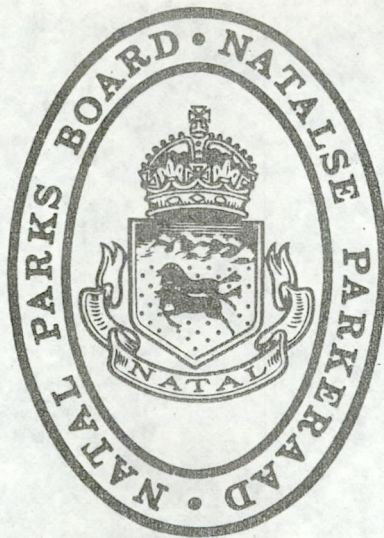


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APPENDIX 4.

REPORT ON A VISIT TO ST. LUCIA: 2 - 6 OCTOBER, 1956.

BY

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1960?

The chief purpose of this visit was to find out how far marine fish and prawns had extended up towards the lakes since the opening of the causeway on 17th April, 1956. Previous visits, in September 1954 and June 1955, and the observations of local rangers had given a certain amount of information about the biology of the lakes since the mouth closed in April, 1951. Professor J. H. Day pointed out that none of the chief angling fishes could breed in St. Lucia nor could the Penaeid prawns that were important as food. He thought it unlikely that mullet would breed either, and this belief has proved correct.

Since the mouth closed fishing has continued to be satisfactory at times in various parts of the lakes, but no small fish have been caught for the last three years or so. The only angling fish which did breed was the perch, Acanthopagrus berda. Length-frequency analysis and scale reading failed to indicate the presence of any salmon, grunter or bream that had been hatched later than the beginning of 1951.

By September 1954 only large mullet could be caught in the lake; the smallest Mugil caphalus measured was nearly 17 inches long. An attempt on the part of shoals of mullet to reach the sea was reported in the winter of 1951. Again in August 1955 the Ranger at Charter's Creek observed large numbers of mullet travelling down towards the estuary. They tried to negotiate the causeway that blocked their path, but eventually returned up the lake. Specimens caught near the causeway were heavy in roe.

Penaeid prawns died out after the mouth closed; the last one reported was a large Penaeus indicus taken in False Bay in December, 1954. The estuarine prawns, Macrobrachium spp. that do breed in lagoons and river mouths also disappeared, possibly due to excessive salinities.

Great fluctuations in salinity occurred during the past two years or so in which readings have been taken. In September, 1954 the level of the lakes was low after a prolonged period with little rain in the catchment area. Salinities were relatively high, with a maximum reading in False Bay of nearly 44 per thousand compared with a value of 35 for sea water. At Charter's Creek the salinity was about equal to that of the sea. Even as far up the Nyalazi River as the hippopotamus fence salinity was 27 parts per thousand. At that time planktonic and benthonic organisms were scarce with the result that game fish were in poor condition.

The summer rains of 1954-55 were heavy and in June 1955 the lake was approximately 3 feet higher than the year before, since water brought down by the rivers had considerably exceeded that lost by evaporation. Large areas that had been dry land were now flooded and the fauna was considerably richer than before. In places Mysid fairy shrimps were plentiful and there was a great increase in small fishes such as Gilchristella, Atherina, Thrissocles and Hyporhamphus that were able to breed prolifically.

Salinity was much reduced; in the northern lake it was about 20 parts per thousand, slightly less at Fannies and Charter's Creek and down to only 2 on the north side of the causeway, where freshwater shrimps and even insect larvae were to be found.

After the section of causeway beneath the new bridge was breached on 17 April 1956, large shoals of mullet were seen approaching the newly opened passage from the estuary. Many of these mullet were reported to have turned back at the bridge. Local residents suggested that the narrowness of the gap under the bridge put them off, besides the presence of sharks which lay in wait on the upstream side.

Professor Day mentions, however, that shoals of mullet which entered the estuary often moved up and down with the tide and did not go on towards the lakes, although no obstruction existed. Recent observations cannot, therefore, be regarded as proof that fish are turned back by the bridge although the channel is only some 85 feet wide and 3 feet deep.

A series of salinity readings, taken on 3 and 4 October, 1956, showed that sea water had extended a considerable distance up the narrows. At high tide the following figures in parts per thousand were recorded; N. side of bridge 30; $\frac{1}{2}$ mile N. of Mpate mouth 29.5; S. of Brodie's Crossing 23; Charter's Creek 18.5. In the lakes salinity had changed very little during the previous 18 months or so. There was a slight increase from Charter's northwards, the reading at Fannies being 20.

Specimens were collected with a 50 foot seine net of $\frac{1}{4}$ inch mesh and also a plankton net. Plankton samples were poor in abundance and have not yet been analysed. The seine nettings gave interesting results and the following table summarises the records obtained from nine localities (1) Lower estuary, (2) North side of bridge, (3) Two miles above bridge, (4) Mpate mouth, (5) Near Brodie's Crossing, (6) One mile south of Charter's Creek, (7) Charter's Creek, (8) Fannies Island, (9) South shore of Hell's Gate.

Only fish and prawns are recorded here; the occurrence of each is indicated by a "p" for present, "f" for fairly common, "c" for common, "a" for abundant. The only other component of the fauna which may be mentioned is "stick bait" *Solen* sp. This mollusc has multiplied rapidly in recent months. After disappearing almost entirely, it is abundant in the Charter's Creek and Fannies Island areas.

Table summary/....

	Locality								
	1	2	3	4	5	6	7	8	9
<i>Penaeus monodon</i> (Tiger Prawn)		c	p						
<i>Penaeus indicus</i> (White Prawn)		a	c	f	p				
<i>Penaeus japonicus</i> (Ginger Prawn)	a	p	c						
<i>Metapenaeus monoceros</i>		c	p						
<i>Macrobrachium</i> spp. (Freshwater Prawn)		c		p	f	p			
<i>Acanthopagrus berda</i> (Perch)	p		f	p					
<i>Labassis commersoni</i> (Glassy)		c	p	p					
<i>Atherina breviceps</i>			f	p	p	p	f	f	p
<i>Diplodus sargus</i> (Blacktail)				p					p
<i>Gilchristella aestaurius</i>	c	c	c	f	f	f	c	p	f
<i>Gobius giuris</i>		c	p	p	p	p	c	f	
<i>Gobius spence</i>		p							
<i>Hypacanthus amia</i> (Garrick)		p							
<i>Hyporhamphus knysnaensis</i> (Halfbeak)		p		p			f	p	
<i>Hyporhamphus improvisus</i>		p	p						p
<i>Lutianus</i> sp. (Snapper Salmon)		p							
<i>Mugil cephalus</i> (Mullet, adults)				f					
<i>Mugil macrolepis</i> and other juvenile mullet spp.		a	c	c	f	p	f		p
<i>Abdosargus</i> spp. (Bream)		p	p	f	p	p	p		
<i>Solea bleekeri</i> (Sole)		f	f						
<i>Syngnathus</i> sp. (Pipefish)					p				p
<i>Therapon jarbua</i> (Tiger fish)		c	f	c	p		p	p	p
<i>Chriisocles malabaricus</i>			f				f	p	c
<i>Tilapia mossambica</i> (Mudbream)			c	f	c	p	a	c	f

From the table it is evident that Penaeid prawns have been moving up from the estuary. At the first netting station on the southeast shore of the blind inlet near the mouth, in the lower part of the estuary, only *P. japonicus* was caught. Other species were doubtless absent from the area worked, only because of the nature of the substratum which was firm sand without vegetation.

At station (2), on the north side of the bridge, a muddy bottom with *Potamogeton* and *Zostera* provided cover for numerous prawns. On the east bank 330 prawns were collected in an area of about 100 square feet. The percentage composition was as follows:- *Penaeus monodon* 21%: *P. indicus* 48%: *P. japonicus* 1%: *Metapenaeus monoceros* 19%: *Macrobrachium ? delagoae* (freshwater prawn) 11%.

The length of the prawns varied from less than 2 inches to 7½ inches. Their total weight was 1 lb 10½ ozs.

Two miles up from the bridge the density of prawn population was less although 45 were caught in two short sweeps with the net. *P. indicus* was the commonest, followed by *P. japonicus*,

and M. monoceros.

Near the Mpate mouth and for half a mile north only P. indicus was found. Half an hour's netting along an open beach, and in the edges of Zostera beds produced 22 specimens, all about 4 to 6 inches long.

The last Penaeid prawn was taken just south of Brodie's Crossing. A haul 200 yards of shore yielded five small prawns from 1 inch to $1\frac{1}{2}$ inches long, including one P. indicus and representatives of two species of Macrobrachium. This point is about 9 miles above the bridge, by water.

The type of net used and the extent to which it was employed were inadequate to give a full picture of the occurrence and distribution of fishes. It is interesting to note, however, that only four species of fish that do not breed in the lakes were caught at any distance up from the estuary. Of these, juvenile bream (apparently R. sarba) were found in fair numbers 2 miles up from the bridge. One $1\frac{3}{4}$ inch bream was captured one mile south of Charter's Creek but none beyond that point. Baby mullet (possibly M. macrolepis) occurred as far as Fannies Island and so did Therapon jarbua. These two species appeared at Charter's Creek within 9 weeks of the opening of the causeway, since the Ranger there caught a juvenile mullet and two small Therapon on 20 June, 1956.

The 4th immigrating species was the blacktail, Diplodus sargus, which is surprising since it has never been a common species in the lakes. Two juveniles were captured, one at Mpate Mouth, the other near Fannies Island.

The only adult mullet caught was a 21.5 inch specimen of Mugil cephalus from the Mpate River. It was obviously an old fish and had presumably been land-locked since the mouth originally closed.

Anglers in the Charter's Creek area had been catching grunter, bream and an occasional salmon, but there was no indication that any of these fish were fresh arrivals. All were large and one may assume they were old specimens that had never left the lake since entering it before April, 1951.

After a break of five years it is now physically possible for game fish, mullet and prawns to move between the sea and the St. Lucia lakes. Periodic collecting and observations on physical and biological changes will obviously yield results of interest.
