



## **Marine Habitat Survey**

**Address | 24 Cabarita Road, Avalon Beach**

**Client | Mr Bruce MacDiarmid**

**Survey Date | 28 February 2022**

**Report Date | 25 February 2023**

**Job Number 22-049-08**

# Table of Contents

1. Report Background.....	1
1.1 Purpose of the Report.....	1
1.2 Environmental Considerations.....	1
1.3 The Property.....	2
1.4 On-Site Survey Methodology of The Property.....	2
2. Existing Property Details.....	4
2.1 Existing Structures at The Property.....	4
2.2 Existing Ecology at The Property.....	4
3. Proposed Waterfront Development.....	6
3.1 Proposed Structures of the Waterfront Development.....	6
3.2 Assessment of Potential Impacts of the Proposed Development to the Existing Ecology of The Property.....	6
Appendix A - On-site Survey Photos .....	8
Appendix B - Layout Plan of Waterfront Development and Seagrass Map .....	11
Appendix C - References .....	13

# 1. Report Background

## 1.1 Purpose of the Report

Crown Lands require that all proposed waterfront development works involving load-bearing structures located below the Mean High Water Mark be reviewed for compliance with environmental regulations. The aim of these regulations is to protect the marine environment, in particular the local fauna and flora such as seagrasses, mangroves and macroalgae. The body responsible for conducting the assessment during the planning stage of the proposed waterfront development is the NSW Department of Primary Industries (Fisheries).

The purpose of this report is to provide all the necessary data required for an assessment to be done by NSW Fisheries.

## 1.2 Environmental Considerations

In summary, the main environmental considerations that require assessment by NSW Fisheries for waterfront development applications are:

- a) Protection of seagrasses;
- b) Protection of mangroves;
- c) Conservation of the existing ecology; and
- d) Impacts from dredging.

The regulations upon which the environmental considerations are based are discussed below.

The Fisheries Management Act 1994 ("FM Act") applies to habitat and aquatic flora and fauna that have the potential to be affected by a proposed waterfront development. The objectives of the FM Act are to conserve, develop and share the fisheries resources of NSW for the benefits of present and future generations, and in particular to protect key fish habitats and to promote ecologically sustainable development. The FM Act states that

*a person must not cut, remove, damage or destroy marine vegetation on public water land, or on the foreshore of any land or lease, except under the authority of a permit issued by the Minister under this Part (205) or of an aquaculture permit.*

Two Fish Habitat Protection Plans have also been developed under the FM Act. The first plan deals broadly with dredging and reclamation activities, fish passage requirements, the protection of marine vegetation (in particular mangroves and seagrasses), and the importance of snags. The second plan is specific to the protection of seagrasses. Scientific research has shown that seagrasses are important to the ecology of shallow estuarine environments as they stabilise sediments and maintain water quality, provide shelter and food critical to the survival of a wide variety of juvenile fishes and mobile invertebrates (many of which are of commercial or recreational importance) and play an important role in the cycling of nutrients within estuaries. Seagrasses are a fragile ecological habitat, with many major estuaries in NSW having lost as much as 85% of their seagrass beds in the past

30 to 40 years. In 2012 the population of *Posidonia australis* seagrass (commonly known as strapweed) was listed as an Endangered Population in the estuaries of Sydney under the Fisheries Management Act (Part 7A).

### 1.3 The Property

The proposed waterfront development of the demolition of the existing slip rails and installation of a new mesh skid ramp with steps is planned for 24 Cabarita Road, Avalon Beach ("The Property").

For details of the existing structures at The Property and the proposed waterfront development refer to Sections 2.1 and 3.1 respectively

### 1.4 On-Site Survey Methodology of The Property

The on-site survey of The Property was conducted at 12:45 on 28 February 2022 by Rick Johnson of Waterfront Surveys Australia. Weather conditions at the time of the survey were overcast with minimal breeze. The water surface was calm and underwater visibility was approximately 1 m. At the time of the survey the tide was rising, with a tidal height of 1.4 m.

The on-site survey area included the footprint of the proposed structures and extended a further 10 m in all directions from the footprint of the proposed structures. The survey was conducted from the shore and inspection of the seabed was done on snorkel. Photos of each habitat were taken using an underwater digital camera and a description of each differing habitat, and species list of aquatic flora and fauna observed within the survey area, was recorded. A tape measure was used to obtain the distance of seagrass from structures/shoreline.

Seagrass species were given the following codes:

Hal – *Halophila ovalis* (paddleweed)

Pos – *Posidonia australis* (strapweed)

Zos – *Zostera capricorni* (eelgrass)

The level of patchiness was also estimated using three categories:

A – Individual strands or small clumps (< 2 m diameter);

B – Medium sized patches (2 - 10 m diameter); or

C – Beds of relatively even distribution (> 10 m diameter).

Estimates of seagrass density were made by ranking each observation point using three categories:

1 – Low density (< 15% seabed cover);

2 – Medium density (15% - 50% seabed cover); or

3 – High density (> 50% cover).

Leaf length of seagrass was categorised as follows:

*Halophila* – S (short < 1 cm), M (medium 1 cm – 3 cm), L (long > 3 cm);

*Posidonia* – S (short < 15 cm), M (medium 15 cm – 30 cm), L (long > 30 cm); or

*Zostera* – S (short < 5 cm), M (medium 5 cm – 15 cm), L (long > 15 cm).

These codes provide a description of the seagrasses within an area and are useful in determining the nature and ecological value of any seagrasses likely to be affected by the proposed works. For example, seagrass with shorter leaves and a lower density (e.g. ZosC1S) may have less ecological value compared with seagrass with longer leaves and a higher density (ZosC3L).

## 2. Existing Property Details

### 2.1 Existing Structures at The Property

The Property is located on the western shoreline of Careel Bay, Pittwater – 300 m south of the end of Stokes Point. The Property faces in an easterly direction.

The existing structures (Photos 1 - 3) present at The Property at the time of the on-site survey included:

- a timber jetty (20.5 x 1.5 m) on the southern half of The Property, supported on 10 concrete piers and two outermost timber piles;
- a timber ramp (6 x 1.5 m);
- a pontoon (3 x 5 m) with two sleeved steel stabilising piles inset on the outer corners; and
- a set of sliprails (15 m in length) on the northern boundary of The Property, supported on sleeved concrete piers.

### 2.2 Existing Ecology at The Property

#### 2.2.1 Existing Ecology Based on Observations from the On-Site Survey

##### *a) Intertidal Ecology*

The intertidal zone at The Property consisted of artificial and natural habitats. A sandstone block seawall stretched across the width of The Property (Photos 1 - 2). The seawall was fronted by intertidal sand (Photos 2 - 3), extending out 4.5 m on the northern side of the jetty (in the location of the proposed new skid) and 6.3 m on the southern side of the jetty. The sand transitioned to an area of intertidal rocky rubble (Photo 3) that extended out to the end of the intertidal zone 9.5 m off the seawall.

The base of the seawall was colonised by a medium density cover of Sydney rock oysters (*Saccostrea glomerata*). There was a patch of medium density, short-leaved *Zostera* seagrass colonising the intertidal sand area near the seawall on both sides of the existing jetty (see section c. below for more distribution details). The rocky rubble was colonised by Neptune's necklace (*Hormosira banksii*) from 6 - 9 m off the seawall. The metal slip rails, sleeved concrete slip rail piers, concrete jetty piers and timber jetty piles were all colonised by a thick growth of oysters.

##### *b) Subtidal Ecology*

The subtidal zone within the on-site survey area of The Property consisted of a gradually sloping silty sand seabed with scattered rocks from 9.5 m off the seawall to 15.3 m off the seawall on the northern side of the jetty and to 13.9 m on the southern side. The rocks disappeared and the seabed became gradually sloping, uniform silty sand across the rest of the survey area.

The subtidal seabed was unvegetated out to the end of the jetty. The seabed under and around the ramp was colonised by a large patch of high density *Zostera* seagrass followed

by a bed of mixed *Zostera* and *Posidonia* around the existing pontoon and continuing offshore (see section c. below for more distribution details).

No fish were observed during the on-site survey.

#### c) *Seagrass and Mangroves*

There was a patch of medium density, short-leaved *Zostera* seagrass (ZosB2S) colonising the intertidal sand area near the seawall on both sides of the existing jetty. Due to their location in the intertidal zone, the leaf length in both of these patches was very short. On the northern side of the jetty the *Zostera* patch started 1.3 m off the seawall and finished 4.5 m off the seawall (Photo 4). The proposed new mesh skid ramp would be located over this patch of *Zostera* (see seagrass map in Appendix B). The *Zostera* patch on the southern side of the jetty (and not impacted by the proposed mesh skid) was located slightly further offshore, from 4.5 - 6.8 m off the seawall.

The subtidal seabed was unvegetated out to the end of the jetty. The seabed under and around the ramp was colonised by a large patch of high density, long-leaved *Zostera* (ZosB3L) followed by a bed of mixed *Zostera* and *Posidonia* around the existing pontoon and continuing further offshore (ZosC2L/PosC1L). The proposed new skid ramp would be located 14.5 m inshore of the *Zostera* patch (See seagrass map in Appendix B).

No mangroves were observed within the on-site survey area of The Property.

### 2.2.2 Existing Ecology Based on Government Published Records

NSW Fisheries has done extensive mapping of the aquatic vegetation in Pittwater. The latest aquatic vegetation maps (Creese et al. 2009) indicate the presence of seagrass (*Posidonia*) seaward of The Property.

### 3. Proposed Waterfront Development

#### 3.1 Proposed Structures of the Waterfront Development

The proposed waterfront development at The Property, as per the design by Stephen Crosby & Associates Pty Ltd (Drawing 2082-DA01), consists of the:

- demolition of the existing slip rails and cradle on the northern side of The Property;
- installation of a new mesh skid ramp (8.0 x 3.0 m) alongside the northern side of the existing jetty, supported on six piers; and
- installation of a set of new mesh steps down the centreline of the new mesh skid.

#### 3.2 Assessment of Potential Impacts of the Proposed Development to the Existing Ecology of The Property

##### 3.2.1 Summary of Findings

In summary, the potential impacts on the aquatic ecology at The Property from the demolition of the existing slip rails and installation of a new mesh skid ramp with steps are expected to be minimal.

The proposed new 8 m long mesh skid ramp would be located over a 3.2 m wide patch of medium density, very short-leaved *Zostera* that was growing on the intertidal sand off the front of the seawall (Photo 4). To mitigate the potential indirect shading impact from the skid ramp on the underlying seagrass, the decking would be constructed of mesh to allow adequate levels of sunlight to pass through to the underlying seagrass. In addition, the skid ramp has been designed to only have piers at its outer edge, which would be located 3 m offshore of the seagrass patch (Photo 3).

The *Zostera* patch around and under the pontoon ramp would be located 14.5 m offshore of the end of the proposed skid ramp. This *Zostera* patch, the outer mixed bed of *Zostera* and *Posidonia*, and the intertidal *Zostera* patch on the southern side of the jetty would not be impacted from the proposed development.

##### 3.2.2 Detailed Listing of Findings

The potential impacts to the existing ecology of The Property are assessed in detail below in relation to the four main environmental considerations:

- a) Protection of seagrasses;
- b) Protection of mangroves;
- c) Conservation of the existing ecology; and
- d) Impacts from dredging.

##### *a) Protection of seagrasses*

<i>Development Works</i>	<i>Potential Impact to Seagrasses</i>	
	<i>Summary</i>	<i>Discussion</i>
Installation of new	Potential indirect harm to	It is predicted that there would be

mesh skid ramp	seagrass from shading	minimal harm to the intertidal <i>Zostera</i> seagrass patch that is located under the proposed new mesh skid ramp. To mitigate the potential indirect shading impact from the skid ramp on the underlying seagrass, the decking would be constructed of mesh to allow adequate levels of sunlight to pass through to the underlying seagrass.
----------------	-----------------------	--

*b) Protection of Mangroves*

No ecological impact from the waterfront development as there were no mangroves present in the survey area.

*c) Conservation of the Existing Ecology*

<i>Development Works</i>	<i>Potential Impact to Existing Ecology</i>	
	<i>Summary</i>	<i>Discussion</i>
Installation of new skid piers	Minor loss of rocky intertidal habitat	There would be no negative impact to the of rocky intertidal habitat in the location of the new skid piers as the rocks were unvegetated
Installation of new structures	Provide replacement artificial intertidal habitat	The installation of the new mesh skid ramp would provide replacement artificial intertidal habitats to compensate for the demolition of the existing slip rails and piers. It is expected that an assemblage of fauna and flora species similar to that colonising the existing slip rails and piers would colonise these new structures.

*d) Impacts from Dredging*

No ecological impact from the waterfront development as there is no dredging required.

## Appendix A - On-site Survey Photos

The following photographs taken by Rick Johnson during the on-site survey conducted at The Property on 28 February 2022 are provided overleaf.

- Photos 1 - 2. Existing waterfront structures at The Property.
- Photos 3 - 4. Intertidal habitats and *Zostera* seagrass in the survey area.

**Photo 1.** The existing structures at The Property (slip rails, jetty, ramp and pontoon). The red arrow indicates the location of the proposed new mesh skid ramp on the northern side of the jetty.



**Photo 2.** The intertidal habitats of seawall fronted by sand in the location of the proposed new mesh skid ramp. The slip rails (at right) are proposed to be removed.



**Photo 3.** The sandy and then rocky intertidal habitat on the northern side of the existing jetty. The red arrow indicates the location of the proposed new skid piers in the rocky habitat.

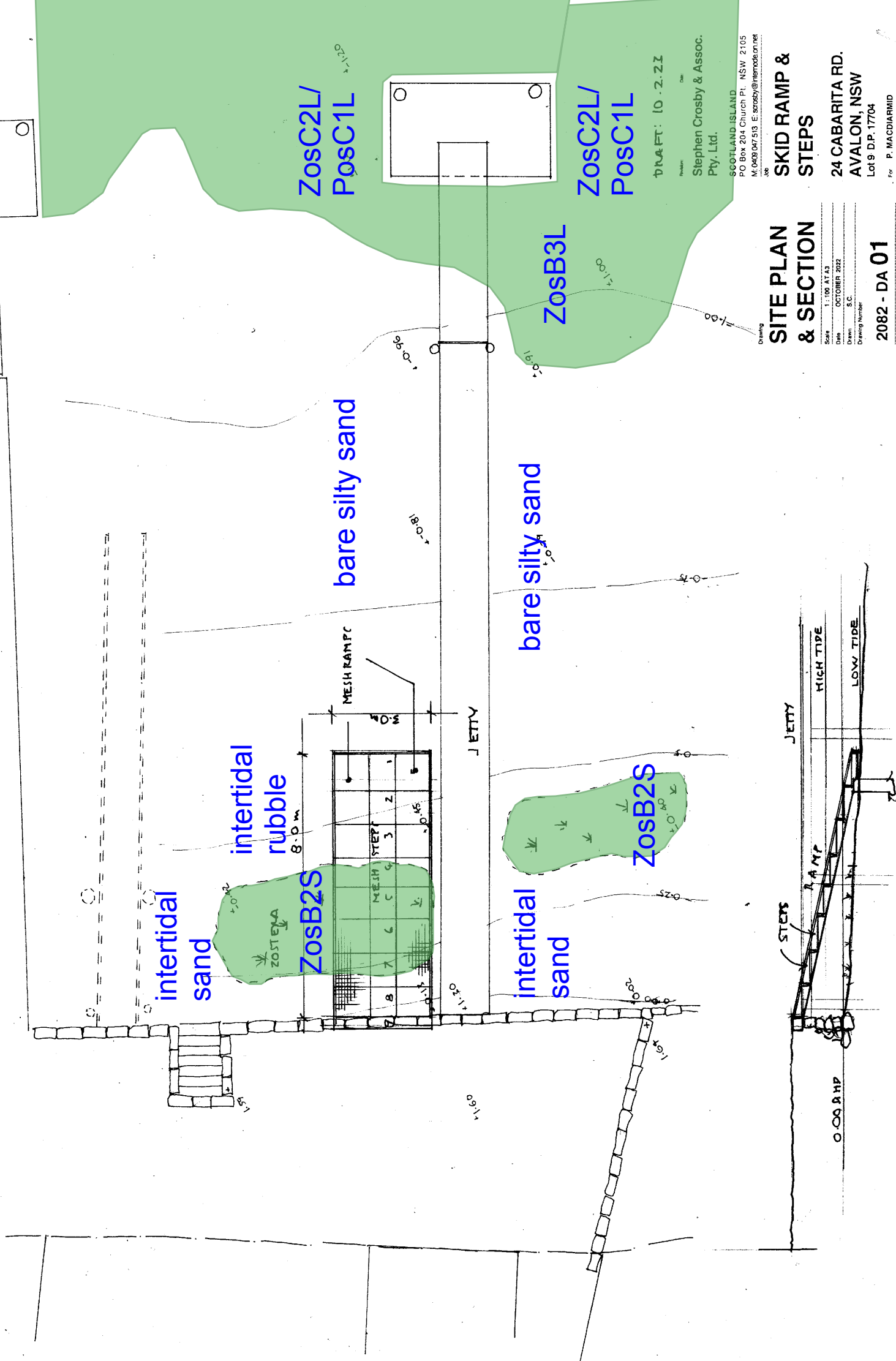


**Photo 4.** The very short-leaved patch of *Zostera* (ZosB2S; indicated by shading) located in the intertidal sand under the proposed new mesh skid ramp.



## **Appendix B - Layout Plan of Waterfront Development and Seagrass Map**

The proposed waterfront development design layout plans (provided by Stephen Crosby & Associates – Drawing 2082-DA01) and mapped seagrass at 24 Cabarita Road, Avalon Beach is provided overleaf.



**SITE PLAN  
& SECTION**

Scale 1:100 AT A3  
Date OCTOBER 2022  
Drawn S.C.  
Drawing Number  
2082 - DA 01

**SKID RAMP &  
STEPS**

24 CABARITA RD.  
AVALON, NSW  
Lot 9 D.P. 17704  
For P. MACDIARMID

SCOTLAND ISLAND  
PO Box 204 Church Pt. NSW 2105  
M: 0408 047 513 E: scrosby@intermode.com.au  
JMB

Draft 10.2.22  
Stephen Crosby & Assoc.  
Pty. Ltd.

## Appendix C - References

Creese, R. G., Glasby, T. M., West, G. and Gallen, C. (2009). *Mapping the habitats of NSW estuaries*. Industry & Investment NSW Fisheries Final Report Series 113. Port Stephens, NSW, Australia. 95pp.