Welcome

Presentation by Mary Mkhonto
Msc Zoology
Supervisor: JHJ Van Vuren
Zoology Department, University of Johannesburg
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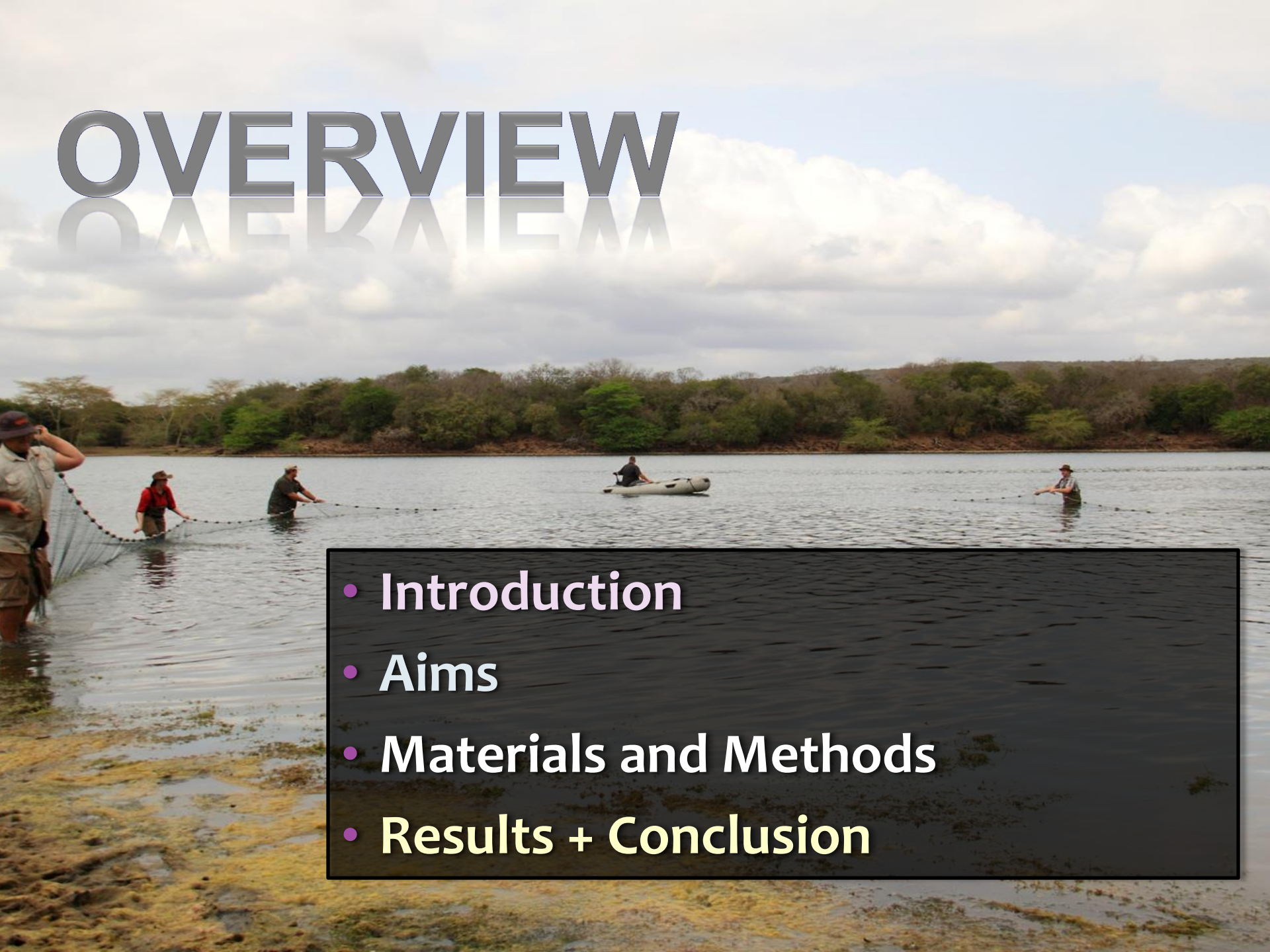
The Impact of Environmental stressors on biomarkers in *Clarias gariepinus* and *Oreochromis mossambicus in Ndumo Game Reserve*

OVERVIEW



- Introduction
- Aims
- Materials and Methods
- Results + Conclusion


Introduction

Lower Phongolo

The Study

- OCP Bioaccumulation
- Biomarker Analysis

Target Species

- *O. mossambicus* (Mozambique tilapia)
- *C. gariepinus* (Sharptooth Catfish)

Aims

1. Evaluating the impacts of environmental stressors and pesticides on the Lower Phongolo River and floodplains.

2. The use of two fish species, Oreochromis *mosambicus* and *Clarias gariepinus* as bio-indicators of pollution and environmental stress.

3. The determination of contaminating compounds and bio-accumulation levels in fish.

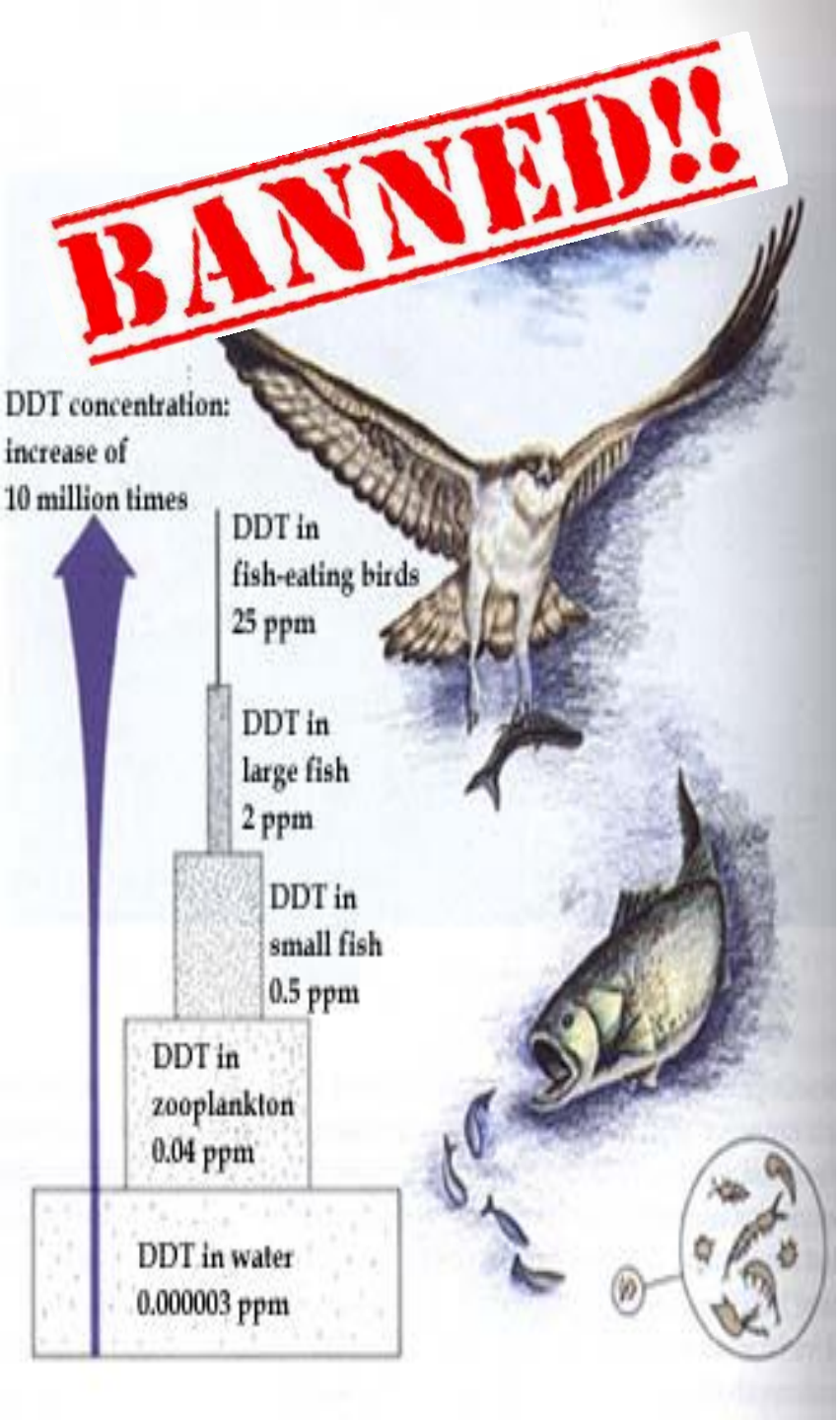
Location

Agriculture and Industry

- Beneficial but detrimental
- Effective Management and support studies
- Phongolopoort Dam

Pesticides

- Agriculture and malaria prevalence
- DDT persistence and monitoring


BANNED!!
DDT concentration:
increase of
10 million times
DDT in
fish-eating birds
25 ppm
DDT in
large fish
2 ppm
DDT in
small fish
0.5 ppm
DDT in
zooplankton
0.04 ppm
DDT in water
0.000003 ppm


¿Quieres un poco de
Bálsamo de Hierbas?
DDT!
DDT!
Malaria
GREEN
PEACE
COX & FORKUM
www.CoxAndForkum.com

Local Communities


Josiah Townsend


Josiah Townsend


Josiah Townsend


Josiah Townsend

Field and Practical Work

Field and Practical Work

Biomarkers

SHORT TERM

Biological Complexity, Response

LONG TERM

Time & Biological Significance

Definition:

Pollutant Chemicals

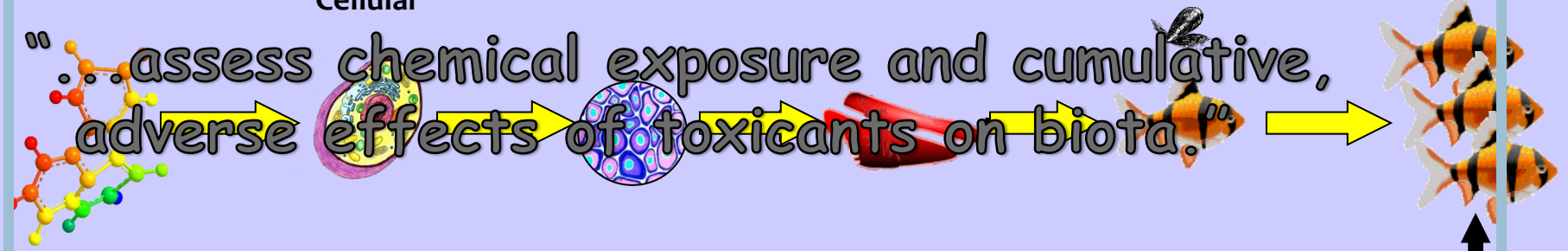
Molecular & Cellular

Tissue

Organs

Individual animal

"...assess chemical exposure and cumulative, adverse effects of toxicants on biota."



Physical factors & Biological Agents

EARLY BIOMARKER SIGNALS

LATER EFFECTS

V. Thomais and V. Athanasios

Biomarkers

Biomarkers of exposure

- AChE (organophosphate and carbamate pesticide)
- Cytochrome P450 (organochline exposure)
- MT Assay (metal exposure)

Biomarkers of effect
(Antioxidant stress)

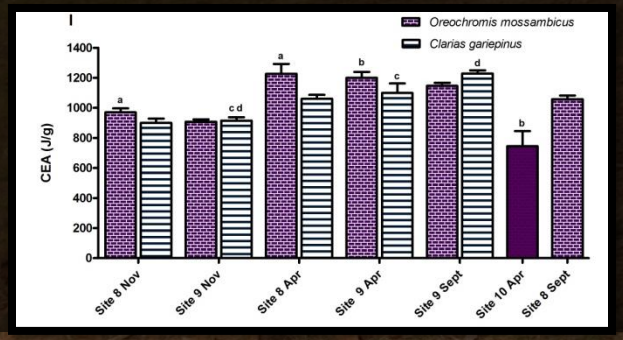
- Catalase Assay (ROS enzyme)
- Lipid peroxidation -malondialdehyde (lipid breakdown)
- Protein carbonyls (protein breakdown)
- Superoxide Dismutase (ROS enzyme)
- Glutathione (metal exposure)

Energy reserve alterations:

Cellular Energy Allocations

Findings and Importance

- Findings:
- Importance:
  - Stress
  - Metals
  - Pesticides



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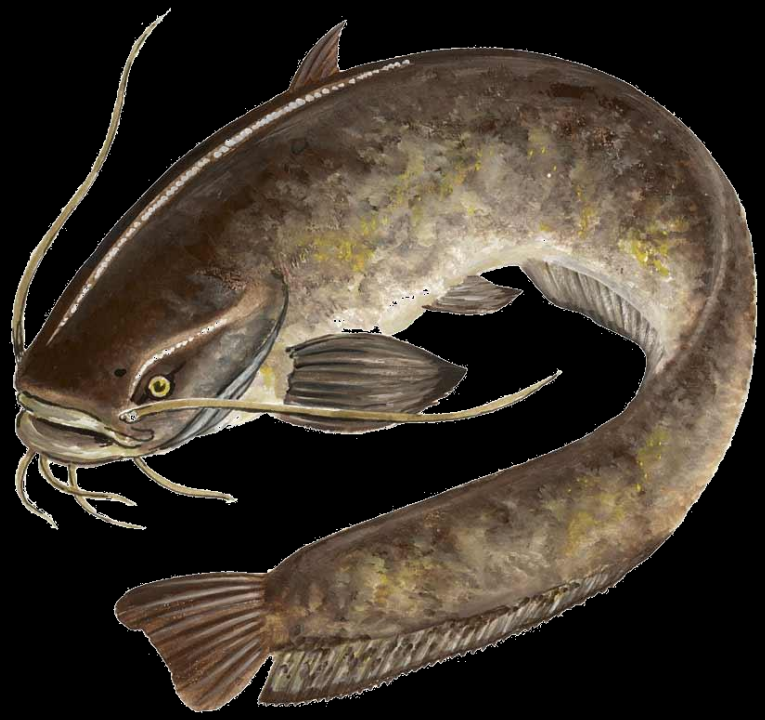
Thank You

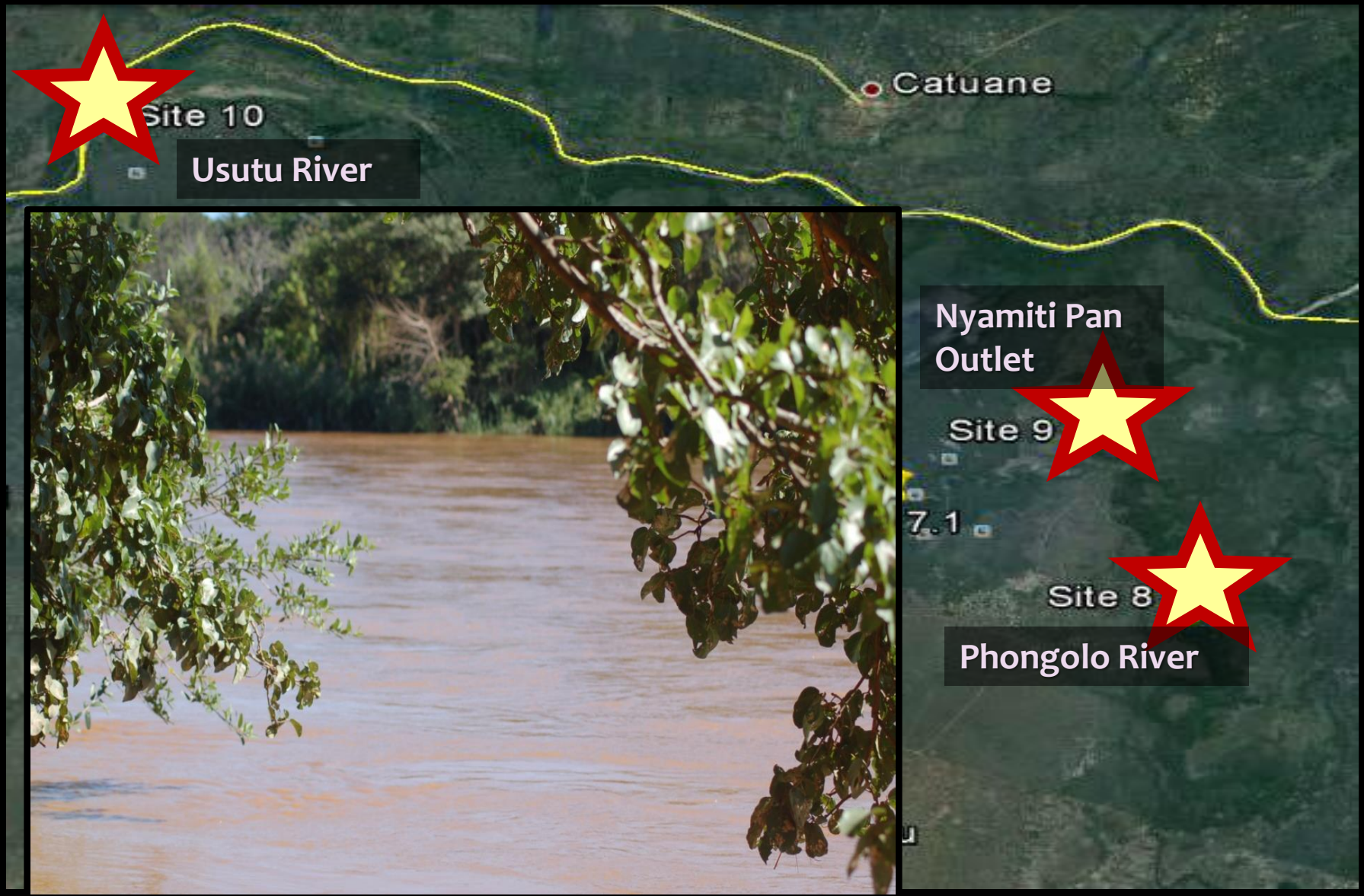
Fish

Oreachromis mossambicus (Mozambican tilapia)

Clarias Gariepinus (Sharptooth catfish)



Site Selection



Preparation