Factsheet #2

Spatio-temporal dynamics of groundwater quality in the Etosha region

Does groundwater quality change over the years as new boreholes are drilled in the Etosha region?

- The National Groundwater Information System (GROWAS) has 1126 boreholes drilled between 1901 and 2000 in the Etosha region. It shows a relatively constant groundwater quality since the 1930s (Fig.1); few boreholes were drilled in the first 30 years and no data was available after 2000.
- TDS/EC, NO_3, F are the typical parameters causing poor/very poor/unsuitable water quality.
- No distinct change emerged over the decades – this might reflect drilling & siting development, hydrogeological knowledge or change in water management practice, land use and climate.

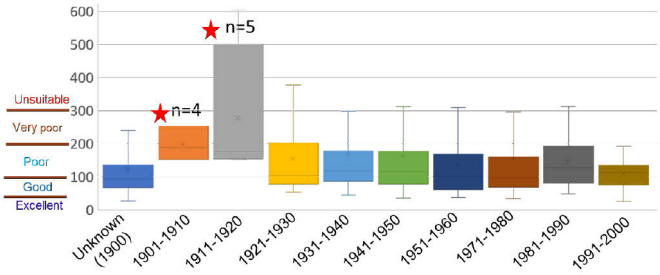


Figure 1: Decadal water quality index (WQI) of boreholes drilled between 1901 and 2000 in the Etosha region (GROWAS data); the star denotes insufficient observation; no data was available after 2000.

To what extent did groundwater quality measured during borehole installation change when compared to current measurements (2020) in the Etosha region?

- Based on 68 matching samples from the GROWAS and our 2020 sampling, water quality remains the same at 44 % of the boreholes (Fig. 2).
- However, water quality deteriorated at 40 % of the boreholes. This occurrence was more pronounced in livestock and private game reserves.
- The number of boreholes with deteriorated water in livestock farms and private game reserves was at least twice higher than in conservancies and national parks.
- In contrast, the number of boreholes with improved water quality in conservancies and national parks was at least two times higher than in livestock farms and private game reserves.

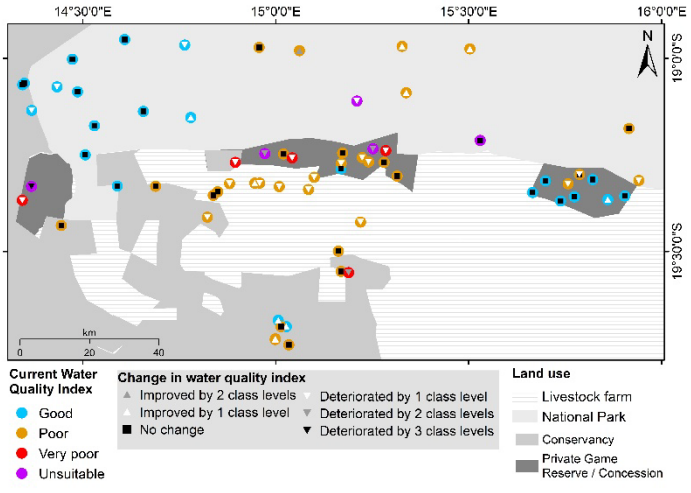


Figure 2: Dynamics of WQI between borehole record at installation and our 2020 sampling.

Cover Photo: Martin Hipondoka

Does borehole water typically deteriorate during the dry season and when provided in concrete and mud troughs for watering game animals?

- For the dry and wet seasons, analysis of 41 matching samples reveals that water quality deteriorates at a quarter of the boreholes (Fig. 3).
- Nearly half (46 %) of borehole water quality remains unchanged; surprisingly, up to a third improves.
- For the water quality between the supplying source and in concrete and mud troughs, analysis at 47 matching samples revealed that water deteriorates at a third of the samples (Fig. 4).
- No change in water quality was recorded at two-thirds of samples in troughs and the supplying source.

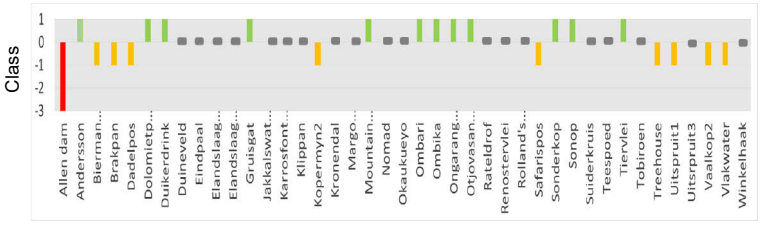


Figure 3: Water quality class change between the wet (May 2022) and dry seasons (Nov 2020); no change (46.3 %), improved (29.3 %), deteriorated (24.4 %)

Figure 4 A

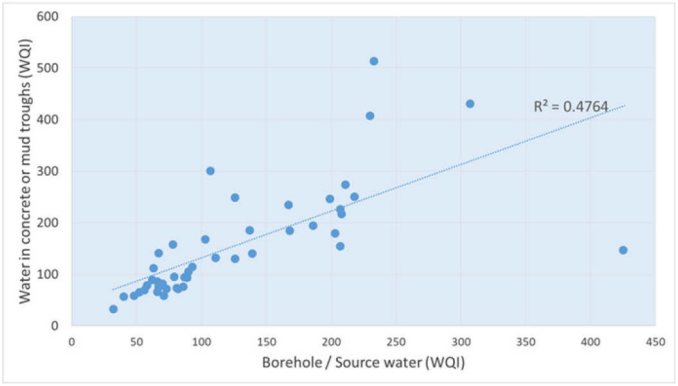
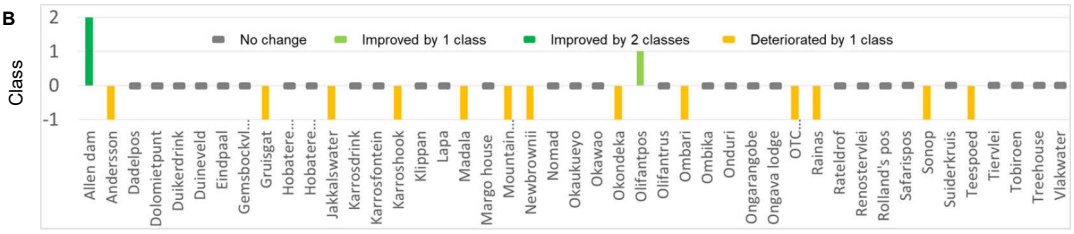


Figure 4: Water quality change between borehole or source water and concrete or mud troughs for watering game animals
A) Difference in WQI; points lying above and below the line have water in troughs deteriorated and increased, respectively;
B) Class change: no change (66.7 %), deteriorated (28.9 %), improved (4.4 %).

Figure 4 B



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The ORYCS Project

The German-Namibian research project “ORYCS – Options for sustainable land use adaptations in savanna systems” aims to assess the suitability of wildlife management strategies in Namibia as options for adapting land use to climate change in savanna ecosystems.

www.orycs.org

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