# The Raleigh Aquarium Society

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# August 2010

*Next Meeting: Thursday @7:30pm September 2nd, 2010*

Meetings are held on the first Thursday of each month at the North Carolina State University College of Veterinary Medicine located at 4700 Hillsborough Street in Raleigh. Visitors are welcome! Snacks and light refreshments are provided. A raffle of fish and fish related items follow the meeting.

# Meeting Agenda

Our talk will be by Eric Hanneman.

Guatemala is situated between Mexico, Belize, Honduras, and El Salvador. Eric has been to Guatemala twice and explored Lake Izabal, Lake Peten Itza, and some of the other rivers and lakes in the region. The area is home to many of the cichlids we know from the pet trade and many others most people are not too familiar with, and to ruins of the Maya. Many livebearers, tetras, and catfish also call Guatemala their home.

****In order to make it easier on everyone, if you are doing a talk the month after this, please email xxemmyxx@gmail.com with a description of your talk so I can send out the news letter at the proper time. Thanks.****

# Monthly Feature

**ARTICLE INFORMATION:**
**Author:** Lee Newman
**Title:** Cichlid Conservation in Uganda

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***Internet publication (club or non-profit web site):***
1. **Credit** author, original publication, and Aquarticles.

**Summary:** An overview of the Lake Victoria Species Survival Plan; chronicles the early days of this important conservation effort.
**Contact for editing purposes:** theo@aquarticles.com
**email:** demonfish.krib@telus.net
**Date first published:** January 1997
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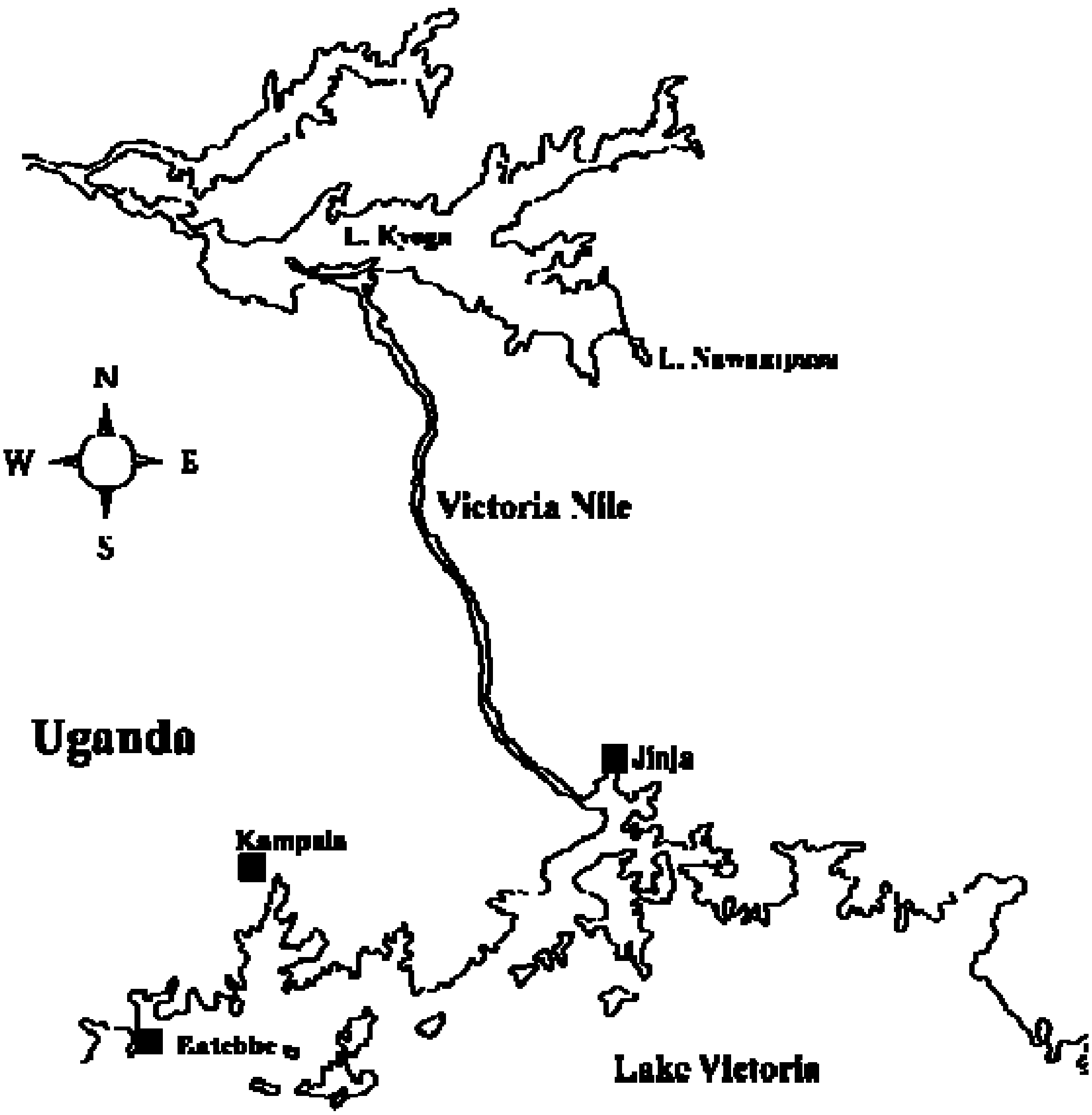
# Cichlid Conservation in Uganda

By Lee Newman
Aquarticles




The Lake Victoria Species Survival Plan (LV-SSP) of the American Zoo and Aquarium Association (AZA) sent me to participate in field work in Uganda in April 1996. My assignment involved participation in ongoing surveys of haplochromines in Lake Victoria; development of exhibit aquaria at the Ugandan Fisheries Research Institute; development of *in situ* aquaculture of endangered cichlids; and recovery of founder stock of important haplochromine taxa from Lake Nawampasa (Kaufman, 1996).

The headquarters of the Ugandan Fisheries Research Institute (FIRI) in Jinja. *Photo by Lee Newman*.

The Lake Victoria Species Survival Plan represents an organized effort by North American zoos and public aquariums to conserve as much of the diversity of the endemic cichlids therein as possible. Captive breeding of endangered species plays an important role in these efforts. Unfortunately much of the cichlid species diversity (representing many entire trophic groups) had already gone extinct in Lake Victoria before founder populations could be secured for the program. Therefore, only a handful of species representing relatively few trophic groups and specializations are now being protected from extinction in breeding programs. Periodically, species in the program are reviewed as to the priority they should be given. To do so, the status of a species in the wild must be considered, using updated information collected during recent field efforts. The major limiting factor in the program is the number of participating institutions and the aquarium space each can make available.

Much of the existing debate concerning the future direction of LV-SSP activities centers around the best ways to maintain genetic integrity of the fishes in the program. Species kept in aquaria or ponds will over time become genetically distinct from wild founder stocks, a situation that is not particularly surprising given the very different selection pressures operating on captive fishes. One option that would maintain these fishes under natural selection pressures and eliminate the need for costly, labor-intensive efforts in North America and Europe is to locate and protect satellite lakes that still support important taxa. Satellite lakes are small, isolated bodies of water left behind when water levels in the Lake Victoria basin dropped to present levels. Provided these lakes are granted protection from environmental degradation and overexploitation, they could serve as sanctuaries for native cichlids as well as other endemic flora and fauna of the basin. Ugandan and American researchers have recently discovered that one of these satellites, Lake Nawampasa, is home to haplochromine taxa representing trophic specializations that have been extirpated from Lake Victoria. This provides an incredible opportunity, at the very least, to secure founder stocks for these taxa, and at best, to preserve a natural "living museum" that grants a second chance to fishes already thought lost forever. Because of its importance to the LV-SSP, and the fact that Lake Nawampasa is already under exploitation pressures from ornamental fish exporters, a reconnaissance of this lake was a priority of my trip to Uganda.

Papyrus shoreline study site in the Napoleon, Lake Victoria. *Photo by Lee Newman*.

This year's field work (1995) began at the British Museum of Natural History in London during a lengthy stopover on my way to Entebbe (Uganda). Here I met up with Dr. Mark Chandler of the New England Aquarium in Boston to study preserved specimens of *Haplochromis* species that we were unfamiliar with but expected to encounter in Lake Victoria and Lake Nawampasa. Admittedly, the viewing of preserved specimens became more meaningful only once we were able to compare them with live fishes from the lake.

After arriving in Entebbe, we drove eastward for three hours along the north shore of Lake Victoria to the Fisheries Research Institute (FIRI) in Jinja. Once we were settled in a comfortable guest house (only a 10-minute walk from FIRI), work plans were established for the next fortnight. The first week would be spent sampling in the Napoleon Gulf of Lake Victoria near Jinja; the second would be consumed in building aquaria at FIRI and collecting fishes in Lake

Nawampasa.

The first week afforded us an opportunity to observe the many changes that have taken place in the lake ecosystem over the last three decades. Hillsides surrounding the Napoleon Gulf are being deforested to produce charcoal fuel. This increases run-off of silt into the lake, which in turn causes increased turbidity. More importantly, the increased inflow of nutrients has resulted in significant eutrophication. The introduced water hyacinth *(Eichhornia crassipes)* is now common in almost all areas of the gulf, a clear indication of the increased nutrient levels in the lake. Aside from being an indicator of nutrient levels, water hyacinth acts as a barrier to the exchange of oxygen at the air-water interface in areas where it collects as a result of wind. Unfortunately, this often happens to be in smaller bays and along shorelines, typically the most productive habitats for haplochromine cichlids.

In a 6-m wooden canoe fitted with an outboard motor, we visited Mark's five study sites in the Napoleon Gulf, reflecting the major habitats represented: papyrus shorelines; intermediate zones with mixed rock and sand substrates; and fringing swamps. Dr. Chandler's research requires regular sampling of these sites with gill nets. At each site, one net is set along the shoreline in shallow water; a second is set parallel to the first about 20 meters offshore; and a third is set *ca.* 200 meters offshore parallel to the first two. Nets are composed of five panels, each with a different mesh size, for sampling fishes of varying sizes. At each site, temperature, dissolved oxygen, and Secchi disk (water transparency) measurements were taken. The nets are left in position for twelve hours but are checked twice during this period, once after about eight hours and then a second time just before they are moved to the next site. As the nets are checked, any haplochromines caught are identified, measured, and recorded. For less commonly encountered species or fishes that we could not positively identify, tissue samples and photographs were also taken. The relatively-abundant characoid *Brycinus sadleri*, Nile perch (*Lates niloticus*), and introduced tilapias, particularly the Nile tilapia (*Oreochromis niloticus*), were measured and counted, then set aside by the Ugandan crew for further studies of a culinary nature!

By week's end it was Mark's impression that there were fewer haplochromines at the sites we sampled than in previous years. The lake's rising turbidity increases the efficiency of Nile perch predation on the visually-oriented cichlids better adapted for life in clear water. However, the effects of water hyacinth on dissolved oxygen levels in inshore habitats may be beneficial to cichlids in that haplochromines can take advantage of the cover in these habitats despite the low oxygen, whereas Nile perch are intolerant of such oxygen levels. This would explain the significantly higher numbers of cichlids caught in the shoreline gill nets as opposed to the nets offshore. While there is little doubt that the lake is still responding to environmental changes and fishing pressures, it is certain that the diversity of haplochromine taxa that once flourished in the lake is now greatly reduced.

Part of FIRI's commitment to conserving the cichlid biodiversity of the region is the development of aquaria and pond aquaculture for education and captive breeding purposes. I suggested using the more secure indoor aquaria to display and breed Lake Nawampasa cichlids and the outdoor ponds to rear offspring. By this arrangement, valuable brood stock can be protected; reproduction can be carefully controlled; and juveniles would have the requisite space for proper growth.

At the start of our second week, we made a trip to Kampala, the capital, to order and pick up glass needed for the planned exhibit aquaria to be built and housed at FIRI. A room (6 m x 4 m) with a sink, drainage, electrical power, and windows (to control ambient light) accomodated a metal stand constructed to hold twelve 150-l aquaria. The arrangement of these tanks permits further expansion as resources become available and husbandry skills develop. A primary aquarist or technician and a back-up person will staff the aquarium room for weekends, holidays, and other times when the primary person is not around. To make the facility complete, a supply of such tools as buckets, nets, siphon hoses, fish foods, medications, and resource books are needed. While we were setting up this facility, we also made plans and took the initial steps to construct concrete lined rearing ponds on the "back lawn" at FIRI. They were designed to operate on a gravity flow system and would be built above ground to facilitate husbandry work.

Newly-built aquaria af FIRI will be used for display, education, and captive breeding efforts. *Photo by Lee Newman.*

Lake Nawampasa is small *(ca.* l square kilometer) and very shallow with a maximum depth of only three meters. The lake is accessible by dirt road although a 4-wheel drive truck is required to negotiate the route given its poor condition. There is a village alongside the lake whose residents are primarily involved in ranching. The area around the lake has little relief so the lake (which is surrounded by tall fringing grasses) is difficult to locate from a distance. One almost needs to get wet feet to know where the lake actually starts!

Perhaps the dominant (certainly the most impressive) physical feature of Lake Nawampasa is the extensive fringe of submerged and emergent macrophytes in the littoral zone, which provides habitat and food for an abundance of resident cichlids. The dominant submerged macrophyte appeared to be *Ceratophyllum* sp. (hornwort), although *Nymphaea* sp. and *Potamogeton* sp. were also readily observed in the clear, shallow waters. In places the submerged macrophytes were so dense that it made travel in the canoe difficult, in contrast to the inshore zones of the Napoleon Gulf of Lake Victoria where I observed no submerged macrophytes. The latter condition is due at least in part to the presence of the introduced *Tilapia zilli*, which has been described as "a goat with fins" based on its habits of foraging on vegetation.

The littoral zone of Lake Nawampasa exhibiting the lush aquatic growth present. *Photo by Lee Newman.*

Fishermen on Lake Nawampasa show off their catch. *Photo by Lee Newman.*

The water of the littoral zone appeared clear and was not stained despite abundant plant debris on the bottom. The substrate in this zone was predominantly a combination of mud and plant debris. The littoral zone conditions contrasted sharply with the turbid, seemingly macrophyte free, open waters of offshore areas.

Geological conditions around Lake Nawampasa are dramatically different from the lateritic soils found in the Jinja area of Lake Victoria. Lake Nawampasa is situated on an ancient shield, responsible for the grey, sandy soils, which also makes its presence known by the occasional massive rock outcrop. It was not surprising to find dissimilar water chemistry from the values observed at Jinja. When tested with a Tetra Laborett kit, the pH of Lake Nawampasa was 7.3 (range: 7.07.5) with a KH of 11 DH. Dissolved oxygen levels were near saturation at most sites where measurements were taken, but this could depend on the amount of exposure to wind and the density of submerged macrophytes.

During our second week, we made two trips to Lake Nawampasa with our Ugandan colleague, S. B. Wandera. Our objectives were to survey the habitat and collect founder stocks for specific *Haplochromis* taxa not represented in the LV-SSP captive breeding program. On the first trip we onto the lake. The canoe we used seemed to have been designed to float at the expense of any ability to keep out water and lacked all but the absolute minimum of stability. However we did manage to complete our work on (rather than in) the lake! Several inshore and offshore sites were identified and sampled using unbaited minnow traps. Also at these sites, temperature and dissolved oxygen measurements were taken. The following morning the minnow traps were checked and removed. The only fish found in the traps were juvenile cichlids less than 3 cm TL. The first trip ended with an unfortunate accident that resulted in the demise of the fish captured from the lake. The plug in the transport cooler came out during the *3.5* hr drive back to Jinja along less than perfectly level roads. Luckily, our second trip later in the week was far more successful.

When we arrived at the lake for the second time, we were greeted by young men eager to fish for us. The local fishermen were very productive. In no time at all, they brought us shallow, plastic tubs containing not more than a few liters of water and up to thirty adult cichlids. The tubs were at times covered with a waterlily leaf to maintain water temperature. Despite this, temperatures in the tubs rose very quickly with an obvious effect on dissolved oxygen content, evidenced by the fish "gasping" at the surface.

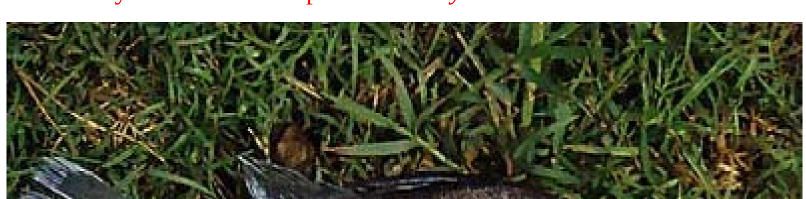
We were interested in only a few of the taxa caught by the fishermen due to our limited transport and shipping space and the priorities of the LV-SSP. Species of most interest were: *Allochromis welcommei*, Lake Victoria's only known lepidophage (scale-eater); any *Lipochromis* species; *Haplochromis barbarae;* any *Prognathochromis*, including species of the subgenus *Tridontochromis;* and any *Harpagochromis* species. Sorted from the fish tubs were a few specimens of *Lipochromis*, a paedophagous (embryo-eating) species; several piscivores of the subgenera *Prognathochromis* and *Tridontochromis*; and an epiphytic algae-grazing *Haplochromis* species. Other cichlid species caught included: *Pseudocrenilabrus victoriae*, *Astatoreochromis alluaudi*, *Oreochromis variabilis* and *O. esculentus*.

A predatory *Harpagochromis* species from Lake Nawampasa. *Photo by Lee Newman.*

*Oreochromis variabilis* is one of the endemic tilapias of the Lake Victoria basin. *Photo by Lee Newman.*

A voracious herbivore. *Tilapia zilli* poses a threat to the cichlid community of Lake Nawampasa. *Photo by Lee Newman.*

We made every effort to sort the fishes as quickly as possible, determining which could be kept and bought and which we would try to convince the fishermen to release back into the lake. At first the concept of releasing unwanted fish made little sense to them. They said if we did not want the fish the first time, releasing them only meant that they could catch the unwanted fish a second time, wasting their effort. The local solution to this problem was to discard the unwanted fish, ensuring that only new, potentially saleable fish would be caught on subsequent trips to the lake. It took some very creative buying practices on the part of S. B. Wandera of FIRI to finally get the fishermen to release unwanted fishes back into the lake.



We were not able to witness the

**ARTICLE INFORMATION:**
**Author:** Robert Fenner
**Title:** Sea Water, Natural or Synthetic? (Which way to go?)
**Summary:** After discussing the pros and cons, Bob comes down in favour of synthetic.
**Contact for editing purposes:**
**email:** fennerrobert@hotmail.com
**Date first published:** 2001
**Publication:** *www.wetwebmedia.com*
**Reprinted from Aquarticles:**
February 2003, *Fish Tales*, Bermuda Fry-Angle Aquarium Society



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# Sea Water, Natural or Synthetic? (Which way to go?)

by Robert Fenner
*Reprinted with permission, from Bob's website in San Diego: www.wetwebmedia.com*
Aquarticles

Every few years a few standard "urban myths" (e.g. to float new arrivals or not), seem to re pop-up in our hobby. One of my favorite, and most disturbing is the issue of "real" seawater versus synthetic mixes. Here I'm referring to legitimate formulations as opposed to "Wonder Water", "Magic Ocean", and other sugar-based let's-raise-the-specific-gravity-gravity-without-increasing-the-ionic-content mixes (supposedly allowing the successful co-existence of marine and freshwater organisms). Nor do I mean to include "lobster" system water softener grade formulations in this discussion. I mean here to disparage the claims of the purveyors of so-called "natural" seawater. These assertions also apply for areas in the world with easy access to the oceans where there arises the choice for the marine aquarist to use a saltwater mix or natural water. There are, admittedly, many valid arguments pro and con for either alternative.

## Economics:

The better mixes can retail for 30-40 cents per gallon or more, depending on how much you buy. "Live" ocean water costs the price of time, travel and proper filtration for you to collect and process it, or typically somewhere @$1.00-$1.50 retail per gallon to purchase.

In San Diego, free, sand-filtered seawater is available usually 24 hours a day at the base of the pier at Scripps Institute of Oceanography, U.C.S.D., La Jolla. This service is available at many other coastal towns. If you are dealing with large volumes of water the dollar savings can be considerable in treating and using this water, but it does have it's drawbacks:

**Suitability:**

More vital than it's expense is the water's relative ability to support marine life. Most of the more complete mixes are capable of sustaining marines for extended periods of time. The history of their use is impressive; they have been used all over the world by science, public aquaria and hobbyists alike for decades. The best available salt mixes have been demonstrated to support many invertebrates and fishes that live in close conjunction with them without further additives or modification.

Natural water that is pH/alkaline reserve checked and, if necessary, adjusted will support all forms of marine life.

**Maintenance:**

The strongest point against real seawater is that it "dies", both biologically and chemically more quickly than synthetics. It's a fact; you must change part of the water more frequently with natural water; depending on the size, type of set-up, filtration, et al. 5-10-20% or more a month is often recommended. Many mixes should be changed just as frequently, but often, especially in terms of appearance (yellowing) you can "cheat" more than with natural water.

Another issue good and bad concerning natural water is that it comes ready equipped with a multitude of micro- and macro-organisms. Even if the water is sediment filtered, diatomed, U-Ved, ozonized, many "things" will survive. What to do then? One or two things: 1) Place the water in a dark place for a couple of weeks before using. 2) Treat the water with copper salts, permanganate, formaldehyde, chlorine, etc. and remove the poisonous effects of the treatment before using. 3) Don't worry; consider the source. Many dealers and hobbyists pour natural water, cold turkey into their systems with impunity. I personally do not endorse item 3). I would treat all natural water as suspect and quarantine and treat accordingly.

There are pro arguments to using real water with little critters or their remains in it to start up a system. One point is that the time needed to establish bio-geo-chemical nutrient cycling (whew!) is decreased greatly. Still another beneficial factor is the ready seeding of the habitat for other microbial needs of the fishes, algaes, invertebrates. Some of the naturally occurring tiny creatures that come in live water are harmful, but most are either beneficial or benign in captive applications.

Natural water should be monitored for pH/alkaline buffering capacity at the very least, and a supply of change water or chemical preparation be kept close at hand for adjustment. Natural seawater, particularly supplies collected far from shore can exhaust it's buffering capacity quickly (within a day).

The synthetic is in a word, convenient; it serves the purpose as a viable medium for marine life and may be kept on a shelf and almost instantly made ready when need. Despite claims to the contrary, there are little deleterious effects of not pre-mixing, aerating... modern synthetic salt mixes prior to their use. Our corporation's service and retail divisions have used thousands of cases of several brands over the years without trouble for new set-ups as well as routine water changes. If the sea life involved is not otherwise challenged or compromised, you should also have no difficulty.

**Trace Elements:**

Are a particularly contentious, confusing issue that continues (to my bafflement) to perplex & impress aquarists. Edmund Mowka (1979, 1980) presents a concise, lucid treatment of the subject. The long and short of it is it appears that most so-called "trace" elements and compounds are:

1) Just that. Small, often transient materials of no or minuscule biological consequence.

2) Readily lost by physical, chemical and/or biological mechanisms in captive systems.

3) Much of the "trace" benefit is derived from food/nutritive sources, not from water per se.

4) For "reef" systems with substantial amounts of invertebrate and intentional algae matter, must have chemical supplementation whether natural or synthetic water is applied.

5) Basically, that there is no substantial valid argument for natural versus synthetic regarding "trace"-elements.

**A Conclusion:**

This is not the whole story either, but it serves to illustrate the point. In my opinion, unless you're dealing with very large volumes of water, want to devote yourself to adequate preparation and monitoring, and consciously intend to put up with the vagaries of potential pollution, pests and parasites, steer clear of natural water. Synthetic is more convenient, cheaper in total cost, easier to deal with physically, lasts longer, is safer, and it works!

Some folks assert that natural water must be best for "natural" livestock. Maybe they think their aquaria are "little pieces of the ocean"; most systems more closely approximate "little sewers". There is nothing phoney about using a synthetic salt mix in an artificial environment.

A few references and further readings are offered listed to elucidate the history of this "controversy", other arguments, and to provide a general background on seawater itself:

Anon. 1974. Seawater. Aquarium Digest International. 2 (4) 1974.

Carlson, J. 1988. Seawater: What Every Marine Aquarist Should Know About This Fluid. Marine Fish Monthly. 3 (4) 1988.

Dawes, J. 1989. The Salt Connection. Seascope. Volume 7, Spring

Fenner, B. 1989. Frequent Partial Water Changes. FAMA April 1989.

Mowka, E. 1979. Essential Chemical Elements. FAMA. April, 1979.

Mowka, E. 1980. A Fresh Look At Salt Water. FAMA. June, 1980.

Segedi, R. & Kelley, W. 1971. A New Formula for Artificial Sea Water. Marine Aquarist. 2 (8). 1971.

Spencer, G. 1974. Advantages of Unnatural Water! Marine Aquarist Magazine 5 (1). 1974.

# Trading Post

Crenuchus spilurus $5
Boehlkea fredcochui $3
Hyphessobrycon loretoensis $3
Paraceirodon innesi (neon tetra) $1
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Thayeria oblicua $4
Corydoras sychri $6
Corydoras arcuatus $4
Corydoras pygmaeus $1.5
Corydoras rabauty $4
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L226 only 2 left $25
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Apistogramma eunotus $25
Apistogramma bitaeniata ORANGE $25
apistogramma cacatuoides $25
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**If you would like to purchase any of the fish listed above, please contact John Patterson at jrpatter@hotmail.com.

*If you would like to participate, please email us at raleighaquariumsociety@yahoo.com*

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Raleigh Aquarium Society Forum on Yahoo Groups
http://groups.yahoo.com/group/raleighaquariumsociety/

Potomac Valley Aquarium Society in the Washington D.C. area http://www.pvas.com/

Atlanta Area Aquarium Association in Atlanta, Georgia http://www.atlantaaquarium.com/

Carolina Fish Talk http://www.carolinafishtalk.com/

Charlotte Area Aquarists Society http://pvelasco.net/CAASBBS/index.php

Marine Aquarium Society of the Carolinas http://masotc.net/

North Carolina Koi & Watergarden Society http://www.nckws.com/

Carolina Aquatic Plant Enthusiasts http://groups.yahoo.com/group/capelist/

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*If you would like your site to be added above, please email us at raleighaquariumsociety@yahoo.com!*

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Reef Keepers Aquarium 1673 Old US Highway 70 West, Clayton, NC 27520-6566 (10%) 919.359.2424

*If you would like to sponsor us, please email us at raleighaquariumsociety@yahoo.com.*

Please contact Emily Hirtle at raleighaquariumsociety@yahoo.com if you are an active member of the Raleigh Aquarium Society and do not have an up to date membership card. Membership cards can be picked up at any meeting.

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(Membership dues run from March 1st each year. New members joining any other time will be pro-rated at $3 + $1 for each month remaining in the year.)

Name(s):____________________________________________________

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New Membership ____

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Mail to:

Raleigh Aquarium Society
PO Box 31564
Raleigh, NC 27612-1564

*****From now on I will be sending out the newsletter on the 25th. If you want anything in the trading post, bargains, etc., you MUST let me know by the 22nd or else it will be in the following month's newsletter. No exceptions. Thanks.*****