REPORT ON THE CONSERVATION VALUE OF THE AREA WEST OF THE PRESTON RIVER MOUTH, LESCHENAULT INLET

S.A. Halse
Department of Conservation and Land Management
P.O. Box 51
Wanneroo W.A. 6065

Prepared for
Kinhill Engineers Pty Ltd
47 Burswood Road
Victoria Park W.A. 6100

Introduction

The Bunbury Port Authority is planning extensions to the Inner Harbour at Koombana Bay that will involve dredging a strip of land south-east of the existing Harbour Basin. A Consultative Environmental Review was prepared, in which it was proposed to put dredging spoil over a large area of land south, east and north of the Harbour Basin including a samphire marsh and saline pool (in areas designated A1 and A2) on the south side of Vittoria Bay, Leschenault Inlet.

When the CER was assessed, the Environmental Protection Authority recommended against reclaiming areas A1 and A2 by placing dredging spoil on them. The Bunbury Port Authority is appealing against the decision and, as part of that process, this report on the conservation values of areas A1 and A2 was prepared. It specifically addresses five issues:

1) the invertebrate fauna of A1 and A2
2) the invertebrate fauna of samphire marshes and mudflats in other parts of Leschenault Inlet
3) the diet of waterbirds in Leschenault Inlet
4) the use of A1 and A2 as feeding areas
5) the conservation value of A1 and A2 relative to other parts of Leschenault Inlet.

Methods

Most of the work reported here was undertaken in 1987-88 as part of a project to assess the effect of different methods of mosquito control on the conservation value of samphire marshes around Leschenault Inlet. Invertebrates were sampled every two months for one year at six sites, including the mouth of the Preston River and the large saline pool west of it in area A2 (Site 2, Fig. 1 - the pool is stippled). Single core and/or sweep samples were collected from saline pool, flooded samphire, tidal channel and tidal mudflat at each site if these habitats occurred and the emphasis of the surveys was on the samphire marshland fringing the estuary rather than estuarine waters.

The large saline pool in A2 was sampled more intensively in April 1991 with four core and three sweep samples being collected. The habitats sampled were the centre of the pool the margin of the samphire zone in the south-eastern corner, 30 m into the pool from the samphire on the south side (core only) and the north-western corner (the sweep included small saline pools in flooded samphire of A1).

In addition to the invertebrate work, the diet 167 waterbirds from the six invertebrate sampling sites was examined and general observations were made of feeding behaviour and the use of Leschenault Inlet by waterbirds.

Results

The intensive survey of invertebrates of the large saline pool (A2) and small pools (A1) in April 1991 provided a list of 52 species (Table 1, Appendix), 12 of which were not collected in the 1987-88 surveys. This reflects the greater intensity of sampling in April 1991 and that some of the samples came from deeper water than had been sampled previously, rather than the existence of a special fauna in A1 and A2.

In the 1987-88 sampling, where there was even sampling intensity across all sites, the Preston River complex supported similar numbers of species to The Blunders (Site 1) and the north-western shore (Site 3); Pt Duoro (Site 4) supported the richest fauna (Table 1). Areas A1 and A2 contained about 50% of the species recorded in the Preston River complex each survey.

Altogether 144 species were collected at Leschenault Inlet (Appendix).

Waterbird diet

Gut contents (oesophagus only) were obtained from 24 species of waterbird, representing nearly all the species that commonly occur and feed around the margin of the Inlet. The most commonly occurring items in the diets of waterbirds were polychaete worms, amphipods (small crustaceans), coleopterans (beetles), decapods (mostly crabs), leaf material, culicids (mosquito larvae) and fish (Table 2). Diet varied considerably, however, according to species and where the birds were recorded eating.

Observations showed that, usually, the majority of feeding birds in the Preston River complex occurred at the mouth of the Preston river and in Vittoria Bay itself. However, at some times of the year or stages of the tide the large saline pool in A2 and surrounding samphire marsh were used extensively for feeding by species such as Black Swans (*Cygnus atratus*), Yellow-billed Spoonbills (*Platelea flavipes*), Grey Teal, Pacific Black Ducks, Sacred Ibis and many migratory waders, including the Eastern Curlew for which A1 and A2 were particularly important. The study produced no data concerning the use of A1 for feeding but results from saline pools elsewhere in the Inlet suggest the pools in A1 would be significant feeding sites after high tides had filled them.

Conservation value

In terms of invertebrates, A1 and A2 do not have as great a conservation value as Pt Duoro, which has a greater diversity of habitats and, therefore, consistently more invertebrate species.

In terms of waterbirds, the southern end of Leschenault Inlet (which we term the Preston River complex) has been shown by Ninox (1989) to have the greatest conservation value of any site within Leschenault Inlet. Most of the time the majority of birds occur at the mouth of the Preston River or along the shore of Vittoria Bay rather than in A1 or A2; it is usually during, or after, periods of high tide or stormy weather that A1 and A2 are used extensively. After high tides much of the samphire marsh in A1 and A2 is flooded, invertebrate life becomes abundant in the saline pools amongst the samphire and many birds feed there. One of the important food sources is mosquito larvae; efforts to control these will be detrimental to waterbird use of the area and this needs to be considered when planning long-term use of the area.

Not all use of the large saline pool (A2) is restricted to periods after high tides, however, and it provides one of the more important feeding sites in the Inlet for large wading birds, swans and ducks.

Reference

Ninox (1989). The significance of mosquito breeding areas to the waterbirds of Leschenault Estuary, Western Australia. Unpublished report to Mosquito Control Review Committee, Waterways Commission.

Table 1. Number of invertebrate species collected at each site in Leschenault Inlet (if water present) on six dates in 1987-88 and at site 2 in 1991.

Date	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6
July 1987	17	19	19	43	-(a)	16
October 1987	12	13	14	26	15	21
December 1987	18	16	14	22	-(a)	-(a)
February 1988	15	12	17	21	-(a)	-(a)
April 1988	20	23	21	25	2	-(a)
June 1988	18	33	37	53	-(a)	-(a)
April 1991		52				
Avererage no. of species(b)	17	19	20	32	8	18

(a) no water
(b) only surveys when water present included, Site 2 in April 1991 omitted

Table 2. Diet of waterbirds in Leschenault Inlet (N = no of birds)

	N	Leaf material	Seeds	Polychaetes	Gastropods	Bivalves	Ostracods	Copepods	Amphipods	Isopods	Decapods	Arachnids	Orthopterans[a]	Lepidopterans[b]	Culicids[c]	Chironomids[c]	Ephydrids[c]	Stratiomyids[c]	Tabanids[c]	Other dipterans[a]	Coleopterans	Fish
Little Black Cormorant *Phalacrocorax sulcirostris*	1																					x
White-faced Heron *Ardea novaehollandiae*	6			x						x	x	x	x	x						x	x	x
Great Egret *Egretta alba*	2										x											x
Sacred Ibis *Threskiornis aethiopica*	1										x											
Australian Shelduck *Tadorna tadornoides*	19	x	x	x			x	x							x	x	x				x	x
Pacific Black Duck *Anas superciliosa*	14		x		x		x		x		x	x			x	x	x	x		x	x	x
Grey Teal *Anas gibberifrons*	26	x	x	x		x	x		x						x		x	x		x	x	x
Dusky Moorhen *Gallinula ventralis*	1	x										x			x					x	x	
Eurasian Coot *Fulica atra*	1	x							x													
Pied Oystercatcher *Haematopus longirostris*	2			x																		

	N	Leaf material	Seeds	Polychaetes	Gastropods	Bivalves	Ostracods	Copepods	Amphipods	Isopods	Decapods	Arachnids	Orthopterans[a]	Lepidopterans[b]	Culicids[c]	Chironomids[c]	Ephydrids[c]	Stratiomyids[c]	Tabanids[c]	Other dipterans[a]	Coleopterans	Fish
Grey Plover *Pluvialis squatarola*	1			x																		
Red-capped Plover *Charadrius ruficapillus*	4			x					x											x	x	
Black-winged Stilt *Himantopus himantopus*	21	x		x						x					x		x	x			x	
Banded Stilt *Cladorhynchus leucocephalus*	6			x	x																	
Red-necked Avocet *Recurvirostra novaehollandiae*	5	x		x			x															
Eastern Curlew *Numenius madagascariensis*	1	x									x											
Common Sandpiper *Tringa hypoleucos*	2			x																		
Greenshank *Tringa nebularia*	9			x	x				x						x		x					
Bar-tailed Godwit *Limosa lapponica*	1			x																		
Great Knot *Calidris tenuirostris*	2			x	x						x											

	N	Leaf material	Seeds	Polychaetes	Gastropods	Bivalves	Ostracods	Copepods	Amphipods	Isopods	Decapods	Arachnids	Orthopterans[a]	Lepidopterans[b]	Culicids[c]	Chironomids[c]	Ephydrids[c]	Stratiomyids[c]	Tabanids[c]	Other dipterans[a]	Coleopterans	Fish
Sharp-tailed Sandpiper *Calidris acuminata*	2			x					x													
Red-necked Stint *Calidris ruficollis*	30			x					x	x								x				
Curlew Sandpiper *Calidris ferruginea*	5			x	x		x		x													
Little Grassbird *Megalurus gramineus*	5		x								x	x	x					x	x		x	
No. of occurrences		7	4	16	5	1	5	1	8	3	7	4	2	1	6	2	5	5	1	5	8	6

[a]terrestrial
[b]terrestrial adults, aquatic larvae
[c]aquatic larvae and pupae

Figure 1. Sampling sites at Leschenault Inlet. Site 1 = The Blunders, Site 2 = Preston River mouth, Site 3 = north-western shore, Site 4 = Pt Duoro, Site 5 = north-eastern shore, Site 6 = flooded paddock. Areas A1 and A2 are marked, the stippling covers the approximate location of the large saline pool in A2.

Appendix. List of all species collected in Leschenault Inlet. Species collected in the A1 and A2 in April 1991 are marked with *, species only recorded from A1 and A2 are marked with **.

PHYLUM SARCOMASTIGOPHORA
* foramaniferen sp.

PHYLUM CNIDARIA
Class Hydrozoa
hydrozoan sp. 1
** hydrozoan sp. 2

PHYLUM NEMATODA
* nematode sp. 1
nematode sp. 2
nematode sp. 3
nematode sp. 4
nematode sp. 5

PHYLUM CHAETOGNATHA
** chaetognath sp.

PHYLUM ANNELIDA
Class Oligochaeta
* *Aelosoma ?hemprichi*
Aelosoma ?niveum
Aelosomanieum sp.
Class Polychaeta
* *Capitella capitata*
Leitoscoloplos ?normalis
* *Prionospio cirrifera*
* *Pseudopolydora* sp.
** sabellid sp.
* *Ceratonereis aequisetis*
Australonereis ehlersi

PHYLUM MOLLUSCA
Class Gastropoda
Ellachorbis tatei
turbinid sp.
Hydrobia buccinoides
* *?Assiminea* sp.
* *Hydrococcus brazieri*
** *Bedeva paivae*
* *Nassarius burchardi*
?Acteocina sp.
* ellobiid sp. 1
** ellobiid sp. 2
* *Salinator fragilis*
Class Bivalvia
* *Arthritica semen*
* *Mysella* sp.
Spisula trigonella
Sanguinolaria biradiata

PHYLUM ARTHROPODA

Sub-Phylum Chelicerata
- Class Arachnida
  - Sub-Order Oribatida sp. 1
  - Sub-Order Oribatida sp. 2
  - Sub-Order Hydracarina sp.
  - Sub-Order Chelonethida sp.
  - *Cheliferina* sp.

Sub-Phylum Mandibulata
- Class Crustacea
  - * crustacean sp. 1
  - crustacean sp. 2
  - * crustacean sp. 3
  - Sub-Class Diplostraca
    - Sub-Order Cladocera
      - macrothricid sp. 1
      - macrothricid sp. 2
      - *Daphnia carinata*
      - *?Echinisca triserialis*
    - Sub-Order Ostracoda
      - * *Cyprideis australiensis*
      - *Paracypria* sp.
      - *Reticypris clava*
      - *Heterocypris* sp.
      - *Newnhamia fenestra*
      - *Alboa warooa*
      - *Sarscypridopsis aculeata*
      - * *Diacypris spinosa*
      - *Mytilocypris tasmanica chapmani*
      - *Australocypris insularis*
      - *Limnocythere mowbrayensis*
      - ostracod sp.1
      - ostracod sp. 2
      - * ostracod sp. 163
      - ostracod sp. 196
  - Sub-Class Copepoda
    - * *Gladioferens imparipes*
    - * calanoid sp. 1
    - *Apocyclops* sp.
    - *Mesocyclops* sp.
    - *Halicyclops* sp.
    - ** *Kelleria ?australiensis*
    - ** cyclopoid sp 165
    - ** cyclopoid sp. 166
    - cyclopoid sp.
    - * *Mesochra flava*
    - ** *Mesochra parva*
    - *Nitocra* aff. *spinipes*
    - *Robertsonia knoxi*
    - *Quinquelaophonte wellsi*
    - *Phyllopodopsyllus aegyptyicus*
    - *Heterolaophonte* sp.
    - * *Cletocamptus confluens*
    - * *Brianola pori*
    - ** harpacticoid sp. 12
    - ** harpacticoid sp. 13
    - ** harpacticoid sp. 14
    - ** harpacticoid sp. 15
  - Sub-Class Malocostraca

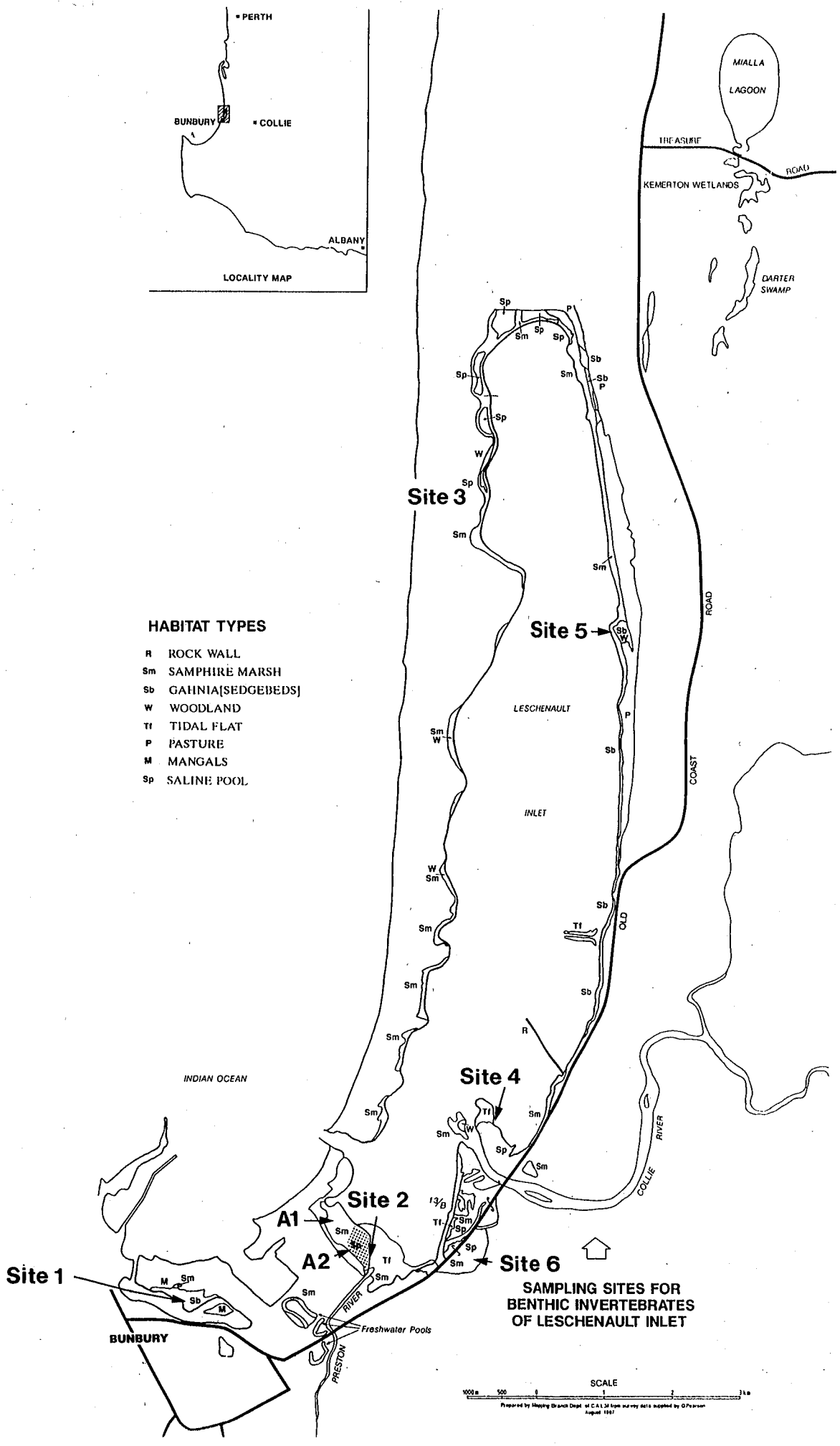
Order Decapoda
* *Palaemonetes australis*
* crab sp. 1
crab sp. 2
crab sp. 3
* crab sp. 4
Order Mysidacea
Gastrosaccus sp.
Order Tanaidacea
Tanais sp.
Order Amphipoda
* *Melita zeylanica kauerti*
* *Austrochiltonia subtenuis*
** *Grandidierella* sp.
* *Corophium ?minor*
Corophium sp.
* *Paracorophium excavatum*
* *Caprella scaura*
Order Isopoda
isopod sp. 1
isopod sp. 2

Sub-Phylum Uniramia
Class Insecta
Order Hemiptera
Micronecta robusta
Anisops thienemanni
Order Diptera
Family Dolichopodidae
dolichopodid sp.
Family Culicidae
culicid sp.
Aedes camptorhyncus
Aedes clelandi
Aedes vigilax
anopheline sp.
Family Chironomidae
Corynoneura scutellata
Chironomus alternans
Chironomus ?curtivalva
Chironomus australis
* *Tanytarsus barbitarsus*
Camptocladius sp.
Procladius villosimanus
Procladius paludicola
Pseudosmittia sp.
Dicrotendipes conjunctus
Limnophages pullus
Pontomyia ?cottoni
Family Ceratopogonidae
ceratopogonid sp.
Atrichopogon sp.
Family Stratiomyidae
* stratiomyid sp. 1
stratiomyid sp. 2
Family Tabanidae
tabanid sp.

Family Ephydridae

* ephydrid sp. 1
ephydrid sp. 2
ephydrid sp. 3
Family Muscidae
* muscid sp. 1
muscid sp. 2
Order Coleoptera
?Anacaena sp.
Hydrochus sp.
Ochthebius sp.
Stenus sp.
Berosus sp.
Necterosoma penicillatus
Haliplus sp.
Allodessus bistrigatus
Liodessus dispar
Enochrus sp.
hydrophyllid sp.
curculionid sp. 2

PHYLUM CHORDATA
Class Osteichthyes
Order Teleosti
* *Atherinosoma elongata*
* *Pseudogobius olorum*
Mugil cephalus


PERTH
BUNBURY
COLLIE
ALBANY
LOCALITY MAP
MIALLA
LAGOON
TREASURE
ROAD
KEMERTON WETLANDS
DARTER
SWAMP
Site 3
Site 5
Site 4
Site 2
Site 1
Site 6
A1
A2
HABITAT TYPES
R ROCK WALL
Sm SAMPHIRE MARSH
Sb GAHNIA[SEDGEBEDS]
W WOODLAND
Tf TIDAL FLAT
P PASTURE
M MANGALS
Sp SALINE POOL
LESCHENAULT
INLET
INDIAN OCEAN
COAST
ROAD
OLD
COLLIE
RIVER
PRESTON
RIVER
Freshwater Pools
BUNBURY
SAMPLING SITES FOR
BENTHIC INVERTEBRATES
OF LESCHENAULT INLET
SCALE