

DOLPHINS IN THE BAY OF GIBRALTAR (II)

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*My life was like a shadow till the Lord of the morning spoke
The silence of his kingdom on wings of birds he broke
The suns first rays of sunlight struck shadows in the sea.
Tell me why I think of you,
and you think not of me.
Shaw*

INTRODUCTION

The presence of dolphins in the Bay of Gibraltar was covered in the first paper in this series presented on the Bay's dolphins (Shaw 1996). The study area was noted as a haven for seasonal pelagic species, with inshore water species also providing resources for visiting and resident cetaceans. The overall question of their permanent presence is no longer under debate.

In this paper it is intended to take that study of the more common species, the common dolphin *Delphinus delphis* and to a lesser extent the striped dolphin *Stenella coeruleoalba* forward and show the distribution and behaviour patterns of those dolphins while present in the Bay area.

METHOD

The methodology used to obtain the results is the same as that used in the first paper.

Boat transects were carried out from the *Nimo*, a 10 metre Mitchell, GRP hull vessel with 145hp turbo charged Perkins inboard engine.

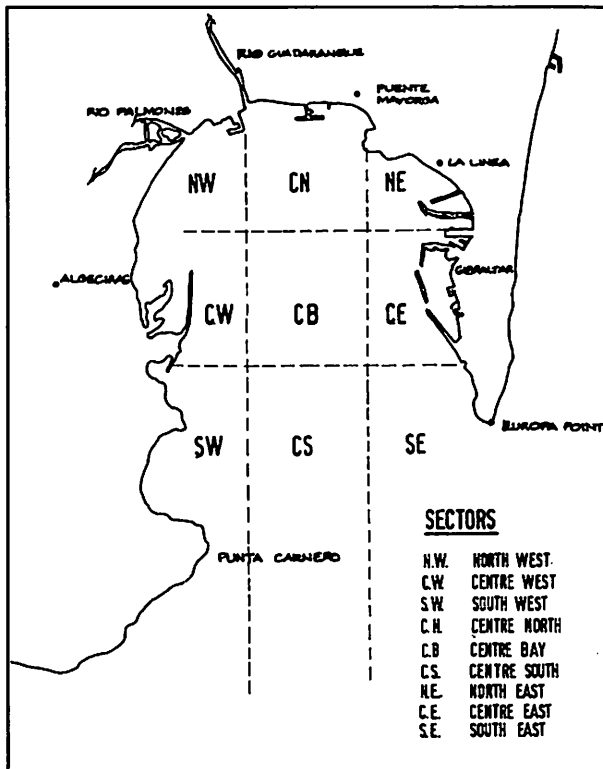


Figure 1. Study area with sectors of the Bay as used during observations

Transects were carried out over a fixed course at a regulated speed of not less than 5 knots and no more than 8 knots over a time period of two and a half hours for each transect survey. Data used in this paper were collected between April 1996 and April 1998.

The team consisted of no less than two persons, one a spotter on the spotting tower or bow of the vessel, and one navigating, working on a rotation basis to cut down on wave blinding (choppy seas over a period of time deceive the eye). The spotter would have every sighting confirmed by the navigator who would use binoculars to confirm distant sightings, each sighting (distant and close) was confirmed by both spotter and navigator as were numbers and species seen.

Photographic identification (Wurig and Jefferson 1990) was used to catalogue presence of long and short term users of the Bay, as were visual observations of dolphins that became known to the observers but which proved difficult to photograph.

Observations were pooled to show presence of dolphins and areas where Feeding, General, Interactive and Nursery behaviour took place. For the purpose of the study the Bay area was divided into nine basic sectors (Figure 1). This enabled the study to examine whether the behaviour of the dolphins was related to the sector of the Bay.

RESULTS

Figure 1 shows a plan of the Bay with the sectors used to record observations. Table 1 gives the activities according to the sector where they were recorded, and Tables 2 to 5 provide this information for specific behaviour patterns for *Delphinus delphis* where sufficient observations were made. The descriptive sections apply to *D. delphis* and *S. coeruleoalba*.

The different behaviour patterns of the dolphins in the Bay are described as follows.

FEEDING

Delphinus delphis employs two basic approaches to feeding if one discounts the incidental encounter of feeding while the animal is in transit. These two approaches are collective feeding and individual feeding. The two systems of feeding for their part are governed by the type of prey item being taken.

COLLECTIVE FEEDING

Collective feeding is used primarily on shoaling species such as mullet (*Liza ramada*), anchovy (*Engralis encrasicolus*), mackerel (*Scomber scombrus*), flying fish (*Cheilopogon heterurus*) and boarfish (*Capros aper*). The tactics used to gain access to these and other species can only be described as a collective hunt.

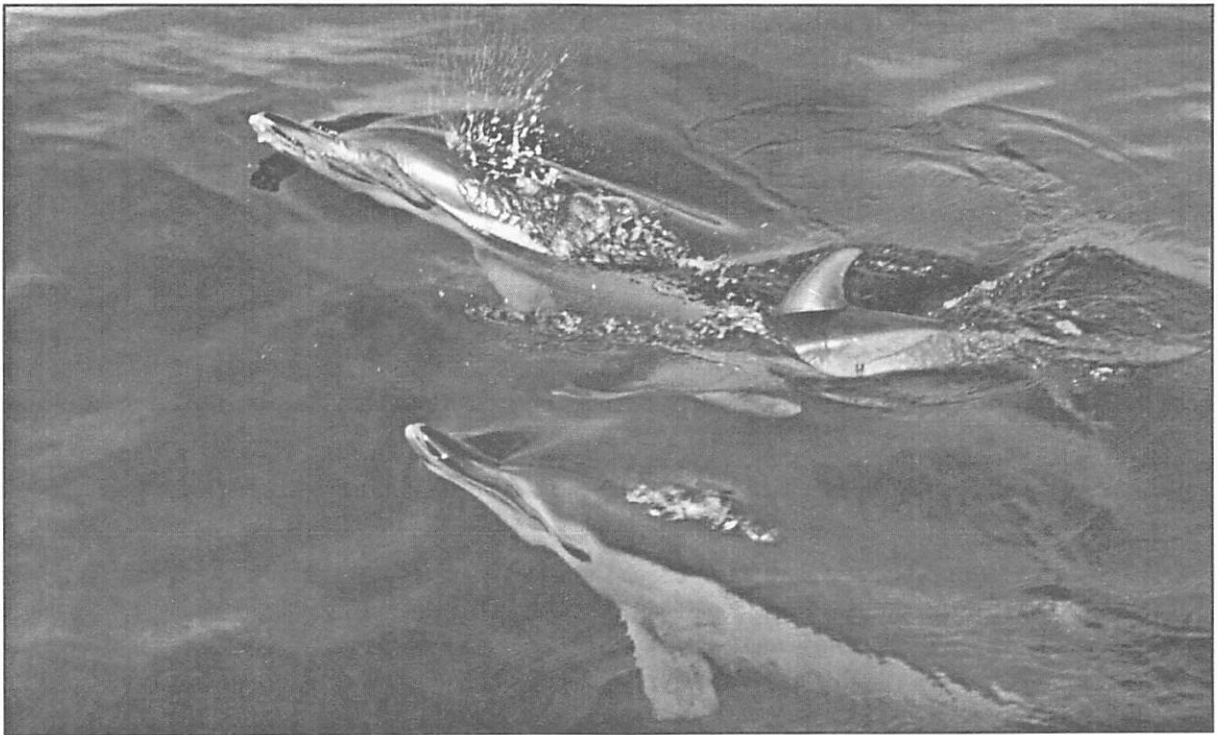


Figure 2. Common dolphins and young in a nursery.

When the dolphins locate a shoal they wish to hunt, they spread out in a pincer formation, with the bulk of their number being in the centre. Moving on their selected shoal they drive them to what would appear to be a pre-selected location. This location seems to be governed by depth (80-100 metres), or to correspond to where there is a strong current flow.

The dolphins take turns in driving the shoal from each side of the pincer formation. By diving down from both sides and the centre the shoal is pushed in the desired direction. Dolphins on the surface will tail slap the water also, from both sides and centre, though not all at the same time.

This action causes the shoal to bunch closer together. In the confusion of the overall shoal's plight, they are driven to where the dolphins will begin to feed.

If the current of the water and not the depth of the water is used, the dolphins will face the selected shoal face on to the current then hold them there while single individuals attack the periphery of the shoal, taking their prey individually, and in doing so ensure that they do not scatter the shoal.

Each dolphin takes its turn to feed, exchanging places with those on the flanks and the centre. Members of the main centre group will from time to time dive down below the shoal forcing them to hold in midwater.

After each dolphin has taken its fill it will still continue to take part in the collective hunt until all that are taking part have fed.

If depth of water is used, the same overall activity takes place with the exception of those in the centre diving down below the shoal. It would seem that the presence of the seabed holds the shoal in midwater. There is however more activity

Comunicaciones

on the flanks and on many occasions the open end of the pincer formation is closed completely to stop the shoal from breaking out. That is, when the seabed is used as part of the trap the shoal being hunted can be completely encircled, with the overall feeding method by the dolphins remaining the same.

When small prey items such as boar fish are being hunted more activity from below is employed by the dolphins to push these quite small fish up to the surface. Yellow legged gulls (*Larus cachinnans*) from the surrounding area take great advantage when these species are being hunted.

Gulls will attack the surfacing shoal from the air, while dolphins attack from below. This causes such panic in the small fish that they ball up and roll around the surface of the sea, seeking communal protection from each other, when in truth they are facilitating their own demise from both gull and dolphin by not scattering. The dolphins for their part do not appear in any way disturbed by the presence of the gulls during this type of hunt. In fact the gulls inadvertent participation in the hunt helps the dolphins. Whether the dolphins are aware of the gulls participation to its benefit is a question that requires more study.

Not all of these collective hunts are successful. Many of them break down when the pursued prey scatters. On such occasions the dolphins may, exceptionally, start the hunt again.

At the termination of these hunts activity can still be quite strong, the school of dolphins however does not always devour the whole shoal they have been feeding from. Some adult and sub-adult dolphins will tease the remaining shoal members with mock attacks. Observations made on those that have sought sanctuary around the observation vessel have clearly demonstrated that at these times the dolphins are merely practicing attacks or just winding down after the hunt. The prey for their part have been seen to leap clear of the water as these attacks are repeatedly made upon them, something that is not seen during the hunt itself.

INDIVIDUAL FEEDING

Individual feeding is for its part what it states, with each dolphin feeding individually. However there can be a large number of participants feeding at the same time in the same overall area.

The typical individual prey would be flying fish (*Cheilopogon heterurus*), garfish (*Belone belone*) and Pipefish (*Syngnathus phlegon*). These prey species have a preference for the surface.

When this type of prey is encountered by dolphins that wish to feed, the prey are attacked on sight. The dolphins go from tranquil behaviour to chaos in a single sweep of their tail, chasing in all directions. In some cases the chase rolls around in a localized area, turning the sea into a boiling pot of jumping, thrashing dolphins. Due to the tactics used by the pursued prey, individual dolphins may be taken a great distance from where they first started in pursuit of a single fish.

This type of feeding however breaks down the overall dolphin school into scattered individuals competing with each other for each and every prey item that is taken.

Adults with young or calves do however seem to stay very much together and do not appear to be drawn by the chase too far from what quickly becomes a scattered school. Tail slapping from adult individuals would appear to be the call for those with young to form up together in a cohesive group. Being a group within a scattered school they then rove the area feeding as opportunity provides.

This type of feeding does not last long due to the nature and number of the prey they are pursuing. However it may be some time before the school has reformed around the adults with young and calves.

NURSERIES

Calves within groups of dolphin are not uncommon, whatever the species. Nurseries however are totally separate from the overall school, even though the school may be quite close by or even encircling the nursery. There are also encounters of nurseries on their own away from all other school members.

These nurseries consist of mothers and their calves with supporting female dolphins that may or may not be in gestation.

The nursery itself is in many ways similar to our own kindergarten parties with only the female family members present. Closer observation of these nurseries show it not to be just a protective group but a learning zone.

When small vessels such as the one used in this study are present, the mothers will bring small calves to the boat while it is in motion. This they do one calf and one accompanying adult at a time. Swimming closely to the vessel with the calf riding the adult's back just below the dorsal fin, both will approach the unseen pressure wave on the bow of the boat, venturing closer until both calf and adult are in the pressure wave of the boat.

The first encounter for a calf sends it scurrying away from this unseen pressure with the adult close behind. Several passes are made and the time taken by each calf's first encounter varies from calf to calf. The end result seems to be that the calf learns that boats have pressure waves on their bow. No other dolphin even when the whole school is present will attempt to bow ride while the calf is undergoing this induction by the accompanying adult. The ultimate induction by the adult is to leave the calf momentarily alone in the pressure wave of the boat, a little like going solo on your first walk about without a parent's guiding hand for support.

After these primary stages calves will venture close to the pressure wave of boats racing to and fro only to be called back by the mother who will either collect the calf by swimming by or with a tail slap.

Calves also seem to be taken to the rear of the vessel and shown the moving parts, namely the propeller of the boat.

During these observations of nurseries calves have been seen learning to wave ride the wake of large ships and ferries, or several at a time, with a single adult, learning to porpoise through the water. When calves are much larger (1-2 months old) they will occasionally bow ride with an adult. They usually stay to the side of vessels accompanied by an adult. Once the trick has been learned however they would appear to conform with the overall movements of the adults in the nursery doing only what they do and moving only where they move. Any transgression to this rule is ended with the transgressor being called into line by the adult tail slapping the water. Only when they are much larger do they endeavor to do as individuals what they had been taught in the nursery.

GENERAL BEHAVIOUR

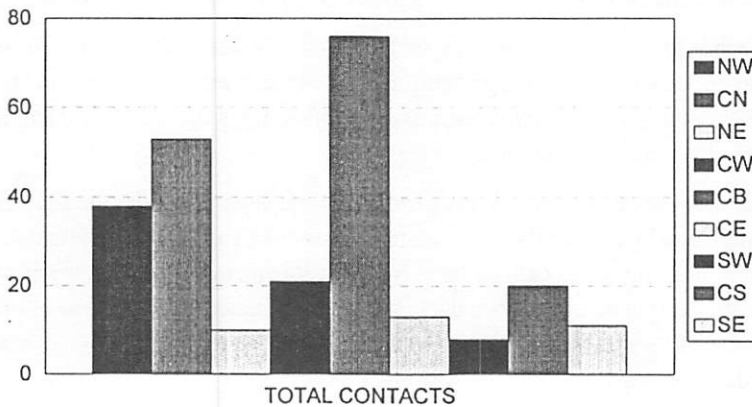
General behaviour is a broad brush that covers a large area of dolphin social behaviour and activity. It covers dolphins at rest, just moving through the water with no apparent overall activity taking place, or displays of interactive behaviour, courtship and mating, aggression and frustration. It is not uncommon to see dolphins teeth raking each other, grasping a dorsal

or pectoral fin in the mouth to hold back forward motion or turn on what would to the onlooker appear to be an opponent. The lives of the dolphins are far more complex than the casual observation may appear to tell us.

DISCUSSION

For total contacts made (see Figure 3 and Table 1) the three East side sectors were the lowest in number of contacts made with the West side providing far larger contact numbers. The centre sectors provided the highest contact numbers overall. This pattern was consistent in terms of use, General, Feeding or Nursery.

The overall frequency pattern fell into three basic areas. Sectors, North West (NW), Centre North (CN), and Centre Bay (CB), were the areas most used.



for sector abbreviations see Figure 1.

Figure 3. Total contacts with *Delphinus delphis* by sector

Though all other sectors were used in variable degrees, it is safe to say with the exception of sectors noted above, that activity there was low in comparison, with one possible exception, Centre South (CS), in terms of general behaviour only.

These patterns of use by the Dolphin are reflected in human use of the Bay area. These uses were noted in Shaw 1996. Four ports work the waters of the Bay, viz. Algeciras, Puente Mayorga, La Linea and Gibraltar. The sectors that these ports occupy and the area of sea where their commercial activities take place are:

1. **Algeciras** area of use, sectors Centre West (CW) & South West (SW). Commercial shipping (general & container), ferries and commercial fishing boats both large and small. Container shipping is on the increase since the completion of the port's by pass bridge plus an off shore anchorage. These sectors do however have strict anchorages and ferry lanes that must be adhered to by all shipping. There is no commercial net fishing allowed in the area.
2. **Puente Mayorga** area of use, sectors, Centre North (CN) & North West (NW). Commercial shipping (tankers & cargo for its refinery smelting plant), and a small fishing community. There is no commercial net fishing allowed in this area.

- 3 **La Linea** area of use, sector North East (NE). Little commercial shipping (cargo) though now in advanced stage of development. Marina and fishing fleet.
- 4 **Gibraltar** area of use, sector Centre East (CE) & South East (SE), Commercial shipping (general), cruise ships, bunkering vessels, off shore anchorage, three marinas & Dolphin tour boats. Under the Nature Protection Ordinance 1991 no commercial net fishing allowed in these waters.

Taking into account each port's commercial activity one sees the only areas that are not being used for any permanent commercial use are sectors, Centre Bay (CB) & Centre South (CS). Only innocent passage takes place in these within these areas.

Three sectors NW, CN, & CB provide the greatest number of contacts, with two of those sectors being within a commercially active area. Overall safety factors implemented in these areas forbid more than one tanker at a time to discharge or take on a cargo. This is done off shore in sector NW, from a floating platform that is fixed to the seabed with chains and concrete anchor blocks. There are also restrictions on anchoring close to or near the area because of the underwater umbilical which carries these liquid cargoes to and from the refinery. In short only vessels that are serving this industry or in support of it are allowed in the area. This restriction keeps shipping activity down to a minimum.

Sector NE is the only exception, bunkering activity passing to and fro as vessels replenish their cargoes from the refinery that is adjacent to this sector can as the demand for bunker fuel increases congest the waters of this sector.

The study data shows the dolphin use of the waters in the Bay to be in the areas least used by man, strongly suggesting that the dolphins and/or their food source are aware of or respond to the pressures on their environment within the Bay.

CONCLUSIONS

An outline of the type and pattern of dolphin activity in the Bay has been shown with this study. The study also shows that the area within the Bay where this activity takes place is with little doubt much smaller than it would have been historically.

With the increasing commercial activity within the Bay from all sides it is obvious that the areas where these animals venture will become even less. The areas most frequented in this study are the only relatively undisturbed ones left without

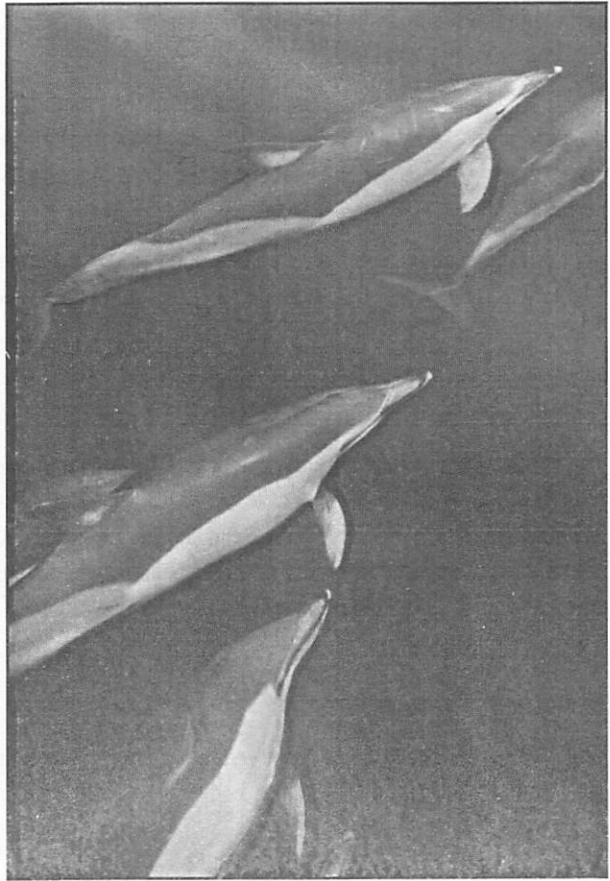


Figure 4. Common dolphins.

commercial pressures. This is except for the intrusion brought about now by eco-tourism, this being the new interloper into the domain of the dolphin.

People will always want to see these delightful creatures and even more so when they are in the wild. Commercial entities (e.g. Discover the World 1998), will likewise want to sell them as a commercial business, and as the knowledge of their accessibility grows so will the demand to see them. With that will come more boats much larger than they are now and greater in number.

All cetaceans have blanket protection under the Agreement on the Conservation of Cetaceans of the Mediterranean and Black Seas (ACCOMABS). It is however my belief that this will not adequately protect the Bay's dolphin.

Local protocols as used in other fields of study (Firth 1996) should be set in place in favour of the dolphin and not the commercial entity. Speed, size of vessel and activity carried out by vessels in close proximity to these animals should be controlled now not when the commercial industry that is fast growing around the dolphin cries out that their industry is failing.

What is left of this unique habitat for dolphins should not only be protected internationally but also locally. All areas with this uniqueness should likewise have local protocols. Protection sadly can only be achieved by restriction. Draconian as it may sound it is the only way we can achieve practical and effective protection. Too much contact can over-burden the animals' tolerance and they will either leave or they will become over tolerant and tame. The latter would suit the commercial entities. The dolphin however would no longer be wild and free to follow nature's call.

Dedication

This paper is dedicated to an eight year old girl in a smock dress and flowered pinafore sleeping under a working loom in 1921 she is forever in my heart.

“Whatever befalls the earth befalls the sons of the earth.
Man did not weave the web of life. He is merely a strand in it.
Whatever he does to the web he does to himself.”

Chief Seattle

Testimony To President Pierce 1854

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Table 1. Activity of *Delphinus delphis* by sector

ACTIVITY	NW	CN	NE	CW	CB	CE	SW	CS	SE
FEEDING	12	15	4	6	19	4	1	3	7
GENERAL	18	21	3	5	33	5	3	10	4
FEEDING/GENERAL	3	6	1	5	7	3	1	1	
NURSERY	3	5		3	5		1		
CALVES	2	5	1		10	1	2	3	
MOVING		1	1	1				3	
OTHER				1	2				
TOTAL CONTACTS	38	53	10	21	76	13	8	20	11

Sector defined in Figure 1

Table 2. Total contacts with *Delphinus delphis* by sector

38	53	10
21	76	13
8	20	11

Sectors arranged as in Figure 1

Table 3. "General" behaviour of *Delphinus delphis* by sector

18	21	3
5	33	5
3	10	4

Sectors as in Figure 1.

Table 4. Feeding observations of *Delphinus delphis* by sector

12	15	4
6	19	4
1	3	7

Sectors as in Figure 1

Table 5. Presence of calves of *Delphinus delphis* by sector

2	5	1
0	10	1
2	3	0

Sectors as in Figure 1