

Epizootic Ulcerative Syndrome (EUS) in Africa – current state

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INTRODUCTION

Epizootic Ulcerative Syndrome (EUS) is “a seasonal epizootic condition of freshwater and estuarine warm water fish of complex infectious etiology characterized by the presence of invasive *Aphanomyces* infection and necrotizing ulcerative lesions typically leading to a granulomatous response”.

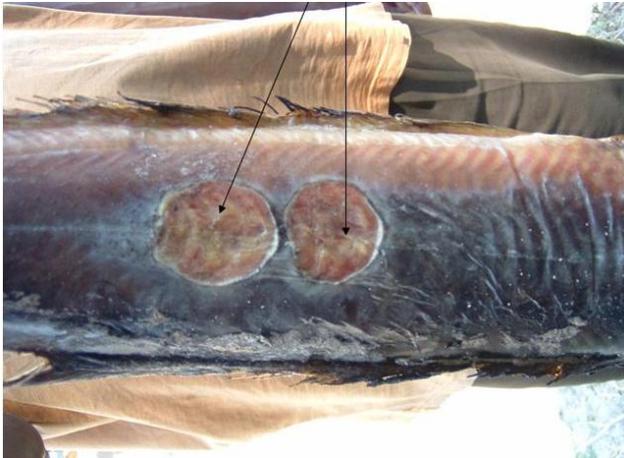
Mass mortality of wild and cultured fish



EFFECTS OF THE DISEASE

1. Leads to significant losses of income to the fisheries industry.
2. Negative biodiversity to the river ecosystems.
3. Social impact on communities dependent on fish.
4. Potential public health risk from infected fish due to opportunistic Bacterial infections.

EUS causes deep haemorrhagic ulcers (Ulcerative → Ulceration)





Parasite

Possible causes include:

- Abrasion
- Acidified water exposure
- Viral dermatitis
- Bacterial dermatitis
- Skin damaged by parasites
- Heavy rainfall and flooding

Pathogenicity of *A. invadans*

Common elements:

1. Exposure of dermis in a susceptible fish species;
2. Attachment of *A. invadans* to the exposed dermis;
3. Subsequent fungal invasion of underlying tissues.

Diagnostic methods (OIE, 2009)

A) Field diagnostic methods

B) Clinical methods

C) Agent detection and identification methods

A. Field diagnostic methods

- Mass mortality of various species of freshwater fish in the wild and in farms during periods of low temperatures and after periods of heavy rainfall
- Loss of appetite and fish become darker
- Infected fish may float below the water surface, and become hyperactive with a very jerky pattern of movement.

B) Clinical methods

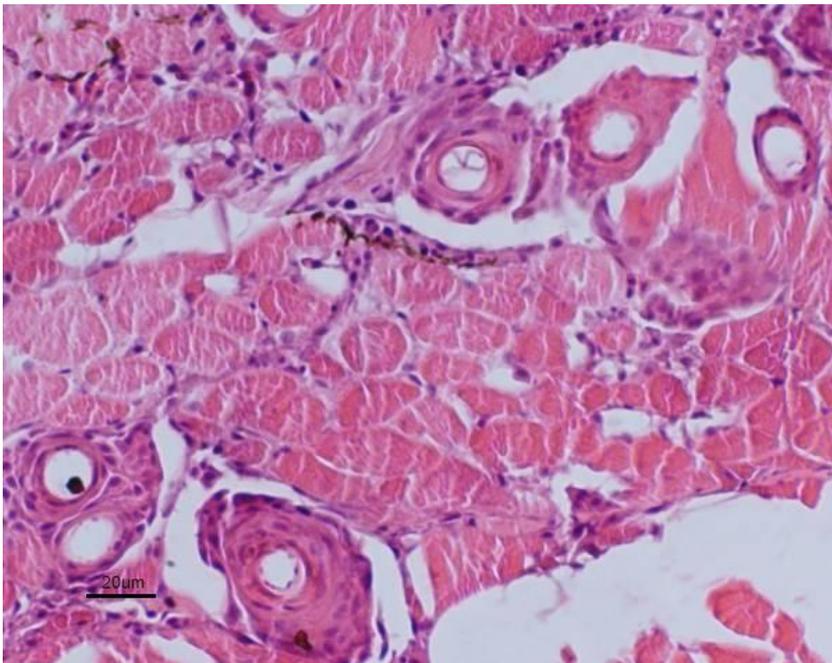
- Development of red spots followed by small to large ulcerative lesions on the body surface, head, operculum or caudal peduncle
- In later stages, large red or grey shallow ulcers, often with a brown necrosis, are observed



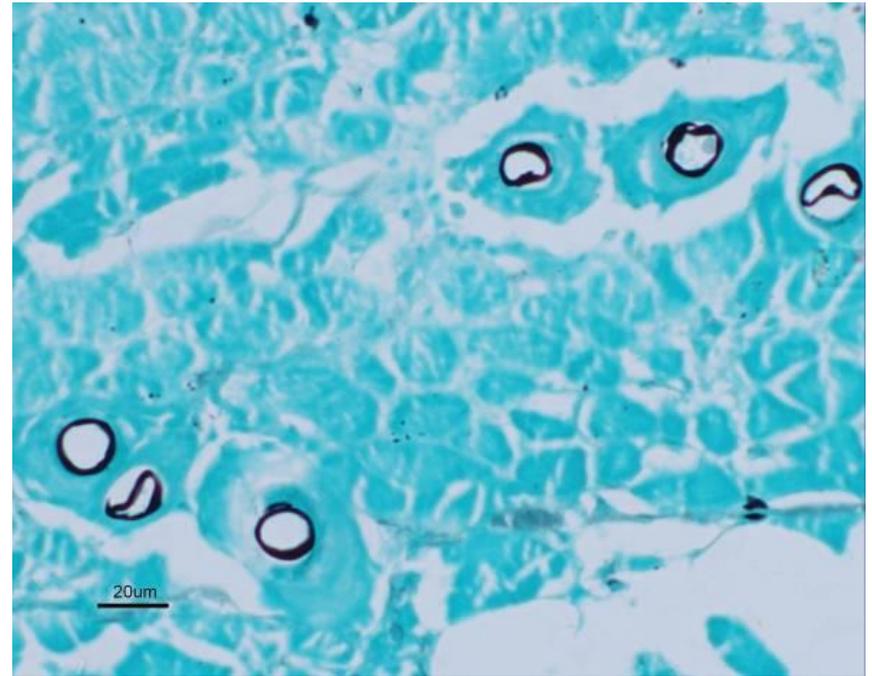
C) Agent detection and identification methods

1. Histopathology

Aphanomyces invadans elicits a strong inflammatory response and granulomas are formed around the penetrating hyphae



H & E staining



Glocott's staining

- 2. Isolation of *Aphanomyces invadans* from internal tissues**
- 3. Identification of pure *Aphanomyces invadans* isolates by Polymerase Chain Reaction**

EPIZOOTIC ULCERATIVE SYNDROME IN AFRICA

In 2006, fish caught in the Chobe–Zambezi River were found with clinical signs of ulcers and focal areas of skin inflammation.

In 2007, the disease was confirmed as EUS, by the OIE reference Laboratory in Thailand with the support of FAO.

EUS was confined only to Asia, Australia and America.

Southern Africa



Original Endemic areas of EUS



As from 2007, the disease was being reported in Namibia and Zambia.

In Namibia the disease was being reported on fish farms, while in Zambia, the wild fisheries were affected.

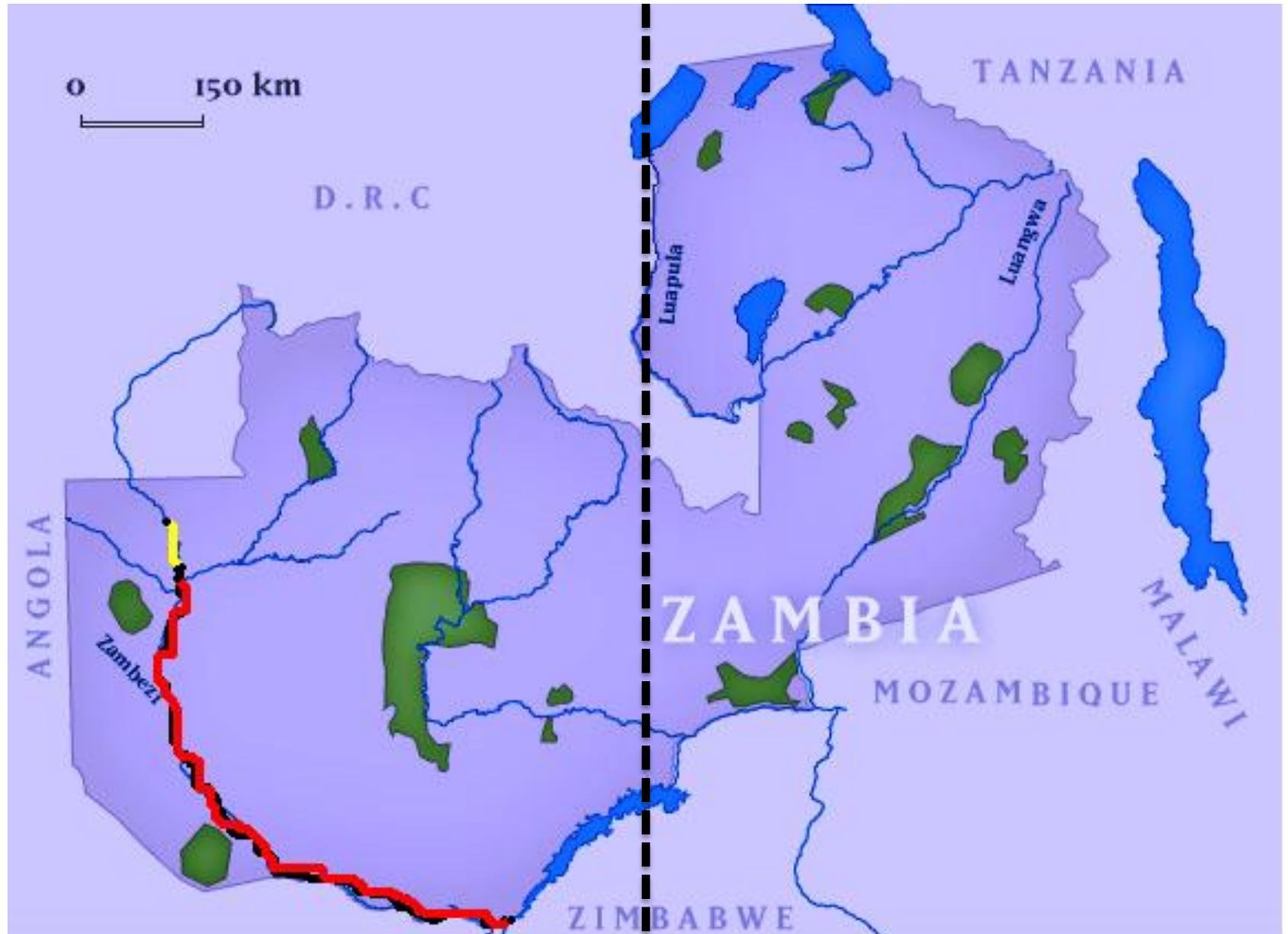
By 2008 and 2009, the entire Zambezi river was affected with its tributaries on the upper part.

In 2010, the disease was reported in the Kafue River.

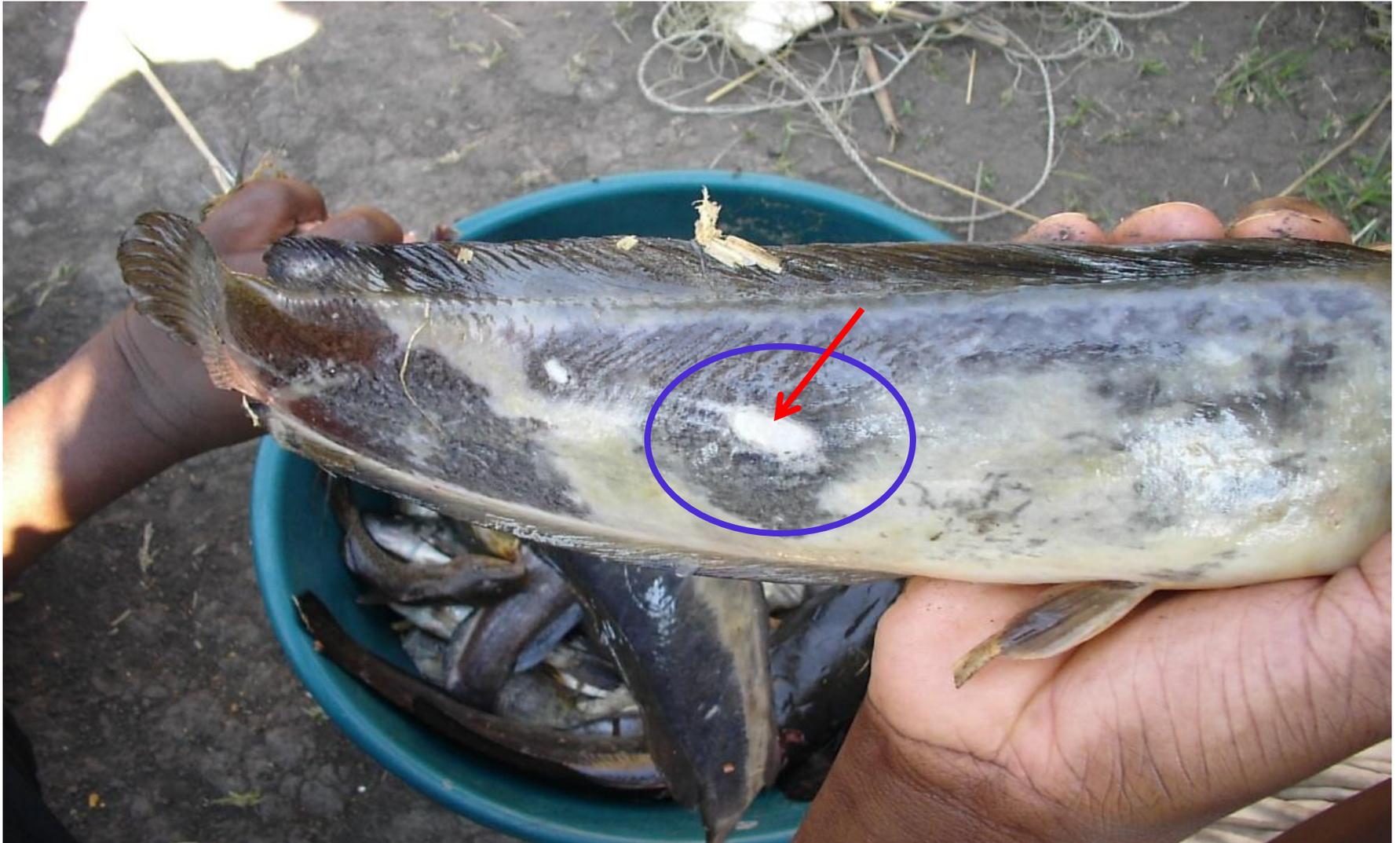
In 2011, the disease was confirmed in some tributaries of the Kafue river (Chongwe river). Zambia has been mostly affected.

WHY??

EUS in Zambia



Currently in Zambia, we have observed Enzootic stability in disease occurrence. Some species have shown signs of healing.



Current African situation

In the region, the disease has been reported in:

- Zambia
- Namibia
- Botswana
- Recently South Africa.

Namibia: Disease confirmation were made up to 2010.

Botswana: The Okavango delta reported clinical signs of the disease in 2010.

South Africa:

The disease has affected wild fish:

- Bluegill sunfish (*Lepomis macrochirus*)
- Cichlid (*Cichlidae*)- were affected, but in-contact trout in cages in the dam were not affected.

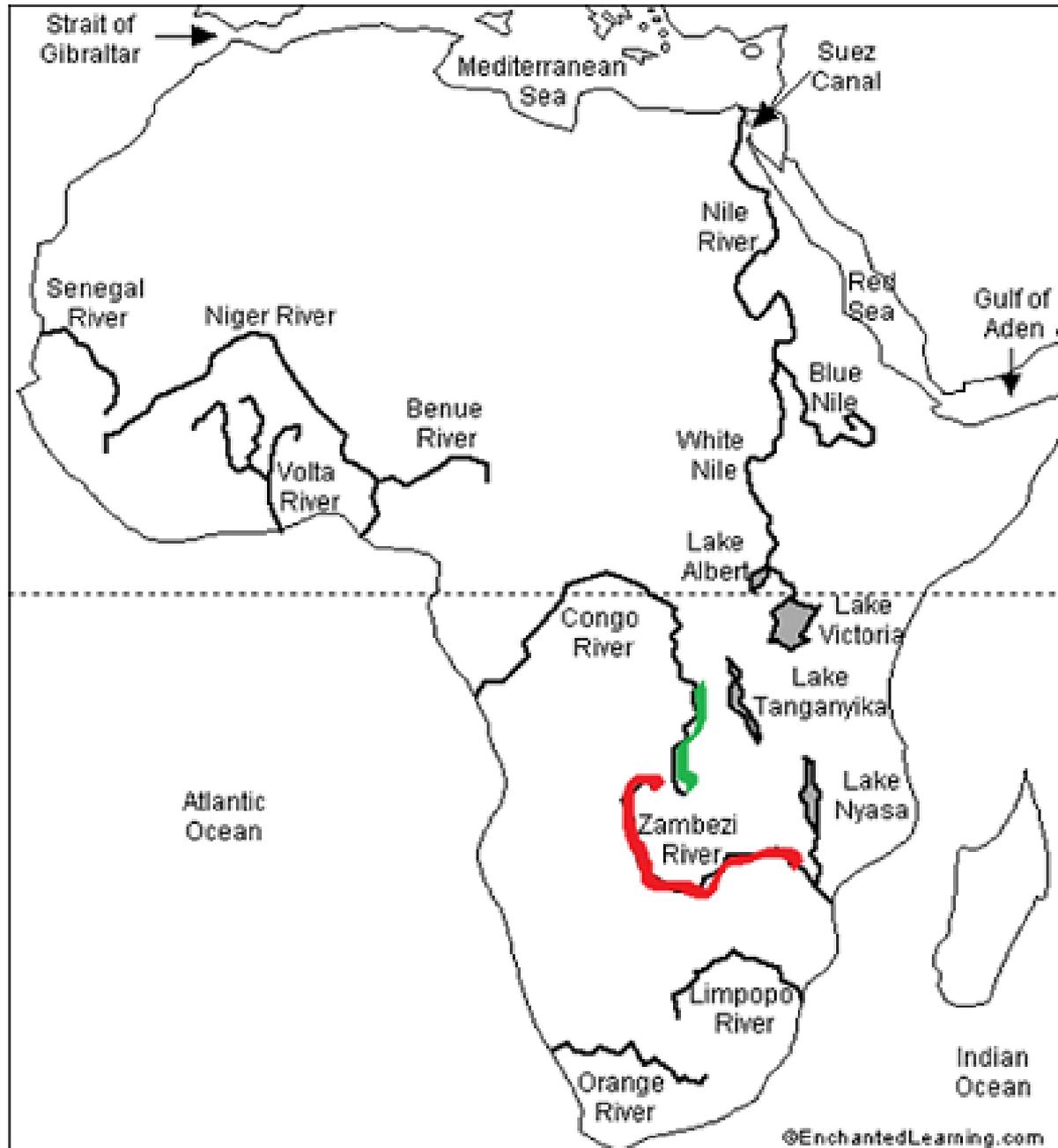
The fish were found in a semi-closed fresh water pond and this is the first incidence of the disease to be reported in South Africa.

Another report is on the fresh water sharptooth catfish.

World wide EUS outbreaks recorded



EUS occurrence by major river systems in Africa



Drainage system of Africa





Lake Albert

Lake Turkana

Congo

Lake Victoria

Lake Tanganyika

Lake Nyasa

Congo
Ubangi

Zambesi
Zambezi

Nambezi

Disease Monitoring/Information gathering

Locally the information about the disease is acquired through:

- Fishermen
- Fisheries technicians
- Politicians
- Traditional leaders
- Area Veterinary officials

Internationally, the information is gathered through the FAO focal points and analysis of samples sent to the laboratory

Species Affected

So far all the species we have found are those documented by the OIE (Manual of Diagnostic Tests for Aquatic Animals 2009).

Prevention and control

- Control of EUS in natural waters is probably impossible. The most effective way of controlling the spread of the disease is to restrict the movement of fish (and/or contaminated material) from infected areas to uninfected areas.
- In outbreaks occurring in small, closed water-bodies, liming water and improving water quality, together with removal of infected fish, is often effective in reducing mortalities and controlling the disease.

Possible routes of Disease entrance in Africa (Zambezi basin)

1. Unrestricted/unregulated imports of fish products into some southern African countries.
2. Sources of bait for angling sporting activities.

THE DISEASE COULD HAVE ALSO BEEN IN THE
ECOSYSTEM OF THE ZAMBEZI BASIN AND WAS
THEREFORE WAITING FOR RIGHTFUL CONDITIONS TO
PROLIFERATE ??????????

EUS SURVEILLANCE EXPENDITION IN ZAMBIA



THANK YOU FOR YOUR ATTENTION