

Appendix 6

BACKGROUND INFORMATION ON FISHERIES AT TAI O/NORTH LANTAU

A6 BACKGROUND INFORMATION ON FISHERIES AT TAI O/NORTH LANTAU

A6.1 Introduction

A search for background information on fisheries at Tai O found that, due to the Hong Kong/China boundary situation prior to 1997, waters of Tai O Bay and off Tai O were not surveyed by Hong Kong studies. As a result, little strictly local information on Tai O fisheries was available. Information from other fishing areas in north Lantau was used to fill this data gap as far as possible. The following references were consulted:

- The Status of Fisheries in Hong Kong Waters (Richards 1980);
- The Demersal Fishery Resources in Hong Kong Waters (1982-83) (Chong 1984);
- Fisheries Production in Hong Kong Waters (AFD 1985);
- Port Survey 1991 (AFD 1991);
- The impact of dredging on fisheries sensitive receivers (Ni 1995);
- Coastal ecology studies – summary data final report (Binnie 1998);
- Port Survey 96/97 (AFD 1998a);
- Fisheries Resources and Fishing Operations in Hong Kong Waters - Final Report (AFD 1998b); and
- Study on Tonggu Waterway (Scott Wilson 1998 a, b, c).

Findings of these reports were reviewed for information on common fisheries species found in north Lantau waters, number and type of fishing vessels, number of fishermen employed and total fisheries production. Relevant information is summarised below.

Using fisheries data collected from North Lantau waters to assess fisheries at Tai O has some limitations. Most of North Lantau waters are relatively open-water fishery areas with water depths of tens of meters, whereas Tai O Bay is a sheltered inshore bay habitat with shallow waters. Sites surveyed in North Lantau are also relatively distant from Tai O, often over 10 km away. These differences limit the applicability of existing data to Tai O to some extent, and should be borne in mind.

A6.2 Information from Background Sources

A6.2.1 Fish Species Potentially Occurring at Tai O

Fish species recorded off north Lantau and in Urmston Road provide an indication of the species which may occur in Tai O waters. **Table A6.1** lists species reported from North-west Lantau waters in Richards (1980). **Table A6.2** lists species reported from Urmston Road in 1982-83 surveys by Chong (1984). **Table A6.3** lists common fisheries species (fish, crustacean and

cephalopod) recorded in North Lantau waters by AFD's Port Survey 96/97 (AFD 1998a). **Table A6.4** lists species recorded in shrimp trawls and hang trawls in surveys for the Study on Tonggu Waterway (Scott Wilson 1998c).

Table A6.1: Fish Species Recorded off North-west Lantau in 1980 (data from Richards 1980).

Family	Species	Common name
Carangidae	<i>Alepes djedaba</i>	Shrimp Scad
Carangidae	<i>Decapterus spp.</i>	Scad
Clupeidae	<i>Ilisha elongata</i>	White Herring
Clupeidae	<i>Sardinella spp.</i>	Sardine
Cynoglossidae	<i>Cynoglossus spp.</i>	Sole
Engraulidae	<i>Stolephorus spp.</i>	Anchovy
Lutjanidae	<i>Lutjanus spp.</i>	
Mugilidae	<i>Mugil spp.</i>	Mullet
Platycephalidae	<i>Platycephalus indicus</i>	Flat Head
Polynemidae	<i>Eleutheronema tetradactylum</i>	Thread Fin
Sciaenidae	<i>Argyrosomus spp.</i>	Croakers
Sciaenidae	<i>Larimichthys croceus</i>	Lion Head
Scorpaenidae	<i>Sebasticus marmoratus</i>	Rock Fish
Serranidae	<i>Lateolabrax japonicus</i>	Sea Perch
Stromateoidae	<i>Pampus spp.</i>	Pomfret
Trichiuridae	<i>Trichiurus lepturus</i>	Hairtail

Table A6.2: Fish Species Collected in Urmston Road Waters during 1982-83 Surveys (data from Chong 1984).

Family	Species	Family	Species
Carangidae	<i>Alepes djedaba</i>	Gobiidae	<i>Oxyurichthys tentacularis</i>
Apogonidae	<i>Apogon striatus</i>	Stromateoidae	<i>Pampus argenteus</i>
Sciaenidae	<i>Pennahia anea</i>	Stromateoidae	<i>Pampus chinensis</i>
Ariidae	<i>Arius nella</i>	Stromateoidae	<i>Pampus nozawae</i>
Ariidae	<i>Arius sinensis</i>	Gobiidae	<i>Parachaeturichthys polynema</i>
Bothidae	<i>Arnoglossus tenuis</i>	Paralichthyidae	<i>Parachthys olivaceus</i>
Callionymidae	<i>Callionymus richardsoni</i>	Sciaenidae	<i>Pennahia argentata</i>
Carangidae	<i>Carangoides malabaricus</i>	Sciaenidae	<i>Pennahia macrocephalus</i>
Triglidae	<i>Chelidonichthys kumu</i>	Sciaenidae	<i>Pennahia pawak</i>
Hemiscylliidae	<i>Chiloscyllium plagiosum</i>	Ophichthidae	<i>Pisodooonophis boro</i>
Sciaenidae	<i>Chrysochir aureus</i>	Ophichthidae	<i>Pisodooonophis cancrivorus</i>
Engraulidae	<i>Coilia grayii</i>	Platycephalidae	<i>Platycephalus indicus</i>
Sciaenidae	<i>Collichthys lucidus</i>	Plotosidae	<i>Plotosus lineatus</i>
Cynoglossidae	<i>Cynoglossus arel</i>	Polynemidae	<i>Polydactylus sextarius</i>
Cynoglossidae	<i>Cynoglossus semilaevis</i>	Priacanthidae	<i>Priacanthus macracanthus</i>
Cynoglossidae	<i>Cynoglossus abbreviatus</i>	Centrolophidae	<i>Psenopsis anomala</i>
Dasyatidae	<i>Dasyatis bennetti</i>	Psettodidae	<i>Psettodes erumei</i>
Dasyatidae	<i>Dasyatis kuhlii</i>	Paralichthyidae	<i>Pseudorhombus levisquamis</i>
Dasyatidae	<i>Dasyatis zugei</i>	Carcharhinidae	<i>Rhizoprionodon acutus</i>

Family	Species	Family	Species
Serranidae	<i>Epinephelus awoara</i>	Clupeidae	<i>Sardinella albella</i>
Sparidae	<i>Evynnis cardinalis</i>	Clupeidae	<i>Sardinella fimbriata</i>
Tetraodontidae	<i>Takifugu xanthopterus</i>	Clupeidae	<i>Sardinella jussieu</i>
Gymnuridae	<i>Gymnura japonica</i>	Leiognathidae	<i>Secutor ruconius</i>
Haemulidae	<i>Hapalogenys nigripinnis</i>	Engraulidae	<i>Setipinna taty</i>
Synodontidae	<i>Harpadon nehereus</i>	Siganidae	<i>Siganus canaliculatus</i>
Pristigasteridae	<i>Ilisha elongata</i>	Sillaginidae	<i>Sillago sihama</i>
Pristigasteridae	<i>Ilisha melastoma</i>	Syngnathidae	<i>Syngnathus acus</i>
Scorpaenidae	<i>Inimicus japonicus</i>	Syngnathidae	<i>Syngnathus schlegeli</i>
Sciaenidae	<i>Johnius belengeri</i>	Gobiidae	<i>Taenioides anguillaris</i>
Sciaenidae	<i>Johnius dussumieri</i>	Tetraodontidae	<i>Takifugu oblongus</i>
Clupeidae	<i>Konosirus punctatus</i>	Theraponidae	<i>Therapon theraps</i>
Tetraodontidae	<i>Lagocephalus lunaris</i>	Theraponidae	<i>Therapon jarbua</i>
Tetraodontidae	<i>Lagocephalus wheeleri</i>	Engraulidae	<i>Thryssa chefuensis</i>
Sciaenidae	<i>Larimichthys croceus</i>	Engraulidae	<i>Thryssa dussumieri</i>
Percichthyidae	<i>Lateolabrax japonicus</i>	Engraulidae	<i>Thryssa hamiltonii</i>
Leiognathidae	<i>Leiognathus berbis</i>	Carangidae	<i>Trachurus japonicus</i>
Leiognathidae	<i>Leiognathus bindus</i>	Tricantidae	<i>Triacanthus biaculeatus</i>
Leiognathidae	<i>Leiognathus brevirostris</i>	Gobiidae	<i>Tridentiger barbatus</i>
Mugilidae	<i>Liza affinis</i>	Trichiuridae	<i>Trichiurus lepturus</i>
Mugilidae	<i>Mugil cephalus</i>	Gobiidae	<i>Trypauchen vagina</i>
Muraenesociidae	<i>Muraenesox cinereus</i>	Sciaenidae	<i>Dendrophysa russelli</i>
Muraenesociidae	<i>Congresox talabonoides</i>	Mullidae	<i>Upeneus sulphureus</i>
Nemipteridae	<i>Nemipterus japonicus</i>	Congridae	<i>Uroconger lepturus</i>
Sciaenidae	<i>Otolithes ruber</i>	Soleidae	<i>Zebrias zebra</i>

Table A6.3: Common Fisheries Species Found in North Lantau Waters during Port Survey 96/97 (AFD 1998a).

Family	Species	Common Name
FISH		
Carangidae	<i>Alepes djedaba</i>	Shrimp Scad
Carangidae	<i>Trachurus japonicus</i>	Scad
Clupeidae	<i>Ilisha elongata</i>	White Herring
Clupeidae	<i>Konosirus punctatus</i>	Gizzard Shad
Clupeidae	<i>Sardinella jussieu</i>	Sardine
Engraulidae	<i>Stolephorus spp.</i>	Anchovy
Leiognathidae	<i>Leiognathus brevirostris</i>	Pony Fish
Lutjanidae	<i>Lutjanus spp.</i>	
Mugilidae	<i>Mugil affinis</i>	Mullet
Muraenesocidae	<i>Muraenesox cinereus</i>	Conger Pike Eel
Platycephalidae	<i>Platycephalus indicus</i>	Flathead
Polynemidae	<i>Eleutheronema tetradactylum</i>	Threadfin
Sciaenidae	<i>Argyrosomus spp.</i>	Croakers
Sciaenidae	<i>Collichthys lucida</i>	Lion Head
Sciaenidae	<i>Larimichthys croceus</i>	Yellow Croaker
Scorpaenidae	<i>Sebasticus marmoratus</i>	Rock Fish
Serranidae	<i>Lateolabrax japonicus</i>	Sea Perch
Siganidae	<i>Siganus canaliculatus</i>	Rabbit Fish

Sparidae	<i>Sparidae spp.</i>	Sea Beams
Stromateoidae	<i>Pampus argenteus</i>	White Pomfret
Trichiuridae	<i>Trichiurus lepturus</i>	Hairtail
INVERTEBRATES		
Loliginidae	<i>Loligo spp.</i>	Squid
Penaeidae	<i>Parapenaeopsis hungerfordi</i>	Prawn
Portunidae	<i>Portunus pelagicus</i>	Blue Crab
Portunidae	<i>Portunus sanguinolentus</i>	3-Spot Crab
Sergestidae	<i>Acetes spp.</i>	Silver Shrimp
Squillidae	<i>Oratosquilla spp.</i>	Mantis Shrimp

Table A6.4: Fisheries Species Recorded During Tonggu Waterway Surveys, 1997/89 (Scott Wilson 1998c).

Shrimp Trawl		Hang Trawl	
Family	Species	Family	Species
Ambassidae	<i>Ambassis gymnocephalus</i>	Aetobatidae	<i>Aetobatus flagellum</i>
Apogonidae	<i>Apogonichthys lineatus</i>	Ambassidae	<i>Ambassis gymnocephalus</i>
Apogonidae	<i>Apogon quadrifasciatus</i>	Apogonidae	<i>Lactarius lactarius</i>
Apogonidae	<i>Apogonichthys striatus</i>	Ariidae	<i>Arius sinensis</i>
Ariidae	<i>Arius sinensis</i>	Belonidae	<i>Tylosurus strongylurus</i>
Bothidae	<i>Arnoglossus tenuis</i>	Belonidae	<i>Tylosurus leiurus</i>
Callionymidae	<i>Callionymus richardsoni</i>	Carangidae	<i>Chorinemus hainanensis</i>
Callionymidae	<i>Callionymus olidus</i>	Carangidae	<i>Chorinemus moadetta</i>
Callionymidae	<i>Callionymus flagris</i>	Carangidae	<i>Decapterus maruadsi</i>
Champsodontidae	<i>Champsodon snyderi</i>	Carangidae	<i>Caranx coeruleopinnatus</i>
Clupeidae	<i>Sardinella aurita</i>	Carangidae	<i>Chorinemus formosanus</i>
Congridae	<i>Uroconger lepturus</i>	Carangidae	<i>Caranx kalla</i>
Cynoglossidae	<i>Cynoglossus lineolatus</i>	Carangidae	<i>Caranx malabaricus</i>
Cynoglossidae	<i>Cynoglossus puncticeps</i>	Carangidae	<i>Caranx equula</i>
Cynoglossidae	<i>Cynoglossus trigrammus</i>	Carangidae	<i>Trachurus japonicus</i>
Cynoglossidae	<i>Cynoglossus bilineatus</i>	Carangidae	<i>Megalaspis cordyla</i>
Cynoglossidae	<i>Cynoglossus macrolepidotus</i>	Carangidae	<i>Chorinemus lysan</i>
Cynoglossidae	<i>Cynoglossus semilaevis</i>	Carcharhinidae	<i>Scoliodon sorrakowah</i>
Cynoglossidae	<i>Cynoglossus sinicus</i>	Centrolophidae	<i>Psenopsis anomala</i>
Dasyatidae	<i>Dasyatis zugei</i>	Clupeidae	<i>Kowala coval</i>
Drepanidae	<i>Drepane longimana</i>	Clupeidae	<i>Harengula nymphaea</i>
Gerridae	<i>Gerres lucidus</i>	Clupeidae	<i>Clupanodon thrissa</i>
Gobiidae	<i>Acentrogobius caninus</i>	Clupeidae	<i>Ilisha elongata</i>
Harpiosquillidae	<i>Harpiosquilla raphidea</i>	Clupeidae	<i>Dussumieria hasselti</i>
Leiognathidae	<i>Leiognathus brevirostris</i>	Clupeidae	<i>Ilisha indica</i>
Loliginidae	<i>Loligo beka</i>	Clupeidae	<i>Sardinella jussieu</i>
Lutjanidae	<i>Lutjanus johni</i>	Clupeidae	<i>Clupanodon punctatus</i>
Mullidae	<i>Upeneus bensasi</i>	Cybiidae	<i>Scomberomorus commersoni</i>
Muraenesocidae	<i>Muraenesox cinereus</i>	Cyprinidae	<i>Ctenopharyngodon idellus</i>
Nemipteridae	<i>Nemipterus tolu</i>	Cyprinidae	<i>Aristichthys nobilis</i>
Nemipteridae	<i>Nemipterus japonicus</i>	Elopidae	<i>Elops saurus</i>
Octopodidae	<i>Octopus fusiformis</i>	Engraulidae	<i>Stolephorus chinensis</i>
Octopodidae	<i>Ocopus ocellatus</i>	Engraulidae	<i>Thrissa vitrostris</i>
Octopodidae	<i>Octopus variabilis</i>	Engraulidae	<i>Thrissa kammalensis</i>

Shrimp Trawl		Hang Trawl	
Family	Species	Family	Species
Paralichthyidae	<i>Tephrinectes sinensis</i>	Engraulidae	<i>Coilia mystus</i>
Paralichthyidae	<i>Pseudorhombus arsius</i>	Engraulidae	<i>Coilia grayii</i>
Paralichthyidae	<i>Pseudorhombus oligodon</i>	Engraulidae	<i>Setipinna taty</i>
Penaeidae	<i>Parapenaeopsis cultrirostris</i>	Engraulidae	<i>Thrissa mystax</i>
Penaeidae	<i>Metapenaeopsis barbata</i>	Engraulidae	<i>Stolephorus commersoni</i>
Penaeidae	<i>Penaeus japonicus</i>	Engraulidae	<i>Engraulis japonicus</i>
Penaeidae	<i>Parapenaeopsis hardwickii</i>	Engraulidae	<i>Thrissa hamiltonii</i>
Penaeidae	<i>Parapenaeopsis cornuta</i>	Engraulidae	<i>Thrissa dussumieri</i>
Penaeidae	<i>Metapenaeus affinis</i>	Engraulidae	<i>Thrissa setirostris</i>
Penaeidae	<i>Penaeus merguensis</i>	Formionidae	<i>Formio niger</i>
Penaeidae	<i>Penaeus penicillatus</i>	Harpodontidae	<i>Harpodon nehereus</i>
Penaeidae	<i>Parapenaeopsis hungerfordi</i>	Hemiramphidae	<i>Hemiramphus georgii</i>
Penaeidae	<i>Atypopenaeus stenodactylus</i>	Hemiramphidae	<i>Hemiramphus intermedius</i>
Penaeidae	<i>Metapenaeus intermedius</i>	Hemiramphidae	<i>Hemiramphus dussumieri</i>
Penaeidae	<i>Penaeus semisulcatus</i>	Leiognathidae	<i>Leiognathus ruconius</i>
Penaeidae	<i>Metapenaeus joyneri</i>	Leiognathidae	<i>Leiognathus equulus</i>
Penaeidae	<i>Trachypenaeus curvirostris</i>	Leiognathidae	<i>Leiognathus berbis</i>
Penaeidae	<i>Parapenaeopsis tenella</i>	Leiognathidae	<i>Leiognathus brevirostris</i>
Penaeidae	<i>Metapenaeus ensis</i>	Leiognathidae	<i>Leiognathus bindus</i>
Platycephalidae	<i>Grammoplites scaber</i>	Loliginidae	<i>Loligo beka</i>
Platycephalidae	<i>Platycephalus indicus</i>	Loliginidae	<i>Loligo duvaucelii</i>
Plotosidae	<i>Plotosus anguillaris</i>	Mugilidae	<i>Osteomugil ophuyseni</i>
Polynemidae	<i>Polynemus sextarius</i>	Mugilidae	<i>Liza haematocheila</i>
Pomacentridae	<i>Daya jordani</i>	Mugilidae	<i>Liza carinatus</i>
Pomadasyidae	<i>Hapalogenys nitens</i>	Mugilidae	<i>Ellochelon vaigiensis</i>
Pomadasyidae	<i>Pomadasyus maculatus</i>	Mullidae	<i>Upeneus sulphureus</i>
Portunidae	<i>Charybdis japonica</i>	Muraenidae	<i>Gymnothorax boschi</i>
Portunidae	<i>Portunus trituberculatus</i>	Nemipteridae	<i>Nemipterus japonicus</i>
Portunidae	<i>Portunus sanguinolentus</i>	Octopodidae	<i>Octopus variabilis</i>
Portunidae	<i>Charybdis affinis</i>	Ophichthyidae	<i>Pisoodonophis boro</i>
Portunidae	<i>Portunus hastatoides</i>	Paralichthyidae	<i>Pseudorhombus oligodon</i>
Portunidae	<i>Charybdis acuta</i>	Penaeidae	<i>Penaeus japonicus</i>
Portunidae	<i>Charybdis truncata</i>	Penaeidae	<i>Metapenaeus intermedius</i>
Portunidae	<i>Portunus pelagicus</i>	Penaeidae	<i>Penaeus penicillatus</i>
Portunidae	<i>Charybdis hellerii</i>	Penaeidae	<i>Metapenaeus joyneri</i>
Portunidae	<i>Portunus argentatus</i>	Polynemidae	<i>Eleutheronema tetradactylus</i>
Portunidae	<i>Charybdis feriatus</i>	Salangidae	<i>Salanx acuticeps</i>
Portunidae	<i>Scylla serrata</i>	Scatophagidae	<i>Scatophagus argus</i>
Sciaenidae	<i>Umbrina russelli</i>	Sciaenidae	<i>Collichthys lucidus</i>
Sciaenidae	<i>Collichthys lucidus</i>	Sciaenidae	<i>Sciaenops ocellatus</i>
Sciaenidae	<i>Wak sina</i>	Sciaenidae	<i>Pseudosciaena crocea</i>
Sciaenidae	<i>Otolithes argenteus</i>	Sciaenidae	<i>Otolithes argenteus</i>
Sciaenidae	<i>Chrysochir aureus</i>	Sciaenidae	<i>Wak tingi</i>
Sciaenidae	<i>Johnius belengeri</i>	Sciaenidae	<i>Pneumatophorus japonicus</i>
Sciaenidae	<i>Argyrosomus pawak</i>	Scombridae	<i>Rastrelliger kanagurta</i>
Sciaenidae	<i>Argyrosomus argentatus</i>	Sepiidae	<i>Sepiella maindroni</i>
Sepiolidae	<i>Euprymna berryi</i>	Sepiolidae	<i>Euprymna berryi</i>
Serranidae	<i>Epinephelus malabaricus</i>	Siganidae	<i>Siganus oramin</i>
Siganidae	<i>Siganus oramin</i>	Sparidae	<i>Sparus latus</i>

Shrimp Trawl		Hang Trawl	
Family	Species	Family	Species
Siganidae	<i>Siganus fuscescens</i>	Stromateidae	<i>Pampus chinensis</i>
Sillaginidae	<i>Sillago sihama</i>	Stromateidae	<i>Pampus nozawae</i>
Soleidae	<i>Solea ovata</i>	Stromateidae	<i>Pampus argenteus</i>
Soleidae	<i>Aseraggodes kobensis</i>	Syngnathidae	<i>Syngnathus acus</i>
Soleidae	<i>Zebrias zebra</i>	Synodidae	<i>Saurida undosquamis</i>
Solenoceridae	<i>Solenocera crassicornis</i>	Tetraodontidae	<i>Fugu ocellatus</i>
Sparidae	<i>Sparus latus</i>	Tetraodontidae	<i>Fugu xanthopterus</i>
Sparidae	<i>Parargyrops edita</i>	Tetraodontidae	<i>Fugu oblongus</i>
Squillidae	<i>Clodiopsis scorpio</i>	Tetraodontidae	<i>Fugu alboplumbeus</i>
Squillidae	<i>Clorida microphthalma</i>	Tetraodontidae	<i>Fugu bimaculatus</i>
Squillidae	<i>Oratosquilla oratoria</i>	Theraponidae	<i>Therapon theraps</i>
Squillidae	<i>Kempina mikado</i>	Theraponidae	<i>Therapon jarbua</i>
Squillidae	<i>Clorida latreillei</i>	Theraponidae	<i>Helotes oxyrhynchus</i>
Squillidae	<i>Oratosquilla interrupta</i>	Trichiuridae	<i>Trichiurus brevis</i>
Squillidae	<i>Oratosquilla nepa</i>	Trichiuridae	<i>Euplerogrammus muticus</i>
Squillidae	<i>Oratosquilla inornata</i>	Trichiuridae	<i>Trichiurus haumela</i>
Squillidae	<i>Dictyosquilla foveolata</i>	Trichiuridae	<i>Lepturacanthus savala</i>
Syngnathidae	<i>Hippocampus trimaculatus</i>		
Syngnathidae	<i>Syngnathus acus</i>		
Synodidae	<i>Saurida elongata</i>		
Synodidae	<i>Saurida tumbil</i>		
Taenioidae	<i>Trypauchen taenlia</i>		
Taenioidae	<i>Trypauchen vagina</i>		
Taenioidae	<i>Ctenotrypauchen microcephalus</i>		
Taenioidae	<i>Odontamblyopus rubicundus</i>		
Tetraodontidae	<i>Fugu ocellatus</i>		
Tetraodontidae	<i>Fugu bimaculatus</i>		
Theraponidae	<i>Helotes oxyrhynchus</i>		

A6.2.2 Fish Production in North Lantau Waters, 1979-1984

The total weight and value of fish production in northern Lantau Island from 1979 to 1984 were estimated by AFD (1985). Total weight is summarised in **Table A6.5** and total value in **Table A6.6**, broken down by area. Due to inconsistencies in data recording methods between different areas, and the tendency for squid and occasionally shrimps to be classed as fish, the data in the following two tables should be considered to be a general indication, rather than a precise estimation, of production.

Table A6.5: Fish Production by Weight ('000kg) in Northern Lantau (1979-1984).

Sub-area	1979	1980	1981	1982	1983	1984
Yam O	30.0	31.5	44.2	23.6	24.2	76.2
Tai Ho Wan	41.7	42.3	39.9	34.5	37.5	58.1
Tung Chung to Sha Lo Wan	38.7	34.5	34.5	41.7	33.3	48.4
South of Sha Chau	51.4	33.9	30.8	24.8	33.3	26.0
Sham Wat	20.3	35.7	53.8	50.2	24.8	68.3
Tai O	79.8	108.3	66.5	59.3	61.7	98.0
Total	261.9	286.2	269.7	234.1	214.8	375.0
Tai O rank	1	1	1	1	1	1
Tai O percent	30%	38%	25%	25%	29%	26%

Table A6.6: Fish Production by Value ('000HKD) in Northern Lantau (1979-1984).

Sub-area	1979	1980	1981	1982	1983	1984
Yam O	174.2	160.2	191.4	150.0	165.0	357.0
Tai Ho Wan	422.6	335.8	303.0	305.0	346.0	431.5
Tung Chung to Sha Lo Wan	415	309.5	287.0	309.0	283.0	447.0
South of Sha Chau	447	288.0	284.0	267.0	355.0	310.5
Sham Wat	250	250.0	366.0	390.0	255.0	48.5
Tai O	711.6	665.0	510.4	454.0	536.0	759.0
Total	2,420.4	2,008.5	1,941.8	1,875.0	1,940.0	2,353.5
Tai O rank	1	1	1	1	1	1
Tai O percent	29%	33%	26%	24%	28%	32%

If invertebrate groups are included in total fisheries production, the total production in 1980 would be 302,000 kg and HK\$2,910,000 (Richards 1980). Invertebrates were mainly crustaceans such as shrimps and crabs. The increase in total production from 1983-4 was reportedly accounted for by increased catches of shrimps (AFD 1985).

As shown in **Tables A6.5** and **A6.6**, Tai O consistently had the highest production in terms of weight and the highest dollar value of the fishing areas off north Lantau. On average Tai O accounted for 29% of the catch in weight and 29% of the dollar value of the catch for the 6 areas reported over the 6-year period. The geographic extent of the 6 fishing areas was not specified, so the values in **Table A6.5** and **A6.6** may not be comparable without adjustment to account for differences in size of fishing area. Additionally, the Tai O fishing area would have included waters which at that time were within the territorial limits of China. If the Tai O fishing area was larger than the others reported above, and if catches reflected effort in China waters, these factors may have accounted at least in part for the greater weight and dollar value of Tai O catches.

A6.2.3 Demersal Trawl Catch Statistics for Urmston Road Station, 1982-83

In 1982-83, a demersal trawl survey was conducted by AFD for comparison with the 1973-75 survey to identify trends in local waters and to guide development of fisheries management policies. One of the stations was located in Urmston Road north of Chek Lap Kok. Although it is remote from Tai O, it is the only report indicating the monthly changes in catch statistics of

north Lantau waters for a one year period.

The survey vessel used was a stern trawler of 39.5m and 85 gross tons. A standard Granton Trawl with a 29.3m headline and fitted with a cod-end cover of 20mm mesh size was used at a trawling speed of 3.5 knots. Three to four sets of trawls were made at each station in each month. Summary statistics were prepared for this survey by Ni and Tam (unpublished report); these are given in **Table A6.7**.

Table A6.7: Summary Statistics for Demersal Trawl Catches at Urmston Road Station, AFD 1982-83 Survey (values expressed as mean \pm 95% confidence interval) (Ni and Tam, unpubl. report).

Month	Mean number of species (S)	Shannon Wiener Diversity Index (H')	Evenness (J)	Catch per Unit Effort (CPUE)	Yield per Unit Effort (YPUE)
Jan '82	14.75 \pm 3.28	1.57 \pm 0.4	0.59 \pm 0.15	507.5 \pm 763.7	33.84 \pm 40.68
Feb	13.33 \pm 1.76	1.35 \pm 1.04	0.52 \pm 0.42	465.33 \pm 479.15	9.34 \pm 11.14
Mar	14.67 \pm 7.58	1.65 \pm 1.49	0.61 \pm 0.43	194.67 \pm 201.1	6.19 \pm 1.46
Apr	21.67 \pm 5.17	1.92 \pm 0.09	0.63 \pm 0.069	1031.33 \pm 2043.96	33.19 \pm 60.61
May	17.33 \pm 7.58	1.97 \pm 0.62	0.7 \pm 0.22	458 \pm 693.78	11.94 \pm 11.01
Aug	11.5 \pm 19.3	0.51 \pm 1.31	0.27 \pm 0.78	2259 \pm 23583.9	35.95 \pm 348.62
Sep	16.67 \pm 15.8	1.53 \pm 0.51	0.56 \pm 0.31	587.33 \pm 1775.86	12.23 \pm 27.33
Oct/Nov	10 \pm 17.38	1.47 \pm 1.6	0.72 \pm 0.3	110 \pm 208.54	4.28 \pm 8.82
Dec	18 \pm 8.95	1.85 \pm 0.44	0.64 \pm 0.04	314.67 \pm 53.09	12.5 \pm 6.93
Jan '83	10.67 \pm 2.87	1.86 \pm 0.65	0.79 \pm 0.35	132 \pm 303.12	8.93 \pm 11.41
Year Mean	14.97 \pm 1.8	1.6 \pm 0.18	0.61 \pm 0.06	547.6 \pm 298.25	16.77 \pm 6.62

Peaks in number of species occurred in April and December, while peaks in diversity occurred in April-May and December-January. Evenness did not vary markedly throughout the year except for a low in August. Mean catch per unit effort (CPUE), which measures number of fish caught per hour, was markedly highest in April and August. Yield per unit effort (YPUE), which measures weight of fish caught per hour, did not show such wide variation; this suggests that the large numbers of fish caught in April and August were mostly juveniles, associated with recruitment events. This conclusion is supported by the fact that spawning of commercial species in the Pearl River Estuary is concentrated heavily in the months of April to August (He and Li 1991), and also agrees with the findings of the Study on Tonggu Waterway summarised below.

A6.2.4 Fish Production by Tai O Homeport Vessels, 1996/97

The most up to date published information on fish production in Tai O is given in the Port Survey 96/97 (AFD 1998a). Since fishing vessels are not restricted to operating in any specific area of Hong Kong waters, it is advisable to summarise the fish production information by homeport and area as in the Port Survey. Production figures by vessel size are given in **Table A6.8**.

Table A6.8: Total Fish Production in 1996-7 for Vessels that Declared Tai O as their Homeport (data from AFD 1998a).

Tai O Home Port	Adult Fish (kg)	Fish Fry (tails)	Total Value (HKD)	No. of Vessels
vessels < 15m	194,396.35	-	8,184,375	109
vessels > 15m	16,692.48	-	825,000	20
Total (all vessels)	211,088.83	-	9,009,375	129

According to the Port Survey 96/97, the top ten fisheries species caught by vessels identifying Tai O as their homeport were as follows (reported in order of adult weight): croakers *Argyrosomus* spp., white herring *Ilisha elongata*, flathead *Platycephalus indicus*, silver shrimp *Acetes* spp., Threadfin *Eleutheronema tetradactylus*, sea breams Sparidae spp., mixed fish, Yellow Croaker *Pseudosciaena crocea*, blue crab *Portunus pelagicus* and *Mugil affinis* (AFD 1998a). All are common fisheries species for western SAR/north Lantau waters, suggesting that most Tai O vessels fish in western Hong Kong waters.

A6.2.5 Fish Production in North Lantau Waters, 1996/97

Although Tai O was not a fishing area included in the Port Survey 96/97, a general idea of production can be obtained by reviewing production in nearby waters, i.e. north Lantau. The total production of vessels working in north Lantau waters is summarised in **Tables A6.9** (vessels under 15 m), **A6.10** (vessels over 15 m) and **A6.11** (all vessels). Fisheries information for north Lantau is broken down into the areas of Shum Wat, Sha Lo Wan, Tung Chung, Chek Lap Kok, Pak Mong, Sham Shui Kok, Yam O and Tsing Chau Tsai.

Table A6.9: Total Fish Production in 1996-7 by Fishing Area in North Lantau Waters (fishing vessels not exceeding 15m) (data from AFD 1998a).

Fishing Area	Area (ha)	Total Production			Production (ha ⁻¹)		
		Adult fish (kg)	Fry (tails)	Value (HKD)	Adult fish (kg)	Fry (tails)	Value (HKD)
Shum Wat	528.41	26,290	-	1,371,090	50	-	2,595
Sha Lo Wan	961.00	18,716	-	1,062,793	19	-	1,106
Tung Chung	363.42	12,795	-	745,604	35	-	2,052
Chek Lap Kok	591.60	15,248	-	763,099	26	-	1,290
Pak Mong	533.22	15,296	-	658,153	29	-	1,234
Sham Shui Kok	531.6	34,594	-	1,422,188	65	-	2,675
Yam O	529.94	28,483	-	1,331,054	54	-	2,512
Tsing Chau Tsai	170.31	38,942	7,661	1,825,480	229	45	10,718
Total	3,722.09	190,364	7,661	9,179,461	507	45	24,182

Table A6.10: Total Fish Production in 1996-7 by Fishing Area in North Lantau Waters (Fishing Vessels exceeding 15m) (data from AFD 1998a).

Fishing Area	Area (ha)	Total Production			Production (ha ⁻¹)		
		Adult fish (kg)	Fry (tails)	Value (HKD)	Adult fish (kg)	Fry (tails)	Value (HKD)
Shum Wat	528.41	108,779	-	2,039,462	206	-	3,860
Sha Lo Wan	961.00	113,734	-	2,273,193	118	-	2,365
Tung Chung	363.42	15,867	-	249,003	44	-	685
Chek Lap Kok	591.60	152,993	-	2,545,892	259	-	4,303
Pak Mong	533.22	51,113	-	552,101	96	-	1,035
Sham Shui Kok	531.6	21,735	-	400,946	41	-	754
Yam O	529.94	34,526	-	368,919	65	-	696
Tsing Chau Tsai	170.31	-	-	-	-	-	-
Total	3,722.09	498,747	-	8,429,516	829	-	13,698

Table A6.11: Total Fish Production in 1996-7 by Fishing Area in North Lantau Waters (All Fishing Vessels) (data from AFD 1998a).

Fishing Area	Area (ha)	Total Production			Production (ha ⁻¹)		
		Adult fish (kg)	Fry (tails)	Value (HKD)	Adult fish (kg)	Fry (tails)	Value (HKD)
Shum Wat	528.41	135,070	-	3,410,552	256	-	6,454
Sha Lo Wan	961.00	132,450	-	3,335,986	138	-	3,471
Tung Chung	363.42	28,662	-	994,607	79	-	2,737
Chek Lap Kok	591.60	168,241	-	3,308,991	284	-	5,593
Pak Mong	533.22	66,410	-	1,210,254	125	-	2,270
Sham Shui Kok	531.6	56,329	-	1,823,134	106	-	3,429
Yam O	529.94	63,009	-	1,699,973	119	-	3,208
Tsing Chau Tsai	170.31	38,943	7,661	1,825,481	229	45	10,718
Total	3,722.09	689,114	7,661	17,608,978	1,336	45	37,880

The Port Survey 96/97 divided Hong Kong waters into 12 sectors. The closest of these to Tai O was SE02, North Lantau. This sector ranked 4th of 12 in terms of production of adult fish per ha and 5th of 12 in terms of value of production per ha. However, it scored only 9th out of 10 ranked sectors in terms of fry production (AFD 1998a). Chong (1984) reported a demersal trawl survey carried out by AFD in 1973-75 which identified 7 major fry collection sites along the north-east coast of Lantau Island. Tai O, however, was not one of the 7 areas identified.

A6.2.6 Fisheries Surveys for Study on Tonggu Waterway, 1997-1998

Fisheries surveys for the Study on Tonggu Waterway were conducted once per month, for a total of 12 sampling sessions (Scott Wilson 1998a). Two fishing methods were employed: shrimp trawling to sample demersal fish and crustaceans, and hang trawling to sample pelagic fish and cephalopods (Scott Wilson 1998c). Three areas were sampled. The nearest of the 3 fisheries survey areas lay roughly 6 km NNW of Tai O, but significant differences were generally not found among the 3 sites (Scott Wilson 1998a). Surveys were conducted with each type of gear once per month over a period of 12 months. Observations of fishing fleet

composition and behaviour in the survey area were also made.

Catches from both shrimp trawls and hang trawls showed strong seasonal variation (Scott Wilson 1998c). Demersal fish abundance was found to vary significantly across the year; the peak in May-June was related to a peak in recruitment of *Ambassis gymnocephalus*, a species of minor commercial importance (*ibid.*). Pelagic fish abundance peaked in April, with peaks in the anchovies *Engraulis japonicus* (dominated by new juveniles) and *Stolephorus commersoni* (dominated by more mature fish) (*ibid.*). Crustacean abundance did not show such strong seasonal variation, but peaks did occur in May (the crab *Portunus sanguinolentus*), July (the crab *Charybdis affinis*, shrimps *Metapeneaus joyneri* and *M. ensis*, and mantis shrimps *Harpisquilla raphidea* and *Oratosquilla interrupta*) and October (*O. interrupta*) (*ibid.*). Cephalopod abundance peaked in September, dominated by the squid *Loligo beka* and *L. duvaucelii*; many of these were juveniles (*ibid.*).

Catches in all groups were dominated by newly recruited individuals (Scott Wilson 1998c). This suggests that mature individuals are largely fished out in the study area, i.e. that growth overfishing is occurring, and that new recruits are carried into the survey area rather than being recruited from a locally reproducing population (*ibid.*). The local fishery can thus be characterised as under severe stress due to fishing pressure.

Site 3, the site nearest Tai O, ranked consistently higher than the two more northerly sites in terms of abundance, biomass and average size of individuals (Scott Wilson 1998b).

Analysis of catch data showed that demersal communities (as sampled by shrimp trawling) were generally more diverse than pelagic communities (as sampled by hang trawling) (Scott Wilson 1998c). This was attributed to the greater diversity of habitats available in the seabed than in the water column.

A total of 132 observations were made of Hong Kong vessels fishing in the study area (Scott Wilson 1998c). Two-thirds of these were hang trawlers and one-third were shrimp trawlers. Vessels typically fished away from islands, in open waters, and peaks in fishing effort were recorded in February-April and in August-November. Hang trawlers may be targeting anchovies and squid during these seasons. No correlation could be found between shrimp trawling activity and abundance of target species (*ibid.*).

A6.2.7 Number of Fishing Vessels at Tai O

The major types of fishing vessels in north Lantau waters in the 1980s were gill netters, hand liners and pair trawlers (AFD 1985). However, by 1984 there was a significant decline in the numbers of vessels of all types in that region.

From the late 1980s onwards the number of vessels increased again, due to an increase in number of P4/7 speed boats. Now the major operators in northern Lantau waters are P4/7 speed boats, followed by "mixed" vessels and shrimp trawlers (**Table A6.12**).

Table A6.12: Number of Vessels by Vessel Type in Tai O and Tung Chung.

Vessel Type	Tai O		Tung Chung		Total	
	1991 ²	1997 ³	1991	1997	1991	1997
Pair Trawler		-	-	-	-	-
Stern Trawler	1	-	-	-	1	-
Hang Trawler		-	-	-	-	-
Shrimp Trawler	12	9	-	-	12	9
Purse Seiner	-	-	-	-	-	-
P4/7	-	99	-	29	-	128
MIX ¹	83	21	39	-	122	21
Total	96	129	39	29	135	158

Notes:

- (1) includes long liners, hand liners, gill netters and miscellaneous crafts.
- (2) AFD (1991)
- (3) AFD (1998b)

While the number of P4/7 speed boats has increased, the numbers of long liners, hand liners and gill netters has declined. This is because the P4/7 speed boat can be used for all three fishing methods. In addition to its versatility, the higher speed of the P4/7 enables the fishermen to reach fishing grounds further afield. This may indicate that the majority of Tai O fishing vessels operate outside Tai O bay itself and possibly at some distance from Tai O. Finally, the small size and shallow draft of the P4/7 may make it easier to maneuver and moor in the stilt-house area at Tai O; these vessels are often seen in the stilt-house area.

A6.2.8 Number of Fishermen Employed by Vessels using Tai O as Homeport

The numbers of fishing crew employed on vessels in Tai O is summarised in **Table A6.13**. These data were collected in 1991. Crews were overwhelmingly made up of family members (363 of 424, or 86% of total), and the dominance was even more marked on traditional vessels (97% family members) than on modern vessels (66% family members). PRC crew constituted about 11% of the total, and Hong Kong hired crew made up the remainder.

Table A6.13: Number of Fishermen Employed by Vessels that Declared Tai O as their Homeport in Feb. 1991 (Data from AFD 1991).

Vessel Type	Traditional Vessels			Modern Vessels			Total			Total fishers
	Family crew	Hired crew	PRC crew	Family crew	Hired crew	PRC crew	Family crew	Hired crew	PRC crew	
Pair Trawler	-	-	-	-	-	-	-	-	-	-
Stern Trawler	-	-	-	3	-	-	3	-	-	3
Hang Trawler	-	-	-	-	-	-	-	-	-	-
Shrimp Trawler	9	-	-	36	-	-	45	-	-	45
Long Liner	12	-	-	-	-	-	12	-	-	12
Hand Liner	18	-	-	-	-	-	18	-	-	18
Gill Netter	178	4	4	62	9	44	240	13	48	301
Purse Seiner	-	-	-	-	-	-	-	-	-	-
Maricul. Craft	-	-	-	-	-	-	-	-	-	-
Misc. Craft	42	-	-	4	-	-	46	-	-	46
Total	259	4	4	104	9	44	363	13	48	424

A6.3 Summary

Existing information indicates that a wide variety of fisheries species are exploited in north Lantau waters and hence probably in the Tai O area. The north Lantau area as a whole is fairly important on an SAR scale in terms of fish production, but is not identified as important for fry production. In surveys in 1979-84, Tai O consistently had the highest production in terms of weight and value of all fishing areas surveyed off north Lantau; more recent production data for Tai O are not available.

AFD surveys in 1982-83 and the Study on Tonggu Waterway in 1997-98 both documented seasonal variation in fisheries species occurrence and abundance off north Lantau, in the general vicinity of Tai O. Peaks occurred at different seasons of the year, and appeared in almost all cases to be associated with recruitment of juveniles. Catches in the Tonggu Waterway surveys were dominated by juveniles, suggesting that mature individuals are largely fished out in this area and that new recruits are carried into the survey area rather than being recruited from a locally reproducing population. This indicates that the local fishery is under severe fishing pressure.

The P4/7 has come to be the most common type of fishing vessel at Tai O in the 1990s. This is probably due to its speed, versatility, and possibly its small size and shallow draft which suit it to existing conditions at Tai O. A 1991 survey showed fishing crews to be overwhelmingly made up of family members (86% of total), with the dominance of family crew much greater on traditional vessels than on modern vessels. PRC crew constituted about 11% of the total, and Hong Kong hired crew made up the remainder.