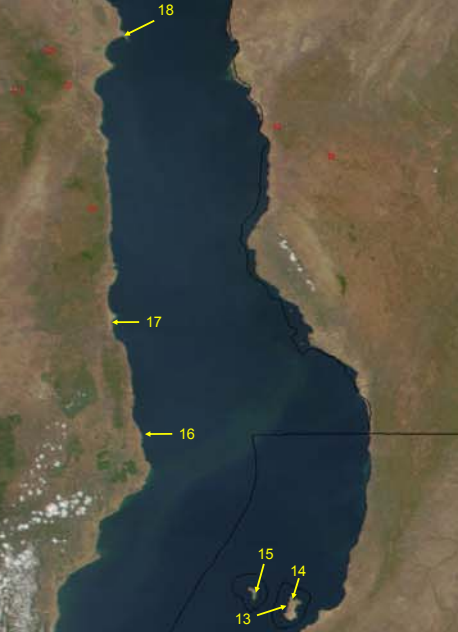


# Lake Malaŵi

## Ecological Interactions of Schistosomes, Snail Hosts, Human Host, and Fish Predators in Lake Malaŵi: Year 2

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Schools at Stations	Prevalence of Infection	n
Mpima (13) & Chilonga (14)	27.1%	214
Kabuthu (15)	30.1 %	108



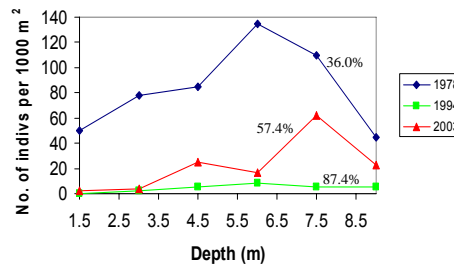
Schools at Stations	Prevalence of Infection	n
Namazizi (1-3)	10.61%	132
Chembe (4-8)	57.37 %	190
Msaka (9-11)	32.33 %	133



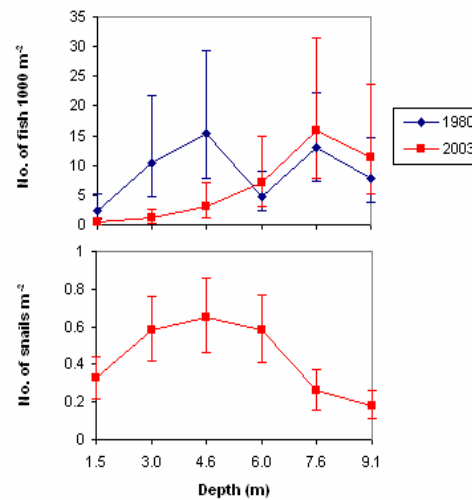
### Introduction

- Over the past decade we have observed a decline in population numbers of snail-eating fishes, an increase in the number of schistosome intermediate host snails (i. e., *Bulinus* sp.), and an increase in the prevalence of schistosomiasis among village residents and expatriate tourists.
- We proposed to gather comprehensive data on the transmission of schistosomiasis to determine if the above phenomena are related.
- Sampling during Year 2 was aimed at determining the relationship between:
  - prevalence of disease in school-age children
  - host snail (*Bulinus globosus* and *B. nyassanus*) densities
  - relative abundance of snail eating fishes throughout the lake (3-spot molluscivores - *Trematocranus* sp.)

### Effects of Fishing on Molluscivores

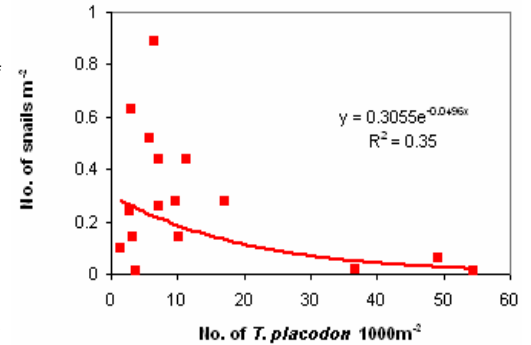


- Density of 3-spot molluscivores at the Fisheries Research (Station 6) declined at all depths between 1978 and 1994 (Stauffer et al. 1997). Fishing restrictions were enforced in 1998; density seems to be increasing in response to reduced fishing pressure particularly in deeper waters.
- Prevalence of disease (indicated by percentages above) seems to increase at lower densities of fish predators.



- Density of *Trematocranus placodon* (1980 and 2003) and *Bulinus nyassanus* (2003) by depth at stations 4-8 at Chembe Village.
- Densities of *T. placodon* at all stations at Chembe Village (4-8) in 2003, were comparable to 1980 densities in deeper waters, but were still lower at depths below 5m.
- Peak abundance of *B. nyassanus* in 2003 is in shallow water (<7m), where *T. placodon* densities are low.

### Relationship between Snails and Fish



- Density estimates of both snails and fishes at localities from where we had prevalence data (i.e., Nankumba Peninsula, Likoma Island, Chisumulu Island) exhibited a negative relationship between density of *B. nyassanus* and *T. placodon*.
- We will be refining data collection in areas that exhibit low densities of *B. nyassanus* and *T. placodon* to test the hypothesis that these may be areas of poor snail habitat.

### Prevalence of Infection

- Two possibilities for disease transmission within the lake itself exist: either by cercariae produced within the lake or by cercariae transported into the lake by inflowing streams or rivers.
- The infection rate among school children of Chembe Village (stations 4-8) was 36% in 1978. In 2003 infection level was 57.4% (please refer to the table in the southern portion of the lake). This increase in infection level between 1978 and 1994 is coincident with the reduction in numbers of snail-eating fishes and the discovery that *B. nyassanus* is an intermediate host of human schistosomes. Introduced strain of schistosome?

- In Chisumulu (stations 13 & 14) and Likoma (station 15) islands, where we found no infected *B. nyassanus*, infection level ranged between 27.1-30.1% (please refer to table in northern portion of lake). *B. globosus* were present in inshore areas and in areas with dense vegetation.

### Focus for 2004/2005

- Are there different species of 3-spot molluscivores that are endemic to different parts of the lake?
- Does the same species of 3-spot molluscivore have the same life history pattern throughout the lake?
- Are the intermediate hosts (snails) different in different parts of the Lake and do they have different susceptibilities to schistosomes?
- Are different strains of schistosome found in different parts of the lake?

### LITERATURE CITED

Stauffer, J.R., Jr., M.E. Arnegard, M. Cetron, J.J. Sullivan, L.A. Chitsulo, G.F. Turner, S. Chiotha, and K.R. McKaye. 1997. Controlling vectors and hosts of parasitic diseases using fishes, A case history of schistosomiasis in Lake Malaŵi. *BioScience* 47:41-49.

### ACKNOWLEDGMENTS

Funding for this project was provided by the Ecology of Infectious Diseases Program that is jointly funded by the National Science Foundation and the National Institutes of Health.