African Center for Aquatic Research and Education

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State of Lake Tanganyika

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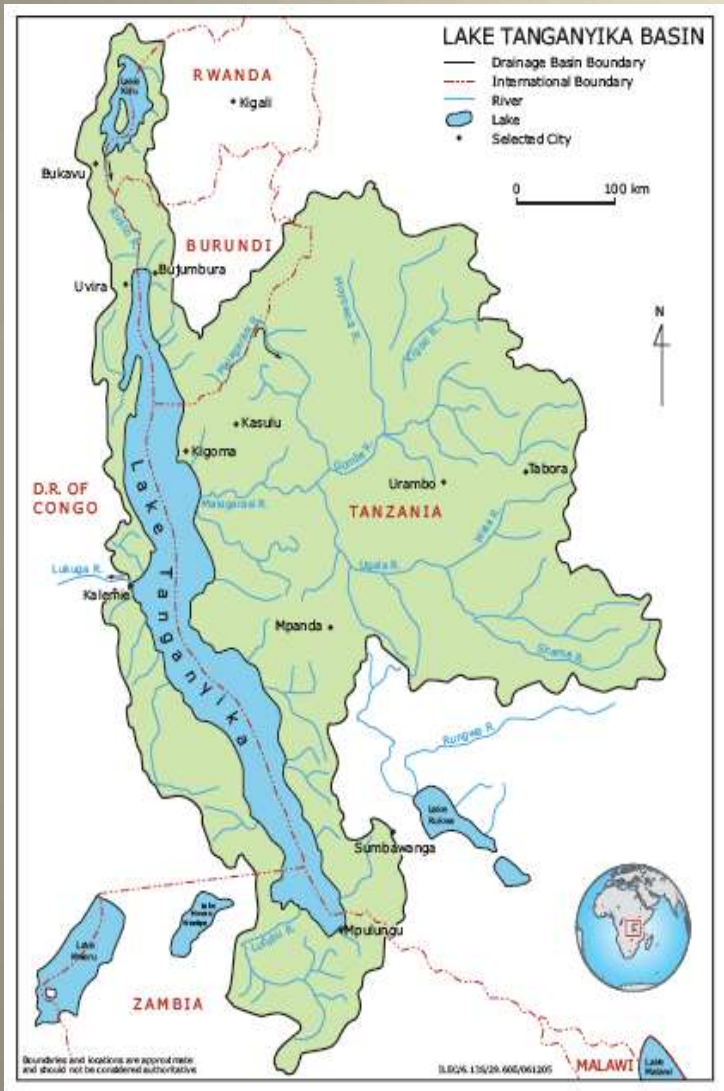
<u>Countries represented:</u>
Democratic Republic of Congo
United Republic of Tanzania
Republic of Burundi
Republic of Zambia

Introduction

Basic information about Lake Tanganyika and its drainage basin



Altitude (surface)	773 m
Surface area	32,000 km^2
Volume	18,940 km^3
Maximum depth	1,470 m
Average depth	570 m
Residence time	440 years
Drainage area	220,000 km^2
Population in drainage area	>10 million
Population density in drainage area	45/km^2
Length of lake	670 km
Length of shoreline	1,900 km
Plant and animal species	>2,000 species
Commercial fish species	Clupeids, Centropomids

Introduction…

What's the problem?

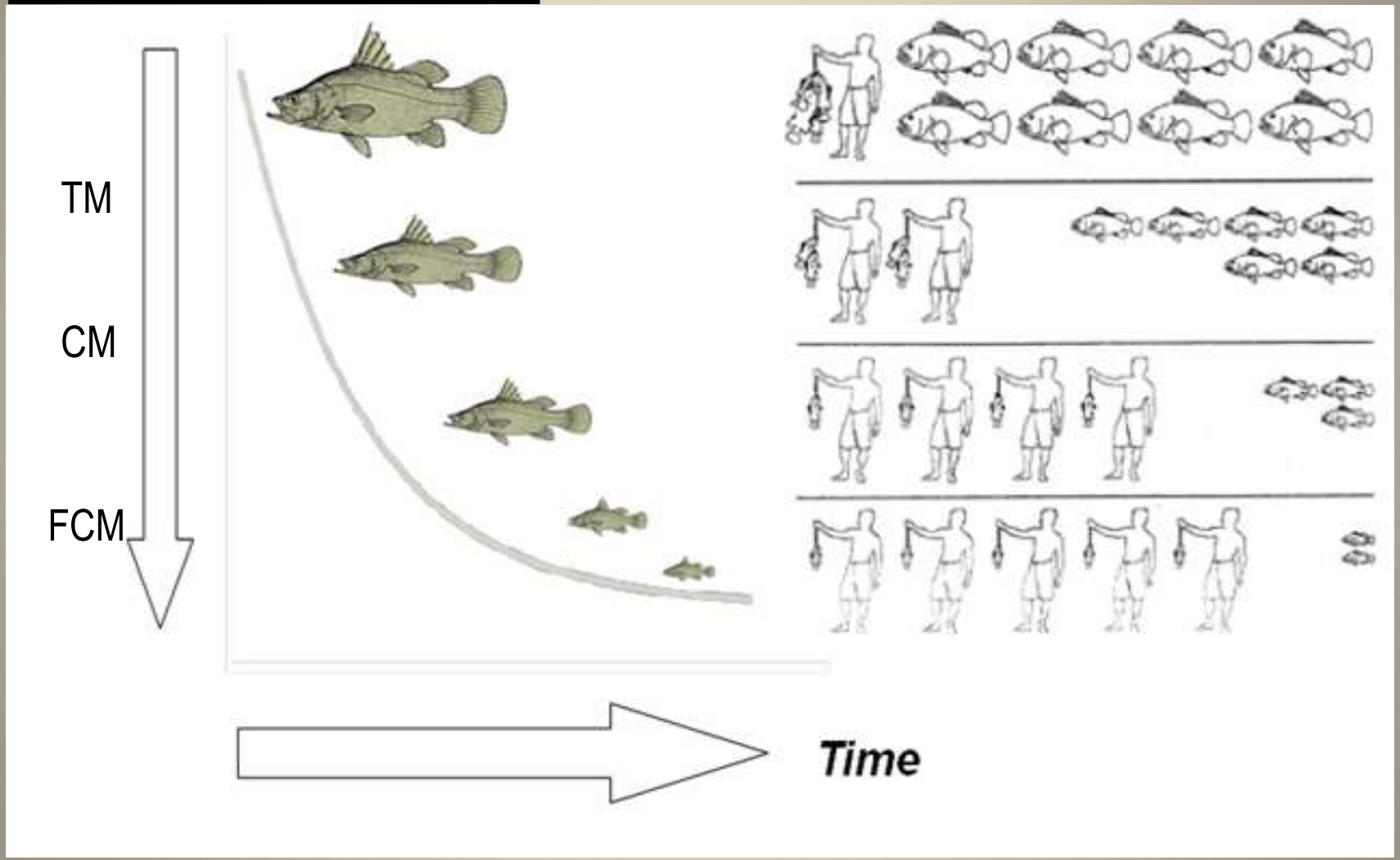


Figure X: Reduction in average quantities and size caught over management regimes

The threats

- Sedimentation, pollution and overexploitation ranked Lake Tanganyika as the ‘most threatened Lake’ in 2017.

The threats…

- Over-exploitation of the fishery and siltation caused by erosion from deforested areas are considered the main threats to the health of the lake.

  - underwater habitat degradation is taking place adjacent to hill slopes.
  - rapid deforestation – creation of agricultural lands or for urban expansion - in the fast growing population centers around the lake.
    - rapid increase in the amount of loose sand and mud being washed into the lake – affecting the lake floor.

The threats…

- increased population pressure and now climate change are causing fish stocks, biodiversity, and water quality to decline.

Danger of sediment/pollution

- Hundreds of lake species inhabit the sunlit shallows.
  - Eroded sediments are being carried into the lake, affecting biodiversity.
  - Leads to the lack of drinking water for the riparian communities (untreated industrial and domestic waste directly discharged into the lake, lubricants, etc).
  - Continuous shallowing.

Danger of sediment…

- Effects on the littoral environment
  - covering benthic algae,
  - harming algal communities,
  - decreasing the foraging efficiency of herbivorous fish,
  - affecting fish populations by reducing the nutritional value of detritus,
  - decreasing habitat complexity,
  - filling crevices and other sheltered areas.

Overexploitation

- Fishing pressure is also affecting the lake.
  - fishing yield has declined dramatically - partially caused by the unsustainable growth in fisheries.
  - Between 1995 and 2011, the total fish stock has decreased by 25 %, the number of fishermen increased fourfold, while the harvest per fisherman per year decreased by 81 %.

Other pressures

Warming lake

- Global climate change related to increased greenhouse gas emissions – rendering surface waters of Lake Tanganyika warming rapidly.
  - This warming has had serious consequences for the lake's fragile ecosystems.
  - Warm water is relatively light and struggles to mix with the deeper layers of the lake - keeping the vast pools of nutrients from floating plankton, food for most fish populations.

Warming lake…

- Unfortunately, this trend is unlikely to be reversed as long as the climate in the region continues to warm.

- Even small changes in lake temperature can cause major disruptions in the lake's ecological stability.
  - reduction in biological productivity in the lake.

The search for oil and gas deposits

- Rift lake sediments of Lake Tanganyika are well known as reservoirs of hydrocarbons.
  - consequences of actual production are still unknown – hence need for careful study and environmental planning before production proceeds.

Invasive species

- Invasive species (e.g. Water Hyacinth) are observed especially at the ports of Bujumbura (Burundi) and Kigoma (Tanzania).
  - Water hyacinth can smother aquatic life by deoxygenating the water,
  - Water hyacinth reduces nutrients for young fish in sheltered bays.
  - Traces of *Oreochromis niloticus*

What the future holds and Recommendations

- lack financial resources to embark on international fundraising campaigns
  - Need to secure funds for the conservation and management of the lake's rich natural resources.
  - Strengthen international cooperation through regional bodies such as the LTA

- Weak entry regulation to cut down on overcapacity
  - Entry into the fishery and migrations should be regulated by strict guidelines supported by policy.

What the future holds and Recommendations…

- Limited alternative livelihoods to address over dependence on fisheries
  - develop viable economic alternatives to fishing e.g. eco-tourism, cage fish farming, …
- Poorly defined use and/or ownership rights
  - secure use rights and management rights to fishery resources
- Political interference
  - establish vigorous, fair and sustained law enforcement
  - raise profiles of stakeholder groups in policy-making through extension education

What the future holds and Recommendations…

- Insufficient interaction between scientists and LKHs
  - Support research in needy areas to in turn support fisheries management.

    (e.g. sedimentology/pollution, biodiversity, resource exploitation, climate change, human dimensions, limnology, etc.).

- *De facto* local community participation is low
  - policy should emphasize participation in village fisheries management committees.
  - new participants unfamiliar with concepts and jargon of fisheries management must receive necessary attention.
  - Cost of participating (time, money) must outweigh expected benefits.

Acknowledgements

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Thanks for your attention!