

# The diet of Osprey *Pandion haliaetus* on Marawah island, Abu Dhabi emirate, UAE

by Mark Beech

## Introduction

In the UAE, the osprey *Pandion haliaetus* is a breeding resident on isolated coasts and islands, primarily to the west of Abu Dhabi city (Aspinall *pers. comm.*). It nests between November and March or April and its numbers are supplemented by migrants and winter visiting individuals between September and April (Aspinall 1996). Individuals, non-breeding or visiting, are present along the whole of the rest of the UAE coast, both within and outside the Arabian Gulf, throughout the year.

Ospreys are seldom found far from water, although they have been seen in the UAE well inland and away from water, presumably on migration, as well as at inland water bodies. They can often be seen perching on posts near tidal mudflats, or resting on other man-made structures. Some occur far offshore, where they utilise oil well-heads and platforms as a base (Richardson 1990). They build a stick nest, or eyrie. On islands these are often on the ground, although many are sited on top of man-made structures. Nests are typically made from a mass of twigs and flotsam, and may include dead seabirds or other animals, flip flops and even safety boots amongst other items. Each pair may build and defend several nests. The cup of the nest can be lined with various sea sponges. Two to four eggs are laid from November onwards.

Comparatively little is known about the diet of the osprey *Pandion haliaetus* populations inhabiting the coastline of

the UAE. The author visited the island of Marawah in Abu Dhabi emirate in March 1999 and March 2003 as a member of the Abu Dhabi Islands Archaeological Survey, ADIAS, team. This provided an opportunity to examine two eyries located on the northern coast, one eyrie on the west coast and a recently used artificial feeding post, originally established for falconry, on the southern coastline, located just to the south-west of the village of Ghubbah. Ospreys have a diet composed entirely of fish and it has been reported that these are generally species for which there is no commercial market (Aspinall 1996: 48). No systematic investigation of osprey diet based on the analysis of actual fish bone debris has so far been carried out though. The aim of the study was, therefore, to provide an insight into osprey diet. By identifying the fish species represented, it was hoped that this would also shed some light on which marine habitats were being exploited. This analysis was made possible through the use of the author's extensive osteological comparative collection of Arabian Gulf fishes, collected during the course of his PhD at the University of York (Beech 2001). This reference collection is now maintained by the author for ADIAS in its headquarters in Abu Dhabi.

## Sampling localities

Visits were made to three osprey eyries located on Marawah. Two of them were located on the northern

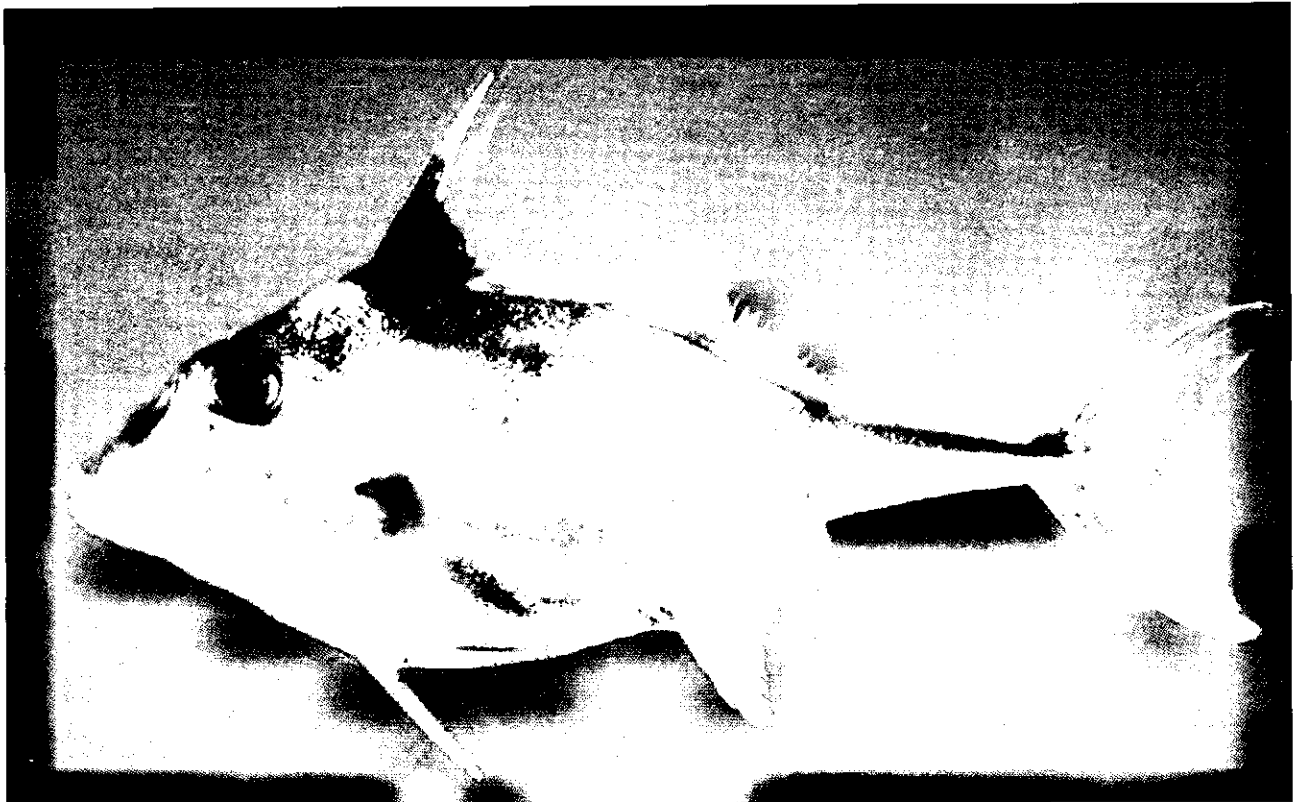


Plate 1. Shortnose tripodfish - *Triaacanthus biaculeatus* (Bloch, 1786). Photograph by J.E. Randall 1997. Specimen caught in Cochin, India. Size: 17.6 cm Standard Length, 21.2cm Total Length. Source: <http://www.fishbase.org/Photos/PicturesSummary.cfm?ID=4562&what=species>

coast of the island, and the third was built on top of an abandoned fish-trap (gargoor), located on the western coast of the island at 53.24604 E, 24.26879 N (GPS datum = WGS84).

A number of visits were also made to the artificial feeding post on the southern coastline of Marawah, about 1.5 kilometres south-west of the village of Ghubbah at 53.26331 E, 24.27087 N (GPS datum = WGS 84).

## Results

No bones were recovered from the three eyrie sites. Material present could all broadly be described as nesting material, being largely comprised of dried seaweed, small sponges, with occasional cuttlefish fragments. Other modern debris in the form of string and plastic was also observed.

The area around the feeding post pole located on the south-western coast was littered with fish bone debris. Fish bone fragments were scattered in a metre wide radius of the pole, with a considerable number of bones also being retrieved from the small platform at its top.

All of the visible bone fragments were systematically collected and subsequently sorted so that the fish remains could be identified. Identifications were made by using the author's osteological comparative collection of Arabian Gulf fishes. The results of this analysis are summarised in Table 1.

Needlefish were represented by three distinctive jaw (dentary) fragments coming from at least two individuals. These were from small-sized individuals, perhaps ca 50-60 cm in length. Needlefish are surface-dwelling fishes which feed mainly on small fishes. A number of genera and species are present within the Arabian Gulf (Randall 1995). These include the flat needlefish *Ablennes hians*, banded needlefish *Strongylura leiura leiura*, spottail needlefish *Strongylura strongylura* and the houndfish *Tylosurus crocodilus crocodilus*. It is not possible to distinguish which particular species is present from these bone remains.

A group of articulated caudal vertebrae was recovered which appeared to be from a single individual butterflyfish, probably only ca 10 cm in length. Their precise identification remains undetermined. Most species of butterflyfishes occur on coral reefs or rocky substrata at depths of less than 30 metres. One of the most common butterflyfishes in the Arabian Gulf is the black-spotted butterflyfish *Chaetodon nigropunctatus* which can attain a length of ca 14cm. Another common species in the Gulf is the longfin bannerfish *Heniochus acuminatus*, which can reach a length of up to 20cm. This latter species often occurs as solitary individuals or

in pairs and is closely oriented to the bottom (Randall 1995: 253).

The remains of shortnose tripodfish *Triacanthus biaculeatus* (Plate 2) comprised the greater part of the osprey bone debris, amounting for 94% of the total number of individual fishes represented in the entire sample. Hundreds of bone fragments (Plate 3) were recovered, out of which a total of at least 49 skulls and 14 'tails' (ultimate caudal vertebrae) could be recorded amongst the remains. Most of the remains were from fish which were about 20-25cm in length.

The shortnose tripodfish can reach up to 30cm in length, and is an inshore species of flat sand or mud bottoms. It can also be found in estuaries (Randall 1995: 391). Tripodfishes feed on bottom-dwelling invertebrates, and are named after their long first dorsal spine and their two long pelvic spines. The pelvic spines can be locked in an extended position, which, together with an erect dorsal spine, form an effective deterrent to many predators. Tripodfish belong to the family called triplespines (Triacanthidae). They are distributed throughout the Indo-West Pacific, from the Arabian Gulf eastwards through the Bay of Bengal to eastern Australia, and northwards to southern Japan and China.

## Osprey diet

Our knowledge of osprey diet is largely derived from studies which have been carried out in North America and Europe. Although osprey diet consists almost entirely of live fish, it is reported that they will occasionally eat frogs, snakes, ducks, crows, and small mammals (Burns 1974; DeGraaf *et al.* 1991; Dubois *et al.* 1987; van Daele and van Daele 1982). Their diet is variable and depends on regional differences in fish availability. For example, in Nova Scotia, alewife, smelt, pollock, and winter flounder compose 94 percent of their diet. Along the southern coast of New England, about one-half of the fish ospreys eat during the breeding season are winter flounder *Pseudopleuronectes americanus*. White herring *Alosa* spp. and Menhaden *Brevoortia tyrannus* each supply another 20 percent of the diet. Ospreys in western North America often eat suckers, carp, bullhead *Ictalurus* spp., and perch *Perca flavescens* when nesting near warm shallow lakes or reservoirs but eat trout when nesting near deeper, colder waters (Poole 1989, Van Daele and Van Daele 1982). Inland ospreys are likely to eat the same species of fish throughout the breeding season, but coastal populations change prey regularly in response to the seasonal migration of marine fish (Poole 1989).

**TABLE 1. Fishes represented in the bone debris collected from the feeding post site on the south-western coast of Marawah.** (MNI = minimum number of individuals, based on the most common non-repeatable anatomical element recorded.)

Family	Species	Common name	MNI
Belonidae	? <i>Ablennes hians</i> , <i>Strongylura leiura leiura</i> , <i>Strongylura strongylura</i> or <i>Tylosurus crocodilus crocodilus</i>	Needlefish	2
Chaetodontidae	? <i>Chaetodon nigropunctatus</i> or <i>Heniochus acuminatus</i>	Butterflyfish	1
Triacanthidae	<i>Triacanthus biaculeatus</i> (Bloch, 1786)	Shortnose Tripodfish	49

They usually feed twice a day, in the mid-morning hours and again in the late afternoon. Osprey are skilled hunters who spot their prey, hover, then plunge into the water, grasping the fish. Ospreys can penetrate only about a metre below the water surface, therefore, they generally catch only surface fish or those that frequent shallow flats and shorelines. The lower surface of the feet are covered with small pads called spicules, that help hold a struggling fish. If a fish is caught the bird will fly up into the air, shake the water from its wings, and then reposition the fish so that the head faces forward to reduce drag while flying. The bird finds a place to eat its meal and, once full, may either abandon remnants or save them for later consumption.

Fishes which are caught are typically 10 to 40 cm long and weigh under 1 kg. Instances are known of ospreys diving on fish too large for them, getting their talons stuck in the fish's flesh, and being dragged under the water and drowned. Ospreys rarely scavenge dead fish or take other animals, possibly only when live fish are unavailable, when they are migrating through unfamiliar territory, or when alternative prey are exceptionally abundant or vulnerable (Unitt 2000).

There have only been two previous studies of osprey diet in Arabia. One study examined the diet of a resident colony on Tiran Island in the northern Red Sea (Safriel *et al.* 1985). The second study, on the Farasan Islands in the southern Red Sea, showed that parrotfish (Scaridae), rabbitfish (Siganidae), needlefish (Belonidae), wrasse (Labridae), and angelfish (Pomacanthidae) are common prey. It was reported that an osprey, whilst feeding chicks, may catch up to eight fish a day, each weighing as much as 800g (Fisher *et al.* 1996b). The diversity of osprey fish diet is generally determined by the type of marine habitat found within the foraging area (usually close to the nest), where shallow lagoons and gently sloping reef platforms are favoured over narrow fringing reefs. Foraging has been monitored in different marine biotopes in the Farasan Islands such as coral, algae, seagrass, mangrove and sandy substrates (Fisher 1996; Fisher *et al.* 1996a).

Ospreys in the southern Red Sea breed from early November through to May. Most pairs lay eggs from mid-November into December. Ospreys at more northerly Red Sea latitudes generally lay about a month later, in early January. It seems likely that, as in the Arabian Gulf,

ospreys have adapted to breed in the winter months to avoid the extremely high summer temperatures, as eggs require continual incubation and protection from the sun. The higher tides and more favourable southerly currents and winds in the winter months in the Red Sea may also play an important role, particularly in areas of extensive shallow water, which are often fished by ospreys.

### Osprey diet on Marawah

The majority of the fishes represented in the osprey feeding debris from Marawah originate from shallow sand to mud bottoms. Such environments can be found around much of the island, and especially on the southern side, in the area immediately adjacent to the sampled osprey perch. Tripodfishes are normally not considered to be of great economic importance in the fisheries of the region. The author has often witnessed them being discarded onto the beach by fishermen dragging in their beach seine nets. The bone debris sample from the modern Marawah osprey perch perhaps, therefore, confirms the general assumption that their diet is predominantly made up of species for which there is no commercial market (Aspinall 1996: 48). Tripodfish and needlefish do occasionally appear in fish markets along the UAE coastline, although they only represent a minor percentage of the overall catch.

An interesting feature of tripodfish is their large livers, apparently an irresistible tasty snack for ospreys. The fish remains collected are nearly all characteristically damaged on one side of the fish where the osprey has ripped out the juicy interior of the tripodfish.

In contrast to the fish remains described above, archaeological excavations carried out in 1999 by the Abu Dhabi Islands Archaeological Survey (ADIAS) of a number of cairn sites, described as MR6, located on the north-western shore of Marawah have recovered fish bone remains which are likely to have been associated with former osprey sites (Beech 2001). The abandoned mounds of former tombs and kilns may have provided ideal perching points for ospreys hunting on the northern side of the island. The fish bone assemblages associated with these sites are somewhat different, however, to the modern assemblage described here from the southern side of the island. Fishes represented within them are predominantly composed of small parrotfishes (Scaridae)



Plate 2 View of tripodfish fish remains collected from beneath the osprey feeding post on Marawah (Photograph by Dr. Mark Beech)

ca 20-30 cm in length, followed by smaller numbers of emperors (Lethrinidae), with occasional needlefishes (Belonidae), groupers (Serranidae) and small rays (Elasmobranchii). All of these fishes were from small-sized individuals which, in some archaeological layers, were directly associated with osprey bones. A number of these fish, such as the parrotfishes, were clearly associated with coral reef type environments rather than just shallow sandy waters, perhaps indicating that the ospreys here fished out in the shallower reef waters encircling the northern side of the island. It seems likely that the ospreys on Marawah may have fished territorially, catching their fish which were then often consumed on nearby suitable perching points. The differences between the fishes represented in the samples between the northern and southern sides of the island may partly reflect this territoriality as well as contrasting access to reefs surrounding the island. It may also reflect the seasonal availability of different fish species around Marawah.

Please inform the author if you record the location of any new osprey nests or perching posts in the U.A.E., in particular if there are piles of old fish bones near any of them! This may provide valuable new information about the geographical and seasonal variability in the diet of this beautiful bird. Tripodfish are apparently used in traditional Chinese medicine (Tang 1987), although the author has been unable to find precise details about this at present. Information on this topic would be welcomed.

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