EZEMVELO KZN WILDLIFE

Conservation, Partnerships & Ecotourism

KOSI BAY FISHTRAP TRENDS AND MANAGEMENT RECOMMENDATIONS

2007 Update

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1. Introduction

In many parts of the world such as Cuba, the Philippines, the Polynesian islands and several African countries fishtraps similar in design and material to those at Kosi Bay have been used to catch fish for several hundred years. Due to increase in human population, fishing pressures, new materials, overfishing and more efficient fishing methods almost all those, apart from Kosi Bay, have died out or become markedly modified. In neighbouring Mozambique those at Vilanculos have disappeared completely while those at Pomeni are heavily modified and rapidly dwindling in numbers.

Despite all the pressures for modification and the availability of more efficient alternatives such as gillnetting, the Kosi Bay traps have remained fundamentally similar until very recent years. The fact that the traps remain an important cultural and economic asset to the region is a direct result of EKZNW management of them and the area. In the early 1980's trap numbers were rapidly dwindling as most trappers were old and gillnetting was quickly establishing itself as the most lucrative fishing method in the area. The traps were declared a National Monument and steps were taken to protect them and suppress modern alternatives.

The traps, although technically always illegal, were allowed to continue even though the area was proclaimed a Nature Reserve, Ramsar site and finally a World heritage Site. The management was clearly successful as the trapping is now a vibrant fishery run by mostly young men.

Trap numbers increased markedly in recent years and this is not only clear in official trap counts but is evident to any visitor to Kosi Mouth. The increase is substantial and obvious and concern has been voiced by visitors, the media and in management circles.

The trapping of marine fish is illegal in terms of the Marine Living Resources Act (MLRA) and, while this Act makes provision for its legalisation, the provision has not been implemented. The traps thus represent an obvious and fairly large-scale illegal fishing activity inside a protected area of world importance.

Fishtraps, made from branches and binding found in the surrounding area, usually extend from a bank, curve upstream into the channel and have one or more fish catching baskets along their length. The traps are an important aspect of local culture, as well as of the local economy, and are recognised as a National Monument. The Subsistence Fishing initiative has been underway for several years to formalise and legalise the traps under the MLRA, but progress to date has been slow.

EKZNW conservation management of the area is under the spotlight and trap management, as a focus of visitor interest and fish utilisation, is an obvious aspect of this. Any changes in the traps, their design, numbers or impacts on the lakes and their fish populations is thus of importance. The traps have been described and catch size and species composition has been monitored since 1980. Information on trap and basket numbers is available from 1950 and in the last twenty-five years there have been almost annual counts of these as well as descriptions of changes in trap construction and materials.

This report serves to summarise and update the data collected and highlight and describe some changes noted. It also comments on the changes and their impacts and recommends some actions.

2. Methods

There is a series of aerial photographs of the Kosi Bay Lakes, from 1950, from which it is possible to determine the approximate number of traps and baskets. In 1981 the traps were formally and exhaustively counted and numbered on foot and, from that time, almost annual foot counts were undertaken. Estimates of the number of

working fish catching baskets were made from the aerial photographs and on some of the counts after 1981 the number of working baskets was recorded.

On an ongoing, but irregular basis notes were made of the types of basket being used, the materials and any changes in construction. There are two types of basket, the umono and ijeli, the former being a detachable closed basket which is taken out of the trap to be emptied, and the latter is an integral part of the trap made of sticks embedded into the sand.

3. Results

From earliest records the number of fishtraps fluctuated quite markedly, but recent records indicate a marked and progressive increase, from the mid 1980's to 2004, to numbers not attained in earlier decades (Figure 1). Similar monitoring of the number of fish catching baskets shows a more pronounced and progressive increase in numbers in the last ten years with an apparent trebling of effort in that time (Figure 2). Both trap and basket numbers have, however, declined from the highest levels in the last three years (Figures 1 & 2). Monitoring of the type of basket shows a substantial decrease in the proportion of umono baskets and a concomitant increase in the other type with less than one percent of present baskets being of the "mono" type. In 1980 virtually no man made fibre was used in trap or basket construction (Figure 3) while by 2004 over one quarter of traps used modern materials, such as nylon rope, to some extent (Figure 4). In the last five years several trappers have used pieces of gillnet, ostensibly taken from illegal netters, to either cover the baskets to prevent birds stealing fish or to make the fencelines more effective. During the last few years a few trappers have begun importing gum poles for use in the baskets. Gum poles are straighter and are long lasting and so retain more fish and are lower maintenance for the trappers (Figure 5). In the past, trappers used unaided traditional spears to empty baskets but in the last few years increasing numbers of trappers have used goggles to assist fish spearing. In historical times the local Traditional Council maintained a thirty-yard trap free channel from the Kosi Lakes to Kosi Mouth. Erosion of traditional influence resulted in some traps being built into this channel during the last ten years. Trap monitoring has also shown that the area of traps has changed markedly. Historically, fishtraps were found in all four of the Kosi Bay lakes but, by 1980, there were no working traps in Amanzamnyama and very few in Nhlange Lake. From 1990 to 2006 there were no working traps in Nhlange Lake but two traps have recently been built there. A few years ago a trap was erected in a new area inside Kosi Mouth on the south bank, close to the sanctuary.

The main changes in Kosi Bay fishtraps were thus

- Substantial increase in trap and basket numbers
- Change from mono to ijeli baskets
- Start of and increase in use of modern binding materials
- Start of and increase in use of gillnet
- The use of gum poles for basket construction
- Start of and increase in the use of goggles to empty baskets
- Building of traps into the trap free channel
- Decrease in traps in Amanzamnyama and Nhlange and increase near Kosi Mouth.

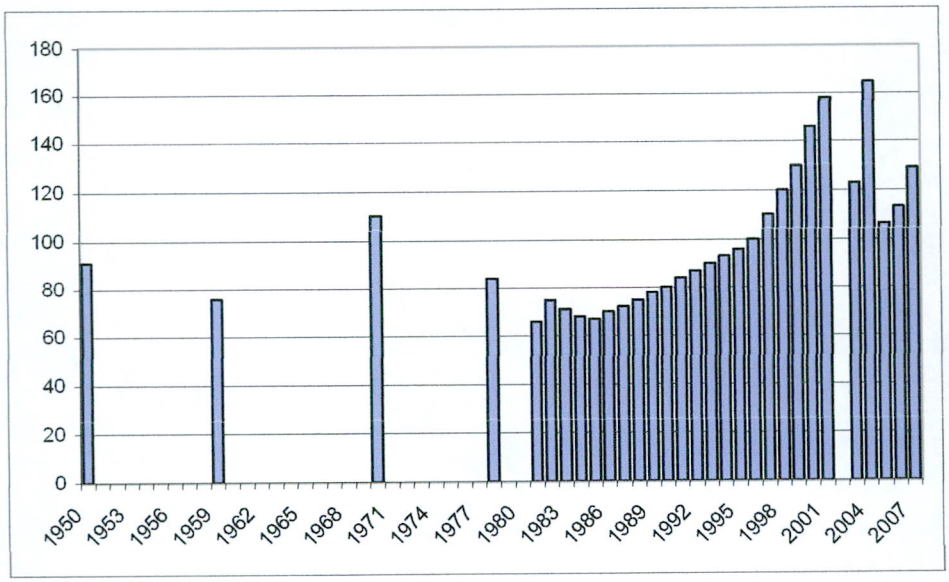

Figure 1. The numbers of Kosi Bay fishtraps estimated from aerial photographs from 1950 to 1980 and ground counts from 1981 to the present day.

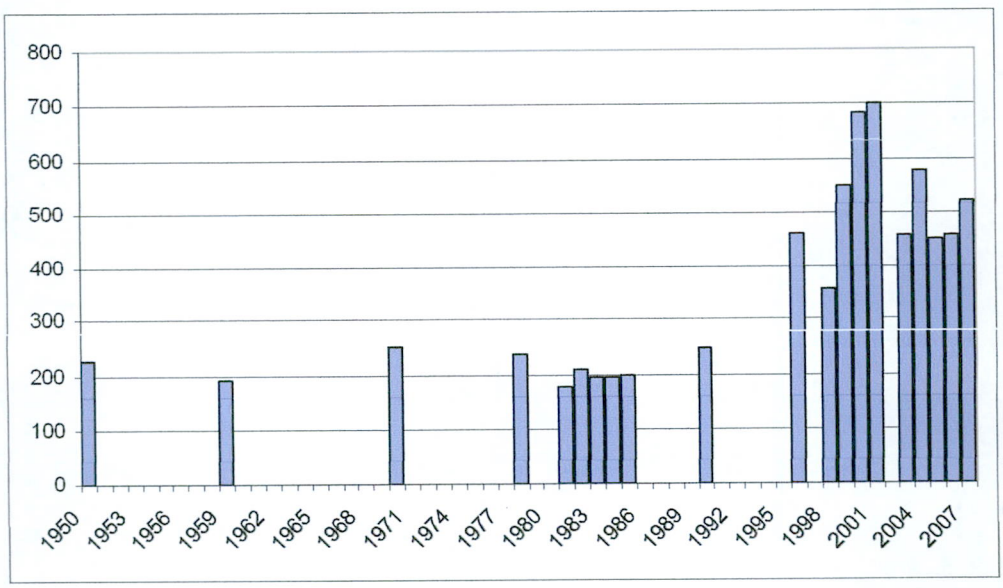

Figure 2. The numbers of Kosi Bay fishtrap baskets estimated from aerial photographs from 1950 to 1980 and ground counts from 1981 to the present day.

Figure 3. Kosi Bay fishtrap Ijeli terminal basket wall showing traditional Ugude (*Strelitzia nicolae*) binding, note large gaps between sticks.

Figure 4. Kosi Bay fishtrap Ijeli terminal basket wall showing the use of nylon rope in place of traditional Ungude (*Strelitzia nicolae*) binding, note smaller gaps between sticks.

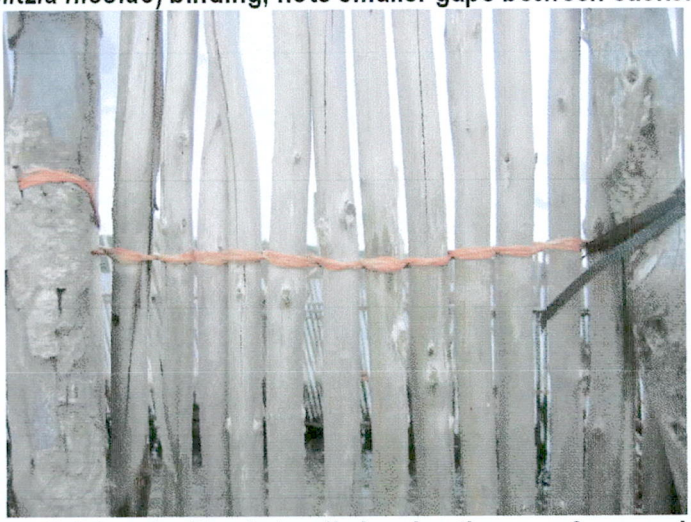

Figure 5. Kosi Bay fishtrap Ijeli terminal basket wall showing the use of gum poles and nylon rope and the resultant narrow gaps between poles.

4. Discussion

4.1 Substantial increase in trap and basket numbers

Increasing trap numbers and baskets will clearly result in an increase in fish catches. Trap catch monitoring in 1981 indicated that they then accounted for about 5% of mature fish stock annually while recent data suggest the figure is nearer 30%. A doubling of trap or basket numbers will, however, not nececessarilly result in a doubling of catches, as no two traps are equally efficient or productive. The first traps were placed in what were considered the most productive trap areas and subsequent traps in less favoured spots. Recent trap catch monitoring shows that species composition is similar to that of earliest records but total annual catches have probably increased from 40 tons in 1980 to between 60 and 100 tons today. Trap catches are, however, still probably sustainable, if illegal fishing is controlled and traps remain within traditional constraints. Considering that the area of traps has reduced markedly, the overall increase in trap numbers has resulted in much greater fishing pressure in the channels of the north of the system.

Trap numbers and placing are, however, controlled by the local Traditional Authority. These people are reluctant to limit trap numbers as they see traps as one of the few opportunities for poor people, often retrenched from Gauteng, to obtain the essential needs and resources for daily survival. They are also not fully aware of the limited nature of fish stocks, despite considerable efforts to pr4sent this information to them. In the past many trappers were old people, supplementing their pensions, and excess fish were often given away or bartered. The average trapper is now a younger man actively trying to catch as many fish as possible to sell to obtain cash. Few fish are now given away or bartered.

During 2007 one trapper, who has no other legal business, bought a Toyota 4 x 4 on the proceeds of his fishtrap. The vehicle is now used principally to transport fish to sell. Most of the fish caught in traps are not "commercial" species and their sale is illegal.

EKZNW is not presently in a position to directly reduce trap numbers but many trappers share uneasiness at the present high number of traps. If the presently dormant fishtrap committee is revitalised it may be possible to limit or reduce trap numbers through this conduit. Other, more direct, attempts to reduce trap numbers may prove counterproductive. Trap numbers may not be critical at present if other aspects of the traps can be successfully addressed.

4.2 Change from mono to ijeli baskets

The change from one type of basket to another should not impact overall trap catches and thus be irrelevant in terms of impacts on fish stocks. Historically almost all baskets were of the umono type and the change to ijeli baskets is apparently accounted for by the fact that it is easier to steal fish from a mono basket. Stealing fish from an ijeli basket necessitates using a torch at night that alerts the trap owner to the thief's activity. A thief can easily detach a mono basket and carry it and the catch off into the bushes.

4.3 Start of and increase in use of modern binding materials

The main modern material used is various forms of nylon rope and string for binding branches and sticks together. This is used in place of the traditional Ugude (*Strelitzia nicolae*) as it is longer lasting and much thinner (Figures 1 & 2). The use of nylon results in the sticks of the baskets being much closer together that, in turn, results in the capture and retention of much smaller fish. Twenty years ago no such material was used but it is routinely available from rope washed up on the beach. As it is longer lasting and enables the retention of smaller fish, an increasing number of trappers have begun using nylon rope in trap construction. At present about a quarter of traps use some modern materials in construction.

The use of modern materials makes the traps more efficient, in terms of numbers of fish caught, and reduces trap maintenance substantially. It also increases the proportion of undersize fish killed by fishtraps. The proportion of legally undersize fish caught in traps, and thus immature, was estimated at less than 5% in 1981. This proportion has increased but some trappers now do not allow monitors to measure undersize fish, as they are aware of our concern over this capture, and so any recent estimates are inaccurate.

Traditionally only indigenous materials were used and it is generally known and accepted that it is "wrong" to use modern materials. There were obvious advantages in using modern materials and so some trappers began using it. In the first few years of use the level was almost insignificant but in the last few years it has increased substantially. Trappers know that they are not supposed to use this material, as it was openly discussed at Joint Management meetings, and many trappers are against its use due to the capture of juvenile fish.

The use of nylon rope has declined recently in some areas, such as near the mouth, but is presently widespread and increasing in and just north of Lake Makawulani.

4.4 Start of and increase in use of gillnet

Historically there was conflict between trappers and netters in the northern areas of Kosi Bay. Occasionally trappers would seize gillnet and in the last few years some trappers began spanning gillnet over their baskets. This stopped fish, such as the bluefin mullet, from jumping from the basket and also stopped birds like fish eagles from taking fish from inside the baskets. This use has flourished in the last five years and very recently some trappers have begun using lengths of gillnet to make their trap guide fences more efficient.
The use of gillnet is known to be illegal but several eminent trappers have begun using it openly. Two years ago EKZNW management patrolled once rapidly though the system and successfully removed all netting from fishtraps.

4.5 The use of gum poles for basket construction

It is not easy to find suitable long thin and fairly straight indigenous poles with which to build fish catching baskets. Some trappers, with access to vehicles, have begun importing and using gum poles to save time in searching for poles and trap maintenance and make baskets which are much more efficient due to smaller gaps between poles. It is clearly very difficult for fish, even undersize fish, to escape from a gum pole trap compared to a traditional one (Figure 5). When trap-building conditions were discussed at Fishtrap Joint Management meetings no one anticipated the use of exotic trees as no one thought people would bring in trap materials by vehicle. The use of gum poles is against the conditions listed in the Fishtrap OMP as only indigenous materials should be used.

4.6 Start of and increase in the use of goggles

In the past trappers emptied ijeli type baskets by spearing fish using an unaided traditional spear. In recent years an increasing number of trappers have begun using goggles to assist in spearing the fish in the baskets. In trap building and maintenance the use of goggles has, to a degree, enabled traps to be erected in deeper and more rapidly moving water, such as in channels and near Kosi Mouth. The use of goggles with traditional spears has been identified as a serious cause for concern in fisheries management at Kosi Bay as, in open water, it can increase catch efficiency by over an order of magnitude. Fishermen at Kosi Bay know well that goggles should not be used with traditional spears. Many trappers, however, favour the use of goggles as they can spear the trapped fish much more easily. The main concern is that allowing some local anglers to use goggles is technically illegal and opens the door to other fishermen to pretend they are trappers so that they can spear fish in the open water.

4.7 Building of traps into the trap free channel

The Traditional Authority, through the senior Induna of the area, used to maintain the thirty-yard trap free channel by occasionally checking it with a thirty-yard rope. Enforcement was erratic until about 1985 when EKZNW assisted the senior Induna of the area to enforce the channel and to demarcate if with treated poles. The channel was last successfully checked and demarcated in this manner in 1995 but subsequently poles put in to mark the channel were soon stolen. The lack of clear definition of the channel and further erosion of TA control resulted in traps being built into the channel. The situation worsened until 2002 when the Fishtrap Joint Management Committee agreed to re establish the channel. The committee, including EKZNW members, marked the channel and any traps built into it and then gave trappers several weeks to remove the offending traps. The owners removed fifteen of the twenty traps involved. The remaining five traps were removed from the channel by EKZNW staff with some trapper assistance. Despite a (refused) claim for R 500 000 for compensation from a trapper who removed a section of his trap from the channel, the operation went smoothly and was supported by most trappers and residents. The channel is presently fundamentally intact but needs ongoing checking.

The channel to Khalu inlet, which had been reduced to almost five metres, was also opened to 30 metres in 2002 but slowly traps are again being built into this channel. There are presently no traps in Mthando channel, between Nhlange and Mpugwini lakes, and this should be maintained, as the channel itself is well under thirty metres in width. There are several traps in the main channel between Makawulani and Mpugwini Lakes but although there are thirty metres from any trap to the bank, fish have to zig zag through the channel to avoid being caught.

In 2007 one man began building a trap in the Nhlange end of Mthando channel inside the "no netting" zone. Fortunately this man has not yet completed is trap.

The long narrow channel from Makawulani Lake to Kosi Mouth continually migrates like a river in a floodplain. In one area it has migrated into the middle of a fishtrap but the owner has maintained the trap and so effectively his trap crosses the channel. No one is presently prepared to ask the trapper to remove his trap and so at this one point there is no real open channel.

4.8 Decrease in traps in Amanzamnyama and Nhlange and increase near Kosi Mouth.

The complete disappearance of fishtraps in Amanzamnyama and then Nhlange Lakes has been attributed to several reasons including increasing turbidity, wave action and fish theft. The real reason is unclear but there are presently no traps in Amanzamnyama and only two small ones in Nhlange. One reason why gillnetting was legalised in Nhlange was the absence of traps, as trappers and netters are usually an uneasy combination. Trap catches in these lakes would consist of a higher proportion of freshwater and non-migrating fish than those in the more northern areas. The increase in traps in the north has resulted in a greater impact on marine fish and their capture during spawning related migrations. The traps nearest Kosi Mouth catch high numbers of fish spawning there, during tidal movement, as well as those resting during migration.

Some people are leaving gillnetting, as the fishery is phased out, and could convert to trapping but Amanzamnyama, zoned as a sanctuary, would now be seen as unsuitable for fishtraps. From a management perspective it would be simpler if traps were limited to the northern two lakes but if previous netters wished to begin trapping in Nhlange then this is preferable to continued netting. The dramatic increase in traps near Kosi Mouth and the recent building of one on the south bank near the sanctuary is cause for concern as some fish species, such as the riverbream, remain for extended periods in this area during spawning. The relatively new trap nearest the mouth recaptured 14 % of tagged riverbream in a recent survey.

5. General

It is clear that trap number, construction and placing have changed substantially in the last decade. At the same time the number of recreational fishermen accessing the lakes has increased and illegal gillnetting levels have not declined markedly. All in all, the amount of fish taken from the lakes by man has increased markedly and traps are the most important capture method, in terms of fish mass. Concern has arisen at the very high level of exploitation of some fish species and the overall large-scale use of fish in a protected area. Traps are in some ways easy to manage in that they are obvious, semi permanent structures, which take a lot of time and effort to construct, and there is a lot of information on their catches. The political and legal situation, however, renders trap management difficult and sensitive. Generally, trappers have a history of not openly coming into conflict with the conservation managers. A reluctance to enforce certain aspects of trap management, to avoid destroying this working relationship, has resulted in some of the changes above. Specifically the use of modern materials and accessories was ignored at low levels but has now increased to possibly negatively affect the overall sustainability of the Kosi Bay fishery.

Enough information is now available to make judgements on what changes need urgent attention and how these should be addressed. The technical process of formalising the fishtraps through the Subsistence Fishing Initiative is far advanced with a completed Operational Management Plan (OMP) for fishtraps. The aspects mentioned above are covered in the OMPS and dealing with some of these now, in an appropriate manner, will facilitate the implementation of the fishtrap OMP.

6. Recommendations

The simplest way forward would be for MCM to issue a community fishtrap license to the Traditional Authority on behalf of the local people. In terms of this a Fishtrap Joint Management Committee would be re constituted and it could deal with the individual issues as follows.....

6.1 Substantial increase in trap and basket numbers

The OMP caps the trap numbers at a level probably acceptable to all

6.2 Change from mono to ijeli baskets

No action required.

6.3 Start of and increase in use of modern binding materials

The use of modern materials is not allowed in the OMP. (Suggestion to JMC: give trappers deadline to remove modern materials then EKZNW to remove remainder after deadline)

6.4 Start of and increase in use of gillnet

Gillnetting is illegal without a specific license and no trappers have gillnet licenses. EKZNW should remove all gillnet and other netting used in or on fishtraps on an ongoing basis. (Already implemented once but needs to be ongoing)

6.5 The use of gum poles for basket construction

Only indigenous materials may be used in legal trap construction, traps with gum poles would not be legalised.

6.6 Start of and increase in the use of goggles to empty baskets

Discuss the use of goggles with JMC, explain concerns and work out way forward

6.7 Building of traps into the trap free channel
EKZNW to monitor the channel and mark any traps built into it. Trappers to be given a week to remove traps otherwise EKZNW to remove. Trap beginnings at mouth of Mthando to be removed ASAP.

6.8 Decrease in traps in Amanzamnyama and Nhlange and increase near Kosi Mouth.
Through JMC, discourage trap building in Amanzamnyama and very near Kosi Mouth.

7. Concluding remarks
The fundamental problem is that all traps are presently illegal and there is no working formal relationship with the trappers. It is currently illegal to operate a trap and so it cannot be any "more" illegal to operate one using nylon rope. The majority of trappers share EKZNW concerns and agree with most of the provisions of the OMP but the difficulty is establishing the formal relationship in the present political atmosphere exacerbated by a few very difficult individuals.

Fish trapping is not in crisis but aspects of it are rapidly approaching levels at which EKZNW will have difficulty maintaining its stance of "wise management" of part of a World heritage Site in the eye of the general public and media.