1237 | 0 |
| BT M&N | 2014 | 0 | 328 | 94 | 281 | 0 |
| NYATI | 1265 | 0 | 1171 | 47 | 187 | 47 |
| MOND | 1486 | 0 | 562 | 0 | 120 | 0 |
| TOTAL | 11716 | 1771 | 5433 | 1067 | 3170 | 300 |

LAKE NAKURU WATER QUALITY DATA – JULY 2003

| SITE | PH | Cond, ms/cm | Sal, g/l | TDS, mg/l | TSS, mg/l | OP, mg/l | TP, mg/l | NO ₂ -N, mg/l | NO ₃ -N, mg/l | Chl 'a' mg/m ³ | Secchi depth, cm | Total depth, m | Temp, °C |
|--------------------|-------|-------------|----------|-----------|-----------|----------|----------|--------------------------|--------------------------|---------------------------|------------------|----------------|----------|
| MON-B | 10.50 | 30.65 | 14.15 | 20.83 | 60 | 1.905 | 4.960 | 0.000 | 0.029 | - | | | |
| MON-T | 10.51 | 30.80 | 14.30 | 19.37 | 140 | 1.875 | 5.420 | 0.012 | 0.14 | 639 | | | |
| MOND-T | 10.52 | 29.94 | 12.44 | 18.30 | 66 | 1.940 | 5.750 | 0.018 | 0.016 | 863 | | | |
| MOND-B | 10.51 | 27.76 | 11.26 | 21.59 | 86 | 2.095 | 5.225 | 0.002 | 0.001 | - | | | |
| JETTY MIDEAST-T | 10.52 | 28.76 | 12.26 | 20.80 | 118 | 2.540 | 6.175 | 0.001 | 0.000 | 960 | | | |
| JETTY EAST SHORE-T | 10.53 | 28.86 | 12.36 | 19.90 | 118 | 2.055 | 5.150 | 0.001 | 0.000 | 1203 | | | |
| BT M&N-B | 10.51 | 29.08 | 12.58 | 20.93 | 98 | 2.045 | 5.765 | 0.000 | 0.083 | 1038 | | | 21.7 |
| BT M&N-T | 10.51 | 29.92 | 13.42 | 21.56 | 106 | 2.665 | 5.990 | 0.018 | 0.070 | - | 20 | 0.85 | 24 |
| MOM-B | 10.50 | 30.10 | 13.60 | 21.65 | 106 | 2.410 | 5.840 | 0.004 | 0.023 | - | | | 22.7 |
| MOM-T | 10.47 | 28.96 | 12.46 | 21.87 | 108 | 2.170 | 5.185 | 0.001 | 0.026 | 1133 | 25 | 0.8 | 24.1 |
| NJORO MID-T | 40.47 | 29.06 | 12.56 | 22.99 | 110 | 2.170 | 5.560 | 0.000 | 0.025 | 537 | | | |
| LSG-T | 10.50 | 28.26 | 11.76 | 19.89 | 150 | 2.375 | 5.105 | 0.002 | 0.033 | 1640 | | | |
| MP-T | 10.49 | 29.10 | 12.90 | 20.37 | 116 | 4.245 | 5.100 | 0.000 | 0.038 | 827 | | | |
| JETTY WEST-T | 10.51 | 29.92 | 9.38 | 25.16 | 144 | 2.835 | 5.640 | 0.004 | 0.016 | 453 | 35 | 1.37 | 22.1 |
| JETTY WEST-B | 10.49 | 25.88 | 12.32 | 21.61 | 140 | 2.575 | 5.760 | 0.000 | 0.083 | - | 34 | 1.50 | 21.0 |
| B/Springs | 8.61 | 0.492 | 0.20 | 8.12 | 8 | 0.425 | 0.830 | 0.50 | 0.249 | | | | |
| R.Nderit | 7.89 | 0.221 | 0.00 | 5.52 | 228 | 0.350 | 0.350 | 0.080 | 0.272 | | | | |
| R. Makalia | 7.86 | 0.122 | 0.00 | 1.48 | 124 | 0.265 | 0.385 | 0.080 | 0.153 | | | | |

PLANKTON COMPOSITION AND DENSITY

| SITE | Spirulina minor, compressed coils/ml | Spirulina major, stretched coils/ml | Microcystis aeruginosa | Anabaena flos-que, coils/ml | Rotifers, units/ml |
|----------------|--------------------------------------|-------------------------------------|------------------------|-----------------------------|--------------------|
| NJORO MID-LAKE | 50 | 1793 | 448 | 149 | 199 |
| MP | 847 | 607 | 149 | 199 | 100 |
| MOND | 200 | 1445 | 249 | 100 | 0 |
| JETTY MID | 50 | 250 | 50 | 200 | 200 |
| JETTY EAST | 0 | 2943 | 100 | 0 | 100 |
| LSG | 100 | 300 | 250 | 200 | 50 |
| JETTY WEST | 100 | 1643 | 50 | 0 | 50 |
| MOM | 0 | 1345 | 50 | 300 | 149 |
| MON | 249 | 1693 | 398 | 1643 | 150 |

LAKE NAKURU WATER QUALITY DATA – AUGUST 2003

| SITE | Temp, °C | PH | Secchi depth, cm | Total depth, m | Cond, ms/cm | Sal g/l | D.O, mg/l | NH3-N, mg/l | NO2-N, mg/l | NO3-N, mg/l | TKN, mg/l | OP, mg/l | TP, mg/l | Alk, g/l | DRY WT, mg/l | Chl 'a', mg/m ³ | TN, mg/l | TSS, mg/l |
|----------------|----------|-------|------------------|----------------|-------------|---------|-----------|-------------|-------------|-------------|-----------|----------|----------|----------|--------------|----------------------------|----------|-----------|
| JETTY WEST-1 m | 24.1 | 10.15 | | | 34.3 | 21.5 | - | 0.06 | 0.004 | 0.056 | 9.30 | 2.205 | 6.720 | 13.00 | 210 | | 9.36 | 48 |
| Njoro east 1 m | 24.3 | 10.37 | | | 31.4 | 19.0 | 8.45 | 0.02 | 0.005 | 0.075 | 10.4 | 2.165 | 5.275 | 14.25 | 190 | | 10.48 | 38 |
| MON-0.5 m | 23.6 | 10.06 | | | 30.0 | 19.2 | 8.68 | 0.02 | 0.006 | 0.074 | 10.8 | 2.150 | 4.560 | 12.00 | 144 | | 10.88 | 46 |
| MP-1 m | 24.3 | 10.06 | | | 35.6 | 22.4 | - | 0.14 | 0.005 | 0.055 | 13.1 | 2.600 | 6.900 | 15.50 | 236 | | 13.16 | 39 |
| Jetty east 1 m | 23.5 | 10.32 | | | 33.8 | 22.4 | 4.02 | 0.04 | 0.006 | 0.064 | 7.14 | 2.890 | 4.325 | 14.75 | 182 | | 7.21 | 76 |
| LSG-1 m | 22.4 | 10.16 | | | 27.4 | 16.9 | 14.88 | 0.01 | 0.006 | 0.054 | 18.12 | 1.920 | 6.745 | 13.25 | 106 | | 18.06 | 42 |
| BT M&N-1 m | 22.1 | 10.24 | | | 32.7 | 20.6 | - | 0.03 | 0.011 | 0.049 | 18.1 | 2.725 | 5.725 | 14.50 | 206 | | 18.16 | 33 |
| MOM-1 m | 22.8 | 10.23 | | | 30.8 | 19.1 | - | 0.05 | 0.005 | 0.055 | 9.60 | 2.625 | 5.615 | 15.00 | 144 | | 9.66 | 40 |
| MOND-1 m | 21.9 | 10.18 | | | 29.4 | 17.3 | 4.79 | 0.02 | 0.004 | 0.066 | 12.9 | 2.075 | 4.990 | 15.75 | 182 | | 12.97 | 28 |
| JETTY MID-1 m | 24.5 | 10.28 | | | 34.9 | 21.9 | 5.67 | 0.02 | 0.004 | 0.066 | 12.62 | 2.320 | 5.825 | 17.00 | 176 | | 12.69 | 43 |
| JETTY WEST 0 m | 24.7 | 10.21 | 32 | 1.52 | 34.6 | 21.7 | 12.3 | 0.04 | 0.003 | 0.077 | 22.3 | 1.965 | 5.775 | 13.75 | 156 | 1277 | 22.38 | 68 |
| LSG-0 m | 22.6 | 10.55 | 40 | 1.22 | 27.8 | 14.8 | 15.56 | 0.09 | 0.002 | 0.078 | 16.9 | 1.990 | 6.240 | 15.50 | 162 | 681 | 16.98 | 17 |
| JETTY MID-0 m | 23.0 | 10.58 | 37 | 1.50 | 31.5 | 20.1 | 11.43 | 0.02 | 0.001 | 0.058 | 13.3 | 1.845 | 6.570 | 15.00 | 156 | 1379 | 13.36 | 29 |
| MOND-0 m | 24.7 | 10.12 | 41 | 1.13 | 22.3 | 12.7 | 7.13 | 0.09 | 0.001 | 0.079 | 9.0 | 1.925 | 6.485 | 16.50 | 194 | 368 | 9.17 | 21 |
| NJORO MID-0 m | 23.6 | 10.55 | 40 | 1.50 | 30.0 | 18.6 | 16.30 | 0.05 | 0.002 | 0.068 | 12.6 | 1.895 | 6.980 | 13.50 | 148 | 494 | 12.67 | 23 |
| BT M & N-0 m | 24.3 | 10.34 | 44 | 0.93 | 32.1 | 20.4 | - | 0.05 | 0.001 | 0.069 | 26.6 | 2.100 | 5.680 | 15.00 | 240 | 375 | 26.67 | 20 |
| MP-0 m | 21.7 | 10.17 | 41 | 1.55 | 36.1 | 22.7 | - | 0.05 | 0.002 | 0.068 | 8.4 | 1.795 | 7.095 | 14.25 | 206 | 534 | 8.47 | 41 |
| MOM-0 m | 21.7 | 10.25 | 33 | 1.22 | 26.4 | 15.2 | 7.01 | 0.03 | 0.001 | 0.069 | 13.3 | 2.095 | 5.310 | 14.00 | 174 | 598 | 13.37 | 28 |
| JETTY EAST-0 m | 25.1 | 10.38 | 40 | 1.20 | 32.1 | 21.4 | 6.17 | 0.04 | 0.003 | 0.077 | 7.2 | 1.940 | 7.850 | 13.50 | 240 | 540 | 7.28 | 41 |
| MON-0 m | 23.0 | 10.28 | 21 | 0.50 | 11.9 | 10.2 | 12.14 | 0.12 | 0.001 | 0.089 | 7.2 | 0.740 | 3.280 | 6.25 | 166 | 95.6 | 7.29 | 89 |

LAKES WATER QUALITY DATA – DECEMBER 2003

| Sample source | Temp °C | PH | Total depth, m | Sample depth | Secchi depth, cm | D.O, mg/l | Cond, ms/cm | Sal g/l | TDS g/l | Alk, g/l | NH3-N, mg/l | NO2-N, mg/l | NO3-N, mg/l | TKN, mg/l | TN, mg/l | OP, mg/l | TP, mg/l | DRY WT, mg/l | Lake level m | Chl 'a', mg/m ³ |
|---------------------------|---------|------|----------------|--------------|------------------|-----------|-------------|---------|---------|----------|-------------|-------------|-------------|-----------|----------|----------|----------|--------------|--------------|----------------------------|
| Lk Bogoria Southern Basin | 24.8 | 9.95 | 7.45 | 0.5 | 20.5 | 5.1 | 78.26 | 48.3 | 56.25 | 46.00 | 0.24 | 0.015 | 0.015 | 0.0624 | 0.092 | 7.635 | 8.490 | 280 | | 631 |
| Lk. Bogoria central basin | 28.8 | 9.75 | 7.00 | 0.5 | 21.5 | 10.1 | 143.04 | 72.0 | 71.44 | 45.75 | 0.30 | 0.010 | 0.030 | 0.210 | 0.250 | 6.930 | 8.360 | 280 | | 548 |
| Lk Bogoria Northern basin | 25.3 | 9.43 | 6.38 | 0.5 | 26.5 | 6.7 | 134.4 | 66.4 | 67.20 | 49.00 | 0.10 | 0.008 | 0.032 | 1.150 | 1.150 | 6.150 | 8.560 | 320 | | 474 |
| Lk. Nakuru | 19.2 | 10.3 | 1.48 | 0.5 | 32.0 | 17.9 | 41.85 | 28.1 | 14.41 | 14.00 | 0.22 | 0.005 | 0.055 | 0.304 | 0.364 | 0.360 | 3.935 | 100 | 1.20 | 492 |
| Lk. Elementaita | 19.2 | 9.72 | 0.67 | 0.5 | 16.5 | 8.60 | 35.3 | 20.8 | 12.62 | 12.62 | 0.27 | 0.010 | 0.070 | 1.254 | 1.334 | 0.100 | 0.150 | 285 | 1.26 | 273 |

Plankton composition and density

| | Spirulina Minor, compressed coils/ml | Microcystis, colonies/ml | Spirulina major, stretched coils/ml | Anabaena flos-que, coils/ml | Net primary productivity |
|---------------------------|--------------------------------------|--------------------------|-------------------------------------|-----------------------------|--------------------------|
| Bogoria southern basin | 1275 | 0 | 1071 | 0 | |
| Bogoria central basin | 1173 | 0 | 1071 | 0 | |
| Lk Bogoria Northern basin | 1785 | 0 | 1122 | 0 | |
| Lk. Nakuru | 1122 | 153 | 357 | 0 | |
| Lk. Elementaita | 383 | 255 | 446 | 64 | |

RIVERS AND STREAMS DATA DECEMBER 2003

| Sample source | Flow m ³ /s | Temp °C | PH | D.O, mg/l | Cond, ms/cm | Sal g/l | Alk, g/l | NH ₃ -N, mg/l | NO ₂ -N, mg/l | TKN, mg/l | TN, mg/l | OP, mg/l | Total phos mg/l | TDS mg/l | TSS mg/l | NO ₃ -N, mg/l |
|------------------|------------------------|---------|------|-----------|-------------|---------|----------|--------------------------|--------------------------|-----------|----------|----------|-----------------|----------|----------|--------------------------|
| River Mbaruk | 0.1314 | 24.6 | 7.88 | 5.20 | 0.27 | 0.0 | 18 | 0.29 | 0.013 | 0.549 | 0.629 | 0.155 | 0.168 | 0.1348 | 32 | 0.067 |
| Baharini springs | 0.0350 | 27.0 | 8.61 | 8.10 | 0.68 | 0.0 | 48 | 0.06 | 0.008 | 0.396 | 0.536 | 0.145 | 0.174 | 0.343 | 4 | 0.1320 |
| Sewage drain | 0.0123 | 18.1 | 7.63 | 5.70 | 0.880 | 0.0 | 56 | 8.10 | 0.023 | 4.68 | 4.79 | 4.992 | 6.435 | 0.430 | 11 | 0.087 |
| River Nderit | 0.0083 | 25.7 | 8.58 | 14.2 | 3.19 | 1.3 | 220 | 0.13 | 0.005 | 2.067 | 2.117 | 0.134 | 0.035 | 1.598 | 51 | 0.045 |
| River Makalia | 0.0203 | 26.9 | 7.23 | 7.20 | 0.283 | 0.0 | 26 | 0.96 | 0.038 | 0.628 | 0.768 | 0.090 | 0.186 | 0.142 | 265 | 0.102 |
| River Njoro | 0.6038 | 19.8 | 7.73 | 8.50 | 0.213 | 0.0 | 16 | 0.19 | 0.010 | 1.360 | 1.440 | 0.120 | 0.198 | 0.103 | 48 | 0.070 |
| River Emsus | 0.1030 | 22.0 | 8.51 | 10.6 | 0.390 | 0.0 | 50 | 0.11 | 0.015 | 0.202 | 0.272 | 0.040 | 0.046 | 1.92 | 18 | 0.055 |
| River Sandai | 0.0147 | 29.8 | 8.72 | 11.9 | 0.205 | 0.0 | 62 | 0.18 | 0.010 | 0.312 | 0.372 | 0.005 | 0.014 | 0.1313 | 29 | 0.050 |
| Fig tree | 0.0258 | 23.2 | 8.41 | - | 0.450 | 0.0 | 44 | 0.11 | 0.008 | 0.374 | 0.434 | 0.010 | 0.046 | 0.232 | 9 | 0.052 |
| Kariaandusi | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry |

LAKE NAKURU WATER QUALITY DATA - JUNE 2002

| SITE | Temp °C | PH | Color | TSS, mg/l | TDS, g/l | Cond. Ms/cm | Sat. g/l | DO, mg/l | DO% mg/l | Alk, g/l | NO2-N, mg/l | NO3-N, mg/l | NH3-N, mg/l | TKN, mg/l | OP mg/l | TP, g/l | Secchi depth, cm | Total depth, m | Chl a, mg/m ³ |
|------------------------|---------|-------|-------|-----------|----------|-------------|----------|----------|----------|----------|-------------|-------------|-------------|-----------|---------|---------|------------------|----------------|--------------------------|
| Mouth of Njoro | 23.5 | 10.37 | 430 | 189 | 30.90 | 31.3 | 19.4 | 11.12 | 193 | 39.0 | 0.006 | 0.04 | 0.60 | 7.5 | 3.17 | 6.255 | 20 | 0.3 | - |
| Mouth of Makalia | 26.4 | 10.30 | 450 | 44 | 32.56 | 33.3 | 20.9 | 11.12 | 211 | 36.40 | 0.001 | 0.001 | 0.350 | 6.0 | 3.83 | 4.245 | 22 | 0.51 | |
| Mouth of Nderit | 27.9 | 10.34 | 158 | 93 | 31.15 | 33.8 | 21.0 | 13.34 | 265 | 40.60 | 0.013 | 0.08 | 0.25 | 15 | 4.80 | 5.09 | 25 | 0.25 | |
| Hippo point | 23.2 | 10.22 | 248 | 118 | 24.69 | 28.9 | 17.8 | 16.8 | 28 | 33.20 | 0.005 | 0.052 | 0.30 | 10 | 4.29 | 9.10 | 18 | 0.38 | 81 |
| Lake shore gauges | 23.6 | 9.78 | 126 | 131 | 27.39 | 30.1 | 18.7 | 1.94 | 146 | 35.20 | 0.006 | 0.03 | 0.55 | 9 | 3.97 | 5.035 | 30 | 0.44 | |
| Drums | 23.1 | 10.41 | 121 | 77 | 26.93 | 32.4 | 20.0 | 9.8 | 99 | 38.10 | 0.012 | 0.028 | 0.20 | 9 | 4.51 | 7.41 | 22 | 0.45 | 216 |
| Kampi Nyati | 25.6 | 10.04 | 151 | 82 | 31.64 | 31.7 | 19.8 | 6.8 | 174 | 37.10 | 0.001 | 0.04 | 0.10 | 10 | 3.34 | 5.025 | 25 | 0.56 | |
| Kampi Nyuki | 25.6 | 10.15 | 225 | 104 | 28.54 | 29.9 | 18.5 | 11.49 | 115 | 34.70 | 0.016 | 0.02 | 0.65 | 7.5 | 3.75 | 5.45 | 22 | 0.48 | 115 |
| Metal pole | 24.2 | 10.37 | 79 | 35 | 30.21 | 33.7 | 21.1 | 7.54 | 192 | 41.00 | 0.011 | 0.036 | 4.0 | 1.15 | 4.25 | 4.180 | 35 | 0.71 | |
| Presidential pavilion | 25.7 | 10.33 | 94 | 28 | 29.83 | 33.4 | 20.9 | 12.92 | 188 | 41.00 | 0.006 | 0.044 | 0.20 | 4 | 2.99 | 4.52 | 40 | 0.64 | 108 |
| Btw makalia and nderit | 26.1 | 10.37 | 123 | 57 | 32.51 | 33.7 | 21.2 | 12.34 | 301 | 40.10 | 0.01 | 0.04 | 0.25 | 3 | 3.52 | 5.74 | 28 | 55 | |

PLANKTON COMPOSITION AND DENSITY – NOVEMBER 5TH 2002

| | MON | MOM | MOMD | PP | MP | BT | HP | LSG | Nyuki | Nyati |
|---------------------|-----|-----|------|-----|-----|-----|-----|-----|-------|-------|
| Spirulina minor | 0 | 60 | 44 | 198 | 184 | 56 | 24 | 80 | 80 | 58 |
| Spirulina major | 0 | 64 | 24 | 210 | 340 | 34 | 32 | 20 | 40 | 34 |
| Anabaena | 2 | 296 | 88 | 78 | 96 | 154 | 102 | 122 | 80 | 64 |
| Chroococcus minutus | | 458 | 66 | 56 | 86 | 120 | 24 | 10 | 6 | 38 |
| Microcystis | 28 | | 4 | 2 | 8 | 0 | 0 | 0 | 0 | 0 |
| Rolifers | 4 | | 3 | 16 | 0 | 32 | 42 | 16 | 4 | 4 |

LAKE NAKURU WATER QUALITY DATA - FEBRUARY 2002

| SITE | Temp °C | PH | Cond. Ms/cm | Sal. g/l | DO % | DO, mg/l | Flow m³/s | Alk, g/l | TSS, mg/l | NH3-N, mg/l | NO2-N, mg/l | NO3-N, mg/l | OP mg/l | TP, g/l | Secchi depth, cm | Total depth, m |
|------------------------|---------|-------|-------------|----------|-------|----------|-----------|----------|-----------|-------------|-------------|-------------|---------|---------|------------------|----------------|
| Metal pole | 24.7 | 10.17 | 46.5 | 30.1 | 184 | 12.24 | - | 11.10 | 62 | 0.92 | ND | 0.04 | 0.190 | 13.41 | 13 | 0.58 |
| Mouth of Makalia | 31.6 | 10.15 | 44.9 | 30.0 | 199 | 11.66 | - | 11.45 | 870 | 1.92 | ND | ND | 6.550 | 18.15 | 19 | 0.48 |
| Mouth of Nderit | 33.1 | 10.10 | 49.3 | 32.6 | 230 | 13.45 | - | 11.30 | 258 | 1.84 | ND | 0.02 | 7.798 | 12.38 | 18 | 0.45 |
| Lake shore gauges | 25.6 | 10.10 | 46.4 | 30.1 | 9.6 | 0.67 | - | 11.40 | 689 | 3.24 | ND | 0.01 | 7.766 | 12.80 | 6 | 0.45 |
| Njoro downstream | 26.3 | 8.49 | 0.067 | 0.0 | 77.7 | 5.01 | 2268 | 0.34 | 470 | 4.10 | 0.05 | 0.01 | 7.180 | 5.97 | - | - |
| Mouth of Njoro | 25.8 | 10.03 | 47.1 | 30.4 | 64.2 | 4.14 | - | 10.65 | 166 | 2.14 | ND | ND | 7.388 | 18.41 | 7 | 0.4 |
| Makalia downstream | 21.6 | 7.42 | 0.18 | 0.0 | 71 | 5.05 | - | 0.084 | 168 | 0.94 | 0.01 | 0.02 | 0.862 | 3.70 | - | - |
| Sewage drain | 22.6 | 7.93 | 1.173 | 8.0 | 27.3 | 1.93 | - | 0.114 | 108 | 5.52 | 0.12 | 0.01 | 3.880 | 10.58 | - | - |
| Baharini springs | 25.4 | 8.20 | 0.558 | 0.0 | 58.6 | 5.05 | - | 0.085 | 12 | 0.32 | 0.055 | 0.05 | 0.318 | 5.17 | - | - |
| Btw makalia and nderit | 30.5 | 10.17 | 46.1 | 30 | 248 | 15.14 | - | 11.10 | 44 | 1.86 | ND | 0.10 | 7.930 | 13.72 | 8 | 0.38 |
| Kampi Nyati | 27.9 | 10.06 | 45.6 | 29.5 | 116.3 | 7.08 | - | 10.48 | 49 | 5.30 | ND | 0.035 | 5.726 | 15.08 | 14 | 0.52 |
| Drums | 26.1 | 9.54 | 47.2 | 39.1 | 1 | 0.07 | - | 11.70 | 1260 | 5.44 | ND | 0.025 | 4.216 | 5.86 | 8 | 0.45 |
| Presidential pavilion | 25.2 | 10.18 | 47.5 | 31.1 | 185 | 12.5 | - | 10.90 | 92 | 1.36 | ND | 0.005 | 7.670 | 15.86 | 13 | 0.55 |

Lake level = 1.27

LAKE NAKURU WATER QUALITY DATA - OCTOBER 2002

| SITE | Temp °C | PH | Color pt.co | TSS, mg/l | TDS, g/l | Cond. Ms/cm | Sal. g/l | DO, mg/l | DO% mg/l | ORP mv | Alk, g/l | NH3-N, mg/l | NO2-N, mg/l | TKN, mg/l | OP mg/l | TP, g/l | Secchi depth, cm | Total depth, m | BOD mg/l | COD mg/l |
|------------------------|---------|-------|-------------|-----------|----------|-------------|----------|----------|----------|--------|----------|-------------|-------------|-----------|---------|---------|------------------|----------------|----------|----------|
| Presidential pavilion | 24.3 | 10.28 | 840 | 248 | 43.26 | 51.2 | 34.7 | 18.08 | 274 | 32 | 25.00 | 1.23 | 0.008 | 3 | 4.335 | 4.855 | 20 | 0.47 | 51.95 | 1392 |
| Mouth of Makalia | 26.3 | 10.28 | 1190 | 940 | 87.26 | 52.5 | 36.0 | 23.4 | 360 | 136 | 26.00 | 0.25 | 0.000 | 6 | 5.69 | 6.495 | 12 | 0.29 | 83.8 | 912 |
| Metal pole | 23.4 | 10.4 | 640 | 846 | 41.16 | 52.9 | 36.4 | 21.2 | 300 | 78 | 26.00 | 0.65 | 0.000 | 9 | 4.565 | 4.610 | 25 | 0.48 | 56.6 | - |
| Hippo point | 24.0 | 10.24 | 18600 | 6650 | 137.24 | 36.1 | 23.6 | 1.32 | 19 | 14 | 25.00 | 2.7 | 0.036 | 15 | 6.360 | 8.025 | 3 | 0.25 | 83.4 | 1680 |
| Btw makalia and nderit | 25.7 | 10.37 | 3960 | 1570 | 45.82 | 47.7 | 31.7 | 22.2 | 351 | 85 | 27.50 | 0.0 | 0.020 | 3 | 4.145 | 6.52 | 7 | 0.37 | 85.3 | - |
| Mouth of Nderit | 26.2 | 10.34 | 4080 | 2040 | 58.54 | 52.2 | 36.0 | 10.9 | 172 | 109 | 25.00 | 5.8 | 0.038 | 9 | 8.075 | 8.115 | 10 | 0.27 | 84.6 | 1216 |
| Kampi Nyati | 26.2 | 10.32 | 2295 | 800 | 38.41 | 46.8 | 30.8 | 8.6 | 134 | 23 | 22.00 | 3.0 | 0.016 | 6 | 5.05 | 5.475 | 10 | 0.33 | 57.3 | 1248 |
| Kampi Nyuki | 26.3 | 10.32 | 3130 | 1350 | 36.25 | 45.4 | 28.9 | 3.15 | 49 | 5 | 25.50 | 4.1 | 0.028 | 6 | 5.570 | 6.59 | 5 | 0.27 | 50.2 | 1728 |
| Lake shore gauges | 25.8 | 10.30 | 1500 | 236 | 35.68 | 41.7 | 25.7 | 4.0 | 61.2 | 35 | 26.00 | 4.25 | 0.022 | 9 | 7.560 | 7.88 | 12 | 0.30 | 62.6 | 1008 |
| Drums | 23.9 | 10.24 | 2060 | 870 | 36.53 | 43.6 | 27.6 | 4.19 | 63.2 | 2 | 30.000 | 3.74 | 0.032 | 24 | 6.310 | 6.485 | 8 | 0.29 | 59.7 | - |
| Mouth of Njoro | 24.4 | 10.28 | 1360 | 540 | 37.29 | 47.9 | 31.9 | 6.5 | 94 | 5 | 27.50 | 3.15 | 0.014 | 66 | 8.040 | 6.173 | 8 | 0.24 | 96.0 | 81 |

Lake level = 0.66m (2.68ft)

ALL MAJOR RIVERS DRY EXCEPT Baharini, springs and sewage drain RIVERS & TOWN STW1

| SOURCE | Temp °C | PH | Color pt.co | TSS, mg/l | TDS, g/l | Cond. Ms/cm | Sal. g/l | NH3-N, mg/l | NO2-N, mg/l | TKN, mg/l | OP mg/l | TP, g/l | BOD mg/l | COD mg/l | Flow m³/s | DO, mg/l | Total Alk, g/l |
|------------------|---------|------|-------------|-----------|----------|-------------|----------|-------------|-------------|-----------|---------|---------|----------|----------|-----------|----------|----------------|
| Sewage drain 1 | 23.7 | 8.34 | 735 | 55 | 896 | 0.72 | 0.1 | 5.05 | 0.112 | 144 | 5.435 | 6.67 | 48.3 | 176 | 1505 | 4.61 | 400 |
| Sewage drain 2 | - | 7.56 | 1405 | 115 | 730 | 0.65 | 0.1 | 5.5 | 0.11 | 6 | 5.36 | - | 49.3 | 192 | - | - | - |
| Baharini springs | 27.6 | 8.69 | 36 | 2 | 4508 | 0.56 | 0.1 | 0.08 | 0.02 | 0 | 0.915 | 0.58 | 3 | 9.9 | 2887 | 7.67 | 350 |
| TMP - 32 | - | 9.21 | 160 | 60 | 690 | 0.54 | 0.0 | 0.68 | 0.062 | 198 | 3.155 | - | 33.4 | 192 | - | - | - |
| GD - 34 TSTW | - | 7.43 | 22.5 | 176 | 620 | 0.66 | 0.0 | 8.1 | 0.256 | 9 | 5.51 | - | 135 | 73.6 | - | - | - |
| TMP - 34 TSTW | - | 7.52 | 23.80 | 197 | 4000 | 0.66 | 0.0 | 11.5 | 0.182 | 216 | 6.24 | - | 147 | 350 | - | - | - |
| RF - 34 TSTW | - | 8.82 | 61 | 18 | 4692 | 0.55 | 0.0 | 1.97 | 0.016 | 122 | 2.09 | - | 11.8 | 160 | - | - | - |
| RF - 32 TSTW | - | 7.39 | 357 | 31 | 504 | 0.69 | 0.0 | 7.5 | 0.544 | 27 | 5.095 | - | 39.5 | 240 | - | - | - |

LAKE NAKURU WATER QUALITY DATA - MARCH 2002

| SITE | Temp °C | PH | Color pt.co | TSS, mg/l | TDS, g/l | Cond. Ms/cm | Sal. g/l | DO, mg/l | | Total Alk, g/l | NO2- N, mg/l | NO3- N, mg/l | TKN, mg/l | OP mg/l | TP, g/l | Secchi depth, cm | Total depth, m | NH3- N, mg/l |
|---------------------------|------------|-------|----------------|--------------|-------------|----------------|-------------|-------------|------|----------------------|--------------------|--------------------|--------------|------------|------------|------------------------|----------------------|--------------------|
| Mouth of Njoro | 28.4 | 10.04 | 760 | 125 | 46.76 | 45.7 | 29.7 | 5.8 | 73.8 | 32.67 | 0.027 | 0.00 | 15.3 | 3.362 | 11.06 | 12 | 0.40 | 0.35 |
| Drums | 32.8 | 10.03 | 2420 | 356 | 24.17 | 47.0 | 30.8 | 4.2 | 48.8 | 32.92 | 0.034 | 0.00 | 19.2 | 4.13 | 11.07 | 12 | 0.50 | 0.36 |
| Metal pole | 30.3 | 10.40 | 550 | 55 | 32.47 | 47.8 | 31.4 | 11.2 | 164 | 33.78 | 0.028 | 0.004 | 19.0 | 4.72 | 11.5 | 17 | 0.68 | 0.12 |
| Presidential pavilion | 28.9 | 10.04 | 570 | 46 | 57.43 | 48.6 | 31.7 | 6.3 | 121 | 32.18 | 0.027 | 0.00 | 9.4 | 2.81 | 16.5 | 24 | 0.58 | 0.14 |
| Mouth of Nderit | 30.0 | 10.03 | 2075 | 289 | 45.24 | 50.4 | 33.4 | 22.2 | 369 | 35.74 | 0.038 | 0.00 | 15.8 | 2.568 | 12.54 | 16 | 0.40 | 0.54 |
| Mouth of Makalia | 31.7 | 10.03 | 631 | 219 | 48.17 | 49.8 | 32.4 | 7.7 | 146 | 17.17 | 0.028 | 0.00 | 21.3 | 2.630 | 13.78 | 17 | 0.5 | 0.25 |
| Btw makalia and nderit | 28.8 | 10.04 | 2285 | 315 | 56.34 | 49.7 | 32.8 | 11.1 | 197 | 33.78 | 0.025 | 0.00 | 19.2 | 2.752 | 13.18 | 9 | 0.4 | 0.30 |
| Lake shore gauges | 28.1 | 10.02 | 2560 | 362 | 56.83 | 47.2 | 30.9 | 0. | 6.3 | 33.50 | 0.002 | 0.014 | 15.3 | 4.258 | 12.52 | 9 | 0.4 | 0.30 |

RIVERS WATER QUALITY DATA

| RIVER | Temp °C | PH | Flow m³/D | Cond. Ms/cm | Sal. g/l | DO, mg/l | TSS, mg/l | NH3- N, mg/l | NO2- N, mg/l | Total Alk, g/l | NO3- N, mg/l | OP mg/l | TP, g/l | Color pt.co |
|------------------|------------|------|--------------|----------------|-------------|-------------|--------------|--------------------|--------------------|----------------------|--------------------|------------|------------|----------------|
| Njoro river | 29.9 | 8.38 | 1010 | 0.243 | 1.10 | 9.4 | 300 | 0.5 | 0.102 | 56 | 0.05 | 1.216 | 2.29 | 300 |
| Makalia river | 29.7 | 7.96 | 349 | 0.285 | 0.00 | 3.3 | 23 | 0.02 | 0.228 | 82 | 0.10 | 0.936 | 1.65 | 1730 |
| Baharini springs | 30.8 | 8.47 | 335 | 0.57 | 0.00 | 5.4 | 1 | 0.03 | 0.06 | 349 | 0.096 | 1.212 | 2.71 | 121 |
| Sewage drain | 27.7 | 7.83 | | 0.705 | 0.10 | 2.9 | 8 | 2.34 | 0.094 | 349 | 0.066 | 1.650 | 5.44 | 34 |
| Nderit river | 30.0 | 9.03 | 121 | 0.350 | 1.8 | 8.7 | 987 | 0.45 | 0.810 | 140 | 0.07 | 1.332 | 2.83 | 7800 |

LAKES WATER QUALITY DATA – NOVEMBER 5TH 2002

| SITE | Temp °C | PH | Color pt.co | TSS, mg/l | TDS, g/l | Cond. Ms/cm | Sal. g/l | DO, mg/l | Total Alk, g/l | NH3-N, mg/l | NO2-N, mg/l | NO3-N, mg/l | TKN, mg/l | OP mg/l | TP, g/l | Secchi depth, cm | Total depth, m | Chl a, mg/m ³ |
|------------------------|---------|-------|-------------|-----------|----------|-------------|----------|----------|----------------|-------------|-------------|-------------|-----------|---------|---------|------------------|----------------|--------------------------|
| Mouth of Njoro | 28.0 | 10.12 | 685 | 176 | 30.84 | 38.6 | 22.1 | 10.9 | 37.50 | 2.55 | 0.06 | 0.03 | 21 | 0.483 | 0.640 | 18 | 0.24 | 424 |
| Mouth of Makalia | 26.3 | 10.16 | 1500 | 572 | 42.64 | 51.1 | 34.6 | 15.46 | 65.50 | 0.64 | 0.09 | 0.02 | 3 | 0.476 | 0.549 | 13 | 0.24 | 629 |
| Mouth of Nderit | 25.2 | 10.19 | 1685 | 444 | 35.12 | 43.9 | 27.4 | 5.50 | 49.00 | 2.96 | 0.04 | 0.03 | 9 | 0.643 | 0.750 | 10 | 0.30 | 485 |
| Hippo point | 20.6 | 10.25 | 1330 | 268 | 26.13 | 32.7 | 16.2 | 5.02 | 40.00 | 1.77 | 0.05 | 0.03 | 6 | 0.436 | 0.600 | 13 | 0.27 | 906 |
| Lake shore gauges | 19.6 | 10.11 | 1635 | 168 | 29.63 | 37.04 | 20.5 | 4.40 | 45.00 | 2.15 | 0.07 | 0.01 | 3 | 0.580 | 0.483 | 22 | 0.35 | 482 |
| Drums | 27.8 | 10.09 | 740 | 240 | 32.80 | 41.0 | 24.5 | 7.17 | 46.00 | 2.72 | 0.07 | 0.02 | 2 | 0.452 | 0.525 | 27 | 0.31 | |
| Btw makalia and nderit | 24.9 | 10.11 | 1090 | 336 | 39.08 | 49.0 | 32.5 | 6.84 | 56.50 | 2.19 | 0.03 | 0.15 | 21 | 0.470 | 0.427 | 16 | 0.31 | 453 |
| Kampi Nyati | 23.0 | 10.02 | 1190 | 352 | 32.36 | 41.0 | 24.6 | 2.69 | 47.50 | 2.60 | ND | ND | 39 | 0.474 | 0.650 | 16 | 0.34 | 473 |
| Kampi Nyuki | 23.4 | 10.04 | 10325 | 6148 | 30.04 | 37.6 | 21.9 | 1.13 | 40.50 | 2.36 | 0.08 | 0.08 | 45 | 0.540 | 0.526 | 4 | 0.24 | 582 |
| Metal pole | 25.3 | 10.34 | 400 | 204 | 39.67 | 49.6 | 33.1 | 21.0 | 58.50 | 1.51 | 0.04 | 0.04 | 45 | 0.444 | 0.429 | 20 | 0.50 | 424 |
| Presidential pavilion | 25.8 | 10.31 | 590 | 208 | 39.99 | 51.9 | 35.4 | 15.69 | 55.00 | 1.66 | 0.09 | 0.09 | 6 | 0.479 | 0.209 | 25 | 0.35 | 550 |

Lake level = 2.68ft

RIVERS AND STREAMS WATER QUALITY DATA

| | Temp °C | PH | Color pt.co | TSS, mg/l | TDS, g/l | Cond. Ms/cm | Sal. g/l | DO, mg/l | Total Alk, g/l | NH3-N, mg/l | NO2-N, mg/l | NO3-N, mg/l | TKN, mg/l | OP mg/l | TP, g/l | BOD mg/l | COD mg/l | Flow m ³ /s |
|------------------|---------|------|-------------|-----------|----------|-------------|----------|----------|----------------|-------------|-------------|-------------|-----------|---------|---------|----------|----------|------------------------|
| Baharini springs | 25.3 | 8.62 | 70 | 3 | 2.4 | 0.55 | 0.0 | 6.56 | 29. | 0.14 | 0.02 | 0.06 | 9 | 0.081 | 0.209 | 7.05 | 16 | 2134 |
| Sewage drain | 19.8 | 8.11 | 1250 | 64 | 0.52 | 0.82 | 0.0 | 8.12 | 128 | 3.50 | 0.18 | 0.12 | 18 | 0.566 | 0.750 | 70.3 | 98 | 415 |

LAKE NAKURU WATER QUALITY DATA - JULY 2002

| SITE | Secchi depth, cm | Temp °C | PH | Color pt.co | TSS, mg/l | TDS, g/l | Cond. Ms/cm | Sal. g/l | DO, mg/l | DO % | Total Alk, g/l | NO2-N, mg/l | NO3-N, mg/l | NH3-N, mg/l | TKN, mg/l | OP mg/l | TP, g/l | Chl a, mg/m ³ | BOD mg/l | COD mg/l | Total depth, m |
|------------------------|------------------|---------|-------|-------------|-----------|----------|-------------|----------|----------|------|----------------|-------------|-------------|-------------|-----------|---------|---------|--------------------------|----------|----------|----------------|
| Mouth of Makalia | 18 | 24.1 | 10.27 | 815 | 252 | 27.47 | 34.3 | 18.3 | 14.51 | 220 | 23.35 | 0.004 | 0.066 | 0.71 | 7.5 | 2.735 | 4.2 | 939 | 38.8 | 912 | 0.36 |
| Mouth of Njoro | 8 | 21.3 | 10.28 | 1775 | 592 | 26.44 | 33.05 | 17.05 | 5.75 | 85 | 21.10 | 0.004 | 0.156 | 1.35 | 39 | 3.045 | 4.0 | 1099 | 140 | 1600 | 0.41 |
| Mouth of Nderit | 20 | 23.1 | 10.35 | 1445 | 264 | 26.59 | 33.2 | 17.02 | 6.36 | 15.4 | 22.70 | 0.002 | 0.078 | 1.53 | 30 | 3.905 | 4.26 | 401 | 26.8 | 1088 | 0.44 |
| Hippo point | 9 | 27.4 | 10.20 | 17900 | 980 | 20.77 | 25.97 | 0.1 | 2.56 | 40 | 20.90 | 0.016 | 0.044 | 4.28 | 12 | 4.53 | 5.095 | 434 | 67 | 1643 | 0.42 |
| Lake shore gauges | 23 | 28.5 | 10.32 | 250 | 208 | 26.10 | 32.63 | 16.6 | 10.97 | 15 | 20.55 | 0.002 | 0.138 | 1.19 | 24 | 3.565 | 4.295 | 650 | 58.8 | 624 | 0.38 |
| Drums | 21.1 | 21.1 | 10.40 | 525 | 388 | 27.26 | 34.08 | 18.08 | 8.18 | 116 | 21.40 | 0.010 | 0.070 | 0.70 | 75 | 1.000 | 2.92 | 857 | 58.8 | 896 | 0.44 |
| Btw makalia and nderit | 20 | 24.3 | 10.31 | 1115 | 268 | 28.04 | 35.04 | 19.04 | 9.82 | 143 | 23.10 | 0.000 | 0.040 | 0.84 | 39 | 0.265 | 2.805 | 401 | 54 | 320 | 0.40 |
| Kampi Nyati | 22 | 23.4 | 10.20 | 500 | 288 | 27.91 | 34.89 | 18.9 | 11.4 | 167 | 22.00 | 0.006 | 0.011 | 1.50 | 18 | 4.065 | 4.2 | 1196 | 37.8 | 1294 | - |
| Kampi Nyuki | 17 | 23.1 | 10.36 | 1070 | 580 | 26.55 | 33.19 | 17.19 | 4.78 | 71 | 20.10 | 0.002 | 0.038 | 3.20 | 9 | 3.705 | 3.88 | 1425 | 43.8 | 480 | - |
| Metal pole | 25 | 21.8 | 10.40 | 315 | 228 | 28.36 | 35.45 | 19.5 | 12.44 | 176 | 21.70 | 0.004 | 0.016 | 0.38 | 16.5 | 3.56 | 3.57 | 1019 | 43.8 | 1261 | 0.72 |
| Presidential pavilion | 23 | 22.9 | 10.32 | 800 | 140 | 28.58 | 35.73 | 19.7 | 16.11 | 234 | 24.15 | 0.004 | 0.116 | 0.35 | 12 | 3.09 | 3.91 | 1193 | 54 | 134 | 0.49 |

Lake level = 2.83ft

RIVERS WATER QUALITY DATA

| River | Flow m ³ /s | Temp °C | PH | Color pt.co | TSS, mg/l | TDS, g/l | Cond. Ms/cm | Sal. g/l | DO, mg/l | DO % | Total Alk, g/l | NO2-N, mg/l | NO3-N, mg/l | NH3-N, mg/l | TKN, mg/l | OP mg/l | TP, g/l | BOD mg/l | COD mg/l | |
|------------------|------------------------|---------|------|-------------|-----------|----------|-------------|----------|----------|------|----------------|-------------|-------------|-------------|-----------|---------|---------|----------|----------|-----|
| Makalia river | 23472 | 20.3 | 8.41 | 3260 | 184 | 2748 | 3.435 | 0.1 | 8.16 | 69 | 72 | 0.016 | 0.074 | 0.14 | 24 | 3.45 | | 32.8 | 1488 | |
| Njoro river | 188614 | 17.6 | 7.53 | 1230 | 28 | 340 | 0.425 | 0 | 17.86 | 228 | 100 | 0.048 | 0.725 | 0.36 | 45 | 0.725 | | 38.8 | 256 | |
| Baharini springs | 3828 | 23.4 | 8.77 | 180 | 3 | 996 | 1.245 | 0 | 5.5 | 77.7 | 212 | 0.002 | 0.025 | 0.11 | 1 | 0.025 | | 18 | 32 | |
| Sewage drain | 1674 | 22.5 | 8.42 | 560 | 69 | 471 | 0.589 | 0 | 2.73 | 40.1 | 326 | 0.668 | 0.012 | 66 | 36 | 4.4 | 36.68 | 52.8 | 224 | |
| Nderit river | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry |

LAKE NAKURU WATER QUALITY DATA - AUGUST 2002

| SITE | Temp °C | PH | Color pt.co | TSS, mg/l | TDS, g/l | Cond. Ms/cm | Sal. g/l | DO, mg/l | Total Alk, g/l | NH3-N, mg/l | NO2-N, mg/l | NO3-N, mg/l | TKN, mg/l | OP mg/l | TP, g/l | Total nitrogen mg/l | BOD mg/l | COD mg/l | Secchi depth, cm | Total depth, m | Phyto plankton per m | Chi a, mg/m ³ |
|------------------------|---------|-------|-------------|-----------|----------|-------------|----------|----------|----------------|-------------|-------------|-------------|-----------|---------|---------|---------------------|----------|----------|------------------|----------------|----------------------|--------------------------|
| Mouth of Makalia | 24.3 | 10.41 | 1045 | 124 | 47.73 | 40.4 | 23.9 | 3.99 | 42.70 | 2.05 | 0.008 | 0.192 | 12 | 5.585 | 6.24 | 13.04 | 27.4 | 1083 | 22 | 0.49 | 88 | 325 |
| Mouth of Njoro | 22.1 | 10.38 | 935 | 24 | 31.04 | 38.8 | 22.3 | 4.89 | 39.20 | 1.3 | 0.004 | 0.096 | 8.3 | 6.425 | 7.47 | 8.40 | 40.7 | 1344 | 22 | 0.41 | 260 | 214 |
| Mouth of Nderit | 25.1 | 10.38 | 2050 | 588 | 29.62 | 37.03 | 20.5 | 13.6 | 42.90 | 2.8 | 0.001 | 0.179 | 19 | 5.420 | 6.98 | 19.18 | 33.4 | 912 | 12 | 0.36 | 190 | 205 |
| Hippo point | 26.8 | 10.26 | 17859 | 499 | 36.34 | 33.2 | 1607 | 1.88 | 31.46 | 5.03 | 0.016 | 0.163 | 28 | 6.720 | 9.48 | 28.18 | 93 | 1428 | 9 | 0.36 | - | 66 |
| Lake shore gauges | 27.0 | 10.35 | 318 | 97 | 41.24 | 37.4 | 20.2 | 10.87 | 38.70 | 1.3 | 0.009 | 0.142 | 31 | 6.310 | 8.48 | 31.2 | 44 | 1263 | 18 | 0.41 | - | 194 |
| Drums | 22.5 | 10.30 | 620 | 16 | 30.79 | 38.5 | 22.0 | 6.70 | 42.20 | 1.85 | 0.008 | 0.132 | 25 | 5.615 | 7.095 | 25.14 | 41.7 | 816 | 27 | 0.41 | 362 | 345 |
| Btw makalia and nderit | 25.0 | 10.24 | 995 | 136 | 32.20 | 40.26 | 23.8 | 4.70 | 44.80 | 2.15 | 0.002 | 0.038 | 8.1 | 6.270 | 7.06 | 8.50 | 35.6 | 720 | 18 | 0.41 | 164 | 61 |
| Kampi Nyati | 27.0 | 10.34 | 1160 | 272 | 31.77 | 39.71 | 23.2 | 14.60 | 38.70 | 2.60 | 0.004 | 0.116 | 10 | 6.005 | 4.655 | 10.12 | 50.7 | 1008 | 18 | 0.35 | 672 | 274 |
| Kampi Nyuki | 26.6 | 10.20 | 1620 | 224 | 26.64 | 33.30 | 16.8 | 1.74 | 38.00 | 5.30 | 0.002 | 0.138 | 7.26 | 6.205 | 9.370 | 7.40 | 42.7 | 1056 | 10 | 0.36 | 302 | 280 |
| Metal pole | 22.2 | 10.30 | 470 | 104 | 29.61 | 37.0 | 20.5 | 11.61 | 42.30 | 0.05 | 0.008 | 0.032 | 16 | 5.25 | 7.650 | 16.04 | 42.6 | 672 | 30 | 0.57 | 404 | 287 |
| Presidential pavilion | 23.4 | 10.40 | 650 | 80 | 31.13 | 38.9 | 23.4 | 9.29 | 41.50 | 0.75 | 0.006 | 0.094 | 7 | 4.795 | 7.565 | 7.10 | 39.2 | 864 | 32 | 0.55 | 330 | 351 |

Lake level = 2.83ft

RIVERS WATER QUALITY DATA

| River | Flow m ³ /s | Temp °C | PH | Color pt.co | TSS, mg/l | TDS, g/l | Cond. Ms/cm | Sal. g/l | DO, mg/l | Total Alk, g/l | NO2-N, mg/l | NO3-N, mg/l | NH3-N, mg/l | TKN, mg/l | OP mg/l | TP, g/l | Total nitrogen mg/l | BOD mg/l | COD mg/l | |
|------------------|------------------------|---------|------|-------------|-----------|----------|-------------|----------|----------|----------------|-------------|-------------|-------------|-----------|---------|---------|---------------------|----------|----------|-----|
| Makalia river | 0.0 | 19.0 | 8.57 | 1305 | 24 | 276 | 0.278 | 0 | 6.34 | 146 | 0.008 | 0.392 | 0.5 | 3.6 | 1.000 | 1.55 | 4 | 17.3 | 176 | |
| Njoro river | 0.396 | 08.0 | 7.47 | 500 | 47 | 284 | 0.305 | 0 | 6.13 | 134 | 0.016 | 0.324 | 1.05 | 1.8 | 0.875 | 5.4 | 2.14 | 26.1 | 33 | |
| Baharini springs | 15.3 | 23.2 | 8.77 | 31 | 3 | 434 | 0.843 | 0 | 5.8 | 210 | 0.01 | 0.070 | 0.09 | 0.3 | 0.028 | 0.03 | 0.46 | 21.0 | 23 | |
| Sewage drain | ? | 23.0 | 8.58 | 111 | 14 | 147 | 0.581 | 0 | 3.4 | 218 | 0.56 | 0.016 | 5.36 | 15 | 2.270 | 4.36 | 15.2 | 74 | 192 | |
| Nderit river | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry |

NJORO RIVER COURSE – MAY 2003

| NO. | Sample source | TN mg/l | TSS m/l | NH3 -N mg/l | NO2-N Mg/l | NO3- Nmg/l | TKN mg/l | OP mg/l | TP mg/l | OC mge/m ₃ |
|-----|---------------------------|------------|------------|-------------------|---------------|---------------|-------------|------------|------------|--------------------------|
| 1 | Highland flowers | 2.00 | 22 | 0.04 | 0.014 | 0.146 | 1.80 | 0.085 | 0.108 | 50.4 |
| 2 | Trilytgori | 0.33 | 68 | 0.00 | 0.011 | 0.109 | 0.21 | 0.066 | 0.142 | 65.9 |
| 3 | Mary Joy downstream | 0.15 | 24 | 0.01 | 0.017 | 0.133 | 0.36 | 0.098 | 0.136 | 88.5 |
| 4 | Logeren | 5.44 | 22 | 0.01 | 0.015 | 0.115 | 6.30 | 0.148 | 0.198 | 42.6 |
| 5 | Egerton sewage upstream | 0.98 | 28 | 0.03 | 0.014 | 0.106 | 0.83 | 0.108 | 0.092 | 40.3 |
| 6 | Neswet bridge | 0.37 | 24 | 0.01 | 0.013 | 0.127 | 0.22 | 0.094 | 0.162 | 72.0 |
| 7 | Runguma | 0.23 | 55 | 0.01 | 0.013 | 0.107 | 0.10 | 0.175 | 0.128 | 114 |
| 8 | Egerton upstream | 0.40 | 26 | 0.00 | 0.03 | 0.137 | 0.35 | 0.110 | 0.088 | 46.1 |
| 9 | Ngata | 2.43 | 25 | 0.02 | 0.015 | 0.095 | 2.3 | 0.144 | 0.238 | 130 |
| 10 | Bora milk | 4.54 | 29 | 0.03 | 0.015 | 0.095 | 4.4 | 0.105 | 0.176 | 126 |
| 11 | Sigotik upstream | 0.73 | 23 | 0.00 | 0.027 | 0.103 | 0.60 | 0.108 | 0.144 | 52.1 |
| 12 | Sigotik bridge | 2.81 | 21 | 0.00 | 0.030 | 0.080 | 1.70 | 0.070 | 0.098 | 66.1 |
| 13 | Confluence upstream | 2.72 | 22 | 0.01 | 0.014 | 0.096 | 2.6 | 0.098 | 0.254 | 52.6 |
| 14 | Forest camp | 1.46 | 28 | 0.01 | 0.015 | 0.135 | 1.3 | 0.074 | 0.110 | 55.3 |
| 15 | Salty spring | 0.12 | 12 | 0.03 | 0.016 | 0.074 | 0.03 | 0.018 | 0.118 | 18.0 |
| 16 | Njoro canners downstream | 2.58 | 32 | 0.03 | 0.027 | 0.123 | 2.4 | 0.027 | 0.124 | 116.1 |
| 17 | Egerton sewage downstream | 2.88 | 38 | 0.05 | 0.023 | 0.107 | 2.7 | 0.017 | 0.150 | 43.6 |
| 18 | Njoro canners upstream | 1.80 | 29 | 0.06 | 0.022 | 0.118 | 1.6 | 0.054 | 0.132 | 47.6 |
| 19 | Bondeni upstream | 0.31 | 20 | 0.02 | 0.031 | 0.099 | 0.16 | 0.025 | 0.124 | 118 |
| 20 | Bondeni downstream | 0.39 | 23 | 0.02 | 0.027 | 0.123 | 0.22 | 0.025 | 0.154 | 94 |
| 21 | Sotik downstream | 1.45 | 16 | 0.03 | 0.014 | 0.106 | 1.3 | 0.121 | 0.88 | 58.2 |
| 22 | Mary joy upstream | 0.44 | 24 | 0.01 | 0.017 | 0.133 | 0.28 | 0.098 | 0.136 | 61.6 |
| 23 | Confluence | 4.81 | 22 | 0.06 | 0.016 | 0.134 | 4.6 | 0.074 | 0.116 | 133 |

NJORO RIVER COURSE – AUGUST 2003

| NO. | Sample source | TSS mg/l | NH3-N mg/l | NO2-N mg/l | NO3-N mg/l | TKN Mg/l | TN mg/l | OP mg/l | TP mg/l | OC mgc/m ₃ |
|-----|----------------------|-------------|---------------|---------------|---------------|-------------|------------|------------|------------|--------------------------|
| 1 | Confluence | 70 | 0.11 | 0.015 | 0.125 | 2.10 | 2.24 | 0.043 | 0.521 | 21.21 |
| 2 | Mary joy upst. | 71 | 0.11 | 0.015 | 0.105 | 2.10 | 2.22 | 0.033 | 0.307 | 37.67 |
| 3 | Confluence upst. | 68 | 0.08 | 0.012 | 0.128 | 1.80 | 1.94 | 0.020 | 0.230 | 35.41 |
| 4 | Mary Joy downst. | 78 | 0.18 | 0.015 | 0.115 | 1.50 | 1.73 | 0.020 | 0.294 | 41.16 |
| 5 | Bondeni upst. | 93 | 0.16 | 0.019 | 0.111 | 132 | 132.13 | 0.028 | 0.343 | 39.82 |
| 6 | Ngata | 138 | 0.09 | 0.024 | 0.116 | 2.10 | 2.24 | 0.050 | 0.465 | 50.22 |
| 7 | Bondeni downst. | 85 | 0.19 | 0.022 | 0.128 | 5.10 | 5.25 | 0.052 | 0.362 | 49.66 |
| 8 | Egerton upst. | 64 | 0.12 | 0.020 | 0.130 | 1.2 | 1.35 | 0.018 | 0.271 | 28.49 |
| 9 | Njoro canners upst. | 55 | 0.09 | 0.018 | 0.102 | 1.5 | 1.62 | 0.026 | 0.259 | 33.24 |
| 10 | Bora milk | 69 | 0.19 | 0.018 | 0.132 | 0.6 | 0.75 | 0.028 | 0.262 | 42.55 |
| 11 | Egerton sewage d/st. | 68 | 0.15 | 0.019 | 0.121 | 1.5 | 1.64 | 0.025 | 0.264 | 47.62 |
| 12 | Egerton sewage d/st. | 68 | 0.09 | 0.019 | 0.121 | 1.5 | 1.64 | 0.036 | 0.366 | 48.46 |
| 13 | Forest camp | 40 | 0.35 | 0.029 | 0.101 | 2.1 | 2.23 | 0.061 | 0.279 | 28.01 |
| 14 | Trilytogori | 81 | 0.14 | 0.011 | 0.149 | 115.2 | 115.36 | 0.017 | 0.212 | 28.23 |
| 15 | Sigotik downst. | 66 | 0.10 | 0.012 | 0.078 | 127.2 | 127.29 | 0.000 | 0.199 | 7.03 |
| 16 | Sigotik upst. | 60 | 0.17 | 0.013 | 0.147 | 1.2 | 1.36 | 0.012 | 0.217 | 19.56 |
| 17 | Salty spring | 49 | 0.09 | 0.012 | 0.088 | 0.04 | 0.14 | 0.000 | 0.153 | 18.59 |
| 18 | Sigotik bridge | 51 | 0.06 | 0.023 | 0.087 | 1.5 | 1.61 | 0.009 | 0.174 | 16.90 |
| 19 | Logaman | 52 | 0.28 | 0.021 | 0.069 | 0.3 | 0.39 | 0.026 | 0.169 | 10.45 |
| 20 | Neswet bridge | 63 | 0.13 | 0.009 | 0.111 | 1.2 | 1.32 | 0.000 | 0.308 | 72.98 |
| 21 | Runguma | 59 | 0.02 | 0.016 | 0.094 | 0.3 | 0.41 | 0.003 | 0.169 | 51.25 |
| 22 | Highland flowers | - | - | 0.016 | 0.124 | 0.6 | - | - | 0.228 | 41.78 |

LAKE NAKURU WATER QUALITY DATA – March 2003

| SITE | Temp °C | PH | Cond. Ms/cm | Sal. g/l | Secchi depth, cm | Total depth, m | TSS, mg/l | TDS, g/l | TP, g/l | OP mg/l | DO, mg/l | Alk, g/l | Chl a, mg/m ³ |
|-----------|------------|-------|----------------|-------------|------------------------|----------------------|--------------|-------------|------------|------------|-------------|-------------|-----------------------------|
| LSG | 28.3 | 10.10 | 97.65 | 58.83 | 10 | - | 2424 | 44.94 | 13.39 | 11.60 | 26.5 | 50.0 | 517 |
| MP-T | 29.0 | 10.31 | 107.5 | 64.76 | 17 | 1.6 | 1690 | 93.46 | 14.18 | 12.40 | 32.1 | 50.0 | 539 |
| MP-B | 30.0 | 10.09 | 92.65 | 55.8 | - | - | 2767 | 67.30 | 12.69 | 11.79 | 23.0 | 50.5 | 462 |
| JETTY-T | 32.8 | 10.10 | 98.85 | 59.55 | - | 0.5 | 1853 | 70.15 | 15.31 | 6.83 | 20.2 | 59.0 | 285 |
| JETTY-B | 28.1 | 10.10 | 100.5 | 60.5 | - | 0.5 | 2080 | 70.34 | 13.19 | 8.40 | 30.4 | 51.5 | 602.4 |
| MOND | 30.7 | 10.27 | 99 | 59.64 | - | 0.5 | 1437 | 86.97 | 8.99 | 7.00 | - | - | 423.7 |
| BT. M & N | 32.2 | 10.22 | 100.3 | 60.4 | - | - | 1470 | 59.69 | 10.17 | - | 18.77 | - | 331 |

LAKE ELMENTAITA WATER QUALITY DATA –March 2003

| SITE | Temp °C | PH | Cond, ms/cm | Sal, g/l | Secchi depth, cm | Total depth, m | TSS, mg/l | TDS, g/l | Alk, g/l | OP, mg/l | TP, mg/l | DO, mg/l | Chl a Mg/m ³ |
|---------------|---------|------|-------------|----------|------------------|----------------|-----------|----------|----------|----------|----------|----------|-------------------------|
| Delamere camp | 30.8 | 9.38 | 146.6 | 88.3 | <5 | 0.05 | 9610 | 39.72 | 86.50 | 4.0 | 7.25 | 7.6 | 342 |
| View point | 25.5 | 9.72 | 9.28 | 5.59 | <5 | 0.30 | 17.3 | 34.24 | 1.75 | 2.74 | 6.26 | 9.6 | 80 |
| Hot springs | 27.7 | 9.24 | 3.73 | 2.25 | >20 | 0.50 | 88 | 33.58 | 9.0 | 2.72 | 5.53 | 9.6 | - |

LAKE BOGORIA WATER QUALITY DATA – MARCH 13TH 2003

| Source | Temp °C | PH | Cond. Ms/ | Salinity g/l | Secchi Depth cm | Total depth, m | TSS mg/l | TDS g/l | Alk. g/l | OP mg/l | TP, mg/l | D.O mg/l | D.O % | Chl a, mg/l |
|--------|---------|-------|-----------|--------------|-----------------|----------------|----------|---------|----------|----------|----------|----------|-------|-------------|
| NB1-T | 26.7 | 9.91 | 121.2 | 73.0 | 25 | | 999 | 75.55 | 68.0 | 10.4 | 11.12 | 12.4 | 172 | 771 |
| NB1-B | 26.6 | - | 124.8 | 75.18 | - | | 1472 | 81.48 | 58.5 | 5.25 | 11.25 | 15.5 | 154 | 714 |
| NB2-T | 29.1 | 9.97 | 120.2 | 72.40 | 30 | 3.75 | 1092 | 80.31 | 60.5 | 9.35 | 12.79 | 12.08 | 176 | 530 |
| NB2-1m | 25.6 | - | 117.3 | 70.70 | - | | 868 | 82.12 | 59.5 | 10.16 | 15.50 | 6.72 | 113 | 577 |
| NB2-2m | 24.8 | - | 120 | 72.30 | - | | 782 | 75.31 | - | 10.63 | 13.17 | 5.02 | - | - |
| NB2-B | 25.0 | - | 124.2 | 74.80 | - | | 2330 | 81.43 | 61.5 | 5.63 | 11.81 | 8.78 | 113 | - |
| CB1-T | 27.5 | 9.97 | 130.4 | 78.55 | 28 | | 944 | 77.63 | 60.5 | 12.41 | 16.71 | 10.8 | - | 814 |
| CB1-B | 26.0 | - | 124 | 74.7 | - | | 898 | 86.78 | 64.0 | 12.04 | 15.31 | 6.2 | - | - |
| CB2-T | 28.9 | 9.95 | 124 | 74.7 | 26 | | 1008 | 80.09 | 77.0 | 9.56 | 12.16 | 11.5 | - | 655 |
| CB2-B | 27.3 | - | 122 | 73.5 | - | | 782 | 81.21 | 59.5 | 5.30 | 12.95 | 9.4 | - | 358 |
| SB1-T | 26.0 | 10.08 | 121 | 72.9 | - | 0.73 | 934 | 79.20 | 61.5 | 7.23 | 11.60 | 12.26 | 172 | 844 |
| SB1-B | 26.0 | - | 110.8 | 66.75 | - | | 1248 | 79.92 | 63.0 | 7.74 | 11.92 | 12.26 | 172 | 630 |
| SB2-T | 28.8 | 10.04 | 111.1 | 66.93 | 26 | | 782 | 77.58 | 59.0 | 6.755.38 | 10.95 | 11.13 | 138 | 646 |
| FG2-B | 26.3 | - | 119.9 | 72.23 | - | | 844 | 76.95 | 59.0 | 8.94 | 13.48 | 4.22 | 62 | 370 |
| FG3-T | 28.3 | 9.94 | 115.2 | 70 | 20 | | 780 | 78.18 | 64.0 | 10.00 | 9.82 | 13.27 | 192 | 644 |
| SB3-T | 28.2 | 9.9 | 115.5 | 69.6 | - | | 806 | 81.25 | 62.5 | 3.19 | 10.03 | 15.30 | 218 | 1895 |
| SB3-B | 27.6 | - | 117.3 | 70.7 | - | | 844 | 172.81 | 86.5 | | 13.90 | 10.33 | - | 404 |

**LAKES NAKURU, BOGORIA AND ELMENTAITA
PHYTOPLANKTON COMPOSITION AND DENSITY**

| SITE | Microcystis | Spirulina minor, compressed coils | Spirulina major, stretched coils | Chroocacus minutus | Spirulina species 2 |
|----------|-------------|--------------------------------------|-------------------------------------|-----------------------|------------------------|
| B/NB | 996 | 996 | 4980 | 0 | 1743 |
| B/NB | 62 | 498 | 2054 | 0 | 374 |
| B/CB | 0 | 623 | 1619 | 0 | 623 |
| B/CB | 0 | 685 | 966 | 0 | 249 |
| B/SB | 374 | 187 | 1693 | 0 | 436 |
| B/SB | 498 | 872 | 1121 | 0 | 125 |
| B/SB | 187 | 125 | 1743 | 0 | 187 |
| B/SB | 62 | 374 | 2252 | 0 | 249 |
| NK/JETTY | 1494 | 0 | 62 | 0 | 0 |
| NK/LSG | 3984 | 0 | 0 | 0 | 0 |
| NK/MP | 3984 | 0 | 249 | 249 | 62 |
| EL/DC | 560 | 0 | 0 | 0 | 0 |
| EL/VP | 862 | 0 | 0 | 0 | 0 |

LAKE NAKURU WATER QUALITY DATA – MAY 2003

| SITE | PH | TSS | Cond, mg/l | Sal, g/l | NH3- N, mg/l | NO2- N, mg/l | NO3- N, mg/l | Inorganic- N, mg/l | OP, mg/l | TP, mg/l | Chl a, mg/m ³ |
|-------------|-------|-----|---------------|----------|-----------------|-----------------|-----------------|-----------------------|-------------|-------------|-----------------------------|
| Jetty | 10.08 | 74 | 37.9 | 21.3 | 0.29 | 0.012 | 0.028 | 0.33 | 1.380 | 1.05 | 1590 |
| MOND | 10.15 | 29 | 34.7 | 18.6 | 0.12 | 0.020 | 0.140 | 0.28 | 1.505 | 4.40 | 843 |
| Jettyeast | 10.13 | 44 | 36.2 | 20.2 | 0.62 | 0.006 | 0.044 | 0.67 | 2.070 | 5.74 | 1501 |
| LSG | 10.11 | 56 | 30.4 | 16.8 | 0.58 | 0.006 | 0.074 | 0.66 | 1.770 | 4.29 | 829 |
| MP | 10.02 | 24 | 4.6 | 0.8 | 0.36 | 0.005 | 0.085 | 0.45 | 1.545 | 3.39 | 873 |
| BT M & N | 10.13 | 47 | 37.4 | 21.4 | 3.80 | 0.006 | 0.044 | 3.85 | 1.670 | 4.05 | 756 |
| MON | 10.15 | 36 | 31.7 | 16.2 | 0.44 | 0.007 | 0.053 | 0.50 | 1.615 | 4.96 | 882 |
| MOM | 10.13 | 28 | 40.0 | 23.8 | 0.30 | 0.007 | 0.053 | 0.36 | 2.325 | 4.09 | 558 |

PLANKTON COMPOSITION AND DENSITY – May 2003

| SITE | Spirulina Minor, compress ed coils/ml | Spirulina major, stretched coils/ml | Chroocacus minutus colonies/ml | Anabaena flos-que, coils/ml | Microcystis, colonies/ml | Rotifers, units/ml |
|----------------|---|--|--------------------------------------|-----------------------------------|-----------------------------|-----------------------|
| Mid-gauges | 1608 | 6432 | 3752 | 1072 | 536 | 536 |
| Bt M&N | 536 | 7772 | 6700 | 1340 | 0 | 340 |
| Jetty east | 804 | 7236 | 6968 | 2144 | 2144 | 1072 |
| MP | 1340 | 5360 | 5092 | 4156 | 804 | 3484 |
| Njoro mid-lake | 804 | 5628 | 3216 | 2412 | 0 | 0 |
| MOM | 1608 | 11792 | 16.8 | 1608 | 1876 | 0 |
| MON | 804 | 6432 | 1340 | 1340 | 268 | 0 |
| Jetty | 1340 | 5092 | 7236 | 5628 | 2144 | 0 |

LAKE NAKURU WATER QUALITY DATA – 28TH FEBRUARY 2004

| | Total depth, m | Sample depth, m | Secchi depth, cm | Temp °C | PH | Cond. Ms/cm | Total Alk, g/l | DO, mg/l | DO % | OP mg/l | TP, g/l | NH3-N, mg/l | NO2-N, mg/l | NO3-N, mg/l | TKN, mg/l | Dry weight mg/l | Chl a, mg/m ³ | TSS, mg/l |
|------------------------|----------------|-----------------|------------------|---------|-------|-------------|----------------|----------|------|---------|---------|-------------|-------------|-------------|-----------|-----------------|--------------------------|-----------|
| Mouth of Nderit | 1.10 | 0.50 | 26 | 28.8 | 10.70 | 33.5 | 18.75 | 23.0 | 300 | 1.190 | 2.420 | 0.08 | 0.005 | 0.045 | 0.710 | 186 | 396/- | 65 |
| Btw makalia and nderit | 1.00 | 0.50 | 28 | 29.0 | 10.65 | 3403 | 17.50 | 15.6 | 191 | 1.805 | 4.710 | 0.08 | 0.002 | 0.048 | 0.495 | 206 | 553/416 | 51 |
| Hippo point | 1.05 | 0.50 | 23 | 23.1 | 10.81 | 31.6 | 15.25 | 23.4 | 277 | 1.250 | 3.880 | 0.08 | 0.002 | 0.048 | 0.313 | 210 | 523/374 | 52 |
| Njoro East | 1.19 | 0.50 | 28 | 24.6 | 10.75 | 29.9 | 15.50 | 28.0 | 303 | 1.205 | 4.255 | 0.08 | 0.002 | 0.039 | 0.602 | 182 | 488/- | 56 |
| Jetty East | - | 0.50 | 30 | 24.2 | 10.72 | 30.3 | 16.50 | 23.9 | 284 | 1.100 | 4.050 | 0.20 | 0.001 | 0.049 | 0.926 | 178 | 406/- | 47 |
| Njoro West | 1.02 | 0.50 | 28 | 22.0 | 10.61 | 18.9 | 15.50 | 18.9 | 250 | 1.455 | 5.590 | 0.10 | 0.001 | 0.039 | 0.367 | 180 | 338/- | 48 |
| Mouth of Makalia | 0.83 | 0.50 | 28 | 28.2 | 10.40 | 34.0 | 18.50 | 23.9 | 296 | 0.890 | 4.550 | 0.48 | 0.003 | 0.037 | 1.454 | 170 | 308/193 | 51 |
| Mid Jetty | - | 0.50 | 28 | 22.7 | 10.78 | 33.0 | 18.25 | 17.0 | 200 | 1.250 | 3.840 | 0.07 | 0.001 | 0.039 | 0.532 | 178 | 298/258 | 46 |
| Jetty West | - | 0.50 | 32 | 26.3 | 10.90 | 33.3 | 17.50 | 21.4 | 270 | 1.200 | 5.005 | 0.11 | 0.001 | 0.039 | 0.611 | 166 | 555/245 | 37 |

PLANKTON COMPOSITION AND DENSITY

| SITE | Spirulina minor, compressed coils/ml | Spirulina major, stretched coils/ml | Anabaena flos-que, coils/ml | Microcystis aeruginosa | Rotifers, units/ml | Chroococcus minutus |
|------------------------|--------------------------------------|-------------------------------------|-----------------------------|------------------------|--------------------|---------------------|
| Jetty East | 750 | 1125 | 314 | 125 | 250 | 0 |
| Mouth of Makalia | 1465 | 645 | 104 | 365 | 31 | 34 |
| Mouth of Njoro | 1250 | 925 | 200 | 31 | 152 | 0 |
| Jetty West | 1344 | 588 | 250 | 63 | 31 | 0 |
| Btw makalia and nderit | 1484 | 401 | 250 | 375 | 63 | 31 |
| Njoro East | 1599 | 502 | 433 | 64 | 125 | 0 |
| Hippo point | 1469 | 719 | 481 | 31 | 0 | 0 |
| Mid Jetty | 1406 | 1230 | 441 | 125 | 125 | 0 |
| Mouth of Nderit | 594 | 495 | 514 | 370 | 125 | 31 |

Net primary productivity = 4.55gcm⁻²/hr

RIVERS AND STREAMS WATER QUALITY DATA – MARCH 2004

| RIVER/STREAM | Flow m ³ /s | PH | Temp °C | D.O, mg/l | Cond, ms/cm | Salinity g/l | Total Alk, mg/l | TDS mg/l | NH3-N, mg/l | NO2-N, mg/l | NO3-N, mg/l | TKN, mg/l | OP, mg/l | Total phos mg/l | TSS mg/l |
|-------------------------|------------------------|------|---------|-----------|-------------|--------------|-----------------|----------|-------------|-------------|-------------|-----------|----------|-----------------|----------|
| Sewage drain | 1019.5 | 7.7 | 17.3 | 0.62 | 0.072 | 0.00 | 256 | 1602 | 6.50 | 0.024 | 0.116 | 1.012 | 6.328 | 7.520 | 25 |
| Baharini springs | 2298 | 8.9 | 23.1 | 9.20 | 0.058 | 0.00 | 256 | 312 | 0.15 | 0.008 | 0.152 | 1.869 | 0.349 | 0.320 | 4 |
| River Nderit | 657 | 8.89 | 24.3 | 4.60 | 0.240 | 0.02 | 415 | 1770 | 0.61 | 0.046 | 0.174 | 3.049 | 0.800 | 1.380 | 415 |
| River Makalia | 0 | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry |
| River Njoro | 13314 | 8.38 | 18.2 | 6.60 | 0.450 | 0.10 | 172 | 316 | 2.90 | 0.06 | 0.120 | 0.4252 | 1.530 | 0.556 | 26 |
| Fig tree | 4579 | 9.39 | 24.1 | 11.60 | 0.445 | 0.10 | 200 | 644 | 0.17 | 0.004 | 0.096 | 0.5720 | 0.095 | 0.232 | 6 |
| River Emsus | 8640 | 9.34 | 24.0 | 13.20 | 0.502 | 0.10 | 830 | 3208 | 0.26 | 0.006 | 0.114 | 0.3463 | 0.132 | 0.230 | 17 |
| Bogoria hot springs | ~ | 8.85 | 790 | - | 7.5 | 4.1 | 22000 | 1674 | 0.040 | 0.036 | 0.044 | 0.1413 | 0.137 | 0.264 | 5 |
| River Sandai | 1002 | 9.18 | 30.8 | 9.40 | 0.800 | 0.3 | 400 | 3030 | 0.52 | 0.000 | 0.100 | 0.5694 | 0.571 | 0.406 | 210 |
| River Mbaruk | 0 | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry |
| R. Kariandusi | 0 | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry |
| Elementaita hot springs | ~ | 9.30 | 47 | - | 0.07 | 0.4 | 210 | 316 | 0.06 | 0.032 | 0.068 | 0.050 | 0.151 | 0.440 | 2 |

LAKES WATER QUALITY DATA – DECEMBER 2003

| Sample source | Temp °C | PH | Secchi depth, cm | Total depth, m | D.O, mg/l | Cond, ms/cm | Sal g/l | NH3-N, mg/l | NO2-N, mg/l | TDS, g/l | |
|---------------------------|-------------|-----------|------------------|----------------|-----------|--------------|----------------------------|----------------|-------------|--------------|----------------|
| Lk. Elementaita | 26.0 | 10.17 | 12.0 | 0.5 | 3.4 | 23.0 | 17 | 2.28 | 0.086 | 24.7 | |
| Lk. Nakuru | 25.2 | 10.57 | 20.5 | 1.0 | 16.8 | 30.5 | 22.5 | 0.30 | 0.014 | 25.1 | |
| Lk Bogoria Southern Basin | 25.8 | 10.31 | 12.0 | 8.5 | 6.4 | 104 | 37.0 | 0.20 | 0.10 | 27.4 | |
| Lk. Bogoria central basin | 27.4 | 10.22 | 13.0 | 8.0 | 10.3 | 72 | 27.0 | 0.21 | 0.008 | 111.34 | |
| Lk Bogoria Northern basin | 29.2 | 10.31 | 20.0 | 6.2 | 12.7 | 107.3 | 37.5 | 0.18 | 0.008 | 104.25 | |
| Sample source | NO3-N, mg/l | TKN, mg/l | TN, mg/l | OP, mg/l | TP, mg/l | DRY WT, mg/l | Chl 'a', mg/m ³ | Total Alk, g/l | TSS, mg/l | Lake level m | Sample depth m |
| Lk. Elementaita | 0.060 | 0.401 | 2.821 | 1.31 | 6.32 | 680 | 71.4 | 14.00 | 113 | 1.0 | 0.5 |
| Lk. Nakuru | 0.060 | 0.136 | 0.510 | 3.75 | 6.12 | 140 | 596 | 18.75 | 30 | 1.09 | 0.5 |
| Lk Bogoria Southern Basin | 0.040 | 0.328 | 0.668 | 12.37 | 10.10 | 624 | 469 | 57.00 | 86 | | 0.5 |
| Lk. Bogoria central basin | 0.020 | 0.025 | 0.263 | 10.02 | 11.19 | 580 | 375 | 55.50 | 94 | 200 | 0.5 |
| Lk Bogoria Northern basin | 0.00 | 0.165 | 0.353 | 15.42 | 10.24 | 572 | 620 | 55.50 | 63 | | 0.5 |

| | Net primary productivity mgcm ⁻³ h ⁻¹ | Gross primary productivity mgcm ⁻³ h ⁻¹ | Respiration mgcm ⁻³ h ⁻¹ |
|------------------|---|---|--|
| Lake Nakuru | 0.169 | 0.68 | 0.34 |
| Lake Bogoria | 1.062 | 1.15 | 0.09 |
| Lake Elementaita | -ve | 2.59 | 3.39 |

NJORO RIVER COURSE – FEBRUARY 2004

| NO. | SITE LOCATION | TSS m/l | Total Alk, g/l | NH3-N mg/l | NO2-N Mg/l | NO3- N mg/l | TKN mg/l | OP mg/l | TP mg/l | OC mgc/m ³ | TN mg/l |
|-----|---------------------------|------------|-------------------|---------------|---------------|----------------|-------------|------------|------------|--------------------------|------------|
| 1 | Bora milk | 11 | 72 | 0.32 | 0.039 | 0.101 | 2.7 | 0.177 | 0.269 | 89 | 3.84 |
| 2 | Canning downstream | 32 | 75 | 0.16 | 0.028 | 0.082 | 1.9 | 0.116 | 0.208 | 76 | 2.01 |
| 3 | Sewage | 20 | 75 | 0.19 | 0.160 | 0.074 | 1.72 | 0.063 | 0.208 | 31 | 1.81 |
| 4 | Mary Joy downstream | 16 | 64 | 0.29 | 0.015 | 0.075 | 0.68 | 0.108 | 0.374 | 61 | 0.77 |
| 5 | Kenyatta bridge | 17 | 71 | 0.29 | 0.014 | 0.076 | 0.33 | 0.140 | 0.184 | 22 | 0.42 |
| 6 | Confluence | 8 | 62 | 0.14 | 0.018 | 0.142 | 0.93 | 0.216 | 5.144 | 96 | 1.09 |
| 7 | Tree tops | 12 | 48 | 0.13 | 0.024 | 0.136 | 0.16 | 0.210 | 0.217 | 28 | 0.32 |
| 8 | Ngata | 33 | 73 | 0.41 | 0.016 | 0.074 | 1.05 | 0.162 | 0.189 | 123 | 1.14 |
| 9 | Bondeni upstream | 17 | 75 | 0.40 | 0.018 | 0.072 | 0.51 | 0.178 | 0.266 | 36 | 0.60 |
| 10 | Makalia mouth | 124 | 19500 | 0.22 | 0.008 | 0.042 | 4.80 | 4.88 | 8.695 | 164 | 4.85 |
| 11 | Njoro cannery upstream | 13 | 66 | 0.34 | 0.026 | 0.184 | 0.66 | 0.204 | 0.360 | 16 | 0.87 |
| 12 | Mouth of Nderit | 1664 | 1200 | 0.40 | 0.040 | 0.360 | 3.30 | 3.720 | 8.100 | 97 | 3.70 |
| 13 | Njoro mouth | 462 | 1160 | 0.60 | 0.116 | 0.444 | 26.66 | 3.945 | 5.350 | 246 | 27.104 |
| 14 | Mary joy upstream | 14 | 61 | 0.55 | 0.011 | 0.069 | 0.63 | 0.034 | 0.074 | 40 | 0.710 |
| 15 | Forest camp | 22 | 64 | 0.18 | 0.034 | 0.146 | 1.27 | 0.874 | 0.478 | 122 | 1.416 |
| 16 | Salty spring | 11 | 44 | 0.02 | 0.022 | 0.098 | 0.06 | 0.070 | 0.375 | 14 | 0.08 |
| 17 | Neswet bridge | 17 | 56 | 0.28 | 0.026 | 0.154 | 0.35 | 0.046 | 0.130 | 53 | 0.53 |
| 18 | Highland flowers | 10 | 48 | 0.38 | 0.020 | 0.120 | 1.56 | 1.244 | 1.114 | 36 | 1.68 |
| 19 | Sigotik bridge | 65 | 50 | 0.08 | 0.020 | 0.140 | 0.15 | 0.060 | 0.110 | 43 | 0.29 |
| 20 | Sigotik downstream | 73 | 46 | 0.04 | 0.023 | 0.148 | 0.20 | 0.060 | 0.130 | 51 | 0.371 |
| 21 | Sigotik upstream | 66 | 47 | 0.15 | 0.018 | 0.142 | 0.21 | 0.040 | 0.050 | 16 | 0.37 |
| 22 | Logeren | 94 | 40 | 0.11 | 0.028 | 0.232 | 0.17 | 0.050 | 0.130 | 13 | 0.33 |
| 23 | Runguma | 80 | 56 | 0.03 | 0.024 | 0.176 | 0.07 | 0.070 | 0.080 | 13 | 0.27 |
| 24 | Trilytogori | 63 | 42 | 0.03 | 0.018 | 0.142 | 0.09 | 0.070 | 0.090 | 22 | 0.25 |

NJORO RIVER COURSE WATER QUALITY DATA – MARCH 2004

| NO. | SITE LOCATION | TSS m/l | Total Alk, g/l | NH3-N mg/l | NO2-N Mg/l | NO3-N mg/l | TKN mg/l | TN mg/l | OP mg/l | TP mg/l | OC mgc/m ³ |
|-----|---------------------------|------------|-------------------|---------------|---------------|---------------|-------------|------------|------------|------------|--------------------------|
| 1 | Sigotik upstream | 9 | 54 | 0.26 | 0.016 | 0.144 | 0.51 | 0.93 | 0.046 | 0.295 | 32.64 |
| 2 | Egerton university sewage | 10 | 72 | 1.09 | 0.264 | 0.296 | 0.47 | 2.12 | 0.442 | 0.413 | 16.82 |
| 3 | Kenyatta bridge | 9 | 82 | 0.53 | 0.020 | 0.160 | 0.67 | 1.38 | 0.280 | 0.306 | 19.46 |
| 4 | canners upstream | 5 | 76 | 0.99 | 0.020 | 0.220 | 0.18 | 1.413 | 0.432 | 0.653 | 13.93 |
| 5 | canners downstream | 13 | 78 | 0.95 | 0.018 | 0.322 | 0.51 | 1.80 | 0.466 | 0.162 | 23.72 |
| 6 | Mary Joy downstream | 10 | 112 | 0.32 | ND | 0.160 | 0.71 | 1.11 | 0.058 | 0.290 | 20.46 |
| 7 | Ngata | 58 | 81 | 0.52 | 0.028 | 0.272 | 1.00 | 1.82 | 0.284 | 0.584 | 67.14 |
| 8 | Neswet bridge | 32 | 70 | 0.26 | 0.030 | 0.150 | 0.93 | 1.37 | 0.088 | 0.455 | 40.73 |
| 9 | Salty spring | 32 | 350 | 0.62 | 0.020 | 0.120 | 1.20 | 1.96 | 0.326 | 0.591 | 22.47 |
| 10 | Sigotik bridge | 11 | 54 | 0.33 | 0.050 | 0.130 | 0.41 | 0.92 | 0.034 | 0.151 | 29.80 |
| 11 | Confluence upstream | 10 | 56 | 0.26 | 0.014 | 0.146 | 1.01 | 1.43 | 0.092 | 0.325 | 21.72 |
| 12 | Bora milk | 12 | 190 | 5.94 | 0.018 | 0.642 | 0.16 | 6.76 | 0.448 | 0.742 | 17.70 |
| 13 | Turkana flats | 9 | 64 | 0.39 | 0.026 | 0.174 | 0.43 | 1.02 | 0.050 | 0.269 | 13.05 |
| 14 | Tree tops | 10 | 63 | 0.23 | 0.038 | 0.142 | 0.26 | 0.67 | 0.044 | 0.290 | 37.55 |
| 15 | Mary joy upstream | 12 | 60 | 0.38 | 0.064 | 0.138 | 0.52 | 10.10 | 0.036 | 0.369 | 19.95 |
| 16 | Forest camp | 17 | 76 | 0.27 | 0.092 | 0.058 | 0.860 | 1.28 | 0.028 | 0.392 | 17.57 |
| 17 | Logeren | 20 | 46 | 0.86 | 0.028 | 0.172 | 0.32 | 1.48 | 0.054 | 0.055 | 17.32 |
| 18 | Sigotik downstream | 14 | 50 | 0.31 | 0.032 | 0.128 | 0.37 | 0.84 | 0.010 | 0.393 | 17.017 |
| 19 | Runguma | 9 | 72 | 0.64 | 0.030 | 0.130 | 0.01 | 0.81 | 0.002 | 0.14 | 54.03 |
| 20 | Highland flowers | 6 | 52 | 0.34 | 0.053 | 0.096 | 0.45 | 0.94 | 0.164 | 0.386 | 290.1 |
| 21 | Njoro bridge | 26 | 80 | 0.32 | 0.02 | 0.108 | 1.312 | 1.76 | 0.316 | 0.468 | 220.9 |
| 22 | Makalia mouth | 133 | 50000 | 2.54 | 0.002 | 0.058 | 5.56 | 8.16 | 0.642 | 0.132 | 175.5 |
| 23 | Baharini springs | 7 | 220 | 0.02 | 0.053 | 0.067 | 1.61 | 1.75 | 0.093 | 0.109 | 107.9 |
| 24 | Njoro mouth | 166 | 1750 | 6.81 | 0.02 | 0.070 | 2.94 | 9.84 | 0.719 | 0.905 | 773.3 |
| 25 | Trilytogori bridge | 16 | 54 | 0.28 | 0.016 | 0.08 | 0.354 | 0.73 | 0.006 | 0.701 | 145.6 |
| 26 | Mouth of Nderit | 1052 | 1250 | 3.64 | 0.016 | 0.264 | 0.92 | 4.82 | 0.820 | 0.892 | 243.3 |

PRIORITY EQUIPMENT AND FACILITIES FOR THE PROPOSED PROJECT

I. EQUIPMENT

| No. | Equipment | Model | Manufacturer | Required quantity | End use of equipment | Estimated cost KSh |
|-----|--|--|--|-------------------|----------------------|--------------------|
| 1. | *Atomic Absorption/Fame Spectrophotometer | Z-6100 | Hitachi | 1 | 15 years | |
| 2. | CEL/700-Industrial water Treatment Laboratory | CEL/700 | HACH company | 1 | Ditto | 300,000 |
| 3. | WTW-Multiline portable meter; for DO, ORP, PH, Conductivity and Salinity. | Contact manufacturer; Email:Info@WTW.com or http://www.wtw.com | Wissenschaftlich-Technische werkstalten | 1 | Ditto | 250,000 |
| 4. | WTW-Microprocessor conductivity meter, range 0-199 mmho/cm | LF96 | Ditto | 1 | Ditto | 80,000 |
| 5. | The Paqualab system for microbiological analysis of drinking water quality. | 418-160 system 50 | ELE international. Eastman way, Hemel Hemstead Hertfordshire HP2 7HB England. Fax. 44442 252474. | 1 | 10 years | 300,000 |
| 6. | Deep freezer | Contact Yamato or Toshiba, Japan | Yamato or Toshiba corporation, Japan | 1 | 20 years | 80,000 |
| 7. | *Kjeldahl Nitrogen digestion unit | 23130-20 P/N 44336-21 | HACH company, Box 389 Loveland, 10.80539 U.S.A | 1 | 10 years | 80,000 |
| 8. | *COD Reflux Apparatus | HC-407 | Central Kagaku corporation | 1 | 15 years | 60,000 |
| 9. | Hot plate/stirrer plates; 240V, 12x12' top | Z4, 593-3 | Sigma Chemicals Pool Dorset BH 177Br UK | 1 | 20 years | 60,000 |
| 10. | (a). The HACH soil shaker Assembly 230V, 50HZ Accessories- 150ml sample cups with lids each- 2500/pk (b). HACH soil crusher 120/240 Vac, 50/60 HZ | 22633-00 | HACH company | 1 | Permanent | 80,000 |
| 11. | Test kit for residual chlorine | Source from HACH company | HACH company | 1 | Ditto | 50,000 |
| 12. | Heating mantle- 4 mantle unit | Source from Yamato or Central kagaku | | 1 | Ditto | 20,000 |
| 13. | Soil sampling handle, back saver Accessories; - -Soil sampling tube, dry soil. -Soil sampling tube, dry soil. | 20587-00 | HACH company | 1 | Ditto | 20,000 |
| 14. | Timer | STBx010 | SEIKO, Japan | 2 | 10 years | 10,000 |
| 15. | Computer plus printer | Suitable model | HEWLETT PARKARD Pavilion 6635 | 2 | 15 years | 300,000 |

*Existing equipment but broken down or spares no longer available.
Price for Atomic Absorption not included.

16. Sieves with plastic frame, test aperture 25, 60, 150, 300 & 1180 SPARTEL TONES TQ97JT, UK – PHONE:
(0) 1548821 362

II. GLASSWARE AND OTHER FACILITIES

| NO. | Item | Manufacturer | Unit | Required Quantity | Estimated cost |
|-----|---|--|-------|-------------------|----------------|
| 1. | Microset pipets; Adjustable volume with suitable pipet tips 0.2-1ml 1-5ml | ADVANTEC TOYO, Toyo Roshi, Kasha Ltd, Japan. | pcs | 1 | 20,000 |
| | | | pcs | 1 | 16,000 |
| 2. | Filter unit, KG – 47 plus base for filter unit Handy Vacuum pump-HP-01, Cat. No. 17311900 | ADVANTEC TOYO, Toyo Roshi, Kaisha Ltd. Japan, | Pcs | 2 | 160,000 |
| | | | Pcs | 2 | |
| 3. | Durhan tubes (fermentation vials) | Ditto | pcs | 200 | 10,000 |
| 4. | Universal bottles (culture tubes) | Ditto | pcs | 200 | 10,000 |
| 5. | Milk dilution bottles, 100 ml (with caps). | Hach company | pcs | 100 | 10,000 |
| 6. | Graduated measuring cylinders 50 ml 100ml | IWAKI Glass, Japan | pcs | 20 | 4,000 |
| | | | pcs | 20 | 4,000 |
| 7. | Conical flasks 100 ml 300 ml | IWAKI Glass, Japan | pcs | 10 | 1,500 |
| | | | pcs | 10 | 2,000 |
| 8. | Beakers 50 ml 100 ml | Ditto | pcs | 20 | 800 |
| | | | pcs | 20 | 800 |
| 9. | Pipets graduated with rubber 2 ml 5 ml 10 ml | ditto | pcs | 10 | 500 |
| | | | pcs | 10 | 500 |
| | | | pcs | 10 | 500 |
| 10. | Screw capped heat resistant bottles; 50 ml. | Ditto | pcs | 20 | 5,000 |
| 11. | Inoculating loops-nichrome wire type | Sigma chemicals, UK | pcs | 10 | 1000 |
| 12. | Petri dishes, 60 mm diameter | Ditto | pcs | 50 | 400 |
| 13. | Spectrophotometer cuvetts for U-2000. Silica (Quartz) | Hitachi | pcs | 4 | 80,000 |
| 14. | Erlenmeyer flasks 300 ml | IWAKI Glass, Japan | pcs | 20 | 5,000 |
| 15. | Pestle and mortar | Sigma chemicals, UK | set | 4 | 2,000 |
| 16. | Stirring magnetic bars | Ditto | pcs | 10 | 200 |
| 17. | Nessler tubes 50 ml 100 ml | IWAKI Glass, Japan | pcs | 20 | 800 |
| | | | pcs | 20 | 800 |
| 18. | Burettes, 50 ml | Ditto | pcs | 10 | 8,000 |
| 20. | Washing bottles, polyethylene. 0.5 L 1 L | Sigma, chemicals, UK | pcs | 10 | 500 |
| | | | pcs | 10 | 500 |
| 21. | Heavy duty gloves | Sigma Chemicals, UK | pairs | 5 | 500 |
| 22. | Waders size, 8, 9, 10 and 11. | Ditto | Pairs | 4 | 5,000 |
| 23. | Whatman filter paper or equivalent Grade No. 1. 15 cm diameter Grade No. 41. 15 cm diameter Grade No. 42. 15 cm diameter | Whatman international Ltd. Maidstone, England | Boxes | 20 | 10,000 |
| | | | Boxes | 20 | 10,000 |
| | | | Boxes | 20 | 10,000 |
| 24. | Glass microfiber filters (GF/C) Circles 47 mm diameter Cat. No. 1822 047 | Ditto | Boxes | 40 | 400,000 |
| 25. | Nutrient absorbent pads 48 mm diameter | Ditto | Boxes | 40 | 24,000 |
| 26. | Membrane filters-CelluloseNitrate 0.45 um Millipore, 47 mm diameter,Cat No. 0454o47A | ADVANTEC TOYO, Toyo Roshi Kaisha Ltd, Japan. | Boxes | 40 | 400,000 |

III. CHEMICAL
A. HACH CHEMICALS

| No. | ITEM | CAT. No. | Required quantity | End use of item | Estimated cost KSh |
|-----|--|------------|-------------------|-----------------|-----------------------|
| 1. | Spadns Reagent solution, 50ml. | 444 - 49 | 12 | 2 years | 42,000 |
| 2. | Diphenylcarbazone powder pillows, 100/pkg | 836 - 99 | 12 | Ditto | 70,608 |
| 3. | Mercuric nitrate 2.256 N | 921 - 01 | 6 | Ditto | 19,656 |
| 4. | Digital titrator, 0.00125 ml/digit, with plastic case, manual and five delivery tubes. | 16900 - 0 | 4 | 20 years | 97,192 |
| 5. | Ferover Iron reagent, 25ml pk/100 | 854 - 99 | 8 | 2 years | 31,928 |
| 6. | Sulphide 1 reagent, 100ml mdb | 1816 - 32 | 4 | Ditto | 20,280 |
| 7. | Sulphide 2 reagent, 100ml mdb | 1817 - 32 | 4 | Ditto | 17,292 |
| 8. | Sulfaver 4 powder pillows, pk/100 | 12065 - 99 | 8 | Ditto | 40,288 |
| 9. | Mineral stabilizer 50ml SCDB | 23766 - 26 | 10 | Ditto | 28,140 |
| 10. | Nessler's reagent, 500ml | 21194 - 49 | 10 | Ditto | 62,640 |
| 11. | Polyvinyl alcohol dispensing | 23765 - 26 | 10 | Ditto | 26,420 |
| 12. | TKN indicator solution, 50ml SCDB | 22519 - 26 | 10 | Ditto | 28,650 |
| 13. | Nitraver 5 powder pillows, 25ml, pk/100. | 14034 - 9 | 10 | Ditto | 76,580 |
| 14. | DPD free chlorine 25ml, pk/100 | 14070 - 99 | 100 | Ditto | 32,870 |
| 15. | Phosver 3 reagent powder pillows, pk/100 | 2125 - 99 | 10 | 3 years | 51,880 |
| 16. | Benzene, 500ml ACS grade CAS No. 71432 | 14440 - 49 | 4 | 3 years | 45,240 |
| 17. | Buffer solution sulfate type, 500ml | 452 - 49 | 4 | 2 years | 20,280 |
| 18. | Detergent reagents pk/25 powder pillows | 1008 - 68 | 8 | Ditto | 13,536 |
| 19. | Test kit, model 17N, mid range 4 – 10 PH color disc | 1470 - 11 | 1 | Permanent | 16,735 |
| 20. | Bromocresol green methyl red pk/100 indicator powder pillows | 943 - 9 | 6 | 2 years | 46,836 |
| 21. | Manver 2 powder pillows 50ml, pk/100 | 851 - 96 | 6 | Ditto | 46,230 |
| 22. | Calver 2 calcium indicator 50 ml, pk/100 powder pillows | 8520 - 99 | 6 | Ditto | 47,148 |
| 23. | Phenol 2 reagent powder pillows | - | 6 | Ditto | 45,000 |
| 24. | 1,1,1 - trichloroethane | 21547 - 49 | 10 | 5 years | 20,000 |

TOTAL

KSh 947,429

All prices include extended cost as per AQUATECH INDUSTRIES of Box 8511, Tel: 729405 Nairobi Kenya – HACH agents.

HACH Company prices can be obtained directly through contact address; HACH COMPANY, P.O. BOX 10. 80539, Loveland, TEL: (970) 66 – 3050. U.S.A

B. OTHER CHEMICALS

| No. | Item | Unit pack | Required quantity | Estimated cost |
|-----|--|-----------|-------------------|----------------|
| 1. | Calcium sulfate | 500g | 1 | 800 |
| 2. | Sodium salicylate | 500g | 1 | 2,200 |
| 3. | Sodium hydroxide | 500g | 5 | 4,000 |
| 4. | Sulfuric acid | 500ml | 6 | 16,000 |
| 5. | Nitric acid | 500ml | 6 | 16,000 |
| 6. | Hydrochloric acid | 500ml | 6 | 16,000 |
| 7. | Hydrogen peroxide 100 vols. | 1L | 5 | 1,200 |
| 8. | Diphenylamine indicator | 10g | 1 | 800 |
| 9. | Hydrazine sulfate | 500g | 1 | 4,000 |
| 10. | Ammonium ferrous sulfate | 500g | 2 | 4,000 |
| 11. | O-phenanthroline-monohydrate | 10g | 1 | 700 |
| 12. | Sodium Metasilicate | 500g | 1 | 1000 |
| 13. | Tin chloride | 500g | 2 | 3,800 |
| 14. | Glycerol | 500ml | 6 | 3,800 |
| 15. | Silver sulfate | 25g | 4 | 20,000 |
| 16. | 1,10 phenanthroline | 10g | 1 | 800 |
| 17. | Ammonium solution | 500ml | 6 | 1,500 |
| 18. | Sodium thiosulfate | 500g | 1 | 2,800 |
| 19. | Potassium hydroxide | 500g | 4 | 3,500 |
| 20. | Sodium periodate | 500g | 1 | 1,500 |
| 21. | Potassium persulfate | 500g | 2 | 3,200 |
| 22. | Sulphanilamide | 100g | 1 | 4,000 |
| 23. | N-1-N Naphthylenediamine dihydrochloride | 100g | 1 | 6,000 |
| 24. | Ferrous sulfate | 500g | 1 | 1,000 |
| 25. | Mercuric Iodide | 100g | 1 | 5,000 |
| 26. | Sodium potassium tartrate | 500g | 1 | 4,000 |
| 27. | Silver Nitrate | 25g | 4 | 28,000 |
| 28. | Sodium sulfite | 500g | 1 | 1,000 |
| 29. | Ammonium sulfamate | 500g | 1 | 1,500 |
| 30. | Thymol | 100g | 1 | 1,500 |
| 31. | Hydrofluoric acid (HF) | 500ml | 6 | 3,000 |
| 32. | Sodium Oxalate | 500g | 1 | 800 |
| 33. | Cupric Sulfate | 500g | 1 | 1,800 |
| 34. | Dichloroisocyanuric acid-Sodium salt | 500g | 1 | 3,000 |

Manufacturer's contact; KANTO CHEMICAL CO. INC. 2-8, Nihonbashi, 3-chrome, chuo-ku, Tokyo.

C. BACTERIOLOGICAL MEDIA

| No. | Item | Manufacturer | Required quantity | Estimated cost |
|-----|--------------------|---------------------------|-------------------|----------------|
| 1. | EC – Broth | Difco Laboratories | 500g | 10,000 |
| 2. | MacConkey Broth | Ditto | 500g | 9,000 |
| 3. | Salmonella shigela | Ditto | 500g | 9,000 |
| 4. | Ethyl alcohol | Kanto chemicals, Japan | 10L | 3,000 |
| 5. | Crystal violet | Ditto | 10g | 2,000 |
| 6. | Safranin | Ditto | 10g | 1,000 |

TOTAL

KSh 34,000

Questionnaire

on

the Study on

the Project for Nakuruu Municipality Environmental Management Capacity Building

in the Republic of Kenya

March 2004

Preparatory Evaluation Study Team of JICA

| Item | | Description | Availability | Remarks |
|---|--|--|--------------|-------------------------------------|
| A. General information of the Nakuru District and Municipality of Nakuru | | | | |
| 1 | Social and economical indicators | Latest and past 5years | | |
| | Production of major industries | | Yes | Statistical Abstract-2003 |
| | Economical statistic in the District | | Yes | Economic Survey 2003 |
| | Number of major facilities of social welfare (hospitals, relational places, administrative offices, community centers) | | Yes | Information of District Office |
| | Educational system and situation | Standard education, Middle and higher education, adult education and environmental education | Yes | Information of District Office |
| | Length of paved roads in the Nakuru district | | No | |
| | Situation of water supply in the region | | Yes | NLUO data Print out |
| | Situation of electric supply in the region | | No | |
| | Situation and system of waste collection and disposal | | Yes | NLUO data Print out |
| 2 | Population statistics | | | |
| | National, Provincial and District level population data for past 5 years | | Yes | 1999 Population and Housing Census |
| | Population distribution by age, sex, race, location, occupation, education in the district | | Yes | 1999 Population and Housing Census |
| | Number of household in the district | | Yes | 1999 Population and Housing Census |
| | Resettlement situation | | Yes | 1999 Population and Housing Census |
| 3 | Administrative structures in the district / the municipality | | | |
| | Organization chart of each organization | | Yes | Data of Town Clark, MCN |
| | Budget and financial status for each organization | | Yes | L.A.Code 576 2003/2004 Estimates |
| | Number of staffs | | Yes | Data of Town Clark, MCN |
| 4 | Development Plan and Projects in the district and the municipality | | | |
| | Completed projects | | No | |
| | Ongoing projects | | No | |
| | Suspended plan and projects | | No | |
| | Development plan | | Yes | District Development Plan 2002-2008 |
| 5 | Maps and data for the province/the district | | | |
| | Topographic map | Include index map, scale, year, agency in charge of management | Yes | Nakuru Municipality 1:10,000 |
| | Administrative map | | Yes | A New Wall map of Kenya |
| | Land use map | | Yes | NLUO data Print out |
| | Land ownership map / Cadastral map | | No | |
| | Transportation map | | Yes | Kenya Traveler's Map |
| | Parks and reserves map | | Yes | Kenya Traveler's Map |
| | Vegetation map | | Yes | Macmillan Secondary School Atlas |
| | Geological map | | Yes | Macmillan Secondary School Atlas |
| | Soil and land classification map | | Yes | Macmillan Secondary School Atlas |
| | GIS data and system | | Yes | NLUO data Print out |
| | Satellite image | | Yes | NLUO data Print out |
| | Aerial photographs | | No | |

| Item | | Description | Availability | Remarks | |
|---|----------------------------|--|--|---------|----------------------------------|
| 6 | Meteorological information | | | | |
| | | Situation of meteorological station in the province (Number, location, agency in charge of management) | No | | |
| | | Temperature | Daily /Monthly record for past 6 years | No | |
| | | Humidity | Daily /Monthly record for past 6 years | No | |
| | | Evaporation | Daily /Monthly record for past 6 years | No | |
| | | Precipitation | Daily /Monthly record for past 6 years | Yes | Nakuru Monthly Rainfall Totals |
| | | Record of disaster | Annual record | No | |
| | | Sediment record of the Lake Nakuru | | No | |
| B. Organization and Structure of Governmental Administration | | | | | |
| 1 | MENRW | | | | |
| | | Organization Chart | | No | |
| | | Finance and budget | | No | |
| | | Staffs | | No | |
| | | Functions and activities | | No | |
| 2 | MOWRMD | | | | |
| | | Organization Chart | | No | |
| | | Finance and budget | | Yes | Hearing of P.S. |
| | | Staffs | | No | |
| | | Functions and activities | | Yes | Hearing of P.S. |
| 3 | NEMA | | | | |
| | | Organization Chart | | Yes | Hearing of P.S. |
| | | Finance and budget | | No | |
| | | Staffs | | No | |
| | | Functions and activities | | Yes | Hearing of P.S. |
| 4 | MCN | | | | |
| | | Organization Chart | | Yes | Hearing of T.C. |
| | | Finance and budget | | Yes | L.A.Code 576 2003/2004 Estimates |
| | | Staffs | | Yes | Hearing of T.C. |
| | | Functions and activities | | Yes | Hearing of T.C. |
| 5 | DEC/DETC | | | | |
| | | Organization Chart | | Yes | Hearing of the Secretary of DEC |
| | | Finance and budget | | Yes | Hearing of the Secretary of DEC |
| | | Staffs | | Yes | Hearing of the Secretary of DEC |
| | | Functions and activities | | Yes | Hearing of the Secretary of DEC |

| Item | | Description | Availability | Remarks |
|---|--|--------------------------|--------------|------------------------------------|
| 6 | KWS | | | |
| | | Organization Chart | No | |
| | | Finance and budget | No | |
| | | Staffs | No | |
| | | Functions and activities | Yes | Hearing of Worden Office in Nakuru |
| 7 | MOLG | | | |
| | | Organization Chart | No | |
| | | Finance and budget | No | |
| | | Staffs | No | |
| | | Functions and activities | Yes | Hearing of P.S. |
| 8 | NAWAS | | | |
| | | Organization Chart | Yes | Activity Report of NAWASS |
| | | Finance and budget | Yes | Activity Report of NAWASS |
| | | Staffs | Yes | Activity Report of NAWASS |
| | | Functions and activities | Yes | Activity Report of NAWASS |
| 9 | Agriculture, Forestry and related department for environment management in the Nakuru district | | | |
| | | Organization Chart | No | |
| | | Finance and budget | No | |
| | | Staffs | No | |
| | | Functions and activities | No | |
| C. Environmental Laws, Regulations, Standards and Policies | | | | |
| 1 | National Level | | Yes | Kenya Gazette Supplement |
| 2 | Regional Level (Rift valley Province, Nakuru Distinct and Municipality of Nakuru) | | Yes | Kenya Gazette Supplement |
| 3 | Lake Nakuru National Park (Inside of the park and its surroundings) | | Yes | Kenya Gazette Supplement |
| 4 | Situation of EIA in Nakuru District | | Yes | Kenya Gazette Supplement |
| | Provide a copy of representative report of very important EIA study in the district | | | |
| D. Activities and Studies of Environmental Management in Nakuru District and Catchments of Lake Nakuru | | | | |
| 1 | District office | | Yes | Hearing of the Secretary of DEC |
| 2 | Municipality council of Nakuru | | Yes | Hearing of the Secretary of DEC |

| Item | | | Description | Availability | Remarks |
|------------------------------|---|-----------------------------|-------------|--------------|--------------------------------|
| | 3 | KWS | | Yes | Hearing of Head of KWS |
| | 4 | NGOs | | Yes | Hearing of ITDG |
| | 5 | International organizations | | Yes | Hearing of AFD |
| | 6 | Nairobi University | | No | |
| | 7 | Egerton Collage | | Yes | Hearing of Dean of Fac.of Env. |
| | 8 | Other Organization | | No | |
| E. International NGOs | | | | | |
| | 1 | WWF | | | |
| | | Organization Chart | | No | |
| | | Finance and budget | | No | |
| | | Staffs | | No | |
| | | Functions and Activities | | No | |
| | 2 | ITDG | | | |
| | | Organization Chart | | Yes | Hearing of ITDG |
| | | Finance and budget | | Yes | Hearing of ITDG |
| | | Staffs | | Yes | Hearing of ITDG |
| | | Functions and Activities | | Yes | Hearing of ITDG |
| F. Private Sector | | | | | |
| | 1 | KNCCCL | | | |
| | | Organization Chart | | No | |
| | | Finance and budget | | No | |
| | | Staffs | | No | |
| | | Functions and Activities | | No | |
| | 2 | KAM | | | |
| | | Organization Chart | | No | |
| | | Finance and budget | | No | |
| | | Staffs | | No | |
| | | Functions and Activities | | No | |

| Item | | Description | Availability | Remarks |
|--|--|-------------|--------------|--------------------------------|
| 3 | Private Sector Alliance | | | |
| | Organization Chart | | No | |
| | Finance and budget | | No | |
| | Staffs | | No | |
| | Functions and Activities | | No | |
| G. Local NGOs and CBOs in Nakuru District | | | | |
| | Name of organization | | Yes | JICA Directory of NGO in Kenya |
| | Contact address, telephone number, mail address | | Yes | JICA Directory of NGO in Kenya |
| | Name of person in-charge and title | | Yes | JICA Directory of NGO in Kenya |
| | Specialty / Field of services | | Yes | JICA Directory of NGO in Kenya |
| | Record of activity in connection with environment in Nakuru area | | Yes | JICA Directory of NGO in Kenya |
| H. International aid or support activities in Nakuru District | | | | |
| 1 | DFID | | | |
| | Name of project | | No | |
| | Type and scope of project | | No | |
| | Kind of support (technical / financial) | | No | |
| | Project cost amount and period or duration of support | | No | |
| | Copy of reports for projects | | No | |
| 2 | UNEP | | | |
| | Name of project | | No | |
| | Type and scope of project | | No | |
| | Kind of support (technical / financial) | | No | |
| | Project cost amount and period or duration of support | | No | |
| | Copy of reports for projects | | No | |
| 3 | AFD | | | |
| | Name of project | | Yes | Hearing of AFD |
| | Type and scope of project | | Yes | Hearing of AFD |
| | Kind of support (technical / financial) | | Yes | Hearing of AFD |
| | Project cost amount and period or duration of support | | Yes | Hearing of AFD |
| | Copy of reports for projects | | No | |
| 4 | USAID | | | |
| | Name of project | | No | |
| | Type and scope of project | | No | |
| | Kind of support (technical / financial) | | No | |

| Item | | Description | Availability | Remarks |
|--|-------|--|--------------|----------------------------|
| | | Project cost amount and period or duration of support | No | |
| | | Copy of reports for projects | No | |
| 5 | Other | | | |
| | | Name of agent / country of origin | No | |
| | | Name of project | No | |
| | | Type and scope of project | No | |
| | | Kind of support (technical / financial) | No | |
| | | Project cost amount and period or duration of support | No | |
| | | | | |
| I. Situation of Sewage System and Facilities | | | | |
| | | Copy of operation reports for the sewage system and activity | Yes | Site Visit |
| | | Function and usage of facilities | Yes | Site Visit |
| | | Organization and function of management for the system | Yes | Site Visit |
| | | Situation of activities for maintenance | Yes | Site Visit |
| | | | | |
| J. Situation of River Management | | | | |
| | | Name of responsible organization | No | |
| | | Function and structure of organization | No | |
| | | Activities | No | |
| | | Budget | No | |
| | | Plan | No | |
| | | Issues | No | |
| | | | | |
| K. Situation of Watershed Management for Lake | | | | |
| | | Name of responsible organization | Yes | Hearing of Town Clark, NCN |
| | | Function and structure of organization | Yes | Hearing of Town Clark, NCN |
| | | Activities | Yes | Hearing of Town Clark, NCN |
| | | Budget | Yes | Hearing of Town Clark, NCN |
| | | Plan | Yes | Hearing of Town Clark, NCN |
| | | Issues | Yes | Hearing of Town Clark, NCN |
| | | | | |