

Fact Sheet

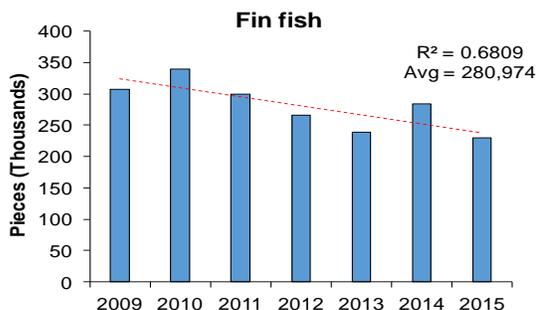
Status assessment of Kenya's Marine Aquarium Fishery

Background:

- Marine aquarium products include fish, invertebrates (soft corals, shrimp, and small clams), and coral rock and are fished using scoop nets and barrier nets by snorkelling or SCUBA diving
- Kenya is among 45 countries that supply aquarium organisms to the global trade. The main export market for live aquarium products from Kenya is the United States. Others include European Union (dominated by Germany and United Kingdom), South Africa, Israel and Japan. Currently there are 8 established companies exporting to 26 countries.
- The fishery mainly targets juveniles (>10cm) and small bodied reef fish and is highly species, sex and size selective species. Rare species are also highly valued and fetch high prices in the export market.

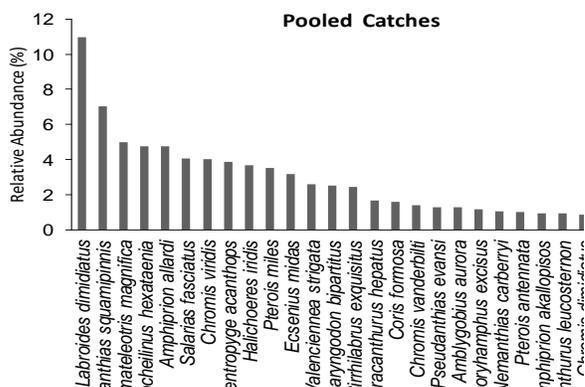
Fish catch production estimates:

- 240,000 - 341,000 (avg 280,000) fish annually
- There is a general declining trend in total annual aquarium fish catches reported from 2009 to 2015
- Estimated annual value: KES 110 - 220 million.



Target species and composition:

- At least 260 species are collected belonging to 36 families. Thirty two species make up 80% of the catch



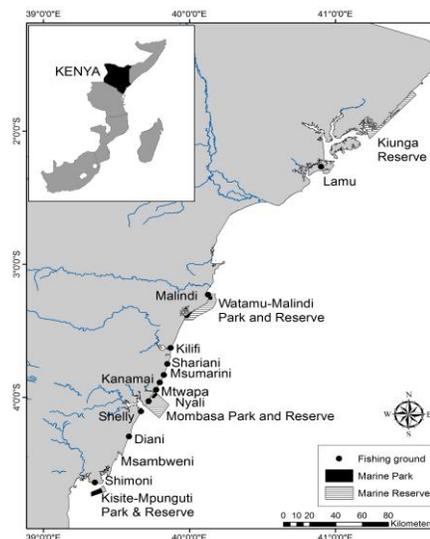
Vulnerability risk assessment:

- Productivity Susceptibility Analysis (PSA) identified: -- Angelfishes: *Pomacanthus maculosus*, *P. chrysurus*, Anemonefishes: *Amphiprion allardi*, *A. akallopisos* to be



Fishing grounds:

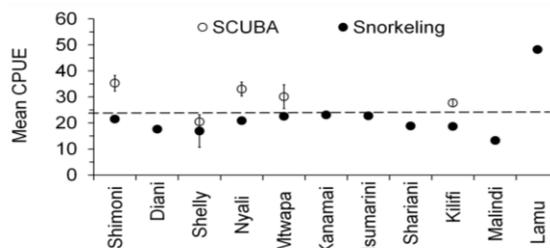
- 90% of the aquarium fish catches are collected from five main fishing grounds: Shimoni (33%), Kanamai (20%), Mtwapa (18%), Kilifi (12%) and Ukunda (5%).
- Catches from Lamu are distinctly different in species composition due to dominance of angelfish species



Location of key fishing grounds for the marine aquarium fishery in Kenya

Spatial catch per unit effort:

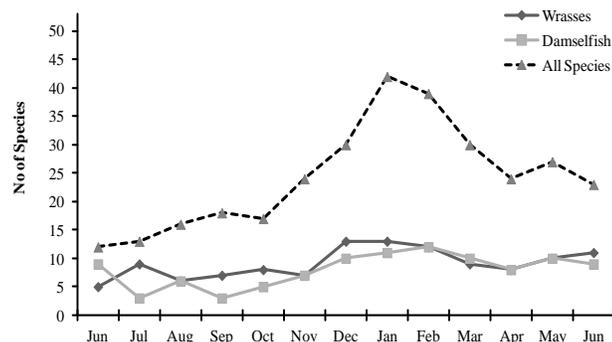
- The fishery occurs throughout the year with high seasonality peaking during January to March and lowest in June-July
- Declines in mean CPUE for some species including anemonefish were observed in some fishing grounds indicating potential localized overfishing
- Overall average CPUE is about 24 fish fisher⁻¹ day⁻¹ with higher catch rates for SCUBA divers



Spatial CPUE trends (fish fisher⁻¹ day⁻¹) for aquarium fishers (dashed line represents overall CPUE)

Juvenile reef fish recruitment dynamics:

- Labridae and Pomacentridae were the most dominant fish families recruiting in shallow lagoon reefs surveyed by underwater visual census accounting for approximately 90% of the total number of recruits.
- Preliminary results indicate high spatial and temporal variability in recruitment of juvenile fish
- Peak recruitment from December - March coinciding with the peak in catches
- All wrasse species showed evidence of extended recruitment throughout the year which may enhance resilience to fishing pressure



Monthly trends in the recruitment of juvenile reef fish monitored in Kuruwitu

Resource overlap with artisanal fisheries:

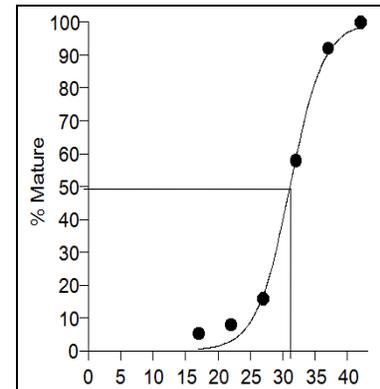
- 57 ornamental fish species were recorded in artisanal catches, dominated by wrasses making up 39% and comprising of 19 species
- Handlines captured the highest diversity of ornamental fish species and also had the highest resource interaction constituting 46% the total ornamental catches in relative abundance. This was followed by spearguns (26%) and basket traps (17%).
- Basket traps mainly captured butterflyfishes, while adults of the angelfishes *Pomacanthus imperata* (see Plate 1) and *P. semicirculatus* were targeted by speargun fishers.



Pomacanthus imperata fish captured in the Shimoni artisanal fisheries

Investigations on the reproductive biology and body condition of the angelfish *P. imperata*

- Sex ratio: 1:1.8 (M to F)
- Spawning is year-round peaking from Feb- June
- Length at 50% maturity: 31cm (females); 32cm (males)
- Length at first maturity: 19.3
- Fecundity estimate: 17,790 – 266,472 eggs



Conclusions:

- Observed declines in catches and CPUE for some species are indicative of potential localized depletion in some fishing grounds
- Most wrasse species showed evidence of extended recruitment throughout the year suggesting high resilience to overfishing by the aquarium fishery; however, the ecological implications of harvesting high numbers of cleaner wrasse *Labroides dimidiatus* needs further investigation.
- Due to an overlap with artisanal fisheries, the additional fishing pressure on adult broodstock must be considered in the sustainable management of exploited ornamental reef fish populations. Angelfishes were observed to be particularly highly vulnerable to recruitment and growth overfishing as a result of the resource overlap.
- The findings contribute towards development of the Aquarium Fishery Management Plan under development by the State Department of Fisheries with support from the Kenya Coastal Development Project (KCDP).

Future research and management considerations:

- Closer monitoring of catches
- Institution of annual catch limits to control harvesting of angelfishes *Pomacanthus maculosus*, *P. chrysurus* and *P. imperator*; and anemonefishes *Amphiprion allardi* and *A. akalopisos*.
- Promotion of technologies to reduce capture of low value species that are targeted by aquarium fishers in artisanal fishing gears. This may include identification of optimum hook sizes to minimize capture of juvenile reef fish in handlines, and encouraging use of gated traps
- Enforce speargun ban to reduce targeted fishing of angelfishes
- Explore and promote the culture of ornamental fish species to reduce wild harvesting
- Introduce new area closures (fixed or rotational) to enhance recruitment and replenishment of exploited stocks

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