Biological Invasions in Inland Waters – International Workshop, Florence, Italy, 5th to7th May, 2005

Invasions by plants in the inland waters and wetlands of Africa

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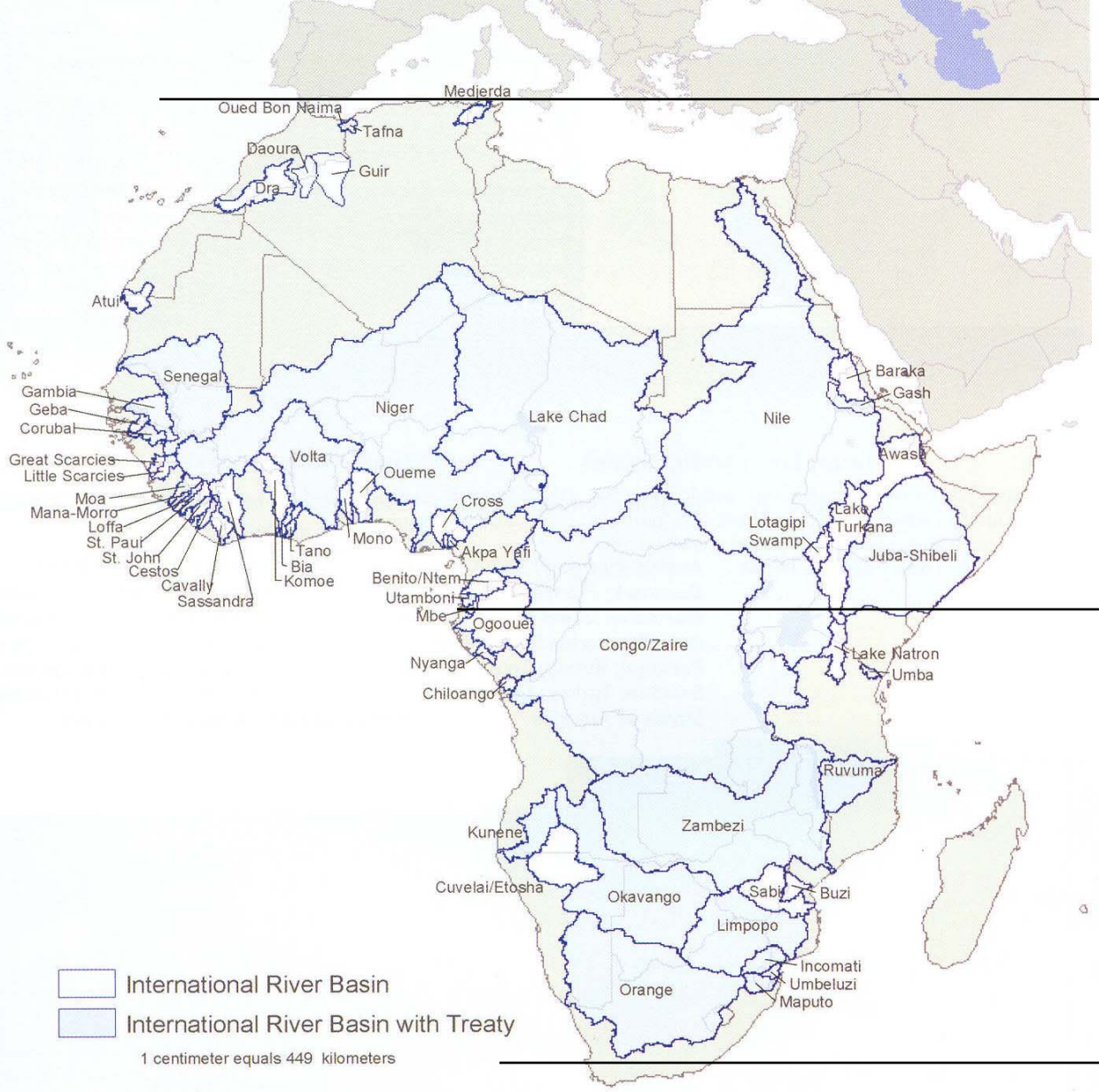
Issues to be discussed:

- **Invasive species are widespread in Africa's waters and wetlands**
- **Aquatic invasives alter vegetation patterns and enhance likelihood of more invasions**
- **Invasive species are not always "alien"**
- **Africa needs more awareness of the prevalence and impacts of invasives**
- **Economic valuation of impacts would make the case for more action in detection, prevention and management**



37°N

0°

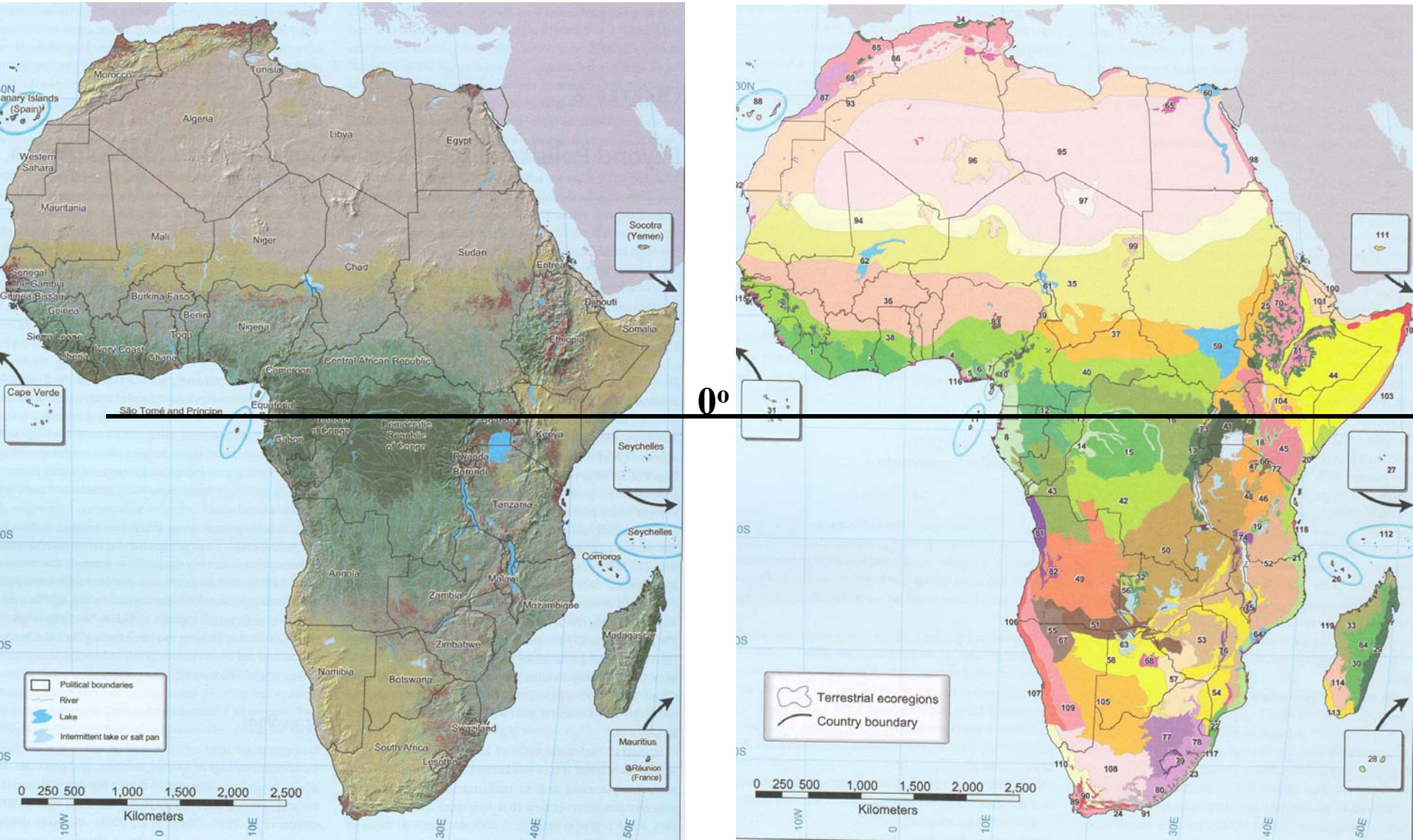
35°S

Small and large riverbasins, long and short rivers with wetlands

Large and small lakes, swamps up to 30,000 km²

Mostly between the tropics (32°N&S) with Mediterranean drylands at one end and temperate dry and wetlands at the other

52 (or 54) countries, many with 5, some with 8 neighbours, major ecosystems are unrelated to national boundaries; most large lakes, rivers and wetlands cross borders



African wetland invasives…

thus have many opportunities for natural and human-assisted unintentional introductions across the continent,

and have been assisted by many intentional introductions in the past century.

Thus the inlands waters and wetlands harbour invasive:

- **Micro-organisms (esp. algae and their blooms),**
- **Lower and higher plants**
- **Athropods (esp. insects and crustaceans) and Molluscs**

- **Lower vertebrates – fish and reptiles**
- **Higher vertebrates – birds and mammals (but ….)**

Aquatic invasive plants in Africa

A brief look at the three main types represented:

1. Floating plants – above and below the water surface

These are numerous and widespread due in part to the absence of any large floating plants in the inland water and wetland flora of Africa

2. Emergent plants- rooted below water with aerial parts

Gradually increasing in diversity and spread and includes some native species (i.e. "non-alien invasives")

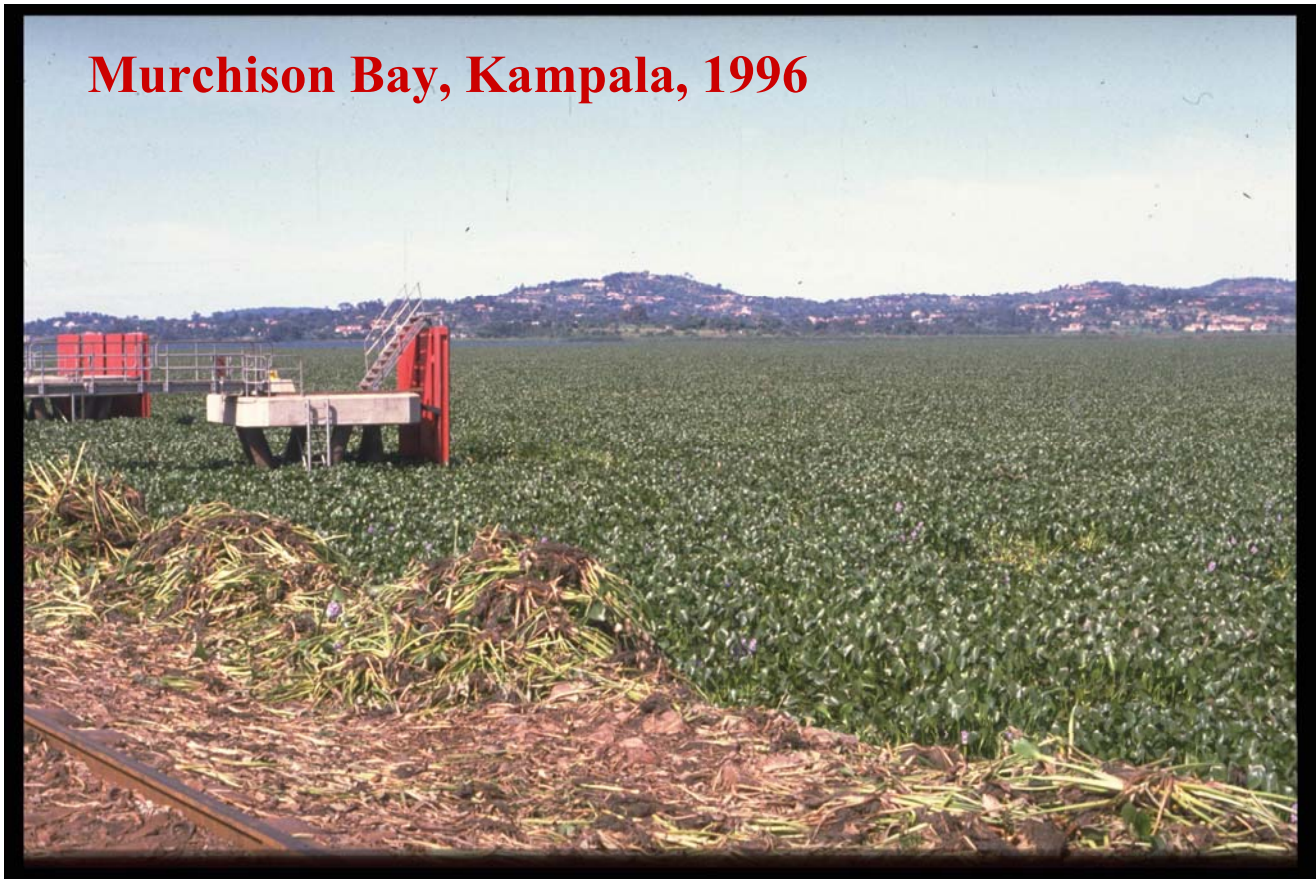
3. Submerged plants – mostly below the surface

These occur - but are seldom seen and less seldom reported!

1. Floating invasive plants

Most common and widespread is Water Hyacinth (WH), *Eichhornia crassipes* – which needs no introduction and is present in ALL of the great lakes of Africa and ALL of the major river systems.

WH flourishes in high humidity and with a water temperature around 25^{o}C – especially when nutrients are added

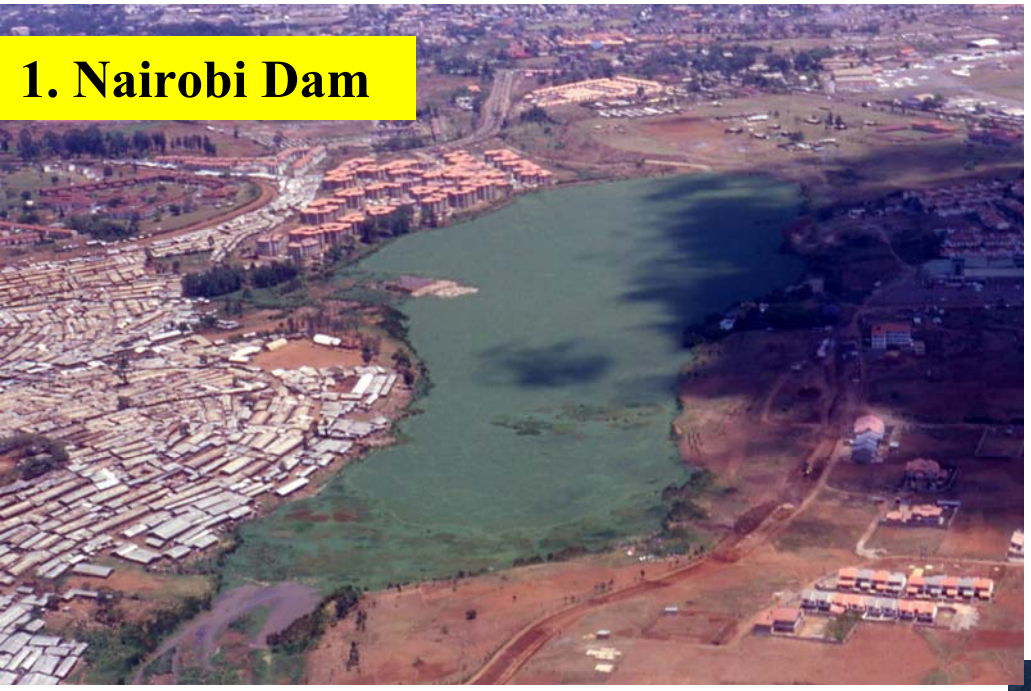


Water Hyacinth continued

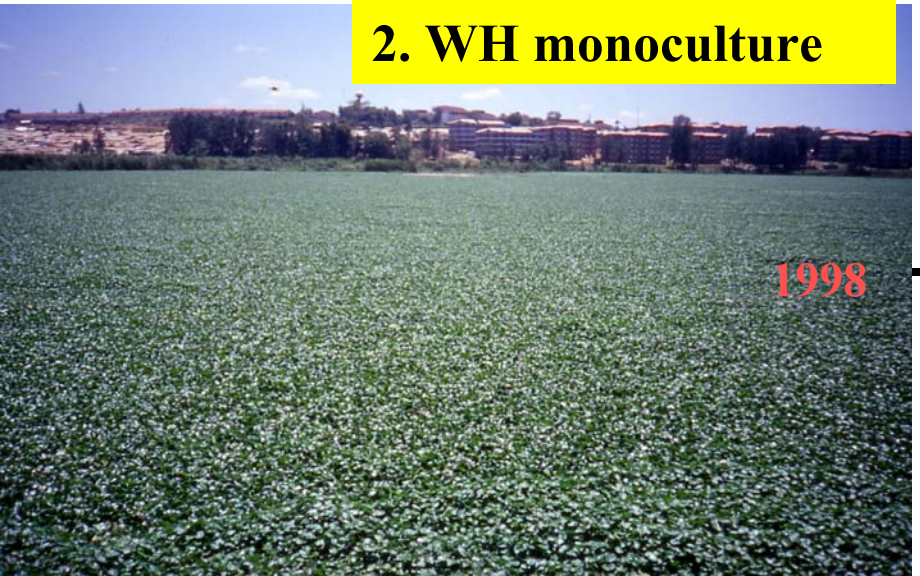
Water Hyacinth in Africa has significant impacts on peoples' livelihoods, on development, on water supply and hydropower generation, water transport, fisheries, etc., etc. but also on aquatic biodiversity. However in low density it does provide habitats for invertebrates and young fish that are not otherwise present

In most situations it is readily controlled by biological agents – the usual weevils used across the tropical world – provided that the temperature is OK for the insects and plant nutrients are adequate for the beetles' reproduction

Water Hyacinth continued



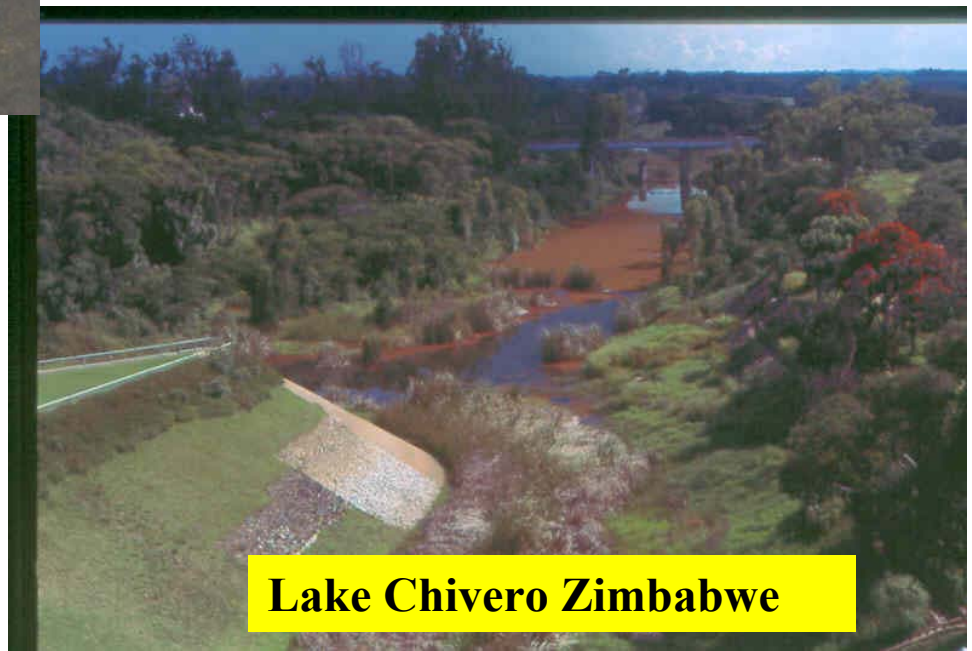
1. Monocultural invasion by WH of an urban lake/reservoir
2. Complete coverage of the water surface
3. Invasions by other species "using" WH for support and so changing the wetland character



Other floating aquatic invasives

Edge of Lake Tanganyka, Burundi

Kafue River, Zambia



***Azolla pinnata*,**
floating water fern - widespread

Other floating aquatic invasives

Two common and widespread "culprits" that become problematic with added nutrients - but both are bio-controllable under the best conditions

Pistia stratiotes

Salvinia molesta

2. Emergent aquatic invasives

4 species of *Typha* are native to Africa yet often invade waters and wetlands with serious consequences for plant diversity

***Typha* spp.**

The term “alien invasive species”

is further confused by *Vossia cuspidata* (hippo grass) that can become invasive when grazing pressures change or when other aquatic invasives impinge upon it

Vossia can also combine with Water Hyacinth to form floating mats which extend its reach far beyond the normal extent of this grass – blocking waterways and changing vegetation patterns

***Vossia cuspidata*, Lake George, Uganda**

The special case of *Mimosa pigra*

The "Giant Sensitive Plant" probably originated in the Americas but has been known in Africa for >200 years. It has become invasive in many places in the last 20 years with varying degrees of impacts – most seriously affecting floodplains

Mimosa pigra **occurred sparsely on the edges of the Kafue River since recorded memory. In 1981 a few shrubs appeared on the edge of the Chunga Lagoon. Now, 2005, it covers a vast area excluding large birds and mammals as well as tourism – WHAT COST?**

So what can be done to slow or stop the spread of aquatic invasives and to reduce their impact on people, development and biodiversity?

The standard answer is: "Prevention, Eradication or Control"

BUT:

PREVENTION is difficult when there are so many borders, some of which are "porous" , where many lakes and rivers are international waters and where quarantine is especially difficult

ERADICATION is rarely possible in large and connected wetlands and waterways – especially for submerged species

CONTROL is the most effective option – but how?

But before control can be effective, the problem needs to be seen

Salvinia,

Myriophyllum

Water Hyacinth
as decorative plants

In many parts of Africa ….

Awareness of the extent and impact of aquatic invasives is:

- **Restricted to a superficial knowledge of Water Hyacinth**
- **Affected by minimal knowledge of aquatic plants**
- **Complicated by many aquatic invasives being "out of sight"**
- **Recognition of exotics and known potential invasives is low**

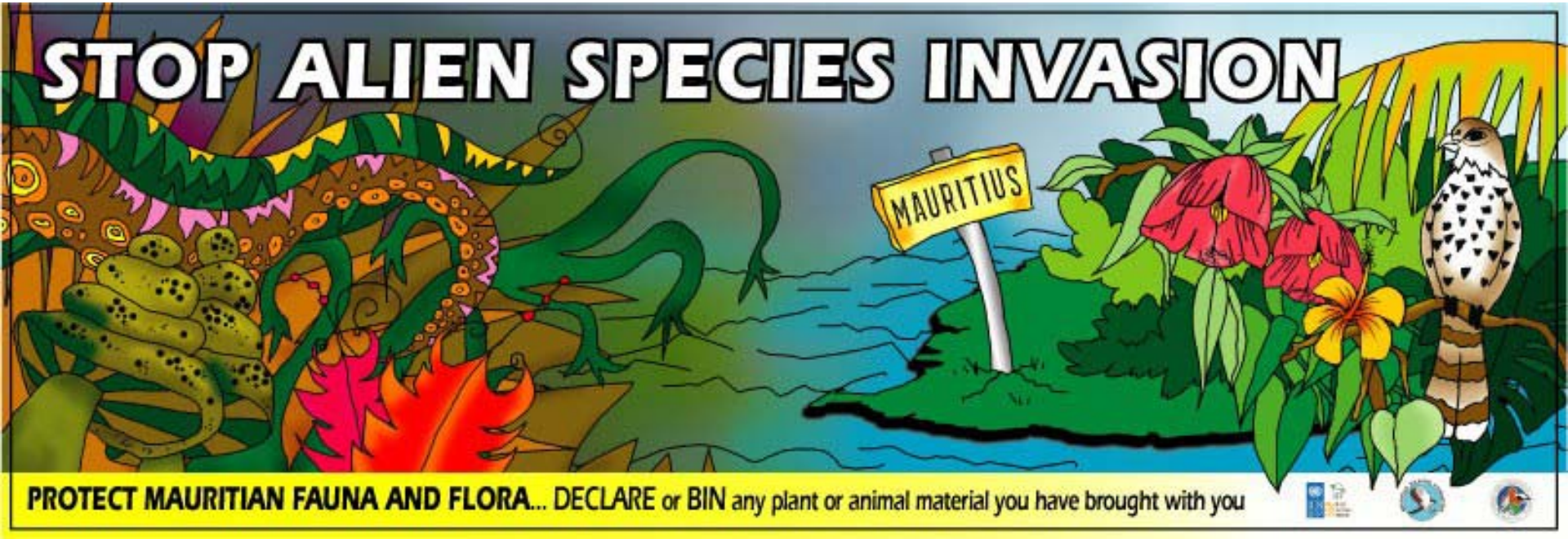
And is complicated by:

- **Lack of access to information on invasives and their control**
- **Knowledge that some invasives are useful and saleable**
- **Difficulty to act quickly to arrest an invasion**

Solutions??

1. **AWARENESS**

Awareness of the problem, the impacts, the pathways of introduction and the solutions to existing and potential invasions



Awareness at all levels

2. Capacity building for recognition of invasives

Plant taxonomy and recognition have not been priorities in the last 30 years in Africa (and elsewhere!) - so capacity is limited

There is need to understand what is native (endemic) and what is exotic (alien) and what can or might be invasive

Taxonomic capacity is fundamental to understanding plant populations and communities

BIONET is assisting - but much more emphasis is needed in education and practice

3. Capacity building for management of invasives

Making available information about management options for invasive species in inland waters and wetlands

Assisting countries to plan prevention and management strategies and providing support

Mechanical control?

Chemical control?

Biocontrol?

Integrated control?

4. Promotion of economic valuation of the impacts of invasive species on people and ecosystems

Costs/benefit analyses of various methods of control

5. Promotion of the idea of ecosystem restoration as an objective for invasive species control

Use of the "ecosystem approach" in management strategies

6. Involving regional and continental organisations to address cross-border spread and management of invasives

Emphasising the need for regional action – through, e.g. The African Union, The Sub-Regional Economic Commissions (SADC,ECOWAS, ECCAS, EAC, AMU, etc. + NEPAD and scientific networks – including GISP and the IUCN Invasive Species Specialist Group (ISSG).

A few exotic species if managed properly and monitored can add to habitat diversity – but is it worth it??

Thank you