



Australian Government

Department of Defence



Australian Government

Department of the Environment and Heritage

Sea Dumping in Australia

Historical and Contemporary Aspects

2003

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Sea dumping in Australia : historical and contemporary aspects

First edition, — This edition. First published by the Department of Defence, Australia 2003

Publisher

Defence Publishing Service
Department of Defence
CANBERRA ACT 2600

National Library of Australia Cataloguing-in-Publication

Plunkett, Geoff.
Sea dumping in Australia : historical and contemporary aspects.

Bibliography.
Includes index.

ISBN 0 642 29588 3.

1. Waste disposal in the ocean - Australia.
2. Marine resources conservation - Australia.
- I. Australia. Dept. of Defence.
- II. Australia. Dept. of the Environment and Heritage.
- III. Title.

363.7280994

Full cataloguing available on the National Library of Australia web site <http://www.nla.gov.au>

Sea Dumping in Australia: Historical and Contemporary Aspects

Geoff Plunkett

This report brings together a number of studies undertaken on all aspects of Sea Dumping in Australia and its Territories. These were previously available in a number of disparate sources and have been collated here for convenience.

At date of publication (2003), Sea Dumping in Australian waters is managed by the Department of the Environment and Heritage, Canberra. Up to date information on obtaining a permit, including the following application forms can be obtained from their website <http://www.deh.gov.au>.

Application form to Dispose of Dredge or Excavation Material at Sea

Application form to Dispose of Vessels at Sea

Application form for an Artificial Reef

Application form for a Burial at Sea

Application form to Dispose of a Fish Waste or Material Resulting from Industrial Fish Processing Operation at Sea

Application form to Dispose Bulky Items from Small Islands Into the Sea

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¹ Free copies of this report are available (to any country) by sending postal address to this email address.

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* This article was first published on the Department of Environment, Sport and Territories (now the Department of the Environment and Heritage) web site in 1996, but has been updated to reflect important new developments in sea dumping, both domestically and internationally. The research was undertaken under the auspice of the former Federal Environment Protection Agency.

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A History of Sea Dumping off Australia and its Territories

SUMMARY

The dumping of material in the world's oceans has a long history. Objects are dumped into the ocean in a variety of ways. Sea dumping, as currently defined in Australian legislation, is any deliberate disposal into the sea of wastes or other matter from vessels, aircraft, platforms or other man-made structures and any deliberate disposal into the sea of vessels, aircraft, platforms or other man-made structures¹. It does not include material released directly into the sea from a land source or operational discharges from ships. Sea dumping of wastes has been common practice in the waters surrounding Australia, from first European settlement until a couple of decades ago. For the past seventy years sea dumping has been regulated by domestic legislation with increasing restriction on the type of material dumped. As Australian Government policy has moved to increase protection of both land and marine environments, waste reduction and environmentally sustainable disposal methods have become increasingly important. To control the dumping of waste Australia first introduced the *Beaches, Fishing Grounds and Sea Routes Protection Act 1932*, an Act to control the dumping of vessels that could potentially obstruct shipping channels or interfere with trawling grounds. Since 1975 an international agreement, the *Convention On The Prevention Of Marine Pollution By Dumping Of Wastes And Other Matter, 1972* (or London Convention) has controlled sea dumping internationally. In order to ratify the London Convention, Australia enacted the *Environment Protection (Sea Dumping) Act 1981* which provides for the regulated dumping of wastes and other substances in waters off Australia and its External Territories. More recently Australia has implemented the *1996 Protocol to the Convention On The Prevention Of Marine Pollution By Dumping Of Wastes And Other Matter, 1972*. The 1996 Protocol to the London Convention severely restricts the list of substances which may be dumped at sea. Currently most sea dumping permits in Australia are issued by the Department of the Environment and Heritage (DEH)² and are for the disposal of uncontaminated dredge spoil. In accord with its status as the predominant dumping permit, DEH has produced the *National Ocean Disposal Guidelines for Dredged Material*³. It assists permit applicants by providing a comprehensive framework for the assessment of the environmental impacts from the disposal at sea of dredged material, in accordance with domestic environmental protection legislation and Australia's international obligations. Occasionally, under strictly limited circumstances, permits are issued for the creation of artificial reefs. Historically, obsolete ammunition, organic refuse, chemicals and other waste have also been dumped off Australia.

¹ As defined by the 1996 Protocol (see further). The definition also includes any storage of wastes or other matter in the seabed and the subsoil thereof from vessels, aircraft, platforms or other man-made structures at sea and any abandonment or toppling at site of platforms or other man-made structures at sea for the sole purpose of deliberate disposal (from Article 1).

² Historically permits were issued by the Environment Protection Group (formerly Environment Protection Agency and Commonwealth Protection Agency).

³ Published by Environment Australia, May 2002 (*ISBN 0 642 54831 5*). Full copy viewable on the internet on the Department of the Environment and Heritage's web site; <http://www.deh.gov.au>.

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International Control of Sea Dumping

Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972 (the London Convention)

The need for an international convention to control the dumping of wastes at sea was recognised in 1972 at the United Nations Conference on the Human Environment which met in Stockholm, Sweden (5 - 16 June 1972). Principle 7, arising from the meeting stated that “*States shall take all possible steps to prevent pollution of the seas by substances that are liable to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the sea*”. Meeting in London in November 1972, an Inter-Governmental Conference on the Convention of the Dumping of Wastes at Sea adopted the *Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter*. Originally known as the London Dumping Convention, now the London Convention, it has been in force internationally since 1975. The Contracting Parties to the Convention recognized that “*The marine environment and the living organisms which it supports are of vital importance to humanity...and that the capacity of the sea to assimilate wastes and render them harmless, and its ability to regenerate natural resources, is not unlimited*”. The London Convention, with its amendments of 1978, 1980 and 1993, controls marine pollution from dumping and incineration at sea.

Many objects are discarded in the world's oceans each year. The material comes from a variety of sources and is introduced into the ocean in a variety of ways. Sea dumping is a common term that covers the release of material into the ocean in a very specific way. Sea dumping as defined in Article III of the London Convention is (i) any deliberate disposal at sea of wastes or other matter from vessels, aircraft, platforms or other man-made structures at sea and (ii) any deliberate disposal at sea of vessels, aircraft, platforms or other man-made structures at sea. The definition does not include (i) the disposal at sea of wastes or other matter incidental to, or derived from the normal operations of vessels (operational discharge), aircraft, platforms or other man-made structures at sea and their equipment⁴ (ii) placement of matter for a purpose other than the mere disposal thereof, provided that such placement is not contrary to the aims of this convention. The disposal of wastes or other matter directly arising from, or related to the exploration, exploitation and associated off-shore processing of seabed mineral resources and material discarded straight to the ocean from a land source such as sewage pumped directly into the ocean from a city's sewerage system are also not covered by the provisions of the Convention. This definition has been amended by the 1996 Protocol (see section below).

The London Convention prohibited the dumping of some substances which are listed in Annex I. These included organohalogen compounds, mercury, persistent plastics, crude oil⁵, radioactive wastes or other radioactive matter and materials in whatever form⁶ produced for biological and chemical warfare. It also allowed the regulated dumping of other substances. The dumping of

⁴ Other than wastes or other matter transported by or to vessels, aircraft, platforms or other man-made structures at sea, operating for the purpose of disposal of such matter or derived from the treatment of such wastes or other matter on such vessels, aircraft, platforms or structures.

⁵ Crude oil and its wastes, refined petroleum products, petroleum, distillate residues, and any mixtures containing any of these, taken on board for the purpose of dumping.

⁶ e.g. solids, liquids, semi-liquids, gases or in a living state.

wastes or other matter listed in Annex II required a prior special permit and the dumping of all other wastes or matter required a prior general permit. Annex II substances included arsenic, beryllium, chromium, copper, lead, nickel, vanadium zinc (and their compounds), organosilicon compounds, cyanides, fluorides pesticides and their by-products not covered in Annex I⁷. Annex III established general provisions to be considered in establishing criteria in governing the issue of permits and included the characteristics and composition of the matter, characteristics of the dumping site and the method of deposit. In 1996, a special meeting of the contracting parties adopted the 1996 Protocol to the London Convention. It replaces the existing list of banned substances with a severely restricted list of substances which may be dumped at sea (see below) .

1996 Protocol To The Convention On The Prevention Of Marine Pollution By Dumping Of Wastes And Other Matter, 1972⁸

In 1996⁹ a Special Meeting of Contracting Parties to the London Convention adopted the 1996 Protocol to the London Convention. It embodies a totally new approach to the dumping of wastes into the sea and will eventually replace the London Convention. The Protocol specifies seven types of materials that may be sea dumped, whereas, the London Convention specifies a list of materials that cannot. Therefore, the list of items that can be dumped under the London Convention is a long list of possibles while the 1996 Protocol is far more restrictive. A major aim of the Protocol is to have less and cleaner waste dumped at sea. On 25 March 1998, Australia signed the 1996 Protocol to the London Convention. Australia's treaty practice is to ratify a treaty after domestic law, which is in agreement with the treaty, is enacted. Thus the *Environment and Heritage Legislation Amendment Bill 2000* which amends the *Environment Protection (Sea Dumping) Act 1981* (see further) was introduced into the Federal Parliament. The Bill came into effect on 16 August 2000 and Australia ratified the 1996 Protocol on 4 December 2000.

The Protocol amended the definition of dumping as originally seen in Article III of the London Convention. Dumping now means (i) any deliberate disposal into the sea of wastes or other matter from vessels, aircraft, platforms or other man-made structures at sea (ii) any deliberate disposal into the sea of vessels, aircraft, platforms or other man-made structures at sea (iii) any storage of wastes or other matter in the seabed and the subsoil thereof from vessels, aircraft, platforms or other man-made structures at sea; and (iv) any abandonment or toppling at site of platforms or other man-made structures at sea, for the sole purpose of deliberate disposal. The Protocol requires the application of the precautionary principle, that is, the Contracting Parties to the Protocol must take appropriate preventative measures where there is reason to *believe* that wastes may cause harm even when there is no conclusive evidence to prove so. Further, the

⁷ Also considered in Annex II were containers, scrap metal and other bulky wastes liable to sink to the sea bottom which may present a serious obstacle to fishing or navigation.

⁸ The information in this section is largely based on Parliamentary Readings and an Explanatory Memorandum to the Environment and Heritage Legislation Amendment Bill 2000. Some of the passages below are taken directly from these sources. The following from the National Ocean Disposal Guidelines for Dredged Material (2002) should also be noted (page 7 & 8). "A major aim of the Protocol is to have less and cleaner waste dumped at sea. Annex 2 of the 1996 Protocol to the London Convention emphasises progressively reducing the need to dump waste at sea, by requiring applicants for sea dumping permits to carry out waste prevention audits and consider a range of waste minimisation strategies. Those who wish to dispose of material at sea should first consider what possible contaminants exist in the material to be dumped, particularly any prohibited substances. Secondly, they should consider the material's suitability for alternate disposal methods, including the comparative merits of dumping at sea and on land. Thirdly, applicants must conduct a waste characterisation process, to assess the material's physical, chemical and biological attributes. If the material is found to be acceptable for sea disposal, or it is feasible for it to be made acceptable by some form of processing, a dump site may then be selected".

⁹ 28 October - 8 November 1996.

Protocol obliges Contracting Parties to make attempts to reduce the necessity for sea dumping and to reduce contamination levels in material to be dumped. Parties are obliged to carry out a waste prevention audit¹⁰, consider waste management options¹¹, formulate an impact hypothesis in which the potential effects are assessed, and (if required) carry out a monitoring program to determine whether changes in the receiving environment are within those predicted by the Impact Hypothesis. In practice, in anticipation of its ratification, Australia had voluntarily adopted many of the provisions when issuing permits. Sea dumping permits issued in the last few years have been primarily for the disposal of uncontaminated dredge spoil. Occasionally, the scuttling of vessels and other appropriate materials for artificial reefs has occurred. These fall within the range of the seven permissible categories as listed in Annex 1 of the Protocol. The categories are;

- (i) dredged material;
- (ii) sewage sludge;
- (iii) fish waste, or material resulting from industrial fish processing operations;
- (iv) vessels and platforms or other man-made structures at sea;
- (v) inert, inorganic geological material;
- (vi) organic material of natural origin; and
- (vii) bulky items, primarily comprising iron, steel, concrete and similarly unarmful materials, for which the concern is physical impact, limited to those circumstances where such wastes are generated at locations having no practicable access to disposal options other than dumping (for example small islands with isolated communities).

Except for in an emergency situation, no other substances may be considered for dumping. The Protocol also prohibits incineration at sea, except in an emergency situation, and prohibits the export of wastes or other matter for dumping into the sea or incineration at sea.

Controlled Sea Dumping in Australia

Legislative History

Although sea dumping has been a common method of waste disposal around the world, some countries have greatly restricted its practice. Australia, in particular, aims to limit sea dumping to the disposal of uncontaminated dredge spoil and occasionally for the creation of artificial reefs. This accords with the Australian Federal Government's¹² policy to minimise the production of waste and to encourage environmentally sustainable waste disposal.

¹⁰ A waste prevention audit is carried out in order to evaluate (1) types, amounts and relative hazard of wastes generated (2) waste sources and (3) the feasibility of waste reduction and prevention techniques. The audit can be used to reduce the amount of waste generated and to reduce waste contamination levels [from the National Ocean Disposal Guidelines for Dredged Material (2002), page 8].

¹¹ The 1996 Protocol to the London Convention requires applicants to consider alternate ways of dealing with waste, apart from disposal into land, air or sea. For example, disposal options, in order of increasing environmental impact, are: re-use; off-site recycling; destruction of hazardous constituents; treatment to reduce or remove the hazardous constituents; disposal on land, into air or into water. The determining authority must refuse an application if there are appropriate alternatives for re-use, recycling or treatment of the waste without undue risks to human health or the environment, or disproportionate costs. [from the National Ocean Disposal Guidelines for Dredged Material (2002), page 8].

¹² Australia is a Federation of six States, three internal territories and seven external territories. The State Governments have their own legislature. The Federal Government is also referred to as the Commonwealth Government.

Beaches, Fishing Grounds and Sea Routes Protection Act 1932

During the 1920s there was considerable public concern about pollution washing up on beaches, primarily on beaches around Sydney, but also around Melbourne and Adelaide¹³. Ships routinely discharged loads of garbage just off the coast. In Sydney this waste included offal, organic refuse¹⁴, waste collected by municipal councils and ashes¹⁵. As well as causing significant pollution problems when garbage washed up onto beaches, disposal of obsolete boats by dumping them off the coast also caused net-snagging problems with the recently established deep sea trawling industry¹⁶. A further problem of unsupervised ship disposal was possible obstruction of the increasingly busy navigation routes.

To reduce this pollution, the Federal Government (using its power to make laws with respect to interstate and international commerce, quarantine and fisheries) introduced the *Beaches, Fishing Grounds, and Sea Routes Protection Act 1932*¹⁷ to control the dumping of boats that could potentially obstruct shipping channels or interfere with trawling in Australia's fishing grounds. The Federal Government also regulated general waste and garbage dumping by prohibiting the dumping of "any garbage, rubbish, ashes or organic refuse" in designated exclusion zones¹⁸. This legislation was enacted some forty years before there were any international moves to control sea dumping.

The *Beaches, Fishing Grounds and Sea Routes Protection Act 1932* designated fourteen vessel dumping sites off the Australian coast, these being specially chosen to avoid shipping routes and areas regularly trawled by fishing boats (they were to become general disposal areas where chemicals and ammunition etc. were also dumped). A permit was required for each vessel dumped. To dump garbage, ashes or organic refuse, permission was required from the Director of Quarantine. The designated dumping zones are shown in Appendix A.

The ships as well as non ship objects that are known to have been dumped within each of these dumping grounds are listed in Appendix B and Appendix C respectively.

Environment Protection (Sea Dumping) Act 1981

Prior to the introduction of domestic legislation commensurate with the London Convention, Australia used voluntary agreements to control dumpings. This arrangement closely followed the Convention. Under the arrangement individuals or organisations wishing to dump materials at

¹³ Parliamentary speeches: second reading 2 December 1932. EPA 94/6791 & EPA 94/6789. These numbers refer to two of the files in the (former) Environment Protection Agency (EPA) file series: EPA- Waste Management Bch-Sea Dumping Records - Database, files which are now in the care of the Department of the Environment and Heritage, Canberra, Australia. The data for this paper has been sourced principally from Federal Government records on sea dumping collected and compiled in this file series.

¹⁴ This included human waste (also known as night soil) which was dumped daily beyond Sydney Heads (David Bishop pers. comm.).

¹⁵ Exact dumping figures are difficult to ascertain but these substances were dumped in large quantities eg. ash was dumped for many years and in one month alone, November 1932, 3,426 tons of ash were dumped three miles east off Sydney Heads. Much of the ash came from power stations. The introduction of incinerators reduced the loads dumped by city councils. Australian Archives ACT Regional Office Series A1928/1, item 848/12 part 1. EPA 94/6789.

¹⁶ An Australian company paid the price for the same problem forty years later when contractors constructing an oil rig dumped scrap metal in the sea at Lakes Entrance, Victoria, in 1971-1972. Because of net-snagging the company had to get the metal removed at a cost of \$100,000. Newspaper article, The Age (Melbourne), 11 August 1972. EPA 94/6789.

¹⁷ The legislative history which follows appears in EPA 94/6791.

¹⁸ It appears only one such zone was ever enacted. This was a prohibited zone off Sydney (found in the Statutory Rules to the Act).

sea approached the Federal Government for permission. If the waste material was banned under the Convention dumping was prohibited. In other cases dumping was allowed only in prescribed circumstances after consultation with relevant bodies such as fisheries and those responsible for navigation routes.

In preparing to ratify the London Convention, the Australian Federal Government introduced the *Environment Protection (Sea Dumping) Act 1981*¹⁹. It came into effect on 6 March 1984. It regulates the dumping of wastes and other matter in Australian waters, including the seas around its External Territories - including Cocos (Keeling) Islands, Christmas Island and Norfolk Island. It repeals the *Beaches, Fishing Grounds and Sea Routes Protection Act 1932*. The Act applies to Australian vessels, aircraft and platforms in any part of the world's seas and to foreign vessels, aircraft and platforms in Australian waters. It is immaterial where the material comes from, whether from a land or a sea-based source, but rather how and where it is dumped. In general, if the material is loaded for dumping or is dumped from a platform, vessel or aircraft to an area below the low tide mark in Australian waters, then a permit is required. Currently DEH administers the *Environment Protection (Sea Dumping) Act 1981* and issues permits to dump material at sea. DEH has delegated authority under the Sea Dumping Act for sea dumping in all Australian waters. Within the boundaries of the Great Barrier Reef Marine Park (GBRMP), the Great Barrier Reef Marine Park Authority (GBRMPA) has both delegated authority under the Sea Dumping Act and legislative authority under the *Great Barrier Reef Marine Park Act 1975* for dredging and the disposal of the associated spoil²⁰.

Under section 9 of the *Environment Protection (Sea Dumping) Act 1981* (known as the Rollback Provision) States can legislate to control sea dumping in their adjacent three nautical miles of sea if the legislation conforms with Federal law and, hence, the London Convention²¹. This is a consequence of the 1979 Offshore Constitutional Settlement, an agreement between the Federal Government and State Governments whereby the States have full sovereignty in the first three nautical miles from their coast. The Commonwealth Act does not apply to dumping in waters within the limits of the Northern Territory or a State, that is within bays, gulfs and rivers. The following from the National Ocean Disposal Guidelines for Dredged Material (2002) is also relevant²². “The Sea Dumping Act does not apply to dumping, or loading for the purposes of dumping, where the associated dumping activities (and any impacts) are to occur entirely in waters within the limits of a State or the Northern Territory. The extent that waters are wholly within the limits of a State or the Northern Territory is determined according to law, including by reference to the 'Letters Patent' issued to State Governors at Federation in 1901. Such waters include rivers, the gulfs in South Australia, and bays such as Sydney Harbour and Port Phillip Bay. State and Territory Governments are responsible for regulating dredging and dumping activities that occur within such waters, and, in most instances, have additional requirements for

¹⁹ Sometimes referred to locally as the Sea Dumping Act which is not to be confused with the International London Convention.

²⁰ All proponents who wish to dredge or dispose spoil in the GBRMP should consult GBRMPA about potential direct or indirect impacts of their activities on the Marine Park. All proponents should also contact GBRMPA to obtain the most recent dredging and spoil disposal policy. GBRMPA's requirements for environmental impact assessment may be more rigorous than in other areas because of the Authority's responsibility to protect the values of the reef and its plants and animals. In particular, dredging and spoil disposal are unlikely to be approved if these activities may damage sensitive environments. If a permit is approved there may be additional restrictions associated with volume or environmental risk. For example, GBRMPA has a precautionary approach, that dredge spoil which is contaminated above the Maximum Levels defined in the Australia New Zealand Environment and Conservation Council (ANZECC) Ocean Disposal Guidelines for Dredged and Excavated Materials (2001), must not be disposed of within the GBRMP [from the National Ocean Disposal Guidelines for Dredged Material (2002), page 3].

²¹ Until 1990 Australia's territorial sea limit was three nautical miles (nm).

²² Page 6.

dredging and dumping that occurs within their adjacent coastal waters. Sea dumping proponents should therefore also refer to the relevant State or Territory authority, to determine the nature and scope of any approvals required under the laws of that State or Territory. As outlined in The *Environment Protection and Biodiversity Conservation Act 1999* section (see further), there may also be a requirement for approval under this Act, for dredging and dumping activities that occur within waters within the limits of a State or Territory”.

The primary consideration in granting a permit is the effect of the material on the marine environment. Environmental impact assessment is undertaken by DEH for each application. If the material proposed for dumping contains sufficiently low levels of contaminants, and if the proposed dumping site will minimise any environmental effects, then the dumping will comply with the *Environment Protection (Sea Dumping) Act 1981* and a permit may be granted by the Federal Government Minister²³ responsible for the environment or his/her Delegate. A permit is not necessary for emergency dumpings to secure the safety of life at sea (referred to as force majeure (see section 15(3) of the *Environment Protection (Sea Dumping) Act 1981*). Permits can allow for multiple dumpings and always specify the amount of material to be dumped, the dumping period and other environmental guidelines. Fines can be levied for dumping without a permit, or if the conditions of a permit are not adhered to.

Australia formally ratified the London Dumping Convention on 21 August 1985. As, previously mentioned, Australia's treaty practice is to ratify a treaty after domestic law, which is in agreement with the treaty, is enacted.

Amendments to the Environment Protection (Sea Dumping) Act 1981

There have been several amendments to the *Environment Protection (Sea Dumping) Act 1981*. The two most important changes were made in 1986 and 1993. After Australia had signed the South Pacific Nuclear Free Zone (SPNFZ) Treaty in 1985 the Australian Federal Government introduced legislation to ban all radioactive waste dumping. Although high level radioactive waste dumping had always been banned by the London Convention, low level waste dumpings were still permitted. The 1986 Australian amendment prohibited all radioactive waste dumpings and defined radioactive material as that having activity above 35 becquerels per gram. Eight years later, on 21 February 1994, the Contracting Parties to the London Convention decided to stop all radioactive waste dumpings internationally.

The 1993 amendments enable Australia to ratify the *Protocol for the Prevention of Pollution of the South Pacific Region by Dumping* to which Australia is a party (commonly referred to as the SPREP Dumping Protocol). This protocol is one of two protocols to the Convention for the Protection of the Natural Resources and Environment of the South Pacific Region, otherwise known as the SPREP Convention. This Convention seeks to protect and manage the marine and coastal environment of the South Pacific Region. To conform with the SPREP Dumping Protocol the geographical area covered by the *Environment Protection (Sea Dumping) Act 1981* was extended to cover the Continental Shelf where it goes beyond the Australian Fishing Zone. In addition organophosphorus compounds were added to the list of banned substances.

Other changes made to the *Environment Protection (Sea Dumping) Act 1981* made by the passage of the *Environment and Heritage Legislation Amendment Bill 2000* include (i) the Sea Dumping Act now applies to Australia's Exclusive Economic Zone (EEZ), rather than, as was previously the case, the Australian Fishing Zone. The current definition of Australian waters is

²³ Referred to as the Responsible Minister.

“Australian waters includes the territorial sea of Australia, any waters on the landward side of the territorial sea (other than waters within the limits of a State or the Northern Territory), and any waters on the seaward side of the territorial sea, out to the limits of the Exclusive Economic Zone (EEZ), or the continental shelf of Australia where it extends beyond the EEZ”²⁴ (ii) the Bill limited the defence force exemption, so that the Australian Defence Force are now required to comply with the Act, except in an emergency situation²⁵ and (iii) puts beyond doubt that the Commonwealth has the responsibility for regulating the construction of artificial reefs.

The Environment Protection and Biodiversity Conservation Act 1999²⁶

The *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act) has put in place a streamlined environmental assessment and approvals process, and establishes an integrated regime for biodiversity conservation and the management of important protected areas. In assessing a permit application under the Sea Dumping Act, the determining authority (currently DEH) must consider the requirements of Part 11 of the EPBC Act. Part 11 of the EPBC Act requires that an action which is the subject of a permit application under the Sea Dumping Act be assessed under Part 8 of the EPBC Act, if that action has, will have or is likely to have a significant impact on the environment. In circumstances where it is determined, in accordance with Part 11, that such an action requires an assessment under the EPBC Act, then the granting of a permit under the Sea Dumping Act will be subject to that assessment, and subsequent recommendations made in accordance with the Part 11²⁷.

Sea Dumping Activity off Australia

Under the auspices of the *Environment Protection (Sea Dumping) Act 1981*, 309 permits and 76 variations to a permit (a variation to a permit alters a condition imposed in a previously issued permit eg. it could alter the amount of material dumped or alter the dumping period; all other conditions in the original permit remain the same) have been issued²⁸ for dumpings in waters under Federal Government control. Most of the permits have been issued for dredge spoil. Other major categories (historically) include materials for the creation of artificial reefs and for the dumping of obsolete equipment and boats (see Table 1 and Appendix D²⁹).

²⁴ National Ocean Disposal Guidelines for Dredged Material (2002), page 3.

²⁵ See the Defence Forces section where it is noted, that in any case, a memorandum of understanding since 1986 between the Defence Forces and the body administering the *Environment Protection (Sea Dumping) Act 1981* has meant that all dumping has occurred in a manner consistent with the Sea Dumping Act.

²⁶ The following account is taken directly from the National Ocean Disposal Guidelines for Dredged Material (2002), pages 3 to 5.

²⁷ Where an action only includes activities for which an approval is required under the Sea Dumping Act (that is, dredging and sea dumping), a proponent is not required to separately refer that action under Part 7 of the EPBC Act. Rather, it will be the responsibility of the determining authority to decide, after consideration of the sea dumping permit application, whether an assessment is required under Part 8 of the EPBC Act, for the purposes of Part 11 of that Act. There may be circumstances, however, where an action will require assessment and approval under both the EPBC Act and Sea Dumping Act. Such circumstances will include a situation where (1) an action includes activities which will require approval under the Sea Dumping Act, and other activities that will not (eg a port expansion involving dredging, sea dumping, land reclamation and the construction of new berths) and (2) that action has, will have or is likely to have a significant impact on a matter of national environmental significance listed in Part 3. As the operation of the EPBC Act may vary depending on the circumstances of particular actions, it is advisable that proponents discuss proposed actions with the Department of the Environment and Heritage.

²⁸ March 1984 to May 2003. EPA 94/4945.

²⁹ To 23 November 1994 data collated by the authour, thereafter from the Annual Report of the Department of the Environment, Sport and Territories/ Department of the Environment and Heritage. Note that the list only includes permits that were issued. It is possible for a permit to have been issued but the item(s) not dumped due to whatever reason.

Australian State Governments have permitted an unknown number of dumpings in waters within the limits of their state, although they have been principally for dredge spoil and artificial reefs (South Australia, especially, has established a large number of tyre reefs in its two gulfs).

Database of pre Environment Protection (Sea Dumping) Act 1981 dumpings

A database³⁰ listing all known sea dumping episodes prior to the introduction of the *Environment Protection (Sea Dumping) Act 1981* has been compiled. The database only details specific dump events where a geographic coordinate is described. It describes the type of material dumped, the amount, date and coordinates. The data has been categorised under four broad and arbitrary headings, being chemicals (Appendix E), boats (Appendix F), ammunition (Appendix G) and a fourth being all dumpings not related to the first three categories (Appendix H). In some cases there is necessary overlap in the categorisation (eg: chemical/ammunition) and the dump event could have been placed in either group. The four categories are presented in four spreadsheets and the data is presented in chronological order. It is important to know where any hazardous material may lie, both to prevent human contact and to assess the possible ecological consequences.

As there is now only limited sea dumping activity most of the data is based on old records. It is based on a variety of Federal Government records, many being secondary records having an unknown source of origin. During the compilation of these secondary records transcription errors may have occurred. Without Global Positioning Systems being available, the dump coordinates are necessarily less accurate than today. Under the influence of currents the dumped material could have drifted from its surface position. Moreover the items may well now be buried or may not even exist having totally dissolved, rotted or corroded. Some of the items have 2 conflicting coordinates possibly due to transcription errors. Gross errors were quickly discounted. Otherwise previous dumping patterns were used to discriminate the most likely coordinate. In the case of scuttled vessels, non-Government data such as that sourced by Maritime Historians can exist. Data submitted under the *Beaches, Fishing Grounds and Sea Routes Protection Act 1932* was used when in conflict (see also Parsons & Plunkett 1995).

In conclusion, many of these records are simply unverifiable. Short of diving on these items and using Global Positioning Systems the detail and coordinates can only be thought of as indicative and not absolute.

The spreadsheets contain all or some of the following field headings:

1. Material
2. Registered boat name (for maritime history of the boats refer *Scuttled and Abandoned Ships in Australian Waters* which is reproduced in this report)
3. State off which the material was dumped
4. Quantity
5. Description of the material
6. Whether item is a submarine
7. Whether item is part of an artificial reef
8. Date(s) of dumping
9. Dump coordinates (D=degrees, M=minutes, S=seconds; two or three lots of latitude/longitude)

³⁰ The database was first published on the Royal Australian Navy Hydrographic Office web site (<http://www.hydro.gov.au>) in Notices to Mariners, January 2000 where an electronic copy is still available.

coordinates indicates the material was dumped in a line marked by these coordinates, four denotes the material was dumped within a boundary marked by the coordinates). The following datums apply; to 1966 - Clarke; 1966 to the early 1990s, ADG66 and thereafter GPS (Global Positioning System) WGS84³¹.

10. Buffer which defines a circle around the given coordinate (nm=nautical miles and km=kilometres), anywhere, within which the item may have been dumped

11. Depth where f=fathoms and m=metres (please note that what is now considered as "shallow water" was viewed differently when these dumpings took place eg: for fishing trawlers operating in the early 1970s, a depth over 120 metres was considered as "very deep water". Nowadays, however, trawlers work in depths to 1000 metres and material dumped decades before can be accidentally recovered).

All the databases combined have been plotted³² and are presented in Appendix L, Appendix M and Appendix N. As can be seen, most of the dumping sites were concentrated at sites near the major ports where the material was loaded for dumping.

Dredge Spoil (and the National Ocean Disposal Guidelines for Dredged Material)

It has already been noted that virtually all current permits for sea dumping are for uncontaminated dredge spoil (see Table 1). Dredging is required in all Australian States. In the northern ports a proportion of this dredging remedies the effects of cyclones which occur at these latitudes.

According to its status as the predominant dumping permit, DEH has produced the *National Ocean Disposal Guidelines for Dredged Material*³³. It assists permit applicants under the Sea Dumping Act, by providing a comprehensive framework for the assessment of the environmental impacts from the disposal at sea of dredged material, in accordance with that Act, other environmental protection legislation (including the *Environment Protection and Biodiversity Conservation Act 1999*) and Australia's international obligations. Public consultation on the National Ocean Disposal Guidelines was conducted between December 2000 and April 2002. Comments received through that consultative process were taken into account in the production of the Guidelines. The Guidelines build upon and replace the *Australian and New Zealand Environment and Conservation Council Interim Ocean Disposal Guidelines*, December 1998.

Under the Guidelines, Australia has developed a decision tree approach for assessing sediment contamination comprising four phases: evaluation of existing information (Phase I); sampling and analysis of dredge spoil (Phase II); bioavailability and acute toxicity testing (Phase III); and comprehensive sub-acute/chronic toxicity testing (Phase IV). The Guidelines also set out a framework for offshore disposal site selection, assessment, management and monitoring. In all cases, impacts on water quality, marine species, environmentally sensitive sites, marine resources, (including fisheries and geological resources), marine infrastructure (including outfalls, cables and pipelines, and monitoring stations), native title interests, the general amenity of the marine environment and other legitimate uses of the sea must be assessed. Dredging and spoil disposal may be prohibited or restricted in protected areas such as Marine Parks or Aquatic Reserves. The Guidelines are not intended to provide mandatory or inflexible standards, but rather a comprehensive best practice framework that the determining authority expects to be

³¹ Mark Bolger pers. comm.

³² The maps were first published on the Royal Australian Navy Hydrographic Office web site (<http://www.hydro.gov.au>) in Notices to Mariners, January 2000. Plotted in Mapinfo 6 some points represent multiple dumps.

³³ The following account comes from these guidelines, pages 3, 13 & 14.

adhered to, unless it is demonstrated by a proponent that an alternative approach is appropriate, or necessary. These Guidelines reflect Australia's commitment to longer term permitting arrangements under the Sea Dumping Act. This will provide proponents with greater certainty and facilitate opportunities for more strategic financial, operational and technical planning.

Consultation with relevant stakeholders should be undertaken by the proponent prior to submission of the application. This may involve the use of a Technical Advisory and Consultative Committee (TACC). A TACC is intended to assist the determining authority and the proponent in protecting the local environment and reconciling various stakeholder interests. Membership is drawn from relevant Commonwealth, State and Local Government and non-Government organisations with expertise, responsibilities or an interest in the subject matter.

Until recently, most permits authorising the dumping, and the loading for the purposes of dumping, of dredged material derived from maintenance dredging, were issued on an annual basis. DEH has now established procedures for applicants to obtain longer term permits, with an increasing number of those permits issued for a term of five years. Longer term permitting arrangements provide greater certainty to proponents and assist with more effective and efficient administration of the Sea Dumping Act.

Chemical and Industrial Waste

Under the *Environment Protection (Sea Dumping) Act 1981* permits issued include those for 'black liquor', a waste product in the paper making industry (three permits were issued for a total of 65,000 tonnes, the last being on 13 January 1986 for 30,000 tonnes) and spent caustic soda (for which two permits were issued for a total of 4,800 tonnes, the last being on 23 December 1986 for 2,800 tonnes). The last permit for industrial waste was for jarosite, a waste product from a zinc smelter in Hobart. It was issued 1 November 1995. There will be no further permits issued for industrial waste as such materials are now not permitted to be dumped under the London Convention (see also Appendix D).

Records of chemical dumpings before March 1984 are limited. The earliest recorded dumping where the amount dumped, the date and the location of dumping is known, was made in 1939 for p-nitrochlorobenzene³⁴. Most of the known chemical dumpings occurred from the mid 1960s to early 1980s (see Appendix E). The figures in Appendix I show the chemical dump sites. Some of the drums of chemicals have posed, and could still pose, a problem for trawling vessels or for sea mining etc. On 18 April 1973 a fishing vessel trawling in 115 fathoms, 15 to 18 miles east of Sydney, snared twelve 44 gallon drums³⁵. The contents of the drums, vinyl chloride tar (contaminated hydrocarbons), covered the deck of the boat and the fish catch. In 1983 a vessel trawling east of Brisbane trawled a 1 ton cylinder of mustard gas³⁶, this being part of the 21,030 tons of chemical warfare agents dumped in Australian waters at the end of World War II (examined in Plunkett 2003 – *Chemical Warfare Agent Sea Dumping off Australia* which is reproduced at the back of this report).

³⁴ Letter marked M49/195/1/589 and dated 31 May 1949 from Master of the vessel responsible for the dumping. EPA 94/6789.

³⁵ Transcription of ABC "Four Corners" program, 23 August 1972. EPA 94/6789.

³⁶ Courier Mail Newspaper, Queensland - 31 August 1983.

In the past, choices for disposal of industrial waste and spent chemicals were limited to landfill, sea dumping or incineration. Sea dumping was preferred as landfill posed obvious environmental hazards (and precluded some future uses of the land). Sea dumping was also inexpensive.

Incineration at Sea

Incineration of wastes at sea has occurred off Australia in compliance with the London Convention. In December 1982 and January 1983, vinyl chloride manufacturing wastes (4,660 tonnes) and PCB wastes (215 tonnes) were incinerated by the American owned vessel, the MT "Vulcanus" which travelled to Australia for this purpose³⁷. The "Vulcanus" undertook the burning 200 nautical miles off the south east coast of Australia. PCB importation to Australia is now banned and a management plan to establish conditions under which environmentally sound ways (excluding sea dumping) of destroying the stocks may proceed has been developed. Incineration at sea of industrial waste is now banned by the London Convention.

Artificial Reefs

From the mid 1960s artificial reefs were constructed with increasing success (see Pollard 1989 for a good introduction to artificial reefs in Australia). At least 74 boats have been dumped for this purpose³⁸. Artificial reefs have been placed for two primary reasons, for fish attracting devices (used by anglers) and for recreational divers, but consideration should also be given to other environmental outcomes, aside from recreational and or fishing ones. A variety of materials have been used including vessels, tyres bound together, pipes, car bodies and other waste material. One of Australia's largest artificial reefs (although not under Federal Government control) is the Hervey Bay Artificial Reef off Woody Island, Queensland. At the Hervey Bay Reef there have been 66 sea dumping episodes between 1968 and 1990³⁹. Material dumped includes seven boats, 500 tons of cement pipes and slabs, some 10,000 tyres as singles and bound, 250 gas stoves, 400 pre-drying racks and 2,600 car bodies. The Curtin Artificial Reef at Moreton Bay, Queensland, has nineteen vessels, nine navigation buoys, 5,000 tyres⁴⁰, 60 car bodies (now rusted away), 36 steel pontoons, seven tonnes of concrete pipes and 57 tonnes of concrete dolphin⁴¹.

The placement and construction of Artificial Reefs are regulated under the Commonwealth *Environment Protection (Sea Dumping) Act 1981* (the Sea Dumping Act). An application for a permit to create an artificial reef must be obtained from, DEH or the Great Barrier Reef Marine Park Authority. Additional permits may also be required under relevant State or Territory legislation⁴².

³⁷ EPA 94/6789.

³⁸ 1967 to July 2002. EPA 94/4945, EPA 94/6943, EPA 94/6790, EPA 94/7319, EPA 94/6944 and EPA 94/6792. See also Parsons and Plunkett (1995).

³⁹ F Grant (pers. comm.). EPA 94/4945.

⁴⁰ A total of 195,700 (to November 1994) bound tyres have been placed at several locations in the Gulf waters of South Australia. Tyres are not now regarded as a suitable material for an artificial reef in Australian waters.

⁴¹ D Lennon (pers. comm.). EPA 94/4945.

⁴² The Artificial Reef Fact Sheet on the DEH website, <http://www.deh.gov.au>, details the resource considerations, site choice, materials needed, layout and long term monitoring requirements that applicants must consider (see also Appendix D).

Vessels

Many hundreds of obsolete vessels have been sea dumped or abandoned off Australia. In *Scuttled and Abandoned Ships in Australian Waters* (which is reproduced at the back of this report) Parsons and Plunkett (1995) have detailed the maritime history of the identified vessels deliberately dumped at sea. Included are obsolete vessels scuttled in the designated "Graveyard" sites of the *Beaches, Fishing Grounds and Sea Routes Protection Act 1932*. Although some of the "Graveyard" sites have been little used, the sites off Sydney Heads (New South Wales), near Rottnest Island (Western Australia) and near Barwon Heads (Victoria) have been heavily utilised. The ships dumped at each of these "Graveyard" sites are listed in Appendix B. Due to the availability of shipping registers and the work of maritime archaeologists in each State, knowledge of ship dumping for this century is relatively comprehensive. Refer to Appendix F for a listing of all boats that are known to have been sea dumped.

Although not technically sea dumping, some boats have been sunk by enemy action. They can be considered as deliberate sinkings. We can note here forty eight boats and three submarines that have been sunk by mines, torpedoes or bombed during the two World Wars. The heaviest casualties occurred on 19 December 1942, when a Japanese air raid sank ten vessels in, or very close to, Darwin Harbour⁴³. Of the ten submarines sunk, six obsolete subs were scuttled in Victorian waters between 1926 and 1930, one was scuttled near Perth in 1952, two Japanese midget subs were sunk in action near Sydney (World War II) and one sub was sunk in the Northern Territory (also World War II)⁴⁴.

The first boat scuttled to form an artificial reef was in October 1967⁴⁵ (see Pollard 1989). Since then an increasing number have been placed in shallow water eg: seven at the Hervey Bay Artificial Reef and nineteen at the Curtin Artificial Reef. Since the coming into force of the *Environment Protection (Sea Dumping) Act 1981*, most of the vessels that have been sunk were for artificial reefs, either for recreational divers or to enhance fishing (refer Appendix D). A condition of each permit is that the vessel be cleaned and stripped of floatable material. Sea dumping of old vessels in deep water is now discouraged and only permitted if this is the only practical means of disposal eg: it was deemed impractical to return the "Nella Dan" (which ran aground and was damaged beyond repair at Macquarie Island) to Australia.

The use of old boats for breakwaters has been a common practice all this century. In 1984, a boat was added to the Tangalooma breakwater in Queensland, a breakwater started in 1963 to provide shelter for small craft on the Moreton Island foreshore. Controlled by the Queensland Government, it contains at least fifteen boats⁴⁶.

Defence Forces

The *Environment Protection (Sea Dumping) Act 1981* does not apply in relation to a vessel or aircraft belonging to the Australian Defence Force, when it is being used in a situation of armed conflict or in an emergency situation other than a situation of armed conflict. The Act also does not apply in relation to a vessel or aircraft belonging to the naval, military or air forces of a foreign country. A memorandum of understanding since 1986 between the Defence Forces and the body administering the *Environment Protection (Sea Dumping) Act 1981* has meant that all dumping must occur in a manner consistent with the Sea Dumping Act.

⁴³ EPA 94/6943. See also Parsons and Plunkett (1995).

⁴⁴ EPA 94/4945.

⁴⁵ Some records indicate September 1967. EPA 94/4945.

⁴⁶ EPA 94/4945. See also Parsons and Plunkett (1995).

Until the early 1970s, obsolete ammunition and equipment was regularly dumped by or on behalf of all three Australian forces, Navy, Airforce and Army⁴⁷. As was the case for hazardous chemicals wastes, the options for ammunition disposal were limited. Disposal on land had inherent dangers and destruction was difficult and costly. Dumpings occurred frequently at the end of World War II to eliminate old war stocks (this included obsolete war planes dumped off Sydney). Again, exact dumping figures are difficult to locate, although it is known that by the early 1970s, some 23,000 tons of ammunition had been dumped by the Department of Supply (former suppliers for the forces) off the North Queensland coast⁴⁸.

The ammunition⁴⁹ (historically including shells, cartridges, fuses, projectiles, guns, missile parts, pistols, mortar bombs, markers, rifles, flares, igniters, depth charges, bombs, plastic explosive, grenades, detonators, bayonets and smoke floats) was dumped, packaged or unpackaged (sometimes counterweighted), at a variety of depths (refer to Appendix G for details and Appendix K for a visual presentation of dumping patterns). Other material included old medical stores, scrap metal, tyres, boats and other surplus or obsolete material. Originally, the Navy appears to have dumped at depths greater than 549 metres (300 fathoms), but then switched to depths greater than 915 metres (500 fathoms) after trawlers working at the 300 fathoms limit had snared ammunition in their nets. Other dumpings are known to have occurred at lesser depths eg: 183 metres (100 fathoms), including the 1945 dumpings off Sydney as mentioned above. Historical exercise areas for gunfire and torpedo practice include Hervey Bay, Jervis Bay, Fremantle, Port Hobart, Port Phillip and Port Jackson.

Most of the ammunition dumping seems to have stopped in 1973. A few episodes are known since then, including two small dumpings in 1981 and two dumpings off Flinders Island, in 1989 and 1992 respectively⁵⁰.

Human Bodies

A total of 29 permits for sea burial of human bodies have been issued from 1984 to May 2003 (see Appendix D). Burials at sea are chosen for a variety of reason eg: by sailors, anglers or those with an affinity for the sea. The practice employed for this purpose is modelled on that already specified for use by ships at sea and includes appropriate ballast provisions as well as the selection of areas away from fishing.

Sea Dumping Activity off Australia's External Territories

Antarctica⁵¹

From the start of Australia's expeditions in the mid 1950s, solid waste generated at the Antarctic stations was usually deposited at tip sites on land. Occasionally in winter, when sea ice conditions allowed, waste materials were taken from the stations and left on the sea ice where they would eventually disperse into the sea. This practice declined with the introduction of high

⁴⁷ EPA 94/7012. A number of LST (Landing Ship Tank) vessels (eg; 3014, 3017 and others) involved with the dumping of ammunition maintained a record of their dumping activities (if not always detailing the exact dump coordinates). The files are held by the Australian War Memorial (Canberra) and National Archives and can be found by using the keywords "dumping ammunition" and "dumping sea" on the records search site at <http://www.naa.gov.au>.

⁴⁸ Newspaper article, West Australian, 8 August 1972. EPA 94/6789.

⁴⁹ EPA 94/7012.

⁵⁰ EPA 94/4945.

⁵¹ Communication from Antarctic Division, Department of the Environment, Sport and Territories, dated 2 November 1994. EPA 94/6789.

temperature incinerators but some non-combustible wastes were disposed of in this way until 1985. The disposal on the sea ice of organic waste (food scraps) and ash ceased at Casey in 1986 and at Mawson and Davis in 1987⁵². There are no records of the volume, composition or location of materials disposed this way. It was generated by a couple of dozen staff over winter. All solid waste is now incinerated on site or brought back to Australia in accordance with legislation implementing the Protocol on Environmental Protection to the Antarctica Treaty (the Madrid Protocol).

Small quantities of waste are also generated aboard Antarctic vessels. Some Antarctic vessels dumped waste north of 60 degrees South before 1988. Since 1988 only macerated food scraps (excluding poultry products) have been dumped. With the current supply boat, all waste is either burnt or returned to Australia. In February 1988 remnants of a few 200 litre drums and some debris from a derelict research station at Atlas Cove was jettisoned off a boat near Heard Island.

Macquarie Island⁵³

Boats were known to have dumped rubbish from field huts four to five times, about 0.5 miles off the east and west coast (1970s to early 1980s). Rubbish was placed in 44 gallon drums, burnt and then dumped. Re-supply vessels also dumped food scraps just off the island. This practice stopped in the mid 1980s⁵⁴.

Norfolk Island

There is no sea dumping as defined by the *Environment Protection (Sea Dumping) Act 1981* undertaken off Norfolk Island. Waste is either incinerated or some is pushed off the land into the sea.

Cocos (Keeling) Islands

The Federal Government has issued several permits to dump in the sea off Cocos (Keeling) Islands. One was in December 1987 for 65 pieces of obsolete equipment and another was in December 1991 for more obsolete equipment including old vehicles (stripped and cleaned) and aeroplane parts. A permit issued in 1992 allowed for the dumping of 30 tonnes of machinery and vehicles (this permit was varied in 1993 to allow the disposal of car bodies, pipes and other material)⁵⁵. More recently, a permit was issued to allow the disposal of several boats that posed a quarantine problem.

Christmas Island

Several permits have been issued to dispose of boats that posed a quarantine problem (refer Appendix D).

⁵² At Mawson Station the original tip site was near the shore and, occasionally, accumulated materials were pushed into the sea affecting some 20 to 30 metres of the shoreline. This practice has been discontinued and some of the material has been recovered. Consistent with the Madrid Protocol, secondary treated grey water and other residues of the sewage treatment systems are disposed of in the sea.

⁵³ Macquarie Island is technically not an external territory but, rather, a part of Tasmania. It has been included here for convenience.

⁵⁴ EPA 94/6789.

⁵⁵ To November 1994. EPA 94/4945.

For Norfolk Island, Cocos (Keeling) Islands and Christmas Island waste minimisation schemes have been developed. Sea dumping remains, for the near and immediate future, a continuing practice at Cocos (Keeling) Islands for the disposal of non-combustible waste (mainly metallic) which is not able to be diverted from disposal by waste minimisation strategies.

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Acknowledgments

All papers are collaborative efforts, this more so than most. The following persons generously provided data and/or advice: Rebecca Bladon, Rachel Hockey, Lee Davey, Shaun Andrews, David Tait, Ian Lambert, Allan Haines, Ian Robertson, David Power, Serena Fulford-Smith, Neil Street, Dennis Ayliffe, Mark Bolger, Frank Grant, Rod Niven, Gary Doburn, Senka Kajtez-Mathews, John Baylis, Steve Foster, Luc Vuong, Elizabeth Kwok, Tom Sullivan, David Lennon, Peter Crawford, Tim Willmington, Brian Wagstaff, Edward Smith, Gavin Wright, Steve Kerr, Steve Blake, Mark Hyman, Barry Carbon, Louise Emmett, Filomena Barzi, David Ramm, David Pollard, Kevin Branden, John Armstead, Buzz Rastapopoulos, Denise Alexander, Peter Shipp, Rene Mouchet, Ian Woolard, Geoff Copson, G Martin, Christine Yeats, Helge Pedersen, and Dick Knoop.

I am indebted to Bernie Dawes, David Bishop, Tim Riley, Lynne Curnow, Frank Ziolkowski and John Gordon-Smith for making sense of my earlier drafts. An especial thanks goes to Narelle Blackaby who somehow tracked down crucial fifty year old Commonwealth files to Wayne Furler who allowed me to do the project in tandem with other duties.

In updating the original report and bringing it to publication, I would like to thank the following Department of the Environment and Heritage staff, Edward Kleverlaan and Dionne Cassanell.

TABLE 1

TYPE AND NUMBER OF PERMITS AND VARIATIONS OF A PERMIT ISSUED BY THE FEDERAL GOVERNMENT⁵⁶

Type of material dumped	Number of permits issued	Variations of a permit
Ammunition	2	-
Chemicals/Industrial waste/Obsolete equipment ⁵⁷	21	4
Dredge spoil	158	60
Fish waste	2	-
Food scraps	1	-
Human bodies	29	-
Jarosite	10	-
Materials for artificial reefs	36	2
Treated water	2	-
Vessels ⁵⁸	27	10

⁵⁶ March 1984 to May 2003.

⁵⁷ Including demolition materials.

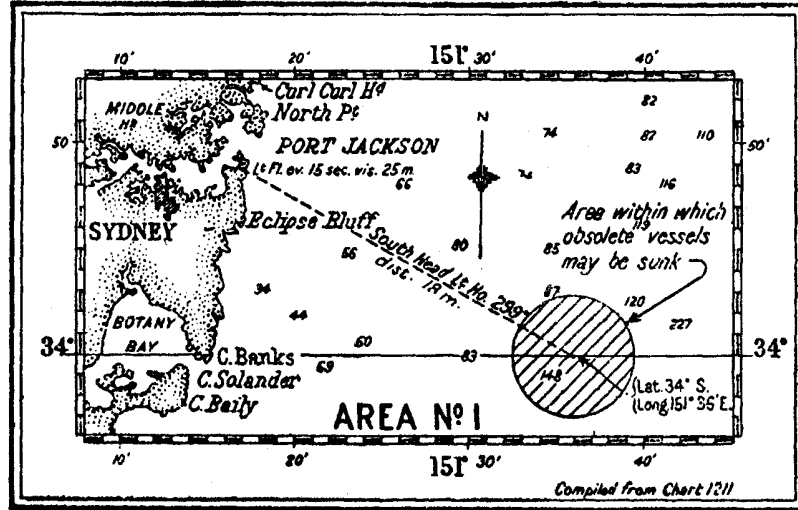
⁵⁸ Not included in artificial reefs.

Appendix A - Dump sites as designated by the *Beaches, Fishing Grounds and Sea Routes Protection Act 1932*

SCHEDULE II.

AREAS IN WHICH, WITH THE PERMISSION OF THE DEPUTY DIRECTOR, VESSELS MAY BE SUNK AT SEA.

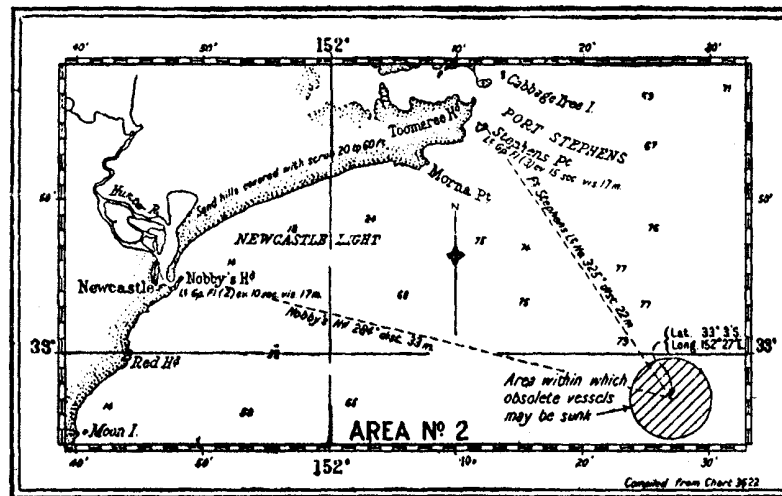
AREA No. 1.—FOR SYDNEY.



Outside the 100 fathom line within a circular area 5 miles in diameter with centre in latitude 34° 0' S., longitude 151° 36' E., with South Head Lighthouse bearing 299° distant 18 miles.

Area 1 -Outside the 100 fathom line within a circular area 5 miles in diameter with centre in latitude 34 deg 0 min S., Longitude 151 deg 36 min E. with South Head Lighthouse bearing 299 deg distant 18 miles.

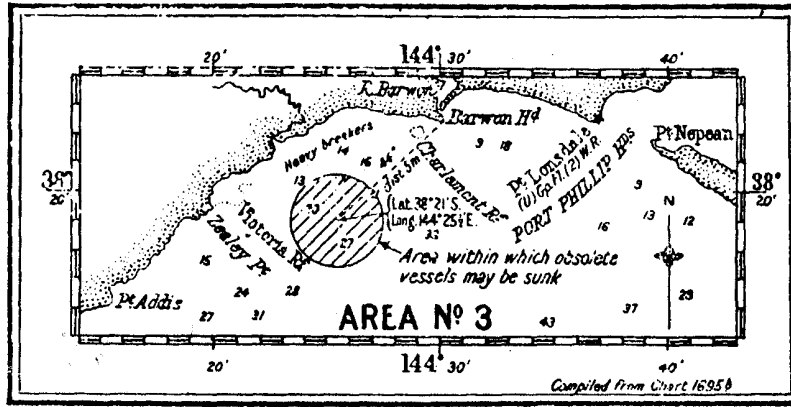
AREA No. 2.—FOR NEWCASTLE.



Outside the 100 fathom line within a circular area 5 miles in diameter with centre in latitude 33° 3' S., longitude 152° 27' E., 104° distant 33 miles from Nobby's Head. Port Stevens Lighthouse distant 22 miles, with high land of Toomere Head bearing 326°.

Area 2 - Outside the 100 fathom line within a circular area 5 miles in diameter with centre in latitude 33 deg 3 min S., longitude 152 deg 27 min E., 104 deg distant 33 miles from Nobby's Head. Port Stevens Lighthouse distant 22 miles, with high land of Toomere Head bearing 326 deg.

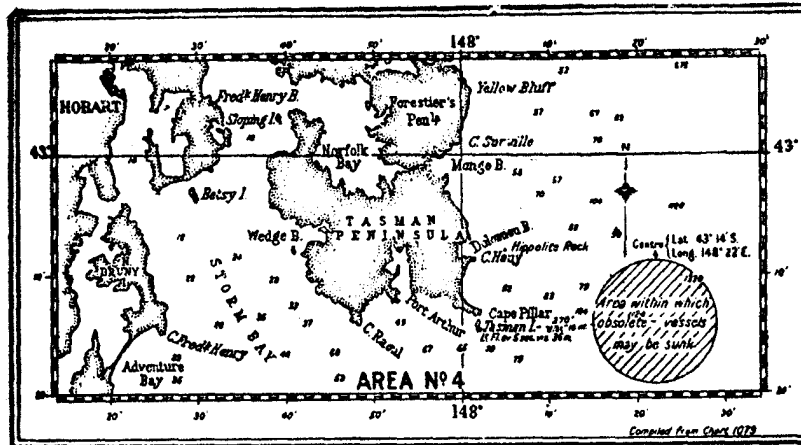
AREA No. 3.—FOR MELBOURNE AND GEELONG.



In about 25 fathoms within a circular area 3 miles in diameter, with centre in latitude $38^{\circ} 21' S.$, longitude $144^{\circ} 25\frac{1}{2}' E.$, with Barwon Head bearing 46° distant 5 miles.

Area 3 - In about 25 fathoms within a circular area 3 miles in diameter, with centre in latitude 38 deg 21 min $S.$, longitude 144 deg 25.5 min $E.$ with Barwon Head bearing 46 deg distant 5 miles.

Area No. 4 - For Newcastle

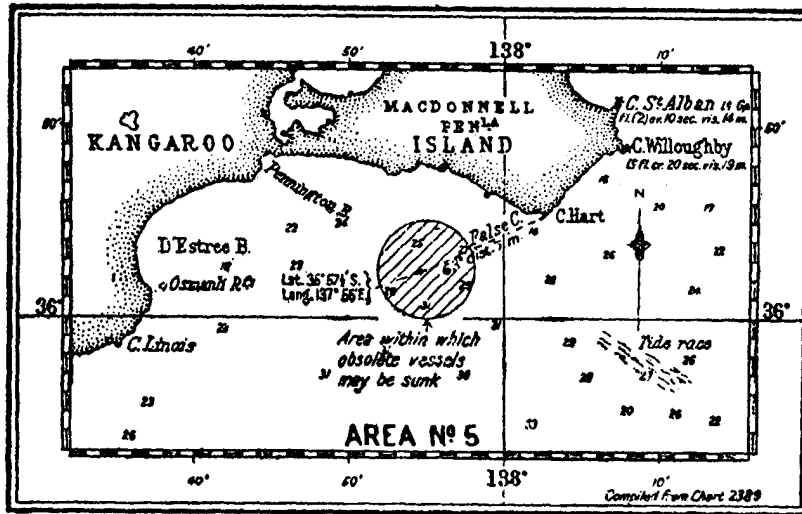


Outside the 100 fathom line with a circular area 5 miles in diameter with centre in latitude $43^{\circ} 14' S.$, longitude $148^{\circ} 22' E.$, Tasman Island Lighthouse bearing 270° distant 15 miles.

NOTE.—The sinking area within the Hobart port limits is on the edge of the reef at the south end of Betsy Island situated to the eastward of the entrance to the Derwent River.

Area 4 - Outside the 100 fathom line with a circular area. 5 miles in diameter with centre in latitude 43 deg 14 min $S.$, longitude 148 deg 22 min $E.$, Tasman Lighthouse bearing 270 deg distant 15 miles. **NOTE.**—The sinking area within the Hobart port limits is on the edge of the reef at the south end of Betsy Island situated to the eastward of the entrance to the Derwent River.

AREA No. 5. FOR ADELAIDE AND GULF PORTS.

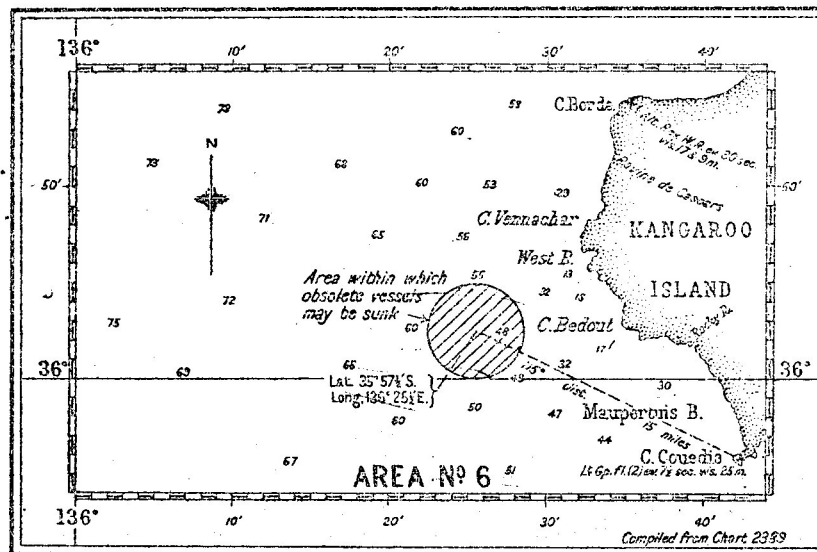


Within either of the following areas:—

No. 5 (Eastern Area).—South of Macdonnell Peninsula in 26 fathoms within a circular area 5 miles in diameter with centre in latitude $35^{\circ} 57\frac{1}{2}'$ S., longitude $137^{\circ} 55'$ E., Cape Hart bearing 63° distant 7 miles.

Area 5 - (Eastern Area).—South of Macdonnell Peninsula in 26 fathoms within a circular area 5 miles in diameter with centre in latitude 35 deg 57.5 min S., longitude 137 deg 55 min E, Cape Hart bearing 63 deg distant 7 miles.

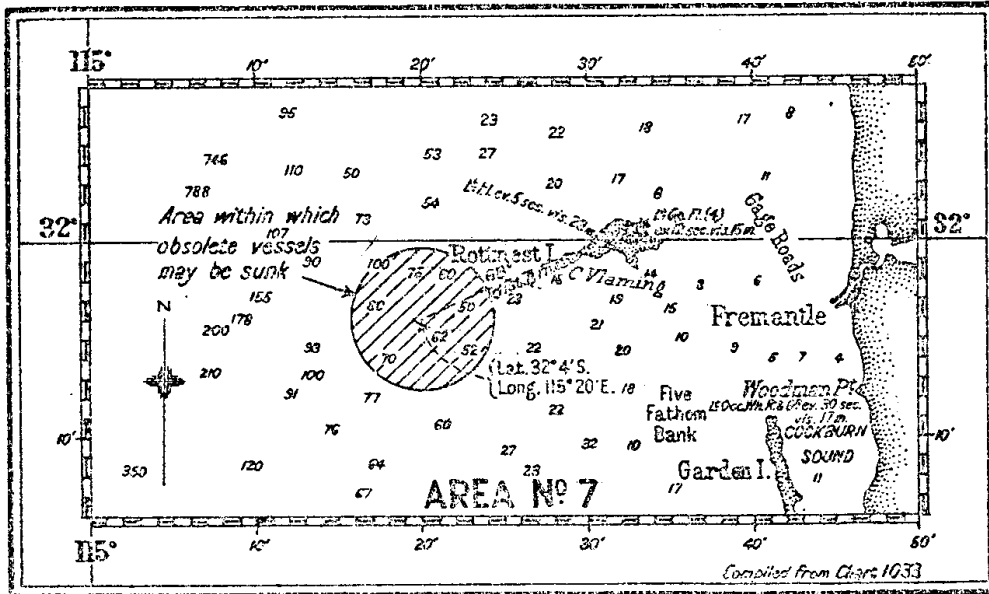
Area No. 6 - For Adelaide and Gulf Ports



No. 6 (Western Area).—West of Kangaroo Island in 50 fathoms within a circular area 5 miles in diameter with centre in latitude $35^{\circ} 57\frac{1}{2}'$ S., longitude $136^{\circ} 25\frac{1}{2}'$ E., Cape Couedie bearing 115° distant 15 miles.

Area 6 - (Western Area).—West of Kangaroo Island in 50 fathoms within a circular area 5 miles in diameter with centre in latitude 35 deg 57.5 min S, longitude 136 deg 25.5 min E., Cape Couedie bearing 115 deg distant 15 miles.

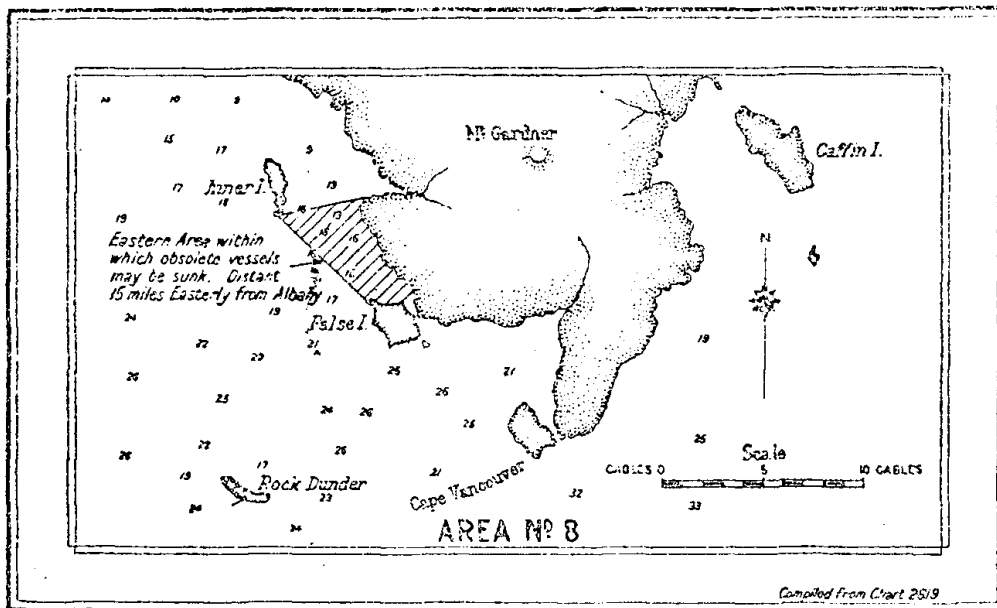
AREA NO. 7.—FOR FREMANTLE.



Within a circular area 7 miles in diameter with centre in latitude 32° 4' S., longitude 115° 20' E., with Rottnest Island Lighthouse bearing 68° distant 11 miles.

Area 7 - Within a circular area 7 miles in diameter with centre in latitude 32 deg 4 min S, longitude 115 deg 20 min E., with Rottnest Island Lighthouse bearing 68 deg distant 11 miles.

AREA NO. 8 FOR ALBANY.



Area 8 - Eastern Area near Cape Vancouver—Within an area bounded by: To the westward—by a line between the south end of Inner Island and the north end of False Island. To the northward—by a line between the south end of Inner Island and the nearest part of a mainland. To the eastward—by the mainland. To the southward—by the northern shore of False Island.

Within either of the following areas:—

No. 8.—Eastern Area near Cape Vancouver—

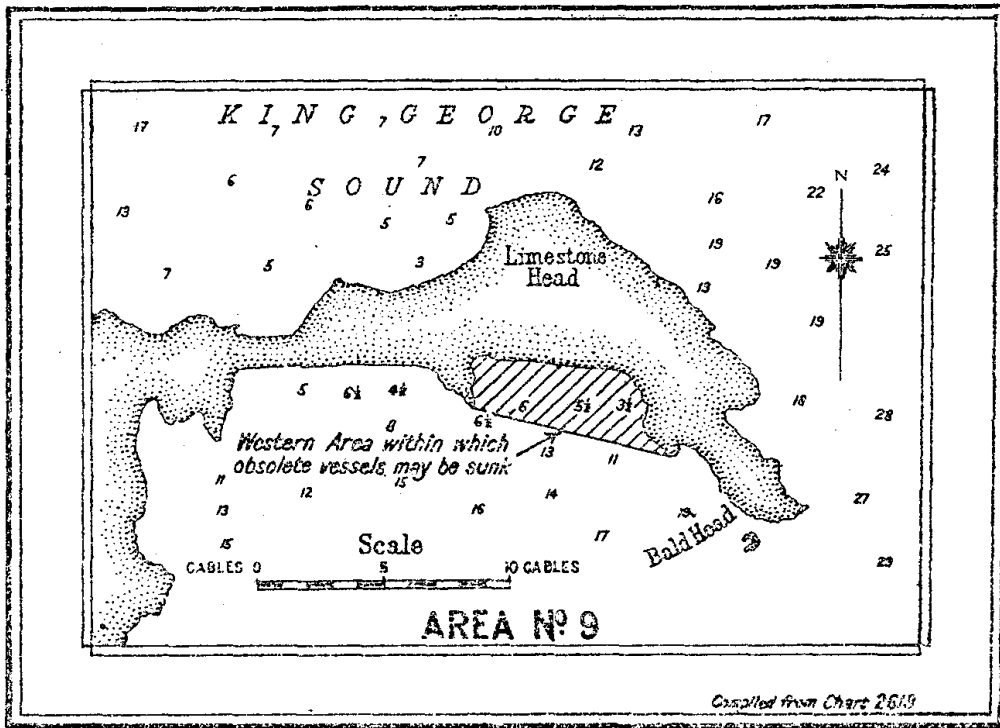
Within an area bounded—

To the westward—by a line between the south end of Inner Island and the north end of False Island.

To the northward—by a line between the south end of Inner Island and the nearest part of mainland.

To the eastward—by the mainland.

To the southward—by the northern shore of False Island.

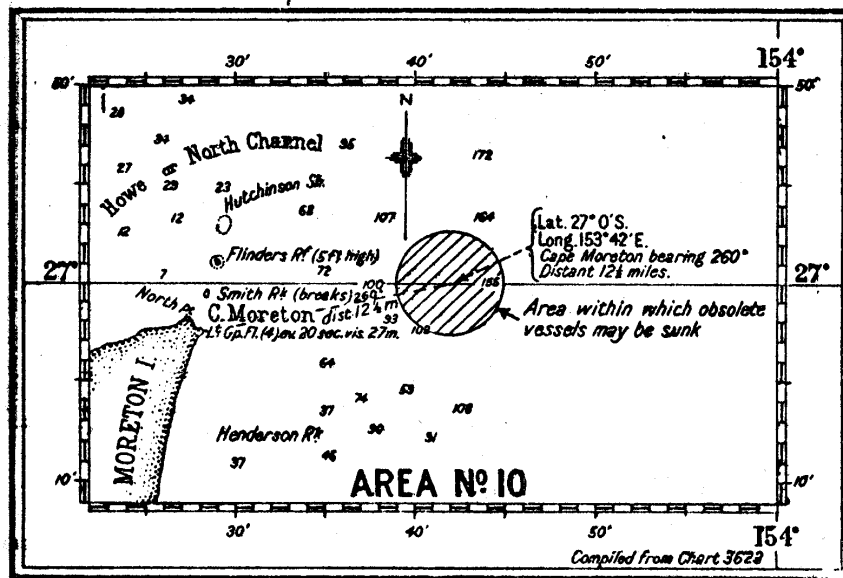


No. 9.—Western Area near Bald Head—

North of a line between the headlands of the Middle Bay (unnamed on chart 2619). South of the summit of the Limestone Head Peninsula.

Area 9 - Western Area near Bald Head- North of a line between the headlands of the Middle Bay (unnamed on chart 2619). South of the summit of the Limestone Head Peninsula.

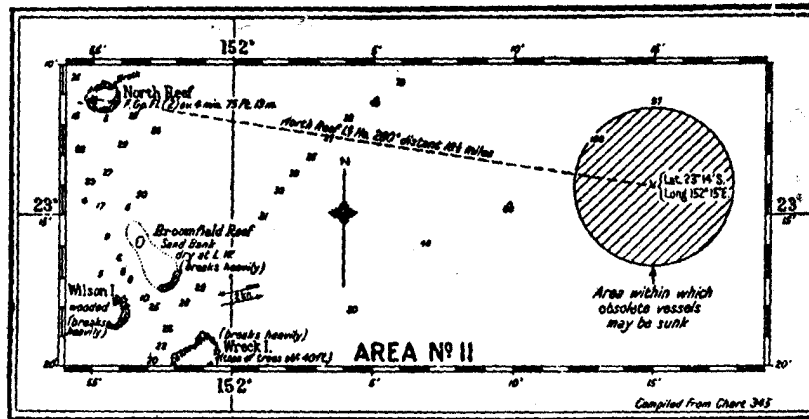
AREA NO. 10.—FOR BRISBANE.



Outside the 100 fathom line within a circular area 5 miles in diameter with centre in latitude 27° S., longitude 153° 42' E., with Cape Moreton Lighthouse bearing 260° distant 12½ miles.

Area 10 - Outside the 100 fathom line within a circular area 5 miles in diameter with centre in latitude 27 deg S., longitude 153 deg 42 min E., with Cape Moreton Lighthouse bearing 260 deg distant 12.5 miles.

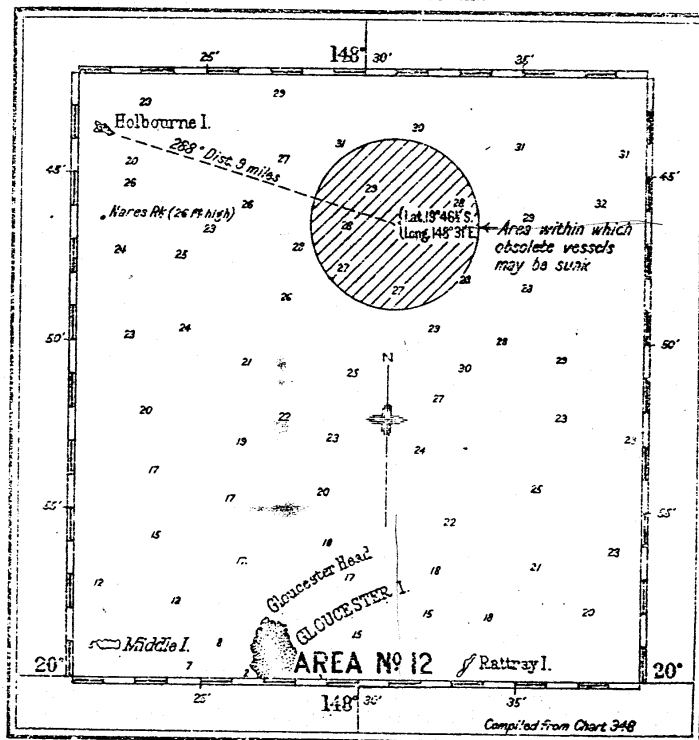
AREA No. 11.—FOR ROUHAMPTON.



Outside the 100 fathom line within a circular area 5 miles in diameter with centre in latitude 23° 14' S., longitude 152° 15' E., with North Reef Lighthouse bearing 280° distant 18½ miles.

Area 11 - Outside the 100 fathom line within a circular area 5 miles in diameter with centre in latitude 23 deg 14 min S., longitude 152 deg 15 min E., with North Reef Lighthouse bearing 280 deg distant 18.5 miles.

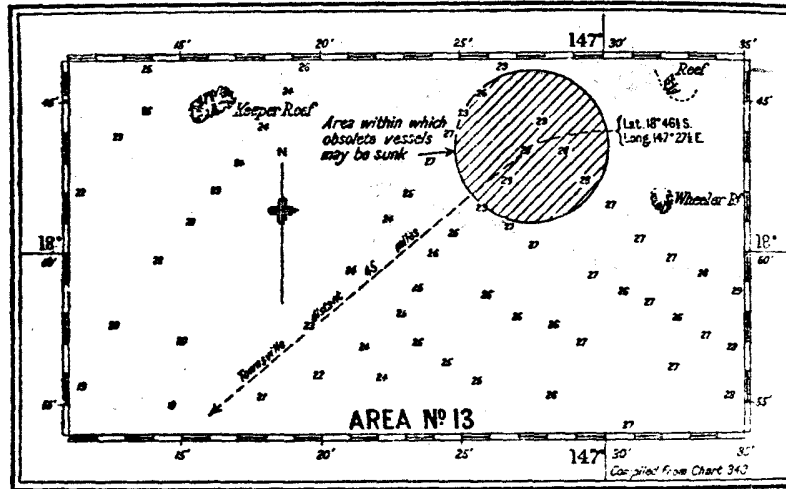
AREA No. 12.—FOR BOWEN.



In 28 fathoms within a circular area 5 miles in diameter with centre in latitude 19° 46½' S., longitude 148° 31' E., with Holborne Island bearing 288° distant 9 miles and Gloucester Head bearing 198° distant 12½ miles.

Area 12 - In 28 fathoms within a circular area 5 miles in diameter with centre in latitude 19 deg 46.5 min S, longitude 148 deg 31 min E., with Holborne Island bearing 288 deg distant 9 miles and Gloucester Head bearing 198 deg distant 12.5 miles.

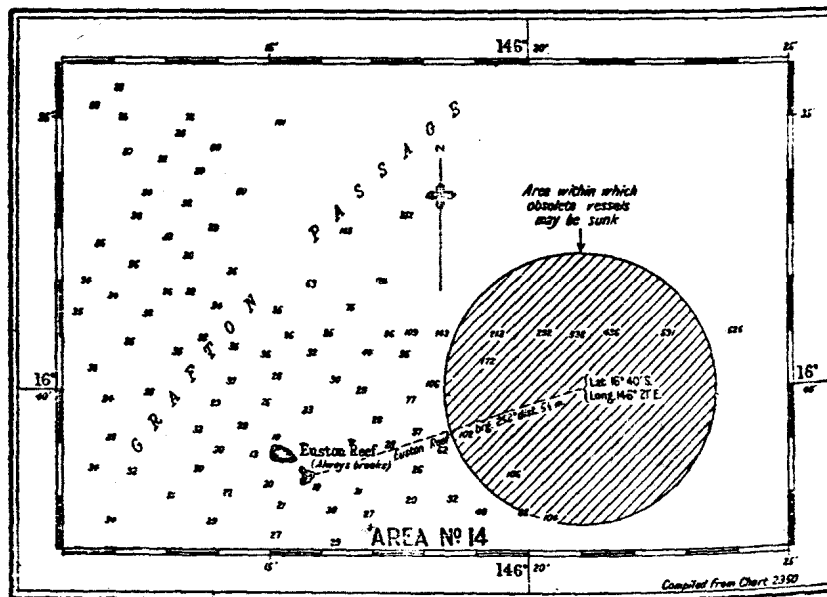
AREA No. 13.—FOR TOWNSVILLE.



In 27 fathoms within a circular area 5 miles in diameter with centre in latitude $18^{\circ} 46\frac{1}{2}'$ S., longitude $147^{\circ} 24\frac{1}{2}'$ E., midway between Keeper and Wheeler Reefs, 45 miles north-east from Townsville.

Area 13 - In 27 fathoms within a circular area 5 miles in diameter with centre in latitude 18 deg 46.5 min S, longitude 147 deg 24.5 E, midway between Keeper and Wheeler Reefs, 45 miles north-east from Townsville.

AREA No. 14.—FOR CAIRNS.



Outside the 100 fathom line, near entrance to Grafton Passage, within a circular area 5 miles in diameter with centre in latitude $16^{\circ} 40'$ S., longitude $146^{\circ} 21'$ E., Euston Reef bearing 253° distance $5\frac{1}{2}$ miles, 40 miles from Cairns.

Area 14 - Outside the 100 fathom line, near entrance to Grafton Passage, within a circular area 5 miles in diameter with centre in latitude 16 deg 40 min S, longitude 146 deg 21 min E, Euston Reef bearing 253 deg distance 5.5 miles, 40 miles from Cairns.

Amendments to dump areas

In 1972 the dump areas were reviewed. Two new areas were added and one was removed, leaving a new total of 15. The amended schedule is shown below with the former status of the area shown in brackets.

Area No. 1 (unchanged)-The area bounded by the circumference of a circle of a radius of two and one-half miles with its centre at the intersection of the parallel 34 degrees south latitude with the meridian 151 degrees 36 minutes east longitude.

Area No. 2 (new)-The area bounded by the circumference of a circle of a radius of one-quarter of a mile with its centre at the intersection of the parallel 33 degrees 47 minutes south latitude with the meridian 151 degrees 21 minutes east longitude.

Area No. 3 (former Area No. 2)-The area bounded by the circumference of a circle of a radius of two and one-half miles with its centre at the intersection of the parallel 33 degrees 03 minutes south latitude with the meridian 152 degrees 27 minutes east longitude.

Area No. 4 (former Area No. 3)- The area bounded by the circumference of a circle of a radius of one and one-half miles with its centre at the intersection of the parallel 38 degrees 21 minutes south latitude with the meridian 144 degrees 25.5 minutes east longitude.

Area No. 5 (former Area No. 4)-The area bounded by the circumference of a circle of a radius of two one-half miles with its centre at the intersection of the parallel 43 degrees 14 minutes south latitude with the meridian 148 degrees 22 minutes east longitude.

Area No. 6 (former Area No. 5)-The area bounded by the circumference of a circle of a radius of two and one-half miles with its centre at the intersection of the parallel 35 degrees 57.5 minutes south latitude with the meridian 137 degrees 55 minutes east longitude.

Area No. 7 (unchanged)-The area bounded by the circumference of a circle of a radius of three and one-half miles with its centre at the intersection of the parallel 32 degrees 04 minutes south latitude with the meridian 115 degrees 20 minutes east longitude.

Area No. 8 (former Area No. 8?)-The area bounded by a straight line between the intersection of the parallel 35 degrees 00 minutes 26 seconds south latitude with the meridian 118 degrees 09 minutes 25 seconds east longitude and the intersection of the parallel 35 degrees 00 minutes 26 seconds south latitude with the meridian 118 degrees 09 minutes 52 seconds east longitude, the straight line between the last-mentioned intersection and the intersection of the parallel 35 degrees 00 minutes 48 seconds south latitude with the meridian 118 degrees 10 minutes 10 seconds east longitude, the straight line between the last-mentioned intersection and the intersection of the parallel 35 degrees 00 minutes 48 seconds south latitude with the meridian 118 degrees 09 minutes 52 seconds east longitude, and the straight line between the last-mentioned intersection and the first-mentioned intersection.

Area No. 9 (former Area No. 9?)-The area bounded by a straight line between the intersection of the parallel 35 degrees 05 minutes 55 seconds south latitude with the meridian 117 degrees 59 minutes 27 seconds east longitude and the intersection of the parallel 35 degrees 06 minutes south latitude with the meridian 118 degrees 00 minutes 11 seconds east longitude, the straight line between the last-mentioned intersection and the intersection of the parallel 35 degrees 06 minutes 14 seconds south latitude with the meridian 118 degrees 00 minutes 15 seconds east longitude, the straight line between the last-mentioned intersection and the intersection of the parallel 35 degrees 06 minutes 05 seconds south latitude with the meridian 117 degrees 59 minutes 27 seconds east longitude and the straight line between the last-mentioned intersection and the first-mentioned intersection.

Area No. 10 (unchanged)-The area bounded by the circumference of a circle of a radius of two and one-half miles with its centre at the intersection of the parallel 27 degrees south latitude with the meridian 153 degrees 42 minutes east longitude.

Area No 11 (unchanged)-Tho area bounded by the circumference of a circle of a radius of two and one-half miles with its centre at the intersection of the parallel 23 degrees 14 minutes south latitude with the meridian 152 degrees 15 minutes east longitude.

Area No. 12 (former Area No. 12 modified)-The area bounded by the circumference of a circle of a radius of two and one-half miles with its centre at the intersection of the parallel 19 degrees 20 minutes south latitude with the meridian 148 degrees 33 minutes east longitude.

Area No. 13 (former Area No. 13 modified)-The area bounded by a straight line between the intersection of the parallel 18 degrees 44 minutes south latitude with the meridian 147 degrees 22 minutes east longitude and the intersection of the parallel 18 degrees 44 minutes south latitude with the meridian 147 degrees 30 minutes east longitude, the straight line between the last-mentioned inter-section and the intersection of the parallel 18 degrees 49 minutes south latitude with the meridian 147 degrees 30 minutes east longitude, the straight line between the last-mentioned intersection and the intersection of the parallel 18 degrees 49 minutes south latitude with the meridian 147 degrees 22 minutes east longitude, and the straight line between the last-mentioned intersection and the first-mentioned intersection.

Area No. 14 (unchanged)-The area bounded by the circumference of a circle of two and one-half miles with its centre at the intersection of the parallel 16 degrees 40 minutes south latitude with the meridian 146 degrees 21 minutes east longitude.

Area No. 15 (new)-The area bounded by the circumference of a circle of two and one-half miles with its centre at the intersection of the parallel 9 degrees 57 minutes south latitude with the meridian 130 degrees east longitude.

**Appendix B - Ships dumped within disposal areas proclaimed under the
*Beaches, Fishing Grounds and Sea Routes Protection Act
1932***

Area 1 -Outside the 100 fathom line within a circular area 5 miles in diameter with centre in latitude 34 deg 0 min S., Longitude 151 deg 36 min E. with South Head Lighthouse bearing 299 deg distant 18 miles.

	Boat name		Boat name
1	716	35	MARJORIE
2	ANGLIAN	36	MARRAWAH
3	ANZAC	37	MATAGALPA
4	ARAWATTA	38	MEDUSA
5	AROONEE	39	MORIB
6	BARRABOOL	40	NAMOI
7	BELLAMBI	41	NANCY
8	BOSUN	42	No.15
9	BURRA-BRU	43	No.16
10	BUSTLER	44	No.5
11	CAPTAIN PHILLIP	45	No.696
12	CAVAN	46	No.8
13	CECIL RHODES	47	OUR ELSIE
14	CIRCE	48	PHYLLIS
15	CRANE BARGE No.4	49	PIONEER
16	CURL CURL	50	POSEIDON
17	CYCLOPS	51	PREMIER
18	DORIC	52	SEAMEG
19	G.F.HOLDEN	53	STALWART
20	GANNET	54	STRAHAN
21	GEEBUNG	55	SUCCESS
22	GERANIUM	56	SWALLOW
23	GOVERNOR BLACKALL	57	TAVIUNI
24	HERCULES	58	TUNCURRY
25	HUON	59	VALIANT
26	IRON DUKE	60	VENDETTA
27	KESTREL	61	WALLSEND
28	KIANGA	62	WICKLOW
29	KURNELL	63	YARRA
30	L292	64	YULOO
31	LEWES	65	UNIDENTIFIED
32	MALLOW	66	G F HOLDEN
33	MARGARET	67	No.716
34	MARGUERITE	68	No.969

Area 2 - Outside the 100 fathom line within a circular area 5 miles in diameter with centre in latitude 33 deg 3 min S., longitude 152 deg 27 min E., 104 deg distant 33 miles from Nobby's Head. Port Stevens Lighthouse distant 22 miles, with high land of Toomere Head bearing 326 deg.

	Boat name
1	ABILITY
2	JUNO

Area 3 - In about 25 fathoms within a circular area 3 miles in diameter, with centre in latitude 38 deg 21 min S., longitude 144 deg 25.5 min E.. with Barwon Head bearing 46 deg distant 5 miles.

	Boat name
1	BATMAN
2	BEVERWYK 19
3	BUNINYONG
4	BUNYIP
5	CASABLANCA
6	D. McLENNAN
7	DUNLOE
8	EURO
9	FAWKNER
10	MILORA
11	PIGOTT
12	PIONEER
13	VHB 53
14	VICTORIAN
15	WAREATEA
16	WHITEPINE
17	WILLS

Area 4 - Outside the 100 fathom line with a circular area. 5 miles in diameter with centre in latitude 43 deg 14 min S, longitude 148 deg 22 min E, Tasman Lighthouse bearing 270 deg distant 15 miles. NOTE.-The sinking area within the Hobart port limits is on the edge of the reef at the south end of Betsy Island situated to the eastward of the entrance to the Derwent River.

NO SHIPS RECORDED

Area 5 - (Eastern Area).-South of Macdonnell Peninsula in 26 fathoms within a circular area 5 miles in diameter with centre in latitude 35 deg 57.5 min S., longitude 137 deg 55 min E, Cape Hart bearing 63 deg distant 7 miles.

NO SHIPS RECORDED

Area 6 - (Western Area).-West of Kangaroo Island in 50 fathoms within a circular area 5 miles in diameter with centre in latitude 35 deg 57.5 min S, longitude 136 deg 25.5 min E., Cape Couedie bearing 115 deg distant 15 miles.

NO SHIPS RECORDED

Area 7 - Within a circular area 7 miles in diameter with centre in latitude 32 deg 4 min S, longitude 115 deg 20 min E., with Rottnest Island Lighthouse bearing 68 deg distant 11 miles.

	Boat name		Boat name
1	AGNES	19	KOORDA
2	BANKFIELDS	20	KOS VII
3	CAPE OTWAY	21	LOCH NESS
4	CARAVAN	22	MARANDA
5	CLEVEDON	23	NIRIMBA
6	COMMILES	24	NORWHALE
7	CONCORDIA	25	PREMIER
8	COUNTY OF CAITHNESS	26	ROBERT MOORE
9	DRAGON	27	ROCKINGHAM
10	DUCHESS	28	SESA
11	ENTERPRISE	29	SUBMARINE K.II
12	EUCLA	30	SWAN
13	FREMANTLE	31	TAMERLANE
14	GOVERNOR	32	THORNLIEBANK
15	GUNGA	33	TOCOPILLA
16	JUNEE	34	UNIDENTIFIED
17	KIRKCUDBRIGHTSHIRE	35	ADVENTURE
18	KNOWSLEY		

Area 8 - Eastern Area near Cape Vancouver-Within an area bounded by;
 To the westward-by a line between the south end of Inner Island and the north end of False Island.
 To the northward-by a line between the south end of Inner Island and the nearest part of a mainland.
 To the eastward-by the mainland.
 To the southward-by the northern shore of False Island.

NO SHIPS RECORDED

Area 9 - Western Area near Bald Head- North of a line between the headlands of the Middle Bay (unnamed on chart 2619). South of the summit of the Limestone Head Peninsula.

NO SHIPS RECORDED

Area 10 - Outside the 100 fathom line within a circular area 5 miles in diameter with centre in latitude 27 deg S., longitude 153 deg 42 min E., with Cape Moreton Lighthouse bearing 260 deg distant 12.5 miles.

	Boat name
1	DREDGE D

Area 11 - Outside the 100 fathom line within a circular area 5 miles in diameter with centre in latitude 23 deg 14 min S., longitude 152 deg 15 min E., with North Reef Lighthouse bearing 280 deg distant 18.5 miles.

NO SHIPS RECORDED

Area 12 - In 28 fathoms within a circular area 5 miles in diameter with centre in latitude 19 deg 46.5 min S, longitude 148 deg 31 min E., with Holborne Island bearing 288 deg distant 9 miles and Gloucester Head bearing 198 deg distant 12.5 miles.

NO SHIPS RECORDED

Area 13 - In 27 fathoms within a circular area 5 miles in diameter with centre in latitude 18 deg 46.5 min S, longitude 147 deg 24.5 E, midway between Keeper and Wheeler Reefs, 45 miles north-east from Townsville.

	Boat name
1	B.D.5
2	CLEVELAND BAY
3	UNIDENTIFIED

Area 14 - Outside the 100 fathom line, near entrance to Grafton Passage, within a circular area 5 miles in diameter with centre in latitude 16 deg 40 min S, longitude 146 deg 21 min E, Euston Reef bearing 253 deg distance 5.5 miles, 40 miles from Cairns.

	Boat name
1	JINN CHANG
2	SOUTHERN ENDEAVOUR
3	SUMATRA

Dumpings in Amended dump areas

In 1972 the dump areas were reviewed. Two new areas were added and one was removed, leaving a new total of 15. The amended schedule is shown below with the former status of the area shown in brackets.

Area No. 2 (new)-The area bounded by the circumference of a circle of a radius of one-quarter of a mile with its centre at the intersection of the parallel 33 degrees 47 minutes south latitude with the meridian 151 degrees 21 minutes east longitude.

NO SHIPS RECORDED

Area No. 12 (former Area No. 12 modified)-The area bounded by the circumference of a circle of a radius of two and one-half miles with its centre at the intersection of the parallel 19 degrees 20 minutes south latitude with the meridian 148 degrees 33 minutes east longitude.

NO SHIPS RECORDED

Area No. 13 (former Area No. 13 modified)-The area bounded by a straight line between the intersection of the parallel 18 degrees 44 minutes south latitude with the meridian 147 degrees 22 minutes east longitude and the intersection of the parallel 18 degrees 44 minutes south latitude with the meridian 147 degrees 30 minutes east longitude, the straight line between the last-mentioned intersection and the intersection of the parallel 18 degrees 49 minutes south latitude with the meridian 147 degrees 30 minutes east longitude, the straight line between the last-mentioned intersection and the intersection of the parallel 18 degrees 49 minutes south latitude with the meridian 147 degrees 22 minutes east longitude, and the straight line between the last-mentioned intersection and the first-mentioned intersection.

	Boat name
1	B.D.5
2	CLEVELAND BAY
3	LALOR
4	UNIDENTIFIED

Area No. 15 (new)-The area bounded by the circumference of a circle of two and one-half miles with its centre at the intersection of the parallel 9 degrees 57 minutes south latitude with the meridian 130 degrees east longitude.

NO SHIPS RECORDED

Appendix C - Non Ship Objects dumped within disposal proclaimed under the Beaches, Fishing Ground and Sea Routes Protection Act 1932

All are separate dumpings

Area 1 -Outside the 100 fathom line within a circular area 5 miles in diameter with centre in latitude 34 deg 0 min S., Longitude 151 deg 36 min E. with South Head Lighthouse bearing 299 deg distant 18 miles.

	DESCRIPTION	AMOUNT	UNITS
1	AMMUNITION	200	Tons
2	VARIOUS	18 pr. shell fuzes removed & boxed, Ctges SAA 50 boxed	Unknown
3	VARIOUS	Bombs incendiary rolls	Unknown
4	AMMUNITION	Unknown	Unknown
5	AMMUNITION	Unknown	Unknown
6	EXHAUST VALVES	18000	Valves
7	EXHAUST VALVES	1932	Valves
8	EXHAUST VALVES	322	Valves
9	EXHAUST VALVES	169	Valves
10	SODIUM EXHAUST VALVES	138	Valves
11	SODIUM EXHAUST VALVES	822	Valves
12	CHEMICAL WARFARE AGENT	5000	Tons
13	WAR PLANES	Unknown	Plane
14	EXHAUST VALVES	6	Boxes
15	EXHAUST VALVES	6	Containers
16	BURIAL AT SEA	1	body
17	BURIAL AT SEA	1	body
18	BURIAL AT SEA	1	body

Area 2 - Outside the 100 fathom line within a circular area 5 miles in diameter with centre in latitude 33 deg 3 min S., longitude 152 deg 27 min E., 104 deg distant 33 miles from Nobby's Head. Port Stevens Lighthouse distant 22 miles, with high land of Toomeree Head bearing 326 deg.

NO OBJECTS RECORDED

Area 3 - In about 25 fathoms within a circular area 3 miles in diameter, with centre in latitude 38 deg 21 min S., longitude 144 deg 25.5 min E.. with Barwon Head bearing 46 deg distant 5 miles.

NO OBJECTS RECORDED

Area 4 - Outside the 100 fathom line with a circular area. 5 miles in diameter with centre in latitude 43 deg 14 min S, longitude 148 deg 22 min E, Tasman Lighthouse bearing 270 deg distant 15 miles. NOTE.-The sinking area within the Hobart port limits is on the edge of the reef at the south end of Betsy Island situated to the eastward of the entrance to the Derwent River.

	DESCRIPTION	AMOUNT	UNITS
1	BURIAL AT SEA	1	Body

Area 5 - (Eastern Area).-South of Macdonnell Peninsula in 26 fathoms within a circular area 5 miles in diameter with centre in latitude 35 deg 57.5 min S., longitude 137 deg 55 min E, Cape Hart bearing 63 deg distant 7 miles.

NO OBJECTS RECORDED

Area 6 - (Western Area).-West of Kangaroo Island in 50 fathoms within a circular area 5 miles in diameter with centre in latitude 35 deg 57.5 min S, longitude 136 deg 25.5 min E., Cape Couedie bearing 115 deg distant 15 miles.

NO OBJECTS RECORDED

Area 7 - Within a circular area 7 miles in diameter with centre in latitude 32 deg 4 min S, longitude 115 deg 20 min E., with Rottneest Island Lighthouse bearing 68 deg distant 11 miles.

	DESCRIPTION	AMOUNT	UNITS
1	EXPLOSIVES	200	Cartons
2	BURIAL AT SEA	1	body
3	BURIAL AT SEA	1	body

Area 8 - Eastern Area near Cape Vancouver-Within an area bounded by; To the westward-by a line between the south end of Inner Island and the north end of False Island. To the northward-by a line between the south end of Inner Island and the nearest part of a mainland. To the eastward-by the mainland. To the southward-by the northern shore of False Island.

NO OBJECTS RECORDED

Area 9 - Western Area near Bald Head- North of a line between the headlands of the Middle Bay (unnamed on chart 2619). South of the summit of the Limestone Head Peninsula.

NO OBJECTS RECORDED

Area 10 - Outside the 100 fathom line within a circular area 5 miles in diameter with centre in latitude 27 deg S., longitude 153 deg 42 min E., with Cape Moreton Lighthouse bearing 260 deg distant 12.5 miles.

	DESCRIPTION	AMOUNT	UNITS	MORE DESCRIPTION
1	SHELL	205.5	Tons	155mm loose shell
2	SHELL	252	Tons	155mm loose shell
3	SHELL	204	Tons	155mm loose shell
4	WEAPONS	30	Tons	Boxes of weapons
5	WEAPONS	70	Tons	Boxes of weapons
6	SHELL	94	Tons	Shell HE boxed-1470 packages
7	VARIOUS	458	Tons	Mortar Ammo HE Light-13763 packages
8	SHELL	57	Tons	Shell HE loose-1271 packages
9	FUZES	2	Tons	Fuzes HE boxed-58 packages
10	VARIOUS	20	Tons	Small arms/ stores
11	PROJECTILES	30	Tons	37mm HE projectiles
12	VARIOUS	4000	Lbs	Boxed general stores including bayonets

Area 11 - Outside the 100 fathom line within a circular area 5 miles in diameter with centre in latitude 23 deg 14 min S., longitude 152 deg 15 min E., with North Reef Lighthouse bearing 280 deg distant 18.5 miles.

NO OBJECTS RECORDED

Area 12 - In 28 fathoms within a circular area 5 miles in diameter with centre in latitude 19 deg 46.5 min S, longitude 148 deg 31 min E., with Holborne Island bearing 288 deg distant 9 miles and Gloucester Head bearing 198 deg distant 12.5 miles.

NO OBJECTS RECORDED

Area 13 - In 27 fathoms within a circular area 5 miles in diameter with centre in latitude 18 deg 46.5 min S, longitude 147 deg 24.5 E, midway between Keeper and Wheeler Reefs, 45 miles north-east from Townsville.

NO OBJECTS RECORDED

Area 14 - Outside the 100 fathom line, near entrance to Grafton Passage, within a circular area 5 miles in diameter with centre in latitude 16 deg 40 min S, longitude 146 deg 21 min E, Euston Reef bearing 253 deg distance 5.5 miles, 40 miles from Cairns.

	DESCRIPTION	AMOUNT	UNITS
1	BURIAL AT SEA	1	body

Dumpings in Amended dump areas

In 1972 the dump areas were reviewed. Two new areas were added and one was removed, leaving a new total of 15. The amended schedule is shown below with the former status of the area shown in brackets.

Area No. 2 (new)-The area bounded by the circumference of a circle of a radius of one-quarter of a mile with its centre at the intersection of the parallel 33 degrees 47 minutes south latitude with the meridian 151 degrees 21 minutes east longitude.

	DESCRIPTION	AMOUNT	UNITS
1	DREDGE SPOIL	40 000	tonnes
2	CONCRETE PONTOON	30	tons

Area No. 12 (former Area No. 12 modified)-The area bounded by the circumference of a circle of a radius of two and one-half miles with its centre at the intersection of the parallel 19 degrees 20 minutes south latitude with the meridian 148 degrees 33 minutes east longitude.

NO OBJECTS RECORDED

Area No. 13 (former Area No. 13 modified)-The area bounded by a straight line between the intersection of the parallel 18 degrees 44 minutes south latitude with the meridian 147 degrees 22 minutes east longitude and the intersection of the parallel 18 degrees 44 minutes south latitude with the meridian 147 degrees 30 minutes east longitude, the straight line between the last-mentioned intersection and the intersection of the parallel 18 degrees 49 minutes south latitude with the meridian 147 degrees 30 minutes east longitude, the straight line between the last-mentioned intersection and the intersection of the parallel 18 degrees 49 minutes south latitude with the meridian 147 degrees 22 minutes east longitude, and the straight line between the last-mentioned intersection and the first-mentioned intersection.

NO OBJECTS RECORDED

Area No. 15 (new)-The area bounded by the circumference of a circle of two and one-half miles with its centre at the intersection of the parallel 9 degrees 57 minutes south latitude with the meridian 130 degrees east longitude.

NO OBJECTS RECORDED

Appendix D - Permits Issued under the Environment Protection (Sea Dumping) Act 1981

State	Material	Quantity (units)	Description	Commence	Expire	Latitude	Longitude	Depth
1 TAS	Jarosite	77,000 tonnes	Zinc refinery. radius 2nm	6/3/1984	30/6/1984	43 36 30	148 14 30	2000m
2 SA	Artificial reef	652 tonnes	2 barges 326 tonnes each (in State waters) 34 31 20, 138 04 for 2nd barge	10/4/1984	11/4/1984	34 59	138 25	18m
3 TAS	Jarosite	240,000 tonnes	Zinc refinery. radius 2nm	1/7/1984	30/6/1985	43 36 30	148 14 30	2000m
4 WA	Dredge spoil	30 million tonnes	Approach channel. 5.4 and 8.6 miles north of port headland. 2 rectangular sites.	1/8/1984	5/5/1985			
5 VIC	Black Liquor	5,000 tonnes	Process liquor (paper making). Between 150 and 250nm off E coast N of 38s to S of 29 30-between 150 and 250nm off South Coast W of 140 35 to E of 135 40	10/10/1984	30/11/1984			
6 QLD	Burial at sea	1	Off Morton Island-QLD	21/12/1984				
7 NSW	Dredge spoil	40,000 tonnes	NE of Port Jackson. radius 0.25nm	28/2/1985	30/8/1985	33 47	151 21	
8 NSW	Demolition materials	22,000 tonnes	triangle 7nm ESE of Port Jackson	28/2/1985	28/2/1986			
9	Spent caustic soda	2,000 tonnes	From production of liquified petroleum gas. Between 100 and 200nm off east coast North of 33 50 south of 28 10	1/3/1985	31/5/1986			
10 VIC	Black Liquor	30,000 tonnes	Process liquor (paper making). Between 150 and 250nm off E coast N of 38s to S of 29 30-between 150 and 250nm off South Coast W of 140 35 to E of 135 40	1/4/1985	31/12/1985			
11 WA	Dredge spoil	34 million tonnes	Supercedes permit (1/8/84-5/5/85). 2 rectangular sites 5.4 and 8.6 nm North of Port Headland/ adjacent to approach channel between 7.4 and 21.6 nm off shore	6/5/1985	30/8/1986			
12 NSW	Dredge spoil	2.2 million tonnes	2nm E of Port Kembla. Hexagonal area.	8/5/1985	30/6/1986			
13 QLD	Vessel	1,000 tonnes	Of Flinders Reef	31/5/1985	30/8/1986	26 58.5	153 29.5	
14 TAS	Jarosite	240,000 tonnes	Zinc refinery. 60nm South of Hobart. 2nm radius	1/7/1985	30/6/1988	43 36 30	148 14 30	2000m
15 NT	Dredge spoil	300,000 tonnes	Dredge spoil from harbour maintenance. 0.5nm W of Alyangule	1/8/1985	31/10/1985			
16 NT	Dredge spoil	490,000 tonnes	Variation of 1/8/85 - outer dump site enlarged. 0.5nm W of Alyangule	27/9/1985				
17 NSW	Dredge spoil	150,000 tonnes	Southern Darling Harbour- 21/9/85? 7nm ESE of Port Jackson. (33 52 48, 151 25 36) (33 51 06, 151 27 54)	27/9/1985	31/8/1987	33 51 36	151 24 00	
18 NSW	Dredge spoil	750 tonnes	2.8 miles E of Curl Curl Head	21/11/1985	21/5/1986			
19 NSW	Dredge spoil	40,000 tonnes	2nm E of port Kembla	16/12/1985	16/12/1986			
20 NSW	Dredge spoil	315,000 tonnes	Harbour maintenance. 2.5nm SE of Nobbys Head	30/12/1985	30/3/1986			
21 WA	Dredge spoil	17 million tonnes	6.5 nm N of Port Dampier. 2 areas	1/1/1986	31/12/1987			
22 VIC	Black liquor	30,000 tonnes	Between 150 and 250nm off E coast N of 38s to S of 29 30-between 150 and 250nm off South Coast W of 140 35 to E of 135 40	13/1/1986	31/12/1986			
23 NSW	Dredge spoil	6000 tonnes	1nm E of Warden Head	20/2/1986	20/2/1987			
24 WA	Dredge spoil	22 million tonnes	Variation of 1/1/86	1/3/1986				
25 NSW	Dredge spoil	1,200 tonnes	2.8nm E of Curl Curl Head	13/3/1986	13/9/1986			
26 NT	Dredge spoil	10,000 tonnes	Balance not dumped under previous permit. 1nm W of Alyangule	23/3/1986	23/9/1986			
27 WA?	Dredge spoil	20,000 tonnes	0.5 nm NE of Tarrant Island	9/4/1986	9/10/1986			
28 WA	Dredge spoil		Variation of permit issued 6/5/85 - outer dump site enlarged	5/5/1986				
29 TAS	Jarosite	240,000 tonnes	60nm S of Hobart	1/7/1986	30/6/1987	43 36 30	148 14 30	2000m
30 NSW	Dredge spoil	31,000 tonnes	Sand, clay and silt. 7nm ESE of Port Jackson	17/10/1986	17/10/1987			100m
31 NSW	Dredge spoil	2,200 tonnes	1nm SE Norah Head. 2 areas	14/11/1986	14/11/1987			

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State	Material	Quantity (units)	Description	Commence	Expire	Latitude	Longitude	Depth
32 NSW	Vessel "Gabriella"		Sank 10/12/86. 29.5nm of Port Kembla	9/12/1986	9/1/1987	34 35	151 30	2000m
33 QLD	Vessel "Merino"		Obsolete vessel-sunk 28/1/87. Gulf of Carpentaria	17/12/1986	17/9/1987	140 14		66m
34 NSW	Spent Caustic soda	2,800 tonnes	Between 100 and 200nm of E coast, N of 33 50 S of 28 10	23/12/1986	23/4/1987			
35 NSW	Dredge spoil	31,500 tonnes	Variation of 17/10/86. 7nm ESE of Port Jackson	9/2/1987				
36 WA	Artificial reef	400 tonnes	tyres/wharf/fender panels	16/2/1987	16/11/1987	20 14 30	108 31 30	
37 NSW	Demolition materials	22,000 tonnes	Area six nautical miles from E of Cape Banks	19/2/1987	19/8/1987			
38	3 barges		Steel barges - reel	28/2/1987	28/8/1987	33 43	151 21	
39 WA	Artificial reef	34,000 tyres	6 400 sq m centred at coords given.Geographie Bay	10/3/1987	10/3/1988	33 35.04	115 10.02	
40	Burial at sea	1		26/3/1987	26/4/1987	19 20	118 33	
41	Vessel-"Leven"	1		29/5/1987	29/11/1987	41 08	146 29	
42 TAS	Jarosite	240,000 tonnes	60nm S of Hobart. Circle 2nm	1/7/1987	30/6/1988	43 36 30	148 14 30	
43 NSW	Dredge spoil	320,000 tonnes	Rectangular area 2.5nm SE of Nobbys Head	10/7/1987	9/1/1988			
	Two 1000 tonne steel flotation tanks							
44 WA	Dredge spoil	2,000 tonnes	Obsolete oiling gear. 16.2nm WNW of Port Dampier, Bare Rock	19/8/1987	18/2/1988			15m
45 WA	Dredge spoil		Variation of permit issued 1/1/86. 6.5nm N of Port Dampier. 2 areas	27/10/1987				
46 NSW	Dredge spoil	16,500 tonnes	Approach channel. Triangular area 7nm ESE of Port Jackson	14/12/1987	13/6/1988			
47	Vessel "Nella Dan"	1,920 tonnes	Vessel ran aground on Macquarie Island. 10nm E of Macquarie Island	18/12/1987	17/8/1988			
48	Obsolete equipment	65 pieces	Supply vechiles and plant. 2nm E of Home Island	18/12/1987	17/8/1988			
49 WA	Dredge spoil	22 million tonnes	Variation of permit issued 1/1/86. 2 areas 6.5nm N of Port Dampier	28/12/1987				
50 QLD	Treated water	60,000 tonnes	Treated sewage from floating hotel. 3nm W of Western edge of John Brewer Reef. rectangular area	13/1/1988	12/1/1988			
51 NSW	Dredge spoil	500,000 tonnes	excavation for tunnels and dredged trench on seabed. Liquid/cut sandstone, clay, sand and silt pumped in seawater	1/3/1988	31/12/1990			
52 WA	Burial at sea	1	Rottmest Is	11/3/1988	10/4/1988	32 04	115 22	
53 WA	Artificial Reef	16,000 vehicle tyres	Disused motor vehicle tyres (13"-15"), solid form, 28 tyres strapped together by 11 mm; nylon tape to form a tetrahedron	20/4/1988	19/4/1989	33 35 04	115 1002	15-20m
54 WA	Dredge spoil	1.65 million tonnes	Bunbury- Coral fines or silts. (33 15 30, 115 39 30) (33 16 38, 115 39 30) (33 16 38, 115 39 50)	24/5/1988	24/5/1989	33 15 30	115 39 50	11-13m
55 QLD	Dredge spoil - part 1	350,000 tonnes	silt flowing into dredged channels, sediment from stormwater. (19 08 09, 146 56 29) (19 08 43, 146 57 28) (19 11 13, 146 55 51)	31/5/1988	31/5/1989	19 10 39	146 54 53	11m
56 QLD	Dredge spoil - Part 2	53,000 tonnes/yr	small scale maintenance dredging in Townsville Harbour. (19 14 51, 146 54 00) (19 15 54, 146 53 18) (19 14 45, 146 51 22)	31/5/1988	31/5/1991	19 13 48	146 52 00	24m
57 NSW	Dredge spoil	23,000 tonnes	Darling Harbour - clayey silt, some sand. Radius 400r	1/6/1988	1/12/1988	33 51.65	151 25.72	
58 WA	Dredge spoil	2.2 million tonnes	sea floor of the Esperance Harbour. (033 52 37, 121 57 44) (033 53 09, 121 57 04) (033 53 09, 121 57 44)	6/6/1988	5/6/1989	033 52 37	121 57 04	35-40m
59 QLD	Dredge spoil	310,000 tonnes/yr	natural siltation of Trinity Inlet. radius 0.5 mile	14/6/1988	13/4/1989	016 47 24	145 48 48	10-12m

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State	Material	Quantity Qty (units)	Description	Commence	Expire	Latitude	Longitude	Depth
60 NSW	Dredge spoil		Variation of permit of 14/12/87 - extension	14/6/1988	14/12/1988			
61 QLD	Dredge spoil	94,000 tonnes	Mackay Harbour -Clay, sand and mud. (21 5 26, 149 16 22) (21 5 57, 149 16 12) (21 5 44, 149 15 29)	16/6/1988	15/6/1989	21 5 13	149 15 39	
62 NSW	20 concrete pontoons-Artificial reef	30 tonnes each	Re-inforced concrete marina pontoons, hollow in section and tubular steel outrigger pontoons. Approx 9.5m x 2m x 1.4m	24/6/1988	23/12/1988	033 43.1	151 20.6	45m
63 NSW	Dredge spoil	400 tonnes	Habour frontage at Mosman, Sand and silt. radius 400 m	24/6/1988	23/12/1988	33 51 65	151 25 72	
64 TAS	Jarosite waste	240,000 tonnes/yr	Ammonium jarosite, primary zinc, zinc ferrite, lead sulphate, gypsum, silica, in the form of high moisture filter cake. radius 2 miles	1/7/1988	30/6/1989	043 3630	148 1430	2000m
65 QLD	Dredge spoil	300,000 tonnes	Harbour siltation, sand, gravel silt. radius 0.5m	21/7/1988	20/8/1989	024 4342	152 2612	
66 NSW	Obsolete tug "Henry Bolte"-Artificial reef	300 tonnes	Twofold Bay, tug	21/7/1988	20/1/1989	037 0800	149 5930	20m
67	65 pieces Obsolete equipment		Variation of permit issued 18/12/87	25/7/1988	17/4/1989			
68 NSW	Dredge spoil	56,000 tonnes	Darling Harbour, variation of 1/6/88, increase tonnage	27/7/1988				
69 NT	Obsolete vessel the "Marchant 3"-Artificial reef	N/A	Darwin harbour-dumped 8/8/88 - hulk, ex rig tender	4/8/1988	3/2/1989	012 10.75	130 40.75	20m
70 QLD	Dredge		Variation of permit issued 31/5/88, change coords. (19 13 24, 146 53 36) (19 15 00, 146 52 36) (19 14 30, 146 51 30)	4/8/1988		19 12 48	146 52 36	
71 QLD	Body	1	Bowen	31/8/1988	30/9/1988	20 00	149 03	
72 NSW	The tug "Tasman Hauler"-Artificial reef	420 tonnes	Tug boat built in Australia in 1959-scuttled 1/10/88	28/9/1988	28/3/1989	037 0800	149 5930	20m
73 NSW	Dredge spoil	3,500 tonnes	Ryde, Sydney, NSW. radius 400m	19/10/1988	18/10/1989	033 5139	151 2544	200m
74 NT	Steel Dumb Barge	0	Steel dumb barge, length 27.44m, breadth 11.60m depth 2.13m-repeated in pre 81 data	12/12/1988	12/5/1989	12 24.84	130 48.17	18m
75 NSW	Dredge spoil	1,500,000 tonnes		1/1/1989	31/3/1991			
76 NSW	Dredge spoil		Variation of permit issued 19/10/88, change coords	10/1/1989		33 52.6	151 25.3	400m
77 NSW	Dredge spoil	450,000 tonnes	From Newcastle Harbour. (32 57 00, 151 51 00) (32 57 48, 151 50 12)(32 57 05, 151 49 12)	19/1/1989	18/1/1990	32 56 20	151 50 00	
78 NSW	Weapons and ammunition		Department of Defence magazine production Obsolete small arms and associated explosive stores-dumped off Flinders Island. radius 1 mile	13/4/1989	13/9/1989	149 25	039 37	4000m
79 QLD	John Brewer Pty Ltd		Treated water output from sewage treatment plant onboard the floating hotel. (018 38 30, 146 55 30) (018 38 30, 146 58 30) (018 35 30, 146 58 30)	20/4/1989	19/4/1990	018 35 30	146 5530	40m
80 QLD	Dredge spoil	60,000 tonnes	Variation of permit issued 31/5/88 350 000 tonnes to 450 000 tonnes	27/4/1989				
81 NSW	Dredge spoil	105,000 tonnes	Spoil and blast furnace slag from Port Kembla Opening of casting basin at Port Kembla. (34 30.7, 151 3.0) (34 32.6, 151 2.4) (34 32.1, 151 0.0)	3/5/1989	2/11/1990	34 20.2	151 00.8	
82 QLD	Dredge spoil	4,500,000 tonnes	From Weipa channel	9/5/1989	8/11/1991	12 39.2	141 40.8	
83 QLD	Dredge spoil	85,000	Trinity Inlet	10/5/1989	9/8/1989			

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State	Material	Quantity Qty (units)	Description	Commence	Expire	Latitude	Longitude	Depth
84 WA	Dredge spoil		Variation of permit issued 24/5/88 Extension to 31/12/88	17/5/1989	31/12/1989			
85 WA	Dredge spoil	1,275,000 tonnes	seabed of Mermaid Sound in the port of Dampier in W.A. Fine-medium grained silty-sands. (020 32 34, 116 45 30) (020 33 03, 116 44 17) (020 32 04, 116 44 17) (020 30 59, 116 46 031) (020 3 059, 116 44 50)	18/5/1989	17/5/1992	020 32 04	116 45 30	8-12m
86 NSW	Dredge spoil	230 tonnes	From Point Piper. radius 400m	14/6/1989	13/12/1989	33 52.6	151 25.3	
87 WA	Dredge spoil	55,000 tonnes	Sea bed of Success Harbour Quartz beach sand which may contain shell fragments and other matter. (33 04 09, 115 43 41) (33 04 58, 115 43 36) (33 04 53, 115 43 49)	19/6/1989	19/6/1990	33 04 04	115 43 54	2
88 TAS	Jarosite	240,000 tonnes	The wastes are mixtures of ammonium jarosite, zinc ferrite, lead sulphate, gypsum and silica	1/7/1989	30/6/1990	043 36 30	148 14 30	2000m
89 QLD	Dredge spoil	385,000 tonnes	Trinity Inlet Marine mud and silt	10/7/1989	30/6/1990	016 48 12	145 48 00	12m
90 WA	Dredge spoil		Variation of permit issued 16/5/89	2/8/1989				
91 NSW	Dredge spoil	250,000 tonnes	Kooragang Island oil berth, Newcastle NSW. Brown silty clay and sand. (032 57 00, 151 51 00) (032 57 48, 151 50 12) (032 57 05, 151 49 12)	4/8/1989	3/8/1990	032 5620	151 5000	24-28m
92 WA	Dredge spoil	750,000 tonnes	Hammersley Shipping channel, Mermaid Sound, WA Fine sand and silt, fawn to olive grey in colour. (20 36 52, 116 40 48) (20 36 51, 116 40 42) (20 36 17, 116 40 49)	24/8/1989	23/8/1990	020 3618	116 4054	6-10m
93 QLD	Dredge spoil	94,000 tonnes	Mackay Harbour -Clay, sand and mud. (21 05 26, 149 16 22) (21 05 57, 149 16 12) (21 05 44, 149 15 29)	25/8/1989	24/8/1990	21 05 13	149 15 39	11-13m
94 NSW	Dredge Spoil	102,000 tonnes	Glebe Is Clay, sand and silt. Centrepoint of 0.5nr	29/8/1989	28/8/1990	33 5148	151 2442	110m
95 NSW	Dredge spoil		Variation of permit issued 1/1/89 change co-ordinates. diameter 1000m. up to 50 000t on given coords. (33 51 48, 151 24 42)	29/8/1989		33 51 42	151 25 42	
96 WA	Obsolete equipment	800 tonnes	Cyclone damaged derrick barge 750t crane jib, 30t boiler, 15t pipe, steel scrap. Centrepoint of 400m	31/8/1989	28/2/1990	20 0800	115 57	50m
97 WA	Obsolete equipment		Derrick barge Steel containers (up to 8). radius 400m	1/9/1989	28/3/1990	20 08	115 57	
98 NSW	Dredge spoil		Variation of permit issued 29/8/89 46 000cu m from pier 3/ 1600cu m from pier 4	1/9/1989				
99 QLD	Dredge spoil	300,000 tonnes	Bundaberg Harbour Sand and silt. Centrepoint of 0.5nr	22/9/1989	21/9/1990	24 43 42	152 26 12	10m
100 NSW	Dredge spoil		Variation of permit issued 29/8/89	22/9/1989				
101 NSW	Dredge spoil	1000 tonnes	From Cremorne	5/10/1989	5/4/1990	33 52.6	151 25.3	
102 QLD	Artificial reef		Ferro boat hull	27/11/1989	26/5/1990	25 05 18	152 34 12	
103 QLD	Food scraps	600 kg/day	2 circular areas. (26 26.3, 151 52.7) (23 28.7, 151 55.9) 2.2nm off Heron Island (23 28.7, 151 55.9 2.2) nm off Heron Island	28/12/1989	27/12/1990			
104 NSW	Dredge spoil	700,000 tonnes	Dredging Newcastle Harbour	5/3/1990	5/3/1991			
105 SA	Obsolete vessel "karina G"			9/3/1990	9/9/1990	34 10	129	3000m
106 WA	Dredge spoil	1.2 million tonnes	Shipping channel, berthing basin, Bunbury. Sand, silt, weed and rock. (33 12 27 115 39 39) (33 16 48, 115 36 00) (33 16 48, 115 39 39)	2/4/1990	2/4/1991	33 12 27	115 36 00	12-15m
107 QLD	Dredge spoil	260,000 cu m	natural silt flow into dredged channels and harbour. (019 08 43, 146 57 28) (019 11 13, 146 55 51) (019 10 39, 146 54 53)	30/4/1990	29/4/1991	019 0809	146 5629	11m
108 NSW	Dredge spoil	8,200 tonnes	Morrison's Bay, Putney Marine sediments mainly silty sands, inorganic silts and clays	16/5/1990	15/5/1991	033 51.83	151 24.72	110-120m

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State	Material	Quantity Qty (units)	Description	Commence	Expire	Latitude	Longitude	Depth
109	QLD		Variation of permit issued 3/5/90 ?	24/5/1990				
110	WA	350,000 cu m	Dredging from Port Headland. (20 12 35, 118 35 04) (20 13 20, 118 35 24) (20 13 51, 118 34 00)	30/5/1990	29/5/1991	20 12 35	118 33 40	
111	TAS	240,000 dry tonnes/yr	EZ zinc smelter	1/7/1990	31/10/1991	043 3630	148 1430	2000m
112	QLD	285,000 tonnes	Cairns Harbour Marine clay, deposited silt. Centerpoint of 0.5nr	17/7/1990	16/7/1991	016 4812	145 4800	10m
113	QLD	1,675,000 tonnes	Cairns Harbour Marine clay, deposited silt. Centerpoint of 0.5nr	15/8/1990	14/8/1991	16 48 12	145 48	
114	QLD	1	Off Cairns. Centrepoint of 5nr	10/10/1990	9/11/1990	16 40	146 21	
115	NSW	2,000 cu m	Waterfront moorings, Sydney harbour Marine sand, silt, clay, sandstone. Centerpoint of 400m	16/10/1990	15/10/1991	033 5236	151 2518	
116	VIC	30 tonnes	Scrapped trawler	26/10/1990	25/4/1991	38 19	141 39	11m
117	QLD	50 car bodies	2km off Woodgate Beach Striped car bodies (up to 50 bodies)	1/11/1990	31/10/1991	25 05 30	152 34 25	9m
118	NSW	14 tonnes	Off Sydney harbour Yacht, ferro-cement hull, 17m long, 3m wide, 4m high	1/2/1991	31/7/1991	034 0000	151 3600	200fth
119	QLD	27,500 tonnes	Navigation channels of Rosslyn Bay, Queensland Marine silt, mud, fine sand, radius 100m	8/2/1991	7/2/1992	023 09 13	150 47 44	6m
120	NSW		Extension of operation to 5/5/91-variation of 5/3/90 permi	1/3/1991	5/5/1991			
121	NSW		Extension of operation to 31/3/92-variation of 1/1/89	13/3/1991	31/3/1992	33 51 48	151 24 42	
122	QLD		Due east of Mooloobabe	23/3/1991	22/4/1991	due east	154	2000fth
123	QLD	60,000 cu m	Extension of operation to 15/6/91 variation of 30/4/90	17/4/1991	15/6/1991			
124	NSW	2,650 cu m	Extension of operation to 16/6/91-variation of 5/3/90	1/5/1991	16/6/1991			
125	NSW	30 tons	bed of Hunters Hill near foreshore Sandy mud in solid form. radius 400r	20/5/1991	19/5/1992	33 52 48	151 2518	100m
126	NSW	500,000 cu m	Off Syney harbour Reinforced concrete with 4 hardwood beams, 43x 116"x 56", displacement 30 tons	14/6/1991	13/12/1991	033 4705	151 2100	45m
127	NSW	15,000 tonnes	Berthing basins and shipping channels in Port of Newcastle. (032 57 00, 151 51 00) (032 57 48, 151 50 12) (032 57 05, 151 49 12)	14/6/1991	13/6/1992	032 5620	151 5000	24m
128	QLD	94,000 tonnes	Townsville Harbour Silt, fine sand clay. (19 13 24, 146 53 36) (19 15 00, 146 52 36) (19 14 30, 146 51 30)	15/6/1991	31/8/1991	19 1248	146 52 36	
129	QLD	400,000 tonnes	Extension of operation to 18/7/91-variation of 18/12/90 ? 25/8/89 ?	18/6/1991	18/7/1991			
130	QLD	210 tonnes	(21 5 26, 149 16 22) (21 5 57, 149 16 12) (21 5 44, 149 15 29)	17/7/1991	16/7/1993	21 5 13	149 15 39	
131	QLD	40 tonnes	Trinity Inlet Marine clay, deposited silt. radius 05 miles	23/7/1991	30/11/1991	016 4724	145 4848	11-13m
132	VIC	210 tonnes	Former tug and fishing vessel-"Emily S" 30m steel construction with timber trims	21/8/1991	20/2/1992	38 24 30	141 40 00	20-24m
133	QLD	525,000 tonnes	Natural silt flow into dredged channels and harbour Silt, fine sand clay (450 000 tonnes offshore and 75 000 tonnes onshore). (019 08 43, 146 57 28) (019 11 13, 146 55 51) (019 10 39, 146 54 53)	30/8/1991	29/8/1992	019 0809	146 5629	11m
134	QLD	40 tonnes	Redcliffe Bay Concrete pipes of variable diameter and length secured with galvanised chain	14/10/1991	13/10/1992	027 1200	153 0735	5m
135	NSW	50 tonnes	.5 km off Cocos Island. Old vehicles (up to 40), aeroplane parts. Composed of metal	16/10/1991	15/4/1992	012 0240	096 5550	2000m
136	NSW	1,340 cu m	Hunters Hill and Darling Point	30/10/1991	29/10/1992	33 52 48	151 25 18	

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State	Material	Quantity/Qty (units)	Description	Commence	Expire	Latitude	Longitude	Depth
137 TAS	Jarosite	240,000 tonnes		1/11/1991	31/10/1995	43 36.5	148 14.5	
138 QLD	Dredge spoil	2,000 cu m	Darnley Is access channel Dredge spoil from the shipping channel	4/11/1991	3/5/1992	09 38 12	143 45 42	12m
139 ACT	Obsolete and rejected munitions		Off Flinders Is	3/2/1992	2/2/1993	39 37	149 25	4000m
140	Obsolete equipment		Variation of permit issued 16/10/91 Increases amount dumped	2/3/1992		12 07 30	96 48 20	
141 QLD	Dredge spoil	1,500,000 m3	Wipea Harbour Sand, silt and clay	27/5/1992	30/6/1993	12 39 18	141 40 48	13-15m
142 NSW	Dredge spoil	500,000 cu m	Port of Newcastle Recently deposited silt. (32 57 00, 151 51 00) (32 57 48, 151 50 12) (32 57 05, 151 49 12)	11/6/1992	10/6/1993	32 56 20	151 50 00	11-13m
143 NSW	Dredge spoil	1,250 m3	Hunters Hill Sandy mud. Centrepoint of 400m	18/6/1992	17/9/1992	33 52 48	151 25 18	
144	Obsolete equipment	30 tonnes	Cocos Keeling Mostly steel equipment - machinery, vehicles	18/6/1992	17/6/1994	12 07 30	96 48 20	
145 QLD	Artificial reef		Gravel dredge, 200 steel structures, 4 steel hoppers, 44 blast furnace sections, 2 steel water tank sections, 80 steel pipes, 53 steel pontoons, 6 truck chassis, 2000 tonnes steel/concrete pipes, 300 cars, 400 tram carriages. Bundaberg. (24 54 07, 152 32 27) (24 54 33, 152 32 07) (24 54 33, 152 31 52)	23/6/1992	22/6/1994	24 54 07	152 31 52	
146 TAS	Burial at sea	1	Dover	23/7/1992	22/8/1992	43 14	148 22	
147	Dredge spoil	268,000 tonnes	Variation of permit issued 30/8/91-extension to 31/10/93	17/8/1992	31/10/1992			
148 WA	Dredge spoil	0.9 million m3	Inner harbour basin and channel around Outer Breakwater. (33 16.48, 115 39.36)	25/9/1992	24/9/1995	33 15.42	115 39.25	
149 QLD	Dredge Spoil		Shipping channel & harbour Silt and calcareous sand occasional rock boulders	21/10/1992	20/10/1993	19 07 42	146 56 47	
150 NSW	Burial at sea	940,000 m3	Silt, fine sand and clay. (19 07 42, 146 58 47) (19 09 51, 146 57 25) (19 09 00, 146 55 57)	11/2/1992	31/12/1992	34 00	151 36	3000m
151 QLD	Burial at sea	1	Off Sydney Harbour	22/12/1992	25/12/1992			
152 QLD	Dredge spoil	450,000 tonnes	Extension of berthing basins Sand, clay and rock. (21 13 02, 149 16 46) (21 13 30, 149 17 38) (21 13 48, 149 17 12)	5/3/1993	4/3/1994	21 13 44	149 17 12	
153 QLD	Dredge spoil	1,000,000 m3	Capital works on port development & maintenance Silt, sand and gravel. (23 52.56, 151 27.03) (23 51.36, 151 27.48) (23 52.36, 151 28.48)	10/3/1993	9/3/1994	23 53.56	151 28.56	
154 WA	Artificial reef		2 obsolete barges	12/3/1993	11/3/1994			
155	Obsolete equipment		Variation of permit issued 18/6/92 Drums, car bodies, fridges, pipes, chains, boat trailers.	12/3/1993		12 07 30	96 48 20	
156	Obsolete equipment		Variation of permit issued 18/6/92 Permit now includes 200m asbestos fibro sheeting	12/3/1993		12 07 30	96 48 20	
157 TAS	Dredge spoil	unspecified	Maintenance of harbour	29/3/1993	28/3/1996			
158 NSW	Demolition material	4,000 tonnes	Demolition of castle on harbour foreshore Concrete blocks, bricks. Centrepoint of 200m circle	27/4/1993	27/3/1994	33 52.18	151 27.24	
159 QLD	Dredge spoil	8,958 cu m		12/5/1993	30/6/1993	16 14 24	145 48 48	
160 NSW	Dredge spoil		Variation - to extend period of operation to 30 June 93 Variation of permit issued 11/6/92	10/6/1993	30/6/1993			
161 NSW	Dredge spoil	800 m3	Mooring bay in front of house-Hunters Hill Sand and silt Centrepoint of 200m circle	10/6/1993	9/6/1994	33 52.18	151 27.24	

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State	Material	Quantity (units)	Description	Commence	Expire	Latitude	Longitude	Depth
162 QLD	Dredge spoil	500,000 m3	Capital and maintenance dredging of harbour Silt, fine sand and clay. (19 13 24, 146 53 36) (19 15 00, 146 52 36) (19 14 30, 146 51 30)	16/6/1993	15/6/1994	19 12 48	146 52 36	
163 NSW	Dredge spoil	300,000 tonnes	Maintenance dredging of harbour. (32 57 00, 151 51 00) (32 57 48, 151 50 12) (32 57 05, 151 49 12)	28/6/1993	10/6/1994	32 56 20	151 50 00	
164 QLD	Dredge spoil	1,500,000 m3	Maintenance dredging of approach channel to harbour Centrepoint of 1.1nm circle	28/6/1993	27/6/1994	12 39.18	141 40.48	
165 QLD	Dredge spoil	500,000 tonnes	Maintenance dredging of channel Clay, silt and sand Centrepoint of 1nm circle	14/7/1993	13/7/1994	16 47 24	145 48 48	
166 QLD	Dredge spoil	70,000 m3	Maintenance dredging Silt, some sand and clay. (21 13 2, 149 16 46) (21 13 30, 149 17 38) (21 12 48, 149 17 12)	15/7/1993	14/7/1994	21 13 44	149 17 12	
167 QLD	Dredge spoil		Variation. Reduce to 50 000 tonnes	21/7/1993				
168 NSW	Burial at sea	1	Off Sydney harbour. Centrepoint of 2.5nm circle	28/7/1993	27/8/1993	34 00	151 36	
169 QLD	Dredge spoil	15,000 tonnes	Maintenance dredging Clay, sand and mud. (21 5 26, 149 16 22) (21 5 57, 149 16 12) (21 5 44, 149 15 29)	28/7/1993	27/9/1993	21 5 13	149 15 39	
170 QLD	Dredge spoil	500,000 m3	Maintenance dredging of harbour and channels Silt, fine sand and clay. (19 07 42, 146 58 47) (19 09 51, 146 57 25) (19 09 00, 146 55 57)	17/8/1993	16/8/1994	19 07 42	146 56 47	
171 QLD	Artificial reef	50 tonnes	Addition to existing artificial reef - 9m depth Car and tractor tyres tied in a module form, ballasted with 150 kg concrete	18/8/1993	17/8/1995	25 05 30	152 34 25	9m
172 QLD	Dredge spoil	160,000 tonnes	Maintenance dredging Clay, sand and mud. (21 5 26, 149 16 22) (21 5 57, 149 16 12) (21 5 44, 149 15 29)	27/9/1993	26/9/1995	21 5 13	149 15 39	
173 NSW	Burial at sea	1	Off Sydney harbour Centrepoint of 2.5 nm	30/9/1993	29/10/1993	34 00	151 36	
174 WA	Dredge spoil	900,000 m3	Construction and maintenance dredging of berthing areas Calcarenite and silty sand. (20 32 34, 116 45 29) (20 33 03, 116 44 17) (20 32 04, 116 44 17) (20 30 59, 116 46 02) (20 30 59, 116 44 49)	11/11/1993	9/5/1995	20 32 04	116 45 29	
175 NSW	Obsolete pontoon		Obsolete concrete ferry landing pontoon	19/11/1993	18/11/1994	33 53	151 27.5	
176 NT	Dredge spoil	5,600 m3	Dredging of the berthing areas at Milner Bay Silt and sand with some small amounts of manganese ore. (13 51.55, 136 24.88) (13 51.85, 136 25.04) (13 51.93, 136 24.89) (13 51.93, 136 24.45)	21/12/1993	20/12/1998	13 51.55	136 24.45	
177 WA	Dredge spoil		Allow one off dumping to 15/9/94	13/1/1994	15/9/1994			
178 WA	Burial at sea	1	Centrepoint of 1nm	3/2/1994	2/3/1994	32 04	115 22	
179 QLD	Dredge spoil		Variation - to extend period of operation till 10/3/95 Silt, sand and grave	23/2/1994	10/3/1995			
180 WA	Dredge spoil	100,000 tonnes	Harbour and approach channel silt and sanc	12/4/1994	11/4/1995			11f
181 QLD	Dredge spoil		Variation of permit issued 17/8/93 Extend operation to 31/12/94 and increase amnt from 500 000 cu m to 700 000 cu m at "offshore dump site". (19 07 42, 146 58 47) (19 09 51, 146 57 25) (19 09 00, 146 55 57)	8/6/1994	31/12/1994	19 07 42	146 56 47	
182 QLD	Dredge spoil		Revokes permit issued 21/7/93-Varies permit of 16/6/93 Extend operation to 31/12/94 and decrease amnt from 500 000 cu m to 50 000 cu m at "inshore dump site". (19 13 24, 146 53 36) (19 15 00, 146 52 36) (19 14 30, 146 51 30)	8/6/1994	31/12/1994	19 12 48	146 52 36	
183 WA	Artificial Reef	250 modules	Modules constructed of tyres and weighted with concrete-28 tyres per module	17/6/1994	16/6/1994	25 02.79	113 32.25	12m

Appendix D - Permits Issued under the Environment Protection (Sea Dumping) Act 1981

State	Material	Quantity (units)	Description	Commence	Expire	Latitude	Longitude	Depth
184	QLD Dredge spoil	1,500,000 cu m	Maintenance dredging of approach channel to Weipa. 1.1 nm radius buffer.	1/7/1994	30/6/1995	12 39.3	141 40.8	7-12m
185	WA Obsolete vessel- "HMAS Adroit"	1 vessel	35nm from Rottnest Island Attack class control boat-deliberately sunk in Navy exercise	4/7/1994	3/1/1995	32 04'	114 45'	2500m
186	WA Aircraft pallets	2 pallets	Steel pallets used to deliver 2 boats to sea for army exercise Steel pallets-1.5mx2.4mx0.1m for a frequent army exercise	5/8/1994	4/2/1995	16 20	123	
187	QLD Dredge spoil	70,000 cu m	Maintenance dredging Port of Hay (21 13 01.87, 149 16 46.4) (21 13 30.31, 149 17 37.8) (21 12 48.18, 149 17 11.5)	25/8/1994	24/8/1995	21 13 44.03	149 17 12.4	
188	NSW Obsolete vessel "Provincial Trader"	1 vessel	Tug took on water & sank in 42m water in Twofold Bay-Eden Salvage oper. were given permit to re-dump in deep water, 150 degrees-30 mins East (line due E from vessel)	28/10/1994	27/4/1995			2000m
189	QLD Various		Adding to existing artificial reef-see 23/6/92 Obsolete light plane (15 seater Beechcraft Super King Air 200), 4 steel hoppers, 44 blast furnace sections, 2 steel water tank sections, 80 steel pipes (clusters of 15), 2000 tonnes steel reinforced concrete pipes (24 54 7, 152 31 52.92) (24 54 7.3, 152 32 7.17) (24 54 33.03, 152 32 7.07) (24 54 32.98, 152 31 52.82)	23/11/1994	22/11/1996			18m
190	WA "HMAS Derwent"	1 vessel	12nm west of Rottnest Is	16/12/1994	15/6/1995			
191	WA Two vessels	2 vessels	Artificial reef variation (Camarvon artificial reef)	22/12/1994				
192	QLD Dredge spoil	500,000 cu m	Extend period of operation for 2 months	31/12/1994	28/2/1995			
193	NSW Dredge spoil	2,200 tonnes		21/1/1995	19/7/1995	33 51.7	151 25.7	
194	QLD Dredge spoil	500,000 cu m		22/2/1995	23/2/1996	19 07 42	146 56 47	
195	WA Two vessels	2 vessels	Sunken fishing vessels	3/5/1995	2/11/1995	21 29.7	115 13.8	
196	QLD tyre modules	150 tyre modules	Increase the amount of material of operator	16/5/1995	17/8/1997			
197	QLD Dredge spoil	3,000 tonnes		17/5/1995	16/6/1995	23 53.56	151 28.56	
198	NSW Dredge spoil	500,000 cu m		8/6/1995	7/6/1996	32 56 20	151 50 00	
199	QLD Dredge spoil	1,200,000 cu m		19/7/1995	19/7/1996	21 13 44	149 17 12	
200	QLD Dredge spoil	150,000 tonnes		25/7/1995	30/6/1996	23 52 78	151 28 42	
201	TAS Obsolete vessel- "Iron Baron"	1 vessel		26/7/1995	25/8/1995	39 33 26	149 23 49	
202	QLD Burial at sea	1	Beyond 1000m contour line Tin Can Bay	22/8/1995				
203	WA Obsolete vessel- "Madelena II"	1 vessel		23/8/1995	23/8/1996	31 37 2	115 37 2	
204	QLD Dredge spoil	85,000 tonnes		30/9/1995	30/9/1996	21 5 13	149 15 39	
205	QLD Dredge spoil	1,500,000 tonnes		4/10/1995	30/9/1996	12 39 3	141 40 8	
206	TAS Jarosite	240,000 tonnes		1/11/1995	31/1/1997	43 36 5	148 14 5	
207	NSW Burial at sea	1		29/11/1995		34 00	151 36	
208	QLD Dredge spoil	550,000 tonnes		30/11/1995	30/11/1996	24 42 33	152 28 28	
209	QLD Mohawk Planes	2 planes	Bundaberg artificial reef	9/2/1996	9/2/1998	25 54 7	152 31 53	
210	WA Dredge spoil	900,000 cu m		19/2/1996	19/2/1999	33 15 30	115 39 30	
211	NSW Obsolete refugee boat	1 vessel	Christmas Island	15/3/1996	15/4/1996	10 25	105 38	

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State	Material	Quantity (units)	Description	Commence	Expire	Latitude	Longitude	Depth
	Obsolete machinery & equipment	various	Cocos (Keeling) Island	20/3/1996	20/3/1998	12 02 40	96 55 50	
212	Obsolete boat	1 vessel	Christmas Island	6/5/1996	6/6/1996	10 25	105 38	
213	Obsolete boat	1 vessel	Christmas Island	7/5/1996	7/6/1996	10 25	105 38	
214	Obsolete boat	1 vessel	Christmas Island	9/5/1996	9/6/1996	10 25	105 38	
215	Obsolete boat	1 vessel	Christmas Island	14/5/1996	14/6/1996	10 25	105 38	
216	Obsolete boat	1 vessel	Christmas Island	31/5/1996	31/5/1997	19 14 30	146 51 30	
217	QLD Dredge spoil	500,000 cu m	19 07 42 146 56 47	4/6/1996	4/9/1996	32 56 20	151 50 00	
218	NSW Dredge spoil	500,000 cu m		11/6/1996	11/6/1997	15 27	145 15	
219	QLD Dredge spoil	250,000 cu m		25/6/1996	25/9/1998	17 25 05	140 44 06	
220	QLD Dredge spoil	1,200,000 cu m		27/6/1996	27/8/1996			
221	QLD Steel tower	1 tower	Off Saumarez reef	22/8/1996	21/8/1997	23 9 3	150 47 79	
222	QLD Dredge spoil	46,000 tonnes		30/8/1996	29/8/1997	41 8 24	146 23 06	
223	TAS Dredge spoil	600,000 tonnes		21/10/1996	20/4/1997	23 53 93	151 28 96	
224	QLD Dredge spoil	100,000 tonnes	Also (23 52.92 151 27.03) (23 51.62 151 27.85) (23 52.63 151 29.78)	21/10/1996	20/4/1997	41 7 45	146 19 6	
225	TAS Artificial reef	1 vessel	Scuba club	30/10/1996	30/10/1997	21 5 13	149 15 39	
226	QLD Dredge spoil	95,000 cu m	Also (21 5.26 149 16.22, 21 5.57 149 16.12, 21 5.44 149 15.29)	27/11/1996	26/2/1997	20 24	117 13	
227	WA Artificial reef	1 vessel	Karratha	1/12/1996	10/1/1997	35 20	151	
228	NSW Burial at sea	1 body	Ulladulla	6/2/1997	6/2/1998	24 42 33	152 28 28	
229	QLD Dredge spoil	550,000 tonnes	Bundaberg					
	Obsolete boat	1 vessel	Christmas Island	24/3/1997	24/9/1997	10 25	105 38	
230	Obsolete boat	1 vessel	Christmas Island	3/4/1997	2/5/1997	32 45	152 55	
231	NSW Burial at sea	1 body	Port Stephens					
	Dredge spoil	340,000 cu m	Port Hedland (20 13.25, 118 35.24) (20 13.56, 118 34.12) (20 12.51, 118 33.42)	16/4/1997	15/4/1998	20 11.54	118 34.42	
232	WA Dredge spoil	340,000 cu m		1/6/1997	1/6/2000	19 7.42	146 56.47	
233	QLD Dredge spoil	500,000 cu m	Townsville (19 7.42, 146 58.47) (19 09.51, 146 57.25) (19 9 , 146 55.57)	2/6/1997	1/7/1997	43 14	148 22	
234	TAS Burial at sea	1 body	Hobart					
	Dredge spoil	500,000 cu m	Newcastle (32 55.77, 151 49.4) (32 56.16, 151 49.79) (32 56.49, 151 49.32)	11/6/1997	10/6/2000	32 56.1	151 48.94	
235	NSW Dredge spoil	340,000 cu m	Port Hedland Variation of permit - change of positor	25/7/1997	15/4/1998	20 30 14	118 43 44	
236	WA Dredge spoil	340,000 cu m	Port Hedland Variation of permit - change of positor	31/7/1997	15/4/1998	20 30 02	118 43 26	
237	WA Dredge spoil	340,000 cu m	Port Hedland Variation of permit - change of positor					
	Obsolete boat	5 vessels	Christmas Island	8/10/1997	7/10/1998	10 25	105 38	
238	Obsolete boat	5 vessels	Christmas Island					
	Dredge spoil	25,000 cu m	Maintenance work Hay Point (21 13 1.87, 149 16 46.43) (21 13 30.31, 149 17 37.84) (21 12 48.18, 149 17 11.53)	10/10/1997	9/10/1998	21 13 44.03	149 17 12.4	
239	QLD Dredge spoil	25,000 cu m		10/10/1997	9/11/1997	36 15	150 30	
240	NSW Burial at sea	1 body	Moruya	20/11/1997	2/11/1999	21 33 8	115 4 5	
241	WA Dredge spoil	3,500,000 cu m	Onslow (21 33.9, 115 5.7) (21 35.9, 115 6.2) (21 35.8, 115 5.3)	1/12/1997	30/11/1998	21 5 13	149 15 39	
242	QLD Dredge spoil	148,000 cu m	Mackay (21 5 26, 149 16 22) (21 5 57, 149 16 12) (21 5 44, 149 15 29)					
	Artificial reef	various items	Bundaberg (24 54 33.03, 152 32 7.07) (24 54 7.3, 152 32 7.17) (24 54 32.98, 152 31 52.82)	3/12/1997	2/12/1998	24 54 7	152 31 52.92	
243	QLD Artificial reef	various items						

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State	Material	Quantity (units)	Description	Commence	Expire	Latitude	Longitude	Depth
244 WA	Obsolete refugee boat	1 vessel	Ashmore Reef	11/12/1997	10/1/1998	12 07	122 53	
245 WA	Artificial reef	1 vessel	HMAS Swan Geographe Bay	11/12/1997	10/12/1998	33 33 02	115 06 02	
246 TAS	Dredge spoil	148,000 cu m	Devonport	16/1/1998	15/1/1999	41 08.21	146 23.37	
247 WA	Dredge spoil	1,000,000 cu m	Dampier (20 36 54, 116 40 33) (20 35 46, 116 40 40) (20 35 46, 116 40 58)	23/1/1998	30/9/1998	20 36 54	116 40 51	
248 QLD	Burial at sea	1 body	Cairns	12/3/1998	12/4/1998	16 40	146 21	
249 TAS	Well head	1	Bass Strait	7/4/1998	7/5/1998	38 45	140	
250 WA	Dredge spoil	550,000 cu m	Dampier (20 36 54, 116 40 33) (20 35 46, 116 40 40) (20 35 46, 116 40 58)	21/4/1998	30/6/1999	20 36 54	116 40 51	
251 QLD	Dredge spoil	160,100 cu m	Gladstone (23 52.92, 151 27.03) (23 51.62, 151 27.85) (23 52.63, 151 29.78)	22/4/1998	22/4/1999	23 53.95	151 28.96	
252 TAS	Well head	1	Bass Strait Variation	22/4/1998	7/5/1998	38 45	149	
253 WA	Fish Waste	160 tonnes	Geraldton	23/4/1998	22/4/1999	28 45	114 21 25	
254 QLD	Dredge spoil	3,000,000 cu m	Weipa	1/5/1998	30/4/2000	12 66 12	141 65 56	
255 TAS	Dredge spoil	240,000 cu m	Variation to increase amount to 240,000 cu m - Devonport	24/5/1998	15/1/1999	41 08.21	146 23.37	
256 QLD	Dredge spoil	1,020,000 cu m	Variation to extend period of permit - Karumbi	25/5/1998	30/9/2000	17 25 05	140 40 06	
257 WA	Obsolete refugee boat	1 vessel	Ashmore Reef	29/5/1998	29/6/1998	12 07	122 53	
258 QLD	Dredge spoil	88,000 cu m	Port Pennefather	1/6/1998	31/7/2000	12 17.2	141 40.4	
259 WA	Dredge spoil	800,000 cu m	Variation to increase spoil size - Dampier (20 36 54, 116 40 33) (20 35 46, 116 40 40) (20 35 46, 116 40 58)	9/6/1998	30/6/1999	20 36 54	116 40 51	
260 NSW	Dredge spoil	24,000 cu m	Newcastle (32 55.77, 151 49.4) (32 56.16, 151 49.79) (32 56.49, 151 49.32)	1/7/1998	31/12/1998	32 56.1	151 48.94	
261 WA	Dredge spoil	3,000,000 tonnes	UTM Grid Zone 50 (AMG); SE corner 7,720,400 mN 466,800mE; SW corner 7,720,400 mN 466,200mE; NW corner 7,722,500 mN 466,400mE; NE corner 7,722,500 mN 467,000mE; Perth Variation of permit from 2,000,000 cu m	17/7/1998	30/9/1998			
262 WA	Dredge spoil	550,000 tonnes	A circle of centrepoint 0.5 nm centred on the coords, Bundaberç	24/7/1998	23/7/1999	24 42 20	152 28 17	
263 WA	Artificial Reef - boat "Samson II"	1 vessel		17/8/1998	16/1/1999	20 24	117 13	
264 QLD	Dredge spoil	1,500,000 cu m	Variation from 1,020,000 cu m	19/8/1998	30/9/2000	17 25 05	140 40 06	
265 NSW	Dredge spoil	10,000 cu m		8/9/1998	1/9/1999	28 10.22	153 33.81	
266 NSW	Dredge spoil	25,000 cu m		29/10/1998	28/10/1999	33 52.3	151 27.4	
267 WA	Burial at sea	1 body	Fremantle	18/11/1998	17/12/1998	32 02	115 02	
268 QLD	Dredge spoil	148,000 cu m	MacKay (21 5 26, 149 16 22) (21 5 57, 149 16 12) (21 5 44, 149 15 29)	30/11/1998	28/2/1999	21 5 13	149 15 39	
269 WA	Vessels	6 vessels	Variation extension of 3 months	18/12/1998	17/12/1999	10 25	105 38	
270 WA	Granite	9,100 tonnes	Christmas Island	22/12/1998	21/12/1999	32 01	115 44	
271 NT	Obsolete vessel - "Min Ping You No. 8"	1 vessel	Port Essington	8/1/1999	7/7/1999	10 40	132 04	

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State	Material	Quantity (units)	Description	Commence	Expire	Latitude	Longitude	Depth
272 NSW	Artificial Reef - vessel "Demetrius"	1 vessel	Coffs Harbour	15/1/1999	14/1/2000	29 55.075	153 22.83	
273 TAS	Dredge spoil	210,000 cu m	Devonport	2/2/1999	1/2/2000	41 8.45	146 23.1	
274 NSW	Artificial Reef - vessel "Urunga"	1 vessel		5/3/1999	4/3/2000	33 58.374	151 15.766	
275 QLD	Dredge spoil	12,000/25,000 cu m	(21 5 26, 149 16 22) (21 5 57, 149 16 12) (21 5 44, 149 15 29) Mackay	10/3/1999	31/8/1999	21 5 13	149 15 39	
276 WA	Obsolete vessel - "Min Ping Liu No. 25"	1 vessel	Port Hedland	12/3/1999	11/3/2000	20 02.5	118 22.2	
277 NSW	Obsolete vessel - "Torrens"	1 vessel		8/4/1999	7/10/1999	31 47	114 47	
278 QLD	Dredge spoil	118,000 cu m	(19 16 1.666, 146 50 33.353) (19 15 37.915, 146 50 33.376) (19 15 37.586, 146 50 28.237) Townsville	12/4/1999	11/4/2000	19 15 40.839	146 50 27.892	
279 WA	Vessels	up to 4 vessels	Ashmore Reef	23/4/1999	22/10/1999	12 11	122 45	
280 QLD	Artificial Reef	1 barge	(24 54 7.3, 152 32 7.17) (24 54 33.03, 152 32 7.07) (24 54 32.98, 152 31 52.82) Bundaberg	13/5/1999	12/5/2000	24 54 7	152 31 52.92	
281 QLD	Dredge spoil	30,000 cu m	(21 13 1.87, 149 16 46.43) (21 13 30.31, 149 17 37.84) (21 12 48.28, 149 17 11.53) Mackay	14/5/1999	13/5/2000	21 13 44.03	149 17 12.4	
282 QLD	Dredge spoil	100,000 cu m	(23 52.92, 151 27.03) (23 51.62, 151 27.85) (23 52.63, 151 29.78) Gladstone	9/6/1999	8/6/2000	23 53.93	151 28.96	
283 NSW	Obsolete vessel - "Torrens"	1 vessel	Variation (31 47, 114 30)	10/6/1999	7/10/1999	31 47	114 47	
284 NSW	Dredge spoil	165,000 tonnes	Variation of 14/12/87. Triangular area 7nm ESE of Port Jackson	?/88				
285 QLD	Dredge spoil	11,200,000 cu m	Karumba			17 25.05	140 40.06	

Appendix E - Database of Chemical Dumping Episodes

Material	State	Quantity	Quantity (units)	Description (1)	Description (2)	Start Date	Finish Date	Latitude DMS	Longitude DMS	Other Detail of Dumping Position	Depth
PARANITROCHLOROBENZENE	SA	487	drums			29/5/1939				50 miles east of north end of Flinders Island	1 138f
MUSTARD GAS	QLD	320	100 pound	320 100 pound bombs - refer Chemical Warfare Agent Sea Dumping off Australia		12/10/1945		18,30	148,5		600f
MUSTARD GAS	QLD	700	65 pound	refer Chemical Warfare Agent Sea Dumping off Australia		14/10/1945		18	148		600f
CHEMICAL WARFARE AGENT	NSW			Various - refer Chemical Warfare Agent Sea Dumping off Australia	Loaded on ship BANTAM	24/9/1946		34,18.8	151,43.6		1829m
CHEMICAL WARFARE AGENT	NSW			Various - refer Chemical Warfare Agent Sea Dumping off Australia	Loaded on ship BINNGARRA	11/12/1946		34,10.2	151,53.1	50 miles east of southern portion of Flinders Island	2 195m
PARANITROCHLOROBENZENE	SA	657	drums	Dumped by Argonaut II		30/4/1949					300f+
RAPIDECH CRYSTALLISED CHEMICAL	NSW	?	?		Sunk under supervision of HMAS Kangaroo	13/12/1949		34,02,00	151,44,00		556f
SPRAYING OIL	NSW	6	drums			5/9/1950					3040f
SODIUM CYANIDE RESIDUE	SA	19	drums	10wt		16/6/1953		37,20,00	131,40,00	0915 hours long 135 deg	3000f
MUSTARD GAS	NSW	~4	pounds	refer Chemical Warfare Agent Sea Dumping off Australia		12/10/1965		34,23	151,26		3 10f
MEDICAL STORES/SULPHUR DRUGS	QLD	0.50	ton			2/2/1966		26,59,00	153,57,00		450f
CYANIDE	NSW	7	drums			14/2/1966				24m ESE of North Head	
CYANIDE	NSW	10	drums			14/2/1966				24m ESE of North Head	
CYANIDE RESIDUE	NSW	10	drums			27/9/1966		33,58,55.6	151,42,19.3		
METHYL PARATHION	NSW	2	drums			27/9/1966		33,58,55.6	151,42,19.3		
POLYMERISED ETHYLENE OXIDE	NSW	1	drum			27/9/1966		33,58,55.6	151,42,19.3		
SULPHONAMIDES & ANTHISTAMINES	NSW	2	drums			27/9/1966		33,58,55.6	151,42,19.3		
MEDICAL STORES FROM WATER POUCE	QLD	0.25	ton			20/12/1966		26,59,00	153,57,00		450f
CHLORINATED HYDROCARBONS	NSW	1760	gallons	44 gal drums		21/2/1967		33,59,18.6	151,43,26		
CHLORINATED HYDROCARBONS	NSW	1584	gallons	44 gal drums		22/2/1967		33,59,18.6	151,43,26		
CHLORINATED HYDROCARBONS	NSW	44	drums			22/3/1967		33,59,18.6	151,43,26		
CHLORINATED HYDROCARBONS	NSW	44	drums			23/3/1967		33,59,18.6	151,43,26		
CHLORINATED HYDROCARBONS	NSW	44	drums			8/5/1967		33,59,41.6	151,44,32.6		
CHLORINATED HYDROCARBONS	NSW	42	drums			29/5/1967		33,59,41.6	151,44,32.6		
CHLORINATED HYDROCARBONS	NSW	1834	gallons	44 & 12.5 gal drums		20/6/1967		33,59,41.6	151,44,32.6		
CHLORINATED HYDROCARBONS	NSW	1741	gallons	44 & 12.5 gal drums		12/7/1967		33,59,18.6	151,43,26		
CHLORINATED HYDROCARBONS	NSW	621	gallons	44 & 12.5 gal drums		25/7/1967		33,59,18.6	151,43,26		
CYANIDE RESIDUE	NSW	396	gallons	44 gal drums		25/7/1967		33,59,18.6	151,43,26		
CHLORINATED HYDROCARBONS	NSW	6952	gallons	44 gal drums		25/8/1967		33,58,32.6	151,41,12.7		
PESTICIDES	SA	180	gallons	15 drums	12 gallon drums	9/9/1967		38,13,00	138,12,00		

Appendix E - Database of Chemical Dumping Episodes

Material	State	Quantity	Quantity (units)	Description (1)	Description (2)	Start Date	Finish Date	Latitude DMS	Longitude DMS	Other Detail of Dumping Position	Depth
CHORINATED HYDROCARBONS	NSW	8008	gallons			28/11/1967		33.51, 19.9	151.45, 51.6		
TOXIC SLUDGE	NSW	160	gallons			28/11/1967		33.51, 19.9	151.45, 51.6		
CYANIDE	NSW	1584	gallons	36 drums	44 gallon drums	29/11/1967		37.22, 00	150, 22, 00		
CYANIDE	NSW	352	gallons	44 drums	8 gallon drums	30/11/1967		34.39, 00	151, 16, 00		
CHORINATED HYDROCARBONS	NSW	3784	gallons			13/2/1968		33.51, 19.9	151, 47, 3.6		
CYANIDE RESIDUE	NSW	836	gallons			13/2/1968		33.51, 19.9	151, 47, 3.6		
CHORINATED HYDROCARBONS	NSW	8096	gallons			16/2/1968		33.51, 19.9	151, 47, 3.6		
CYANIDE RESIDUE	NSW	264	gallons			16/2/1968		33.51, 19.9	151, 47, 3.6		
CHORINATED HYDROCARBONS	NSW	6600	gallons			6/5/1968		33.51, 19.9	151, 45, 51.6		
CYANIDE	QLD	15	Vats		Cyanide impregnated vats	Jun-68		31, 06, 00	153, 25, 00		540f
CYANIDE	VIC	5	pots		Obsolete cyanide-pots weighted in 45 gallon drums	8/7/1968		36, 25, 00	150, 30, 00		500f
CYANIDE	NSW	264	gallons	44 gallon drums used x 6	Cyanide residue	2/8/1968		33.51, 19.9	151, 43, 27.5		200f
HYDROCARBONS	NSW	1760	gallons	44 gallon drums used x 40	Hydrocarbons	2/8/1968		33.51, 19.9	151, 43, 27.5		200f
HYDROCARBONS	NSW	5236	gallons	44 gallon drums used x 119	Contaminated residue	2/8/1968		33.51, 19.9	151, 43, 27.5		200f
CYANIDE	VIC	115	gallons	5 gallon drums x 23	Cyanide	30/8/1968		38, 48, 00	151, 20, 00		2000f
CYANOGEN BROMIDE	NSW	88	gallons	44 gallon drums used x 2	Cyanogen Bromide	6/9/1968		33.51, 19.9	151, 42, 15.5		90f
PHOSPHOROUS TRICHLORIDE	NSW		cartons and drums	44 gallon drums used	Phosphorous Trichloride-935 cartons and 9 x 44 gal. drums	20/9/1968		33.51, 19.9	151, 47, 3.6		275f
CYANIDE	QLD	4	vats		Cyanide impregnated vats	Jan-69		46, 52, 00	153, 49, 00		500f
ELECTRIC PLATING VATS	QLD	2649	lbs	Cyanide impregnated-partially neutralised	Also 20 x OMC-180 lbs	8/1/1969		26, 52, 00	153, 48, 00		500f
WHITE SPIRIT/PERCHLOROETHYLENE	NSW	88	gallons	44 gallon drums used x 2	White spirit/Perchloroethylene (50:50)-2 x 44 gallon drums	4/3/1969		33.51, 19.9	151, 43, 27.5		300f
PESTICIDES	VIC	144	gallons	12 gallon drums used		2/4/1969		35, 16, 00	103, 41, 00		
CHEMICALS	VIC	20	gallons	5 gallon drums used x 4	Obsolete chemicals	14/4/1969		38, 57, 00	151, 17, 00		2500f
CYANIDE	VIC	90	gallons	45 gallon drums used x 2	Scrap cyanide	14/4/1969		38, 57, 00	151, 17, 00		2500f
CYANIDE	VIC	13	gallons	13 gallon drums used x 1	Scrap cyanide	14/4/1969		38, 57, 00	151, 17, 00		2500f
ARSENICAL SOLUTION	WA	19360	gallons	44 gallon drums used x 440 drums	Waste Arsenical Solution in 44 gal. Drums	18/4/1969		31, 37, 00	114, 14, 00		2950f
CYANA-GAS	VIC	20	gallons	20 gallon drums used	Cyana-gas	7/5/1969		29, 50, 00	84, 00, 00		1500f
CYANA-GAS	VIC	40	gallons	10 gallon drums used x 4	Cyana-gas	7/5/1969		29, 50, 00	84, 00, 00		1500f
SODIUM CYANIDE	VIC	352	gallons	44 gallon drums used x 8 drums	Sodium cyanide	7/5/1969		29, 50, 00	84, 00, 00		1500f
HYDROCARBONS	NSW	6424	gallons	44 gallon drums used x 146	Contaminated hydrocarbons	8/9/1969		33, 59, 45.9	151, 41, 28.1		200f
CYANIDE	NSW	3273	kg	Enclosed in 12.5 gallon sealed drums	20% cyanide salt & 80% sodium carbonate in lump form	15/9/1969				37.5km S, 13km E of South Head	
HYDROCARBONS	NSW	6660	gallons	45 gallon drums used x 148	Contaminated hydrocarbons	29/9/1969		33, 59, 45.9	151, 41, 28.1		200f
CYANIDE		352	gallons	8 drums	44 gallon drums	12/10/1969		37, 09, 00	150, 39, 00		
CYANIDE	VIC	3124	gallons	44 gallon drums-20/10/68?	Cyanide-71 x 44 gal. drums and 2 pots	20/10/1969		38, 30, 00	148, 47, 00		1000f

Appendix E - Database of Chemical Dumping Episodes

Material	State	Quantity	Quantity (units)	Description (1)	Description (2)	Start Date	Finish Date	Latitude DMS	Longitude DMS	Other Detail of Dumping Position	Depth
ARSENICAL SOLUTION	NSW	20	drums		Waste Arsenical Solution	Nov-69		32,04,00	115,04,00		200-f
HYDROCARBONS	NSW	8640	gallons	45 gallon drums x 192	Contaminated hydrocarbons	4/11/1969		33,51,19.9	151,44,39.6		200f
SHEEP DIP	NSW	462	Gallons		Sheep dip	4/11/1969		33,51,19.9	151,44,39.6		200f
IRON CALCINE	TAS	11 621	tonnes	Continuous twice daily dumping refer Chemical Warfare Agent Sea Dumping off Australia	Iron Calcine derived from the roasting of iron pyrite Iron-58% zinc 2% lead 1% silica 6% trace quantities of other heavy metals	Jan-70	Jun-70	40,58,12	146,36,00		50m
MUSTARD GAS	QLD	0.5	ton			23/1/1970		26,59,30	153,57		450f
MUSTARD GAS CYLINDERS	QLD	0.50	ton			23/1/1970		26,59,30	153,57,00		450f
CYANIDE	VIC	190	gallons	5 gallon drums x 38	Waste cyanide	3/2/1970		38,08,00	155,26,00		2500f
CYANIDE	VIC	50	gallons	25 gallon drums x 2	Waste cyanide	3/2/1970		38,08,00	155,26,00		2500f
PYROTECHNICS	VIC	90	gallons	45 gallon drums x 2	Obsolete pyrotechnics	3/2/1970		38,08,00	155,26,00		2500f
SODIUM AZIDE	NSW	375	gallons	15 drums	25 gallon drums	3/2/1970		38,08,00	155,26,00		2500f
CYANIDE RESIDUE	NSW	1056	gallons	44 gallon drums x 24	Cyanide residue	12/2/1970		33,4,47.4	151,33,11.7		
CYANIDE SALT	NSW	1027	gallons	13 gallon drums x 79	Cyanide salt	12/2/1970		33,4,47.4	151,33,11.7		
HYDROCARBONS	NSW	6864	gallons	44 gallon drums	Contaminated hydrocarbons-156 x 44 gal. drums	12/2/1970		33,4,47.4	151,33,11.7		150f
ARSENICAL SOLUTION	WA	20	drums		Waste arsenical solution-20 drums	Mar-70		32,20,00	114,55,00		350f
SODIUM AZIDE	WA	3	tons	Reject material from reserve stock	Sodium azide	Apr-70		34,13,00	97,12,00		
IRON CALCINE	TAS	82 411	tonnes	Continuous twice daily dumping	See Jan 70 dumping for details of material dumped	Jul-70	Jun-71	40,58,12	146,36,00		50m
CYANIDE	VIC	90	gallons	5 gallon drums x 18	Cyanide	23/7/1970		39,02,00	142,20,00		400f
CYANIDE	VIC	96	gallons	24 gallon drums x 4	Cyanide	23/7/1970		39,02,00	142,20,00		400f
CYANIDE	VIC	1408	gallons	44 gallon drums x 32	Obsolete cyanide-32 x 44 gal. drums	Aug-70		38,22,00	152,16,00		
CYANIDE	TAS	8	drums		Waste cyanide-8 drums	4/8/1970		42,02,00	144,34,00		500f
PYROTECHNICS	VIC	1	ton		Obsolete pyrotechnics	30/8/1970		38,22,00	152,16,00		
CERAMICS	WA	100	tons	Also in April 1970	Ceramics contaminated with arsenic	Dec-70		32,00,00	114,30,00		
PESTICIDES	VIC	384	gallons	12 gal. drums	Pesticides-32 drums	23/12/1970		35,02,00	88,09,00		
HYDROCARBONS	NSW	7392	drums	44 gallon drums x 168	Contaminated hydrocarbons-44 gal. drums	12/1/1971		33,53,4.7	151,40,58.2		
CYANIDE	VIC	10	drums		Waste cyanide	1/2/1971		43,23,00	145,32,00		500f
CARBONATE/CYANIDE	NSW	151	lbs		Zinc carbonate and cyanide	19/5/1971		33,40,54.5	151,43,23.1		
HYDROCARBONS	NSW	7392	gallons		Contaminated hydrocarbons-168 x 44 gal. drums	19/5/1971		33,40,54.5	151,43,23.1		
SOLVENTS	NSW	10	gallons	5 gallon drums x 2	Mixed solvents/narcotic residues	19/5/1971		33,40,54.5	151,43,23.1		
HYDROCARBONS	NSW	7392	gallons	44 gallon drums used x 168	Contaminated hydrocarbons	1/6/1971		33,40,54.5	151,43,23.1		

Appendix E - Database of Chemical Dumping Episodes

Material	State	Quantity	Quantity (units)	Description (1)	Description (2)	Start Date	Finish Date	Latitude DMS	Longitude DMS	Other Detail of Dumping Position	Depth
CONTAMINATED HYDROCARBON	NSW	7392	gallons	44 gallon drums x 168	Vinyl Chloride Tar-duplicate of 10/6/71 dumping?	8/6/1971		33,46,6.5	151,43,58.3		
HYDROCARBONS	NSW	7392	gallons	44 gallon drums x 168	Contaminated hydrocarbons	10/6/1971		33,46,6.5	151,43,58.3		
IRON CALCINE	TAS	159,439	tonnes	Continuous twice daily dumping	See Jan 70 dumping for details of material dumped	Jul-71	Jun-72	40,58,12	146,36,00		50m
HYDROCARBONS	NSW	7392	gallons	44 gallon drums x 168	Contaminated hydrocarbons	16/7/1971		34,1,1.5	151,42,29.4		
HYDROCARBONS	NSW	7392	gallons	44 gallon drums x 168	Contaminated hydrocarbons	28/8/1971		33,57,9.3	151,36,41.7		
CYANIDE	VIC	85	gallons	5 gal. Drums x 17	Waste cyanide	6/9/1971		38,14,00	156,37,00		3000f
HYDROCARBONS	NSW	7392	gallons	44 gallon drums x 168	Contaminated hydrocarbons	9/9/1971		33,48,16.5	151,41,54		
HYDROCARBONS	NSW	7392	gallons	44 gallon drums x 168	Contaminated hydrocarbons	4/10/1971		33,46,16.9	151,42,47.4		
HYDROCARBONS	NSW	7392	gallons	44 gallon drums x 168	Contaminated hydrocarbons	8/12/1971		33,50,6.5	151,43,12.1		
HYDROCARBONS	NSW	14784	gallons	44 gallon drums x 336 drums	Contaminated hydrocarbons	1/3/1972		24,02,00	151,36,00		
HYDROCARBONS	NSW	7392	gallons	46 gallon drums x 168	Contaminated hydrocarbons	28/3/1972		33,50,6.5	151,42,00		
HYDROCARBONS	NSW	7392	gallons	47 gallon drums x 168	Contaminated hydrocarbons	20/4/1972		33,50,6.5	151,42,00		
CYANIDE	NSW	1300	gallons	44 gallon drums	Cyanide in alkaline solution-40 drums	27/4/1972		34,03,54.7	151,43,17.8		
HYDROCARBONS	NSW	5280	gallons	44 gallon drums x 120	Contaminated hydrocarbons	16/5/1972		33,50,6.5	151,42,00		
CYANIDE	VIC	63	gallons	12.5 gallon drums	Obsolete cyanide	19/5/1972		41,24,00	143,57,00		1200f
POISONOUS MATERIAL	VIC	70	gallons	5 gallon drums x 14	Poisonous material-14 x 5 gal. drums	19/5/1972		41,24,00	143,57,00		1200f
HYDROCARBONS	NSW	7040	gallons	44 gallon drums x 160	Contaminated hydrocarbons	20/6/1972		33,50,6.5	151,42,00		
HYDROCARBONS	NSW	7392	gallons	47 gallon drums x 168	Contaminated hydrocarbons	27/6/1972		33,50,6.5	151,42,00		
IRON CALCINE	TAS	176,538	tonnes	Continuous twice daily dumping	See Jan 70 dumping for details of material dumped	Jul-72	Jun-73	40,58,12	146,36,00		50m
CONTAMINATED HYDROCARBON	NSW	7392	gallons	47 gallon drums x 168	Waste cyanide-15 tons	25/7/1972		33,50,6.5	151,42,00		
CYANIDE	VIC	15	tons		Waste cyanide-15 tons	26/7/1972		43,40,00	145,34,00		700f
FLARES	VIC	95	gallons	5 gallon drums x 19	Obsolete flares	26/7/1972		43,40,00	145,34,00		700f
HYDROCARBONS	NSW	7392	gallons	44 gallon drums x 168	Contaminated hydrocarbons	8/8/1972		33,50,6.5	151,42,00		
HYDROCARBONS	NSW	7392	gallons	45 gallon drums x 168	Contaminated hydrocarbons	25/8/1972		33,50,6.5	151,42,00		
PYROTECHNICS	NSW	unknown			Outdated pyrotechnics	Sep-72		32,00,00	115,03,00		500f
RESIDUE FROM GRAIN CLEANING	WA	1320	gallons	44 gallon drums x 30	Residue from grain cleaning-30 drums	Oct-72		32,04,00	114,52,00		
JAROSITE	TAS	330	tonnes	Trial dumping	zinc and iron precipitates-ammonium jarosite,zinc ferrite,gypsum,lead sulphate,silica and trace quant. of heavy metals	19/12/1972		40,14,00	148,18,30		1500m
SPENT CAUSTIC SODA	NSW	3150	tonnes		Spent caustic soda-hydroxide 10% sodium sulphide 6% and trace quant. of sodium mercaptides	25/4/1973				(33,49,00/155,00,00) (36,12,00/158,00,00)	4000m

Appendix E - Database of Chemical Dumping Episodes

Material	State	Quantity	Quantity (units)	Description (1)	Description (2)	Start Date	Finish Date	Latitude DMS	Longitude DMS	Other Detail of Dumping Position	Depth
IRON CALCINE	TAS	150 240	tonnes	Continuous twice daily dumping	See Jan 70 dumping for details of material dumped	Jul-73	Jun-74	40.58, 12	146.36, 00		50m
SPENT CAUSTIC SODA	NSW	2751	tonnes		See Apr 73 dumping for details of material dumped	4/8/1973				(33,49,00/155,00,00) (36,12,00/158,00,00)	4000m
SPENT CAUSTIC SODA	NSW	1533	tonnes		See Apr 73 dumping for details of material dumped	7/11/1973				(33,49,00/155,00,00) (36,12,00/158,00,00)	4000m
JAROSITE	TAS	34 068	tonnes	One ref says 64 038 tonnes	see 19/12/72 dumping for details of material dumped	Dec-73	Jun-74	43,38, 00	148, 18, 00	Buffer - radius of 8km	2000m
SPENT CAUSTIC SODA	NSW	2900	tonnes		See Apr 73 dumping for details of material dumped	19/4/1974				(33,49,00/155,00,00) (36,12,00/158,00,00)	4000m
IRON CALCINE	TAS	148 431	tonnes	Continuous twice daily dumping	See Jan 70 dumping for details of material dumped	Jul-74	Jun-75	40.58, 12	146.36, 00		50m
JAROSITE	TAS	96 500	tonnes	One ref says 99 599 tonnes	see 19/12/72 dumping for details of material dumped	Jul-74	Jun-75	43,38, 00	148, 18, 00	Buffer - radius of 8km	2000m
SPENT CAUSTIC SODA	NSW	2900	tonnes		See Apr 73 dumping for details of material dumped	26/9/1974				(33,49,00/155,00,00) (36,12,00/158,00,00)	4000m
SPENT CAUSTIC SODA	NSW	2000	tonnes	Approx tonnage, 150 miles off SE Aust coastline	See Apr 73 dumping for details of material dumped	Nov-74		35,20, 00,	154,40, 00		
PHOSPHOROUS TRICHLORIDE	NSW	15 000	kg	Liquid form-released from a barge	Phosphorous Trichloride-50 x 44 gal. steel drums	22/1/1974		34,10, 00	151,55, 00		1800m
IRON CALCINE	TAS	116 315	tonnes	Continuous twice daily dumping	See Jan 70 dumping for details of material dumped	Jul-75	Jun-76	40.58, 12	146.36, 00		50m
JAROSITE	TAS	106 433	tonnes	Some of the data suggests more was dumped? This is dry wgt?	see 19/12/72 dumping for details of material dumped	Jul-75	Jun-76	43,38, 00	148, 18, 00	Buffer - radius of 8km	2000m
SPENT CAUSTIC SODA	NSW	2850	tonnes		See Apr 73 dumping for details of material dumped	12/7/1975				(26,30,00/166,00,00) (25,50,00/167,05,00)	
EXHAUST VALVES	NSW	18000	valves	3000 valves in each box-from aircraft engines x 6 boxes	Unservicable sodium filled engine exhaust valves	17/1/1976		34,00, 00	151,36, 00	Course 160, 7 knots) 150 miles off SE Australian Coast, Began at 8am-finished at 3.25pm	300m
SPENT CAUSTIC SODA	NSW	1000	tonnes	Approx tonnage	See Apr 73 dumping for details of material dumped	31/5/1976		35,43, 00	156,40, 00		
IRON CALCINE	TAS	142 676	tonnes	Continuous twice daily dumping	See Jan 70 dumping for details of material dumped	Jul-76	Jun-77	40,58, 12	146,36, 00		50m
JAROSITE	TAS	133 000	tonnes	One ref has 133 509 tonnes	see 19/12/72 dumping for details of material dumped	Jul-76	Jun-77	43,38, 00	148, 18, 00	Buffer - radius of 8km	2000m
SPENT CAUSTIC SODA	NSW	2695	tonnes		See Apr 73 dumping for details of material dumped	7/2/1977				(36,05,00/153,10,00) (36,40,00/153,56,00) (36,40,00/153,43,00)	4000m
IRON CALCINE	TAS	157 666	tonnes	Continuous twice daily dumping	See Jan 70 dumping for details of material dumped	Jul-77	Jun-78	40,58, 12	146,36, 00		50m
JAROSITE	TAS	143 158	tonnes	Some of the data suggests more was dumped? This is dry wgt?	see 19/12/72 dumping for details of material dumped	Jul-77	Jun-78	43,38, 00	148, 18, 00	Buffer - radius of 8km	2000m

Appendix E - Database of Chemical Dumping Episodes

Material	State	Quantity	Quantity (units)	Description (1)	Description (2)	Start Date	Finish Date	Latitude DMS	Longitude DMS	Other Detail of Dumping Position	Depth
SPENT CAUSTIC SODA	NSW	2500	tonnes	Approx tonnage	See Apr 73 dumping for details of material dumped	23/7/1977				(35,45,00/153,40,00) (36,37,00/153,29,00)	4000m
SPENT SULPHURIC ALKYLATION ACID	NSW	2300	tonnes	Contains small quantities of hydrocarbon and organic material	Spent sulphuric alkylation acid loaded at Port Kembla	11/8/1977				(34,51,00/154,25,00) (35,23,00/154,58,00) (35,18,00/155,09,00) (34,29,00/154,20,00)	4000m
SPENT SULPHURIC ALKYLATION ACID	NSW	3500	tonnes	Contains small quantities of hydrocarbon and organic material	Spent sulphuric alkylation acid	15/2/1978				(32,52,00/153,50,00) (39,34,00/152,52,00)	
EXHAUST VALVES	NSW	1932	valves	322 valves per container x 6	Unservicable sodium filled engine exhaust valves	Jun-78		34,00,00	151,35,00		200m
IRON CALCINE	TAS	54 232	tonnes	Continuous twice daily dumping	See Jan 70 dumping for details of material dumped	Jul-78	Jun-79	40,58,12	146,36,00		50m
JAROSITE	TAS	142 236	tonnes	Some of the data suggests more was dumped? This is dry wgt?	see 19/12/72 dumping for details of material dumped	Jul-78	Jun-79	43,38,00	148,18,00	Buffer - radius of 8km	2000m
SPENT CAUSTIC SODA	NSW	1980	tonnes	Approx tonnage	See Apr 73 dumping for details of material dumped	Jul-78				(34,53,00/154,00,00) (36,20,00/153,30,00)	
SPENT SULPHURIC ALKYLATION ACID	NSW	2440	tonnes	Contains small quantities of hydrocarbon and organic material	Spent sulphuric alkylation acid	Jul-78				(35,45,00/153,49,00) (38,35,00/152,55,00)	
PHOSPHORUS OXYCHLORIDE	NSW	4	tonnes	loaded at Botany Bay	In glass carboys with frangible aluminium disk	1/8/1978		34,15,00	151,50,00		2000m
EXHAUST VALVES	NSW	322	valves	421 valves per container	Unservicable sodium filled engine exhaust valves	Dec-78		34,00,00	151,35,00		200m
SPENT SULPHURIC ALKYLATION ACID	NSW	3500	tonnes	Contains small quantities of hydrocarbon and organic material	Spent sulphuric alkylation acid	Feb-79				More than 150 miles off coast, south of 25 degrees and not less than 100 miles from all islands and reefs	
SPENT CAUSTIC SODA	NSW	1474	tonnes	Approx tonnage	See Apr 73 dumping for details of material dumped	Apr-79				(37,18,00/153,40,00) (38,35,00/153,12,00)	4000m
IRON PYRITE	TAS	15 000	tonnes	300 tonnes per day	Unused iron pyrite (containing iron 40% zinc 3% lead 1.4%)	May-79	Jun-79	40,58,12	146,36,00	Bass Strait	50m
HEAT TREATED SALTS	NSW	9	tonnes		Heat treated salts in 26 x 44 gal. drums	26/5/1979		34,10,00	151,55,00		2000m
SPENT SULPHURIC ALKYLATION ACID	NSW	2500	tonnes	Contains small quantities of hydrocarbon and organic material	Spent sulphuric alkylation acid	Jun-79				More than 150 miles off coast, south of 25 degrees and not less than 100 miles from all islands and reefs	4000m
JAROSITE	TAS	199 926	tonnes	Continuous daily dumping	see 19/12/72 dumping for details of material dumped	Jul-79	Jun-80	43,38,00	148,18,00	Buffer - radius of 8km	2000m
SODIUM	NSW	350	kg			24/9/1979		34,10,00	151,55,00		2400m
EXHAUST VALVES	NSW	169	valves			Oct-79		34,00,00	151,35,00		200m
JAROSITE	TAS	207 631	tonnes	Continuous daily dumping	see 19/12/72 dumping for details of material dumped	Jul-80	Jun-81	43,38,00	148,18,00	Buffer - radius of 8km	2000m

Appendix E - Database of Chemical Dumping Episodes

Material	State	Quantity	Quantity (units)	Description (1)	Description (2)	Start Date	Finish Date	Latitude DMS	Longitude DMS	Other Detail of Dumping Position	Depth
SODIUM EXHAUST VALVES	NSW	138				Aug-80		34,00,00	151,36,00		200m
CAUSTIC SODA	NSW	1900	tonnes			Nov-80				(36,33,00/154,11,00) (38,43,00/153,21,00)	4000m
JAROSITE	TAS	211 231	tonnes	Continuous daily dumping	see 19/12/72 dumping for details of material dumped	Jul-81	Jun-82	43,38,00	148,18,00	Buffer - radius of 8km	2000m
BLACK LIQUOR	NSW	2650	tonnes		Trial dumping-a paper residue	Nov-81				(38,00,00/153,07,00) (34,25,00/154,31,00)	4000m
BLACK LIQUOR	VIC	27 81.5	tonnes		A paper residue	Jan-82	Dec-82			(40,55,00/140,35,00)	3400m
JAROSITE	TAS	222 527	tonnes			Jul-82	Jun-83	43,36,30	148,14,30	Buffer 2nm	2000m
SODIUM EXHAUST VALVES	NSW	822				25/8/1982		34,00,00	151,36,00		200m
IRON ORE	WA	1005	tonnes		"Shinyo Maru"	1/12/1982		20,20,00	116,30,00	Buffer - radius of 3km	2000m
JAROSITE	TAS	240 000	tonnes			Jul-83	Jun-84	43,36,30	148,14,30		2000m
CHEMICAL WARFARE AGENT	QLD	8000	ton	Various - refer Chemical Warfare Agent Sea Dumping off Australia	Dumped post WW2					Between 100 and 600 fathom line off Cape Moreton - refer Chemical Warfare Agent Sea Dumping off Australia	
CHEMICAL WARFARE AGENT	NSW	5000	ton	Various - refer Chemical Warfare Agent Sea Dumping off Australia	Dumped post WW2			34	151,36	Buffer of 5	

Appendix F - Database of Ship dumping episodes

Boat name	State	Latitude DMS	Longitude DMS	Buffer (Diameter in nm)	Submarine	Artificial reef	Maritime history of boat	Notes
ABILITY	NSW	33,03,00	152,27,00	5			Refer Scuttled & Abandoned Ships in Australian Waters	
ADONIS	QLD	27,22,00	153,10,30				Refer Scuttled & Abandoned Ships in Australian Waters	
ADROIT	WA	32,04,00	114,45,00				Refer Scuttled & Abandoned Ships in Australian Waters	
ADVENTURE	WA	32,04,00	115,20,00	7			Refer Scuttled & Abandoned Ships in Australian Waters	
AGNES	WA	32,04,00	115,20,00	7			Refer Scuttled & Abandoned Ships in Australian Waters	
ALBA	SA	34,48,47	138,31,45				Refer Scuttled & Abandoned Ships in Australian Waters	
ANGLIAN	NSW	34,00,00	151,39,00				Refer Scuttled & Abandoned Ships in Australian Waters	
ANZAC	NSW	34,00,00	151,36,00				Refer Scuttled & Abandoned Ships in Australian Waters	
ARAWATTA	NSW	34,00,00	151,36,00	5			Refer Scuttled & Abandoned Ships in Australian Waters	
ARCHER	NSW	33,52,00	151,39,00				Refer Scuttled & Abandoned Ships in Australian Waters	
AROONEE	NSW	34,00,00	151,36,00				Refer Scuttled & Abandoned Ships in Australian Waters	
AURIGA	VIC	38,20,57	144,34,18				Refer Scuttled & Abandoned Ships in Australian Waters	
AUSTRALIA	NSW	33,53,24	151,20,42				Refer Scuttled & Abandoned Ships in Australian Waters	
B.D.5	QLD	18,46,30	147,24,30	5			Refer Scuttled & Abandoned Ships in Australian Waters	
BADGER	QLD	27,22,00	153,10,30				Refer Scuttled & Abandoned Ships in Australian Waters	
BALLINA	NSW	33,03,42	152,24,00				Refer Scuttled & Abandoned Ships in Australian Waters	
BANKFIELDS	WA	32,04,00	115,20,00	7			Refer Scuttled & Abandoned Ships in Australian Waters	
BANTAM	NSW	34,18,48	151,43,36				Refer Scuttled & Abandoned Ships in Australian Waters	
BAR-EA-MUL	NSW	33,54,54	151,26,00				Refer Scuttled & Abandoned Ships in Australian Waters	
BARGE No.2	SA	34,14,00	136,50,00				Refer Scuttled & Abandoned Ships in Australian Waters	
BARGE No.5	SA	33,11,00	138,00,00				Refer Scuttled & Abandoned Ships in Australian Waters	
BARRABOOL	NSW	34,00,00	151,36,00				Refer Scuttled & Abandoned Ships in Australian Waters	
BARRAMBIN	QLD	27,06,07	153,21,00		R		Refer Scuttled & Abandoned Ships in Australian Waters	
BATMAN	VIC	38,21,306	144,24,659				Refer Scuttled & Abandoned Ships in Australian Waters	Revised 3/10/2000. Updated coords supplied by Rowan Stevens. GPS determined within 3m error. Datum WGS 84.

Appendix F - Database of Ship dumping episodes

Boat name	State	Latitude DMS	Longitude DMS	Buffer (Diameter in m)	Submarine	Artificial reef	Maritime history of boat	Notes
BAYONET		38,43,05	144,35,25				HMAS, 2/9/99 in 80 metres water	
BELLAMBI	NSW	34,00,00	151,36,00				Refer Scuttled & Abandoned Ships in Australian Waters	
BELLUBERA	NSW	33,43,00	151,21,00			R	Refer Scuttled & Abandoned Ships in Australian Waters	
BERMAGUI	QLD	27,10,00	153,22,00			R	Refer Scuttled & Abandoned Ships in Australian Waters	
BEVERWYK 19	VIC	38,21,12	144,25,171				Refer Scuttled & Abandoned Ships in Australian Waters	Notes as for Batman
BINGERA	QLD	27,22,00	153,10,30				Refer Scuttled & Abandoned Ships in Australian Waters	
BINNGARRA	NSW	34,10,12	151,53,06				Refer Scuttled & Abandoned Ships in Australian Waters	
BOSUN	NSW	34,00,00	151,36,00	5			Refer Scuttled & Abandoned Ships in Australian Waters	
BREAM	QLD	27,10,00	153,22,00			R	Refer Scuttled & Abandoned Ships in Australian Waters	
BREMER	QLD	27,06,07	153,21,00			R	Refer Scuttled & Abandoned Ships in Australian Waters	
BRONZEWING	SA	34,41,00	135,52,42			R	Refer Scuttled & Abandoned Ships in Australian Waters	
BUNINYONG	VIC	38,21,00	144,25,30				Refer Scuttled & Abandoned Ships in Australian Waters	
BUNYIP	VIC	38,22,13	144,25,02				Refer Scuttled & Abandoned Ships in Australian Waters	
BURRA-BRU	NSW	34,00,00	151,36,00	5			Refer Scuttled & Abandoned Ships in Australian Waters	
BURRINBAR	NSW	33,47,30	151,41,24				Refer Scuttled & Abandoned Ships in Australian Waters	
BUSTLER	NSW	34,00,00	151,36,00	5			Refer Scuttled & Abandoned Ships in Australian Waters	
CAMPANA	VIC	38,20,854	144,34,15				Refer Scuttled & Abandoned Ships in Australian Waters	Notes as for Batman
CAMRO	NSW	34,04,00	151,33,30				Refer Scuttled & Abandoned Ships in Australian Waters	
CAPE OTWAY	WA	32,04,00	115,20,00	7			Refer Scuttled & Abandoned Ships in Australian Waters	
CAPTAIN COOK	QLD	27,22,00	153,10,30				Refer Scuttled & Abandoned Ships in Australian Waters	
CAPTAIN PHILLIP	NSW	34,00,00	151,36,00				Refer Scuttled & Abandoned Ships in Australian Waters	
CARAVAN	WA	32,04,00	115,20,00	7			Refer Scuttled & Abandoned Ships in Australian Waters	
CASABLANCA	VIC	38,21,36	144,26,40				Refer Scuttled & Abandoned Ships in Australian Waters	
CAVAN	NSW	34,00,00	151,36,00	5			Refer Scuttled & Abandoned Ships in Australian Waters	
CECIL RHODES	NSW	34,00,00	151,36,00				Refer Scuttled & Abandoned Ships in Australian Waters	
CENTIPEDE	QLD	27,06,07	153,21,00			R	Refer Scuttled & Abandoned Ships in Australian Waters	
CERATODUS II	QLD	24,54,28	152,31,92			R	Refer Scuttled & Abandoned Ships in Australian Waters	
CERBERUS	VIC	37,58,09	145,00,23				Refer Scuttled & Abandoned Ships in Australian Waters	
CERES	NSW	33,11,54	151,37,48				Refer Scuttled & Abandoned Ships in Australian Waters	
CIRCE	NSW	34,00,00	151,36,00	5			Refer Scuttled & Abandoned Ships in Australian Waters	

Appendix F - Database of Ship dumping episodes

Boat name	State	Latitude DMS	Longitude DMS	Buffer (Diameter in m)	Submarine	Artificial reef	Maritime history of boat	Notes
CIVILITY	QLD	27,22,00	153,10,30				Refer Scuttled & Abandoned Ships in Australian Waters	
CLEVEDON	WA	32,04,00	115,20,00	7			Refer Scuttled & Abandoned Ships in Australian Waters	
CLEVELAND BAY	QLD	18,46,30	147,24,30	5			Refer Scuttled & Abandoned Ships in Australian Waters	
COMMILES	WA	32,04,00	115,20,00	7			Refer Scuttled & Abandoned Ships in Australian Waters	
CONCORDIA	WA	32,04,00	115,20,00	7			Refer Scuttled & Abandoned Ships in Australian Waters	
COOGEE	VIC	38,18,429	144,34,3				Refer Scuttled & Abandoned Ships in Australian Waters	Notes as for Batman
COOLOOLI	NSW	33,43,00	151,21,00			R	Refer Scuttled & Abandoned Ships in Australian Waters	
COUNTY OF CAITHNESS	WA	32,04,00	115,20,00	7			Refer Scuttled & Abandoned Ships in Australian Waters	
COURIER	VIC	38,19,488	144,34,914				Refer Scuttled & Abandoned Ships in Australian Waters	Notes as for Batman
CRANE BARGE No.4	NSW	34,00,00	151,36,00				Refer Scuttled & Abandoned Ships in Australian Waters	
CRUSADER II	QLD	26,58,30	153,29,30			R	Refer Scuttled & Abandoned Ships in Australian Waters	
CRYSTAL VOYAGER	QLD	24,17,00	153,18,00				Refer Scuttled & Abandoned Ships in Australian Waters	
CURL CURL	NSW	34,00,00	151,36,00	5			Refer Scuttled & Abandoned Ships in Australian Waters	
CURRAJONG	NSW	33,50,54	151,41,06				Refer Scuttled & Abandoned Ships in Australian Waters	
CYCLOPS	NSW	34,1,9,00	151,37,00				Refer Scuttled & Abandoned Ships in Australian Waters	
D. McLENNAN	VIC	38,22,13	144,25,18				Refer Scuttled & Abandoned Ships in Australian Waters	
DAGANG BARU		22,11	122,45				Dumped 22/9/99. Boat seized in Ashmore Reef National Nature Reserve. Code name "Eliza". Arrived 11/8/99.	
DEE WHY	NSW	33,43,06	151,20,36			R	Refer Scuttled & Abandoned Ships in Australian Waters	
DERWENT	WA	32,00,00	115,12,00				Refer Scuttled & Abandoned Ships in Australian Waters	
DOLPHIN	QLD	27,10,00	153,22,00			R	Refer Scuttled & Abandoned Ships in Australian Waters	
DOMINION	VIC	38,08,24	144,42,42				Refer Scuttled & Abandoned Ships in Australian Waters	
DOOMBA	NSW	33,43,12	151,20,30			R	Refer Scuttled & Abandoned Ships in Australian Waters	
DORIC	NSW	34,00,00	151,36,00	5			Refer Scuttled & Abandoned Ships in Australian Waters	
DOROTHY H. STERLING	SA	34,48,49	138,32,19				Refer Scuttled & Abandoned Ships in Australian Waters	
DOROTHY S	SA	34,48,47	138,32,00				Refer Scuttled & Abandoned Ships in Australian Waters	
DRAGON	WA	32,04,00	115,20,00	7			Refer Scuttled & Abandoned Ships in Australian Waters	
DREDGE D	QLD	27,00,00	153,42,00	5			Refer Scuttled & Abandoned Ships in Australian Waters	

Appendix F - Database of Ship dumping episodes

Boat name	State	Latitude DMS	Longitude DMS	Buffer (Diameter in m)	Submarine	Artificial reef	Maritime history of boat	Notes
DSAC BARGE	NT	12,24,50	130,48,10			R	Refer Scuttled & Abandoned Ships in Australian Waters	
DUCHESS	WA	32,04,00	115,20,00	7			Refer Scuttled & Abandoned Ships in Australian Waters	
DUNLOE	VIC	38,21,36	144,24,405				Refer Scuttled & Abandoned Ships in Australian Waters	Notes as for Batman
EAGLE	NSW	33,58,06	151,33,00				Refer Scuttled & Abandoned Ships in Australian Waters	
ECHENEIS	QLD	27,10,00	153,22,00			R	Refer Scuttled & Abandoned Ships in Australian Waters	
EDEN	NSW	33,56,54	151,36,54				Refer Scuttled & Abandoned Ships in Australian Waters	
EGERIA	NSW	33,30,30	151,32,00				Refer Scuttled & Abandoned Ships in Australian Waters	
ELENI K	SA	32,18,00	133,31,24				Refer Scuttled & Abandoned Ships in Australian Waters	
EMILY S	VIC	38,24,30	141,40,00			R	Refer Scuttled & Abandoned Ships in Australian Waters	
EMU	NSW	33,59,00	151,39,00				Refer Scuttled & Abandoned Ships in Australian Waters	
ENCOUNTER	NSW	33,54,36	151,20,54				Refer Scuttled & Abandoned Ships in Australian Waters	
ENTERPRISE	WA	32,04,00	115,20,00	7			Refer Scuttled & Abandoned Ships in Australian Waters	
ERRINGHI	NSW	33,54,54	151,26,00				Refer Scuttled & Abandoned Ships in Australian Waters	
ESTRELLA DEL MAR	QLD	27,06,07	153,21,00			R	Refer Scuttled & Abandoned Ships in Australian Waters	
EUCLA	WA	32,04,00	115,20,00	7			Refer Scuttled & Abandoned Ships in Australian Waters	
EURO	VIC	38,20,651	144,26,368				Refer Scuttled & Abandoned Ships in Australian Waters	Notes as for Batman
EXCELSIOR	QLD	27,22,00	153,10,30				Refer Scuttled & Abandoned Ships in Australian Waters	
EXCELSIOR	SA	34,45,00	138,19,00				Refer Scuttled & Abandoned Ships in Australian Waters	
EXCELSIOR	SA	34,47,00	138,31,00				Refer Scuttled & Abandoned Ships in Australian Waters	
FAWKNER	VIC	38,21,378	144,25,31				Refer Scuttled & Abandoned Ships in Australian Waters	Notes as for Batman
FLINDERS	SA	34,48,47	138,32,00				Refer Scuttled & Abandoned Ships in Australian Waters	
FREMANTLE	WA	32,04,00	115,20,00	7			Refer Scuttled & Abandoned Ships in Australian Waters	
G F HOLDEN	NSW	34,00,00	151,36,00				Refer Scuttled & Abandoned Ships in Australian Waters	
G.F.HOLDEN	NSW	34,00,00	151,36,00	5			Refer Scuttled & Abandoned Ships in Australian Waters	
GABO	NSW	33,57,18	151,38,00				Refer Scuttled & Abandoned Ships in Australian Waters	
GABRIELLA	NSW	34,35,00	151,38,00				Refer Scuttled & Abandoned Ships in Australian Waters	
GAIL JEANETTE II	TAS	42,00,00	148,38,00				Refer Scuttled & Abandoned Ships in Australian Waters	
GANNET	NSW	34,00,00	151,36,00	5			Refer Scuttled & Abandoned Ships in Australian Waters	
GARTHNEILL	SA	34,48,47	138,32,00				Refer Scuttled & Abandoned Ships in Australian Waters	
GEEBUNG	NSW	34,00,00	151,36,00	5			Refer Scuttled & Abandoned Ships in Australian Waters	

Appendix F - Database of Ship dumping episodes

Boat name	State	Latitude DMS	Longitude DMS	Buffer (Diameter in m)	Submarine	Artificial reef	Maritime history of boat	Notes
GEO.KERMODE	VIC	38,31,12	145,14,48			R	Refer Scuttled & Abandoned Ships in Australian Waters	
GEORGE DINSDALE	SA	34,48,47	138,32,00				Refer Scuttled & Abandoned Ships in Australian Waters	
GERANIUM	NSW	34,00,00	151,36,00	5			Refer Scuttled & Abandoned Ships in Australian Waters	
GLAUCUS	SA	34,48,47	138,32,00				Refer Scuttled & Abandoned Ships in Australian Waters	
GOORI	QLD	25,17,12	152,58,36			R	Refer Scuttled & Abandoned Ships in Australian Waters	
GOVERNOR	WA	32,04,00	115,20,00	7			Refer Scuttled & Abandoned Ships in Australian Waters	
GOVERNOR BLACKALL	NSW	34,00,00	151,36,00	5			Refer Scuttled & Abandoned Ships in Australian Waters	
GRACE DARLING	SA	34,48,47	138,32,00				Refer Scuttled & Abandoned Ships in Australian Waters	
GROPER	QLD	27,22,00	153,10,30				Refer Scuttled & Abandoned Ships in Australian Waters	
GROPER	QLD	27,10,00	153,22,00			R	Refer Scuttled & Abandoned Ships in Australian Waters	
GUNGA	WA	32,04,00	115,20,00	7			Refer Scuttled & Abandoned Ships in Australian Waters	
HAM LUONG	NT	11,28,36	130,47,54				Refer Scuttled & Abandoned Ships in Australian Waters	
HARMONY	WA	21,29,46	115,14,16				Refer Scuttled & Abandoned Ships in Australian Waters	
HENRY BOLTE	NSW	37,08,00	149,59,30			R	Refer Scuttled & Abandoned Ships in Australian Waters	
HERCULES	NSW	34,00,00	151,36,00	5			Refer Scuttled & Abandoned Ships in Australian Waters	
HIMMA	NSW	33,43,12	151,20,30			R	Refer Scuttled & Abandoned Ships in Australian Waters	
HOPPER BARGE	SA	34,58,48.5	138,26,22.5			R	Refer Scuttled & Abandoned Ships in Australian Waters	
HOPPER BARGE	SA	34,31,50.5	138,03,41			R	Refer Scuttled & Abandoned Ships in Australian Waters	
HOPPER BARGE	WA	28,44,00	114,44,00				Refer Scuttled & Abandoned Ships in Australian Waters	
HOUGOMONT	SA	35,16,58	136,56,36				Refer Scuttled & Abandoned Ships in Australian Waters	
HUON	NSW	33,58,00	151,36,00				Refer Scuttled & Abandoned Ships in Australian Waters	
HYGEIA	VIC	38,21,02	144,33,34				Refer Scuttled & Abandoned Ships in Australian Waters	
ICEBERG	QLD	27,10,00	153,22,00			R	Refer Scuttled & Abandoned Ships in Australian Waters	
INCA	NSW	33,47,00	151,31,24				Refer Scuttled & Abandoned Ships in Australian Waters	
IRON DUKE	NSW	34,00,00	151,36,00	5			Refer Scuttled & Abandoned Ships in Australian Waters	
J1	VIC	38,19,01	144,33,06		S		Refer Scuttled & Abandoned Ships in Australian Waters	
J2	VIC	38,18,52	144,34,39		S		Refer Scuttled & Abandoned Ships in Australian Waters	
J3	VIC	38,14,44	144,42,06		S		Refer Scuttled & Abandoned Ships in Australian Waters	
J4	VIC	38,18,01	144,33,39		S		Refer Scuttled & Abandoned Ships in Australian Waters	
J5	VIC	38,18,42	144,32,57		S		Refer Scuttled & Abandoned Ships in Australian Waters	

Appendix F - Database of Ship dumping episodes

Boat name	State	Latitude DMS	Longitude DMS	Buffer (Diameter in m)	Submarine	Artificial reef	Maritime history of boat	Notes
J7	VIC	37,56,41	144,59,36		S		Refer Scuttled & Abandoned Ships in Australian Waters	
JINN CHANG	QLD	16,40,18	146,21,00				Refer Scuttled & Abandoned Ships in Australian Waters	
JOHN HOLLAND	NT	11,28,27	130,47,57			R	Refer Scuttled & Abandoned Ships in Australian Waters	
JOHN NIMMO	VIC	38,21,24	144,33,15				Refer Scuttled & Abandoned Ships in Australian Waters	
JOSEFA	QLD	19,18,00	147,55,00				Refer Scuttled & Abandoned Ships in Australian Waters	
JUNEE	WA	32,04,00	115,20,00	7			Refer Scuttled & Abandoned Ships in Australian Waters	
JUNO	NSW	33,03,00	152,27,00	5			Refer Scuttled & Abandoned Ships in Australian Waters	
JUNO	SA	34,48,47	138,32,00				Refer Scuttled & Abandoned Ships in Australian Waters	
KARINA G	SA	34,10,00	129,00,00				Refer Scuttled & Abandoned Ships in Australian Waters	
KAROOLA	NSW	34,50,00	151,30,00				Refer Scuttled & Abandoned Ships in Australian Waters	
KEMBLA	NSW	33,45,12	151,42,00				Refer Scuttled & Abandoned Ships in Australian Waters	
KESTREL	NSW	34,00,00	151,36,00	5			Refer Scuttled & Abandoned Ships in Australian Waters	
KGARI	QLD	25,16,20	152,58,12			R	Refer Scuttled & Abandoned Ships in Australian Waters	
KIANGA	NSW	34,00,00	151,36,00	5			Refer Scuttled & Abandoned Ships in Australian Waters	
KIRKCUDBRIGHTSHIRE	WA	32,04,00	115,20,00	7			Refer Scuttled & Abandoned Ships in Australian Waters	
KNOWSLEY	WA	32,04,00	115,20,00	7			Refer Scuttled & Abandoned Ships in Australian Waters	
KOOKABURRA	NSW	33,51,30	151,20,42				Refer Scuttled & Abandoned Ships in Australian Waters	
KOOKABURRA	QLD	27,10,00,	153,22,00			R	Refer Scuttled & Abandoned Ships in Australian Waters	
KOORDA	WA	32,04,00	115,20,00	7			Refer Scuttled & Abandoned Ships in Australian Waters	
KOS I	QLD	27,10,00	153,22,00			R	Refer Scuttled & Abandoned Ships in Australian Waters	
KOS II	QLD	27,10,00	153,22,00			R	Refer Scuttled & Abandoned Ships in Australian Waters	
KOS VII	WA	32,04,00	115,20,00	7			Refer Scuttled & Abandoned Ships in Australian Waters	
KUNMUNYA	WA	20,25,00	117,12,00			R	Refer Scuttled & Abandoned Ships in Australian Waters	
KURAMIA	NSW	33,59,5,00	151,35,00				Refer Scuttled & Abandoned Ships in Australian Waters	
KURNELL	NSW	34,00,00	151,36,00	5			Refer Scuttled & Abandoned Ships in Australian Waters	
L292	NSW	34,00,00	151,36,00	5			Refer Scuttled & Abandoned Ships in Australian Waters	
LADY DALY	SA	34,48,00	138,31,00				Refer Scuttled & Abandoned Ships in Australian Waters	
LADY JOYUS	WA	25,02,47	113,32,15			R	Refer Scuttled & Abandoned Ships in Australian Waters	
LADY NORMAN	QLD	27,06,07	153,21,00			R	Refer Scuttled & Abandoned Ships in Australian Waters	
LADY PAMELA	WA	21,29,45	115,14,19				Refer Scuttled & Abandoned Ships in Australian Waters	

Appendix F - Database of Ship dumping episodes

Boat name	State	Latitude DMS	Longitude DMS	Buffer (Diameter in m)	Submarine	Artificial reef	Maritime history of boat	Notes
LALOR	QLD	18,46,00	147,25,50				Refer Scuttled & Abandoned Ships in Australian Waters	
LASS O'GOWRIE	QLD	25,16,40	152,58,24			R	Refer Scuttled & Abandoned Ships in Australian Waters	
LEEWIN	VIC	38,21,16	144,33,47				Refer Scuttled & Abandoned Ships in Australian Waters	
LEWES	NSW	34,00,00	151,36,00	5			Refer Scuttled & Abandoned Ships in Australian Waters	
LIMA TUJUH		22,11	122,45				Dumped 22/9/99. Boat seized in Ashmore Reef National Nature Reserve. Code name "Ida". Arrived 30/8/99.	
LOCH NESS	WA	32,04,00	115,20,00	7			Refer Scuttled & Abandoned Ships in Australian Waters	
LOCH TAY	SA	34,48,47	138,32,00				Refer Scuttled & Abandoned Ships in Australian Waters	
LOCHEIL	QLD	27,22,00	153,10,30				Refer Scuttled & Abandoned Ships in Australian Waters	
LOEVESTEIN	QLD	27,06,07	153,21,00			R	Refer Scuttled & Abandoned Ships in Australian Waters	
LOTTIE	SA	34,48,47	138,32,00				Refer Scuttled & Abandoned Ships in Australian Waters	
LUCINDA	QLD	27,22,00	153,10,30				Refer Scuttled & Abandoned Ships in Australian Waters	
LULU	SA	34,49,00	138,31,00				Refer Scuttled & Abandoned Ships in Australian Waters	
MAIDA	QLD	27,22,00	153,10,30				Refer Scuttled & Abandoned Ships in Australian Waters	
MALACHITE	NSW	33,52,00	151,39,00				Refer Scuttled & Abandoned Ships in Australian Waters	
MALAITA	VIC	38,21,16	144,33,04				Refer Scuttled & Abandoned Ships in Australian Waters	
MALLOW	NSW	34,01,18	151,35,42				Refer Scuttled & Abandoned Ships in Australian Waters	
MANGANA	SA	34,48,47	138,32,00				Refer Scuttled & Abandoned Ships in Australian Waters	
MARANDA	WA	32,04,00	115,20,00	7			Refer Scuttled & Abandoned Ships in Australian Waters	
MARCHART 3	NT	12,10,45	130,40,45			R	Refer Scuttled & Abandoned Ships in Australian Waters	
MARGARET	NSW	34,00,00	151,36,00	5			Refer Scuttled & Abandoned Ships in Australian Waters	
MARGUERITE	NSW	34,00,00	151,36,06				Refer Scuttled & Abandoned Ships in Australian Waters	
MARJORIE	NSW	34,00,00	151,36,00	5			Refer Scuttled & Abandoned Ships in Australian Waters	
MARRAWAH	NSW	33,57,48	151,34,48				Refer Scuttled & Abandoned Ships in Australian Waters	
MARYBOROUGH	QLD	27,10,00	153,22,00			R	Refer Scuttled & Abandoned Ships in Australian Waters	
MASTER JACK	SA	35,42,55	136,46,08				Refer Scuttled & Abandoned Ships in Australian Waters	
MATAGALPA	NSW	34,00,00	151,36,00	5			Refer Scuttled & Abandoned Ships in Australian Waters	
BARGE No.20	WA	20,08,00	115,57,00				Refer Scuttled & Abandoned Ships in Australian Waters	
MEDUSA	NSW	34,00,00	151,36,00	5			Refer Scuttled & Abandoned Ships in Australian Waters	
MELBOURNE	QLD	27,06,07	153,21,00			R	Refer Scuttled & Abandoned Ships in Australian Waters	

Appendix F - Database of Ship dumping episodes

Boat name	State	Latitude DMS	Longitude DMS	Buffer (Diameter in nm)	Submarine	Artificial reef	Maritime history of boat	Notes
MERINO	QLD	14,00,00	140,00,00				Refer Scuttled & Abandoned Ships in Australian Waters	
MILORA	VIC	38,21,103	144,23,379				Refer Scuttled & Abandoned Ships in Australian Waters	Notes as for Batman
MINER	QLD	27,22,00	153,10,30				Refer Scuttled & Abandoned Ships in Australian Waters	
MING PING LUI NO. 25		20,02,29	118,22,05				Scuttled 26/3/99 in 17m. Scuttled with explosives.	
MING PING YOU NO. 8		10,40,45	132,04				Scuttled 9/1/99. Seized Cobourg Peninsula, Northern Territory.	
MOE	SA	34,48,47	138,32,00				Refer Scuttled & Abandoned Ships in Australian Waters	
MORETON	QLD	27,22,00	153,10,30				Refer Scuttled & Abandoned Ships in Australian Waters	
MORIB	NSW	34,00,00	151,36,00	5			Refer Scuttled & Abandoned Ships in Australian Waters	
MORWONG	QLD	27,10,00	153,22,00		R		Refer Scuttled & Abandoned Ships in Australian Waters	
MOURILYAN	QLD	20,22,00	148,57,25		R		Refer Scuttled & Abandoned Ships in Australian Waters	
MYEE	NSW	33,52,48	151,25,36				Refer Scuttled & Abandoned Ships in Australian Waters	
MYEE	SA	33,11,00	138,00,00				Refer Scuttled & Abandoned Ships in Australian Waters	
NAMOI	NSW	34,01,00	151,38,00				Refer Scuttled & Abandoned Ships in Australian Waters	
NANCY	NSW	34,00,00	151,36,00	5			Refer Scuttled & Abandoned Ships in Australian Waters	
NEVILLE BONNAR	QLD	27,06,07	153,21,00		R		Refer Scuttled & Abandoned Ships in Australian Waters	
NEWCASTLE	NSW	33,48,06	151,42,00				Refer Scuttled & Abandoned Ships in Australian Waters	
NIRIMBA	WA	32,04,00	115,20,00	7			Refer Scuttled & Abandoned Ships in Australian Waters	
No.15	NSW	34,00,00	151,34,00				Refer Scuttled & Abandoned Ships in Australian Waters	
No.16	NSW	34,00,00	151,34,00				Refer Scuttled & Abandoned Ships in Australian Waters	
No.25	QLD	27,06,07	153,21,00		R		Refer Scuttled & Abandoned Ships in Australian Waters	
No.5	NSW	34,00,00	151,36,00	5			Refer Scuttled & Abandoned Ships in Australian Waters	
No.651	NSW	33,41,18	151,21,18		R		Refer Scuttled & Abandoned Ships in Australian Waters	
No.653	NSW	33,42,00	151,21,00		R		Refer Scuttled & Abandoned Ships in Australian Waters	
No.654	NSW	33,41,18	151,21,18		R		Refer Scuttled & Abandoned Ships in Australian Waters	
No.656	NSW	33,43,00	151,23,00		R		Refer Scuttled & Abandoned Ships in Australian Waters	
No.696	NSW	34,00,00	151,36,00	5			Refer Scuttled & Abandoned Ships in Australian Waters	
No.716	NSW	34,00,00	151,36,00	5			Hopper barge, 18/10/56	
No.8	NSW	34,00,00	151,36,00	5			Refer Scuttled & Abandoned Ships in Australian Waters	
No.969	NSW	34,00,00	151,36,00	5			Hopper barge, 6/8/47	

Appendix F - Database of Ship dumping episodes

Boat name	State	Latitude DMS	Longitude DMS	Buffer (Diameter in m)	Submarine	Artificial reef	Maritime history of boat	Notes
NOR'WESTER	VIC	38,19,50	144,41,26				Refer Scuttled & Abandoned Ships in Australian Waters	
NORWHALE	WA	32,04,00	115,20,00	7			Refer Scuttled & Abandoned Ships in Australian Waters	
OIL FUEL LIGHTER	QLD	27,06,07	153,21,00			R	Refer Scuttled & Abandoned Ships in Australian Waters	
OIL FUEL LIGHTER 1204	NSW	35,30,30	151,04,06				Refer Scuttled & Abandoned Ships in Australian Waters	
OTTER	QLD	25,16,40	152,58,24			R	Refer Scuttled & Abandoned Ships in Australian Waters	
OUR ELSIE	NSW	34,00,00	151,36,00	5			Refer Scuttled & Abandoned Ships in Australian Waters	
OZONE	VIC	38,08,24	144,42,42				Refer Scuttled & Abandoned Ships in Australian Waters	
PAM	SA	36,00,00	138,00,00				Refer Scuttled & Abandoned Ships in Australian Waters	
PELICAN	QLD	25,16,40	152,58,24			R	Refer Scuttled & Abandoned Ships in Australian Waters	
PHYLLIS	NSW	34,00,00	151,36,00				Refer Scuttled & Abandoned Ships in Australian Waters	
PIGOTT	VIC	38,20,751	144,26,095				Refer Scuttled & Abandoned Ships in Australian Waters	Notes as for Batman
PIONEER	NSW	34,00,00	151,36,00	5			Refer Scuttled & Abandoned Ships in Australian Waters	
PIONEER	VIC	38,20,366	144,26,378				Refer Scuttled & Abandoned Ships in Australian Waters	Notes as for Batman
PL BARU TERBIT		22,11	122,45				Dumped 1/11/99. Illegal boat seized in Ashmore Reef National Nature Reserve. Code name "Xarag".	
PLATYPUS II	QLD	27,10,00	153,22,00			R	Refer Scuttled & Abandoned Ships in Australian Waters	
POINT LOOKOUT	QLD	27,06,07	153,21,00			R	Refer Scuttled & Abandoned Ships in Australian Waters	
POSEIDON	NSW	34,0,5,00	151,36,00				Refer Scuttled & Abandoned Ships in Australian Waters	
PREMIER	NSW	34,00,00	151,36,00	5			Refer Scuttled & Abandoned Ships in Australian Waters	
PREMIER	WA	32,04,00	115,20,00	7			Refer Scuttled & Abandoned Ships in Australian Waters	
PYRMONT II	NSW	33,43,12	151,20,30			R	Refer Scuttled & Abandoned Ships in Australian Waters	
QUEENSLAND	QLD	27,22,00	153,10,30				Refer Scuttled & Abandoned Ships in Australian Waters	
QUORNA	SA	35,59,00	138,11,00				Refer Scuttled & Abandoned Ships in Australian Waters	
REMORA	QLD	27,10,00	153,22,00			R	Refer Scuttled & Abandoned Ships in Australian Waters	
RHEA	NSW	33,54,48	151,45,00				Refer Scuttled & Abandoned Ships in Australian Waters	
ROBERT MOORE	WA	32,04,00	115,20,00	7			Refer Scuttled & Abandoned Ships in Australian Waters	
ROCKINGHAM	WA	32,04,00	115,20,00	7			Refer Scuttled & Abandoned Ships in Australian Waters	
RODERICK DHU	QLD	27,22,00	153,10,30				Refer Scuttled & Abandoned Ships in Australian Waters	
ROTOMAHAMA	VIC	38,19,197	144,32,175				Refer Scuttled & Abandoned Ships in Australian Waters	Notes as for Batman
S.F.HERSEY	VIC	38,14,43	144,42,07				Refer Scuttled & Abandoned Ships in Australian Waters	

Appendix F - Database of Ship dumping episodes

Boat name	State	Latitude DMS	Longitude DMS	Buffer (Diameter in m)	Submarine	Artificial reef	Maritime history of boat	Notes
SAMSON	NSW	34,54,00	151,21,00				Refer Scuttled & Abandoned Ships in Australian Waters	
SANTIAGO	SA	34,48,43	138,32,25				Refer Scuttled & Abandoned Ships in Australian Waters	
SARNIA	SA	34,48,47	138,32,00				Refer Scuttled & Abandoned Ships in Australian Waters	
SAURIAN	SA	35,06,57	138,24,38			R	Refer Scuttled & Abandoned Ships in Australian Waters	
SCHNAPPER	QLD	27,22,00	153,10,30				Refer Scuttled & Abandoned Ships in Australian Waters	
SEAHORSE	WA	25,02,47	113,32,15			R	Refer Scuttled & Abandoned Ships in Australian Waters	
SEAL	QLD	27,10,00	153,22,00			R	Refer Scuttled & Abandoned Ships in Australian Waters	
SEAL	TAS	41,07,27	146,19,36			R	Refer Scuttled & Abandoned Ships in Australian Waters	
SEAMEG	NSW	34,02,00	151,36,00				Refer Scuttled & Abandoned Ships in Australian Waters	
SESA	WA	32,04,00	115,20,00	7			Refer Scuttled & Abandoned Ships in Australian Waters	
SETIA KAWAN		22,11	122,45				Dumped 22/9/99. Boat seized in Ashmore Reef National Nature Reserve. Code name "Grenfell". Arrived 23/8/99.	
SIMPATI		22,11	122,45				Nature Reserve. Code name "Hawthorn". Arrived 26/8/99.	
SINAR		12,08	122,50				Dumped 22/9/99. Boat seized in Ashmore Reef National Nature Reserve. Code name "Jagged". Arrived 31/8/99.	
SIR WILLIAM McPHERSON	VIC	38,20,49	144,28,55				Refer Scuttled & Abandoned Ships in Australian Waters	
SOLACE	QLD	27,06,07	153,21,00			R	Refer Scuttled & Abandoned Ships in Australian Waters	
SONG SAIGON	NT	11,28,29	130,48,04.6			R	For artificial reef, 4/11/82	
SOUTH AUSTRALIAN SOUTHERN	SA	34,58,45	138,26,20			R	Refer Scuttled & Abandoned Ships in Australian Waters	
ENDEAVOUR	QLD	16,39,48	146,19,12				Refer Scuttled & Abandoned Ships in Australian Waters	
ST. KILDA	QLD	27,22,00	153,10,30				Refer Scuttled & Abandoned Ships in Australian Waters	
STALWART	NSW	34,00,00	151,36,00				Refer Scuttled & Abandoned Ships in Australian Waters	
STANLEY	SA	34,48,47	138,32,00				Refer Scuttled & Abandoned Ships in Australian Waters	
STINGAREE	QLD	27,10,00	153,22,00			R	Refer Scuttled & Abandoned Ships in Australian Waters	
STRAHAN	NSW	34,00,00	151,36,00	5			Refer Scuttled & Abandoned Ships in Australian Waters	
SUBMARINE K.II	WA	32,04,00	115,20,00	7	S		Refer Scuttled & Abandoned Ships in Australian Waters	
SUCCESS	NSW	34,00,00	151,36,00				Refer Scuttled & Abandoned Ships in Australian Waters	
SUMATRA	QLD	16,41,54	146,21,12				Refer Scuttled & Abandoned Ships in Australian Waters	

Appendix F - Database of Ship dumping episodes

Boat name	State	Latitude DMS	Longitude DMS	Buffer (Diameter in m)	Submarine	Artificial reef	Maritime history of boat	Notes
SUNBEAM	SA	34,48,47	138,31,36				Refer Scuttled & Abandoned Ships in Australian Waters	
SWALLOW	NSW	34,0,5,00	151,36,24				Refer Scuttled & Abandoned Ships in Australian Waters	
SWAN	WA	32,04,00	115,20,00	7			Refer Scuttled & Abandoned Ships in Australian Waters	
SWORDSMAN	NSW	34,10,00	151,30,00				Refer Scuttled & Abandoned Ships in Australian Waters	
SYDNEY	NSW	33,51,36	151,24,00				Refer Scuttled & Abandoned Ships in Australian Waters	
TAMERLANE	WA	32,04,00	115,20,00	7			Refer Scuttled & Abandoned Ships in Australian Waters	
TASMAN HAULER	NSW	37,08,00	149,59,30		R		Refer Scuttled & Abandoned Ships in Australian Waters	
TASMANIA	NSW	34,07,48	151,26,54				Refer Scuttled & Abandoned Ships in Australian Waters	
TATTOO	NSW	33,59,54	151,30,54				Refer Scuttled & Abandoned Ships in Australian Waters	
TAVIUNI	NSW	34,00,00	151,36,00	5			Refer Scuttled & Abandoned Ships in Australian Waters	
TELFOR BARGES	SA	35,06,00	138,24,00				Refer Scuttled & Abandoned Ships in Australian Waters	
THOMAS & ANNIE	SA	34,48,47	138,32,00				Refer Scuttled & Abandoned Ships in Australian Waters	
THORNLIBANK	WA	32,04,00	115,20,00	7			Refer Scuttled & Abandoned Ships in Australian Waters	
TOCOPILLA	WA	32,04,00	115,20,00	7			Refer Scuttled & Abandoned Ships in Australian Waters	
TORRENS		31,39,5	114,30				Scuttled 14/6/99. Destroyer Escort sunk by Submarine.	
TORRENS	NSW	33,53,54	151,39,54				Refer Scuttled & Abandoned Ships in Australian Waters	
TRAFALGAR	SA	34,48,00	138,31,00				Refer Scuttled & Abandoned Ships in Australian Waters	
TRINITY BAY	QLD	16,43,00	146,15,00				Refer Scuttled & Abandoned Ships in Australian Waters	
TUNCURRY	NSW	34,00,00	151,36,00				Refer Scuttled & Abandoned Ships in Australian Waters	
UKI	QLD	27,10,00	153,22,00		R		Refer Scuttled & Abandoned Ships in Australian Waters	
ULLOCK	SA	34,48,47	138,32,00				Refer Scuttled & Abandoned Ships in Australian Waters	
UNIDENTIFIED	QLD	18,46,30	147,24,30				Sunk under Beaches, Fishing grounds etc. Act 1933 on 18/9/49	
UNIDENTIFIED	NT	12,11,10	130,41,14		R		Steel boat cut in 2 sections, 19/6/91	
UNIDENTIFIED	QLD	25,05,18	152,34,12		R		For artificial reef	
UNIDENTIFIED	QLD	25,16,20	152,58,12		R		2 barges for artificial reef, 15/3/81 & 16/9/81	
UNIDENTIFIED	NT	12,24,36	130,48,11.2		R		Barge for artificial reef	
UNIDENTIFIED	NSW	34,00,00	151,36,00	5			Navy target barge, 12/7/72	
UNIDENTIFIED	WA	28,44,00	114,36,00				Old hopper barge dumped 5/9/73?	
UNIDENTIFIED	NT	12,24,50	130,48,10		R		Steel dumb barge for artificial reef, 27.44m length	

Appendix F - Database of Ship dumping episodes

Boat name	State	Latitude DMS	Longitude DMS	Buffer (Diameter in m)	Submarine	Artificial reef	Maritime history of boat	Notes
UNIDENTIFIED	WA	32,04,00	115,20,00	7			Barge, 13/12/69	
UNIDENTIFIED	NSW	33,43,00	151,21,00			R	Steel barge for artificial reef, 4/12/79	
UNIDENTIFIED	QLD	27,6,10,00	153,21,5,00				Hull of craft, metal, 7/1/65, Army	
UNIDENTIFIED		12,11	122,46				Vessel was codenamed "Nelson"	
UNIDENTIFIED		10,25	105,39				Scuttled 12/6/98	
UNIDENTIFIED		10,24	105,39				Named Budi Murni?	
UNIDENTIFIED		10,24	105,33					
UNIDENTIFIED		11	122,45				Named Maskur Ilahi?	
UNIDENTIFIED		11	122,45				Named Sinar Bonerate?	
UNIDENTIFIED	QLD	24,54,12.1	152,32,4.3			R	TB Landing Barge at Cochrane Artificial Reef, 27/5/99, 10.8m	
UNIDENTIFIED		12,13	122,53				17/5/2000 Burnt and sank. Towline snapped. Named "Rockingham?".	
UNIDENTIFIED		22,11	122,45				Dumped 28/7/99. Illegal boat seized in Ashmore Reef National Nature Reserve. Code name "York".	
UNIDENTIFIED		22,11	122,45				Dumped 28/7/99. Illegal boat seized in Ashmore Reef National Nature Reserve. Code name "Zeil".	
UNIDENTIFIED		22,11	122,45				Dumped 22/9/99. Illegal boat seized in Ashmore Reef National Nature Reserve. Code name "Buller". Arrived 21/7/99.	
UNIDENTIFIED		22,11	122,45				Dumped 27/9/99. Illegal boat seized in Ashmore Reef National Nature Reserve. Code name "Nebo".	
UNIDENTIFIED		22,11	122,45				Dumped 27/9/99. Illegal boat seized in Ashmore Reef National Nature Reserve. Code name "Owen".	
UNIDENTIFIED		10,24	105,34				Scuttled 21/8/99. Arrived Christmas Island 13/8/99.	
UNIDENTIFIED		10,33,12	105,42,05				Scuttled 18/2/2000. Illegal foreign vessel.	
UNIDENTIFIED		10,22,09	105,32,01				Scuttled 24/12/1999. Illegal foreign vessel.	
UNIDENTIFIED		10,23,54	105,32,54				Scuttled 3/12/1999. Illegal foreign vessel.	
UNIDENTIFIED		10,24,45	105,33,55				Scuttled 20/11/1999. Illegal foreign vessel.	
UNIDENTIFIED		10,23,15	105,34,47				Scuttled 14/11/1999. Illegal foreign vessel.	

Appendix F - Database of Ship dumping episodes

Boat name	State	Latitude DMS	Longitude DMS	Buffer (Diameter in m)	Submarine	Artificial reef	Maritime history of boat	Notes
UNIDENTIFIED	QLD	24,54,14.1	152,31,59.3			R	Breaksea Spit Light Vessel scuttled on Cochrane Artificial Reef - Bundaberg on 23 September 2000	
UNIDENTIFIED	QLD	24,54,16.1	152,32,1.2			R	Breaksea Spit Light Vessel scuttled on Cochrane Artificial Reef - Bundaberg on 23 September 2000	
UTAH 2	QLD	27,06,07	153,21,00			R	Refer Scuttled & Abandoned Ships in Australian Waters	
VALIANT	NSW	34,00,00	151,36,00	5			Refer Scuttled & Abandoned Ships in Australian Waters	
VENDETTA	NSW	34,00,00	151,36,00				Refer Scuttled & Abandoned Ships in Australian Waters	
VERDIER	NSW	33,43,00	151,21,00			R	Refer Scuttled & Abandoned Ships in Australian Waters	
VHB 53	VIC	38,21,645	144,26,217				Refer Scuttled & Abandoned Ships in Australian Waters	Notes as for Batman
VHB 54	VIC	38,20,587	144,25,058				Refer Scuttled & Abandoned Ships in Australian Waters	Notes as for Batman
VICTORIAN	VIC	38,21,00	144,25,30				Refer Scuttled & Abandoned Ships in Australian Waters	
WALLSEND	NSW	34,00,00	151,36,00	5			Refer Scuttled & Abandoned Ships in Australian Waters	
WAREATEA	VIC	38,21,42	144,26,08				Refer Scuttled & Abandoned Ships in Australian Waters	
WERFA	VIC	38,21,29	144,33,50				Refer Scuttled & Abandoned Ships in Australian Waters	
WHITEPINE	VIC	38,21,757	144,26,354				Refer Scuttled & Abandoned Ships in Australian Waters	Notes as for Batman
WICKLOW	NSW	34,00,00	151,36,00	5			Refer Scuttled & Abandoned Ships in Australian Waters	
WILLS	VIC	38,21,18	144,26,48				Refer Scuttled & Abandoned Ships in Australian Waters	
YAMBA	NSW	33,53,24	151,22,36				Refer Scuttled & Abandoned Ships in Australian Waters	
YARRA	NSW	34,00,00	151,36,00	5			Refer Scuttled & Abandoned Ships in Australian Waters	
YOSEMITE	QLD	27,22,00	153,10,30				Refer Scuttled & Abandoned Ships in Australian Waters	
YU HAN 22	NT	12,30,03	130,48,18			R	Refer Scuttled & Abandoned Ships in Australian Waters	
YULOO	NSW	34,00,00	151,39,00				Refer Scuttled & Abandoned Ships in Australian Waters	

Appendix G - Database of Ammunition dumping episodes

Type	State	Quantity	Quantity (units)	Description	Start Date	Finish Date	Latitude DMS	Longitude DMS	Other Detail of Dumping Position	Depth
AMMUNITION	NSW	200 tons	200 tons	Unserviceable ammunition	25/8/1945		34,00,00	151,37,00		366m
AMMUNITION	NSW	180 tons	180 tons	HMAS Paterson towed a barge to the area & dumped	3/9/1945		33,53,56	151,44,29		366m
AMMUNITION	NSW			Unserviceable ammunition	11/9/1945		34,00,00	151,40,00		188.5m
AMMUNITION	NSW	150 tons	150 tons	HMAS Paterson towed a barge to the area & dumped	12/9/1945		33,53,56	151,44,29		366m
AMMUNITION	NSW	110 tons	110 tons	18 pr. shell fuzes removed & boxed, Ciges	17/9/1945		33,53,56	151,44,29		366m
VARIOUS	NSW			SAA 50 boxed	11/12/1945		34,00,00	151,36,00		183m
VARIOUS	NSW			Bombs incendiary rolls	6/2/1946	8/2/1946	34,00,00	151,36,00		183m
AMMUNITION	NSW			Unserviceable ammunition	15/3/1946		33,55,00	151,41,00		183m
AMMUNITION	NSW			Unserviceable ammunition	8/6/1946		33,59,00	151,35,00		219.6m
AMMUNITION	NSW	500 tons	500 tons	Unserviceable ammunition	11/6/1946	12/6/1946	34,02,41	152,03,25		
AMMUNITION	SA	6 tons	6 tons	Ammunition	6/2/1961		35,00,00	130,00,00		2745m
SHELL	QLD	205.50 tons	205.50 tons	155mm loose shell	7/3/1962		27,00,00	153,42,00		283.65m
SHELL	QLD	252 tons	252 tons	155mm loose shell	9/3/1962		27,00,00	153,42,00		283.65m
SHELL	QLD	204 tons	204 tons	155mm loose shell	15/3/1962	16/3/1962	27,00,00	153,42,00		283.65m
WEAPONS	QLD	30 tons	30 tons	Boxes of weapons	15/3/1962	16/3/1962	27,00,00	153,42,00		283.65m
VARIOUS	NSW	70 tons	70 tons	Boxes of weapons	19/3/1962	20/3/1962	27,00,00	153,42,00		283.65m
PROJECTILES	NSW			Fuzes and cartridges	1963		33,54,00	151,52,00		622.2m
PROJECTILES	NSW			Projectiles	1963		34,05,00	151,40,00		640.5m
PROJECTILES	NSW			Projectiles	1963		31,34,00	153,15,30		576.45m
PROJECTILES	NSW			Projectiles	1963		34,31,30	151,26,48		549m
PROJECTILES	NSW			Projectiles	1963		33,45,00	151,52,00		585.6m
PROJECTILES	NSW			Projectiles	1963		33,44,30	151,55,00		878.4m
PROJECTILES	NSW			Projectiles	1963		33,49,48	151,50,00		585.6m
PROJECTILES	NSW			Projectiles	1963		33,46,00	151,51,00		567.3m
PROJECTILES	NSW			Projectiles	1963		34,04,00	151,39,00		576m
PROJECTILES	NSW			Projectiles	1963		34,20,00	151,32,00		549m
VARIOUS	NSW			Rifles, pistols and shell	1963		36,55,00	150,22,00		585.6m
VARIOUS	NSW			Guns and rifles	1963		37,10,00	150,25,00		915m
PROJECTILES	NSW			Projectiles	1964		33,59,00	151,44,30		549m
PROJECTILES	NSW			Projectiles	1964		34,18,00	151,27,00		549m
PROJECTILES	NSW			Projectiles	1964		34,06,00	151,38,00		576.45m
PROJECTILES	NSW			Projectiles target	1964		34,10,00	151,50,00		549m
VARIOUS	NSW			target	1964		34,13,00	151,31,30		640.5m
VARIOUS	NSW			Sweep acoustic	1964		34,25,00	152,20,00		3660m
VARIOUS	NSW			Sweep acoustic and shell	1964		34,19,30	151,32,00		768.6m
SHELL	NSW			Shell	1964		34,16,00	151,32,00		585.6m
SHELL	NSW			Shell	1964		34,11,00	151,31,42		732m

Appendix G - Database of Ammunition dumping episodes

Type	State	Quantity	Quantity (units)	Description	Start Date	Finish Date	Latitude DMS	Longitude DMS	Other Detail of Dumping Position	Depth
SHELL	NSW			Shell	1964		33,34.00	151,50.00		631.35m
DISTRESS SIGNAL	NSW			Distress signal	1964		32,20.00	153,08.00		2196m
SHELL	VIC			Shell	1964		38,44.00	149,05.00		1830m
SHELL	QLD	94 tons		Shell HE boxed-1470 packages	12/6/1964	30/6/1964	27,00.00	153,42.00		283.65m
VARIOUS	QLD	458 tons		Mortar Ammo HE Light-13763 packages	12/6/1964	30/6/1964	27,00.00	153,42.00		283.65m
SHELL	QLD	57 tons		Shell HE loose-1271 packages	12/6/1964	30/6/1964	27,00.00	153,42.00		283.65m
FUZES	QLD	2 tons		Fuzes HE boxed-58 packages	12/6/1964	30/6/1964	27,00.00	153,42.00		283.65m
VARIOUS	QLD	20 tons		Small arms/ stores	12/6/1964	30/6/1964	27,00.00	153,42.00		283.65m
PROJECTILES	QLD	30 tons		37mm HE projectiles	12/6/1964	30/6/1964	27,00.00	153,42.00		283.65m
VARIOUS	NSW			Generators, Fuzes, Igniters, Shell, Flares and Projectiles	1965		34,00.00	151,44.00		594.75m
VARIOUS	NSW			Projectiles and flares	1965		34,00.00	151,42.00		640.5m
PROJECTILES	NSW			Projectiles	1965		33,57.00	151,41.00		640.5m
PROJECTILES	NSW			Projectiles	1965		33,50.00	151,54.00		677.1m
PROJECTILES	NSW			Projectiles	1965		33,47.48	151,49.30		585.6m
VARIOUS	NSW			Projectiles, cartridges, shell, fuzes	1965		34,35.30	151,17.18		640.5m
PROJECTILES	NSW			Projectiles	1965		34,29.24	151,18.18		594.75m
PROJECTILES	NSW			Projectiles	1965		33,21.12	152,13.00		686.25m
DEPTH CHARGES	NSW			Depth charges	1965		34,05.00	151,40.36		549m
DEPTH CHARGES	NSW			Depth charges	1965		35,03.00	151,42.24		549m
DEPTH CHARGES	NSW			Depth charges	1965		35,05.00	151,40.24		549m
DEPTH CHARGES	NSW			Depth charges	1965		34,04.00	151,40.42		549m
VARIOUS	NSW			Depth charges and fuzes	1965		34,05.54	151,39.42		549m
PROJECTILES	NSW			Projectiles	1965		34,23.12	151,24.30		549m
VARIOUS	NSW			Projectiles, cartridges, fuzes, shell and flares	1965		28,56.00	153,53.00		1116.3m
FUZES	NSW			Fuzes	1965		35,10.00	151,08.00		1244.4m
STORES	QLD	1 ton		Ordnance stores	6/11/1965		26,59.18	153,57.00	(37,45,5/139,35,5) (37,48,2/139,48,2) Dumped in straight line between these points	823.5m
MISSILE PARTS	SA		7 tons	Inert metal missile parts	7/11/1965					
VARIOUS	NSW			Plastic explosives, shell, motor flares, fuzes	1966		33,49.30	152,00.00		824
VARIOUS	NSW			Floats, cartridges, generators	1966		34,19.00	151,31.00		814.4m
CARTRIDGES	WA			Cartridges	1966		22,33.00	113,26.00		796m
CARTRIDGES	NSW			Cartridges	1967		34,05.30	151,46.24		1189.5m
VARIOUS	NSW			T-cutters, shell, detonators	1967		34,12.00	151,34.00		915m
VARIOUS	WA			Cartridges, fuzes, primers, exploder, detonators, grenades	1967		31,57.00	115,06.00		951.6m
DEPTH CHARGES	WA			Depth charge	1967		32,02.00	115,08.00		549m

Appendix G - Database of Ammunition dumping episodes

Type	State	Quantity	Quantity (units)	Description	Start Date	Finish Date	Latitude DMS	Longitude DMS	Other Detail of Dumping Position	Depth
VARIOUS	NSW			Rifles, fuzes	1967		36,07.00	150,32.00		915m
VARIOUS	WA			Detonator, fuzes	1968		32,03.00	115,05.00		549m
VARIOUS	VIC			Cartridges, projectiles and fuzes	1968		39,42.00	142,53.00		1098m
WEAPONS	QLD	2080	lbs	Boxed weapons	21/2/1968		26,59.00	153,13.00		237.9m
VARIOUS	QLD	4000	lbs	Boxed general stores including bayonets	21/2/1968		27,02.00	153,41.00		256.2m
EXPLOSIVES	WA	200	cartons	Explosives	9/8/1968		32,4.00	115,20.00	Buffer - 7mm Diameter reading	
VARIOUS	QLD	600	lbs	Boxed rifle barrels & sulphur bottles	21/10/1968		27,05.00	153,55.00		915m
STORES	WA	1	ton	Ordnance stores	6/12/1968		31,59.00	115,23.00		65.88m
VARIOUS	NSW			Shell, grenades, cartridges	1969		33,35.00	152,00.00		622.2m
VARIOUS	NSW			Flares, T-Cutter	1969		33,41.00	151,53.00		567.3m
GUNS	WA			Guns	1969		31,58.30	115,09.00		592.92m
VARIOUS	WA			Shell, bombs, detonator, cartridges	1969		31,59.00	115,08.00		
CARTRIDGES	WA			Cartridges	1969		21,23.00	114,37.00		183m
VARIOUS	WA			Fuzes, cartridges, shell	1969		30,32.00	114,35.00		567.3m
VARIOUS	WA			Grenades, smoke float, flares, shell, cartridges, bombs, exploders	1969					549m
VARIOUS	NSW			Flares, cartridges, grenades	1969		36,36.00	150,23.00		594.75m
SMALL ARMS	VIC	4	tons	Small arms	25/1/1969		38,22.00	148,22.00		250.71m
SHELL	WA	47	tons	Naval 5.5 star shells	22/3/1969		31,59.00	115,23.00		65.88m
VARIOUS	QLD	6800	lbs	Boxed OMC parts & assorted weapons	24/3/1969		25,58.00	153,44.00		265.35m
SMALL ARMS	VIC	4	tons	Small arms	9/7/1969		40,05.00	146,00.00		86.01m
WEAPONS	SA	59	cases	Weapons	19/9/1969		38,23.00	140,17.00		915m
VARIOUS	WA	8	tons	Army weapons/Medical stores	2/10/1969		32,04.00	114,52.00		915m
SMOKE FLOAT	NSW			Smoke float	1970		34,23.00	151,28.00		732m
SMOKE FLOAT	NSW			Smoke float	1970		33,21.30	153,32.00		4941m
SMOKE FLOAT	NSW			Smoke float	1970		34,10.00	151,34.00		549m
SMOKE FLOAT	QLD			Smoke float	1970		24,01.00	153,09.00		567.3m
SMOKE FLOAT	NSW			Smoke float	1970		34,35.06	151,24.42		1098m
VARIOUS	SA			Pistols, springs, guns, cartridges	1970		36,57.00	129,33.00		5490m
VARIOUS	NT			Defused bloodhound missiles, inert components, specified non hazardous	3/1/1970		8,53.00	129,50.00		1830m
PYROTECHNICS	NSW		2	drums	3/2/1970		38,08.00	155,26.00		4575m
VARIOUS	WA		7	tons	19/3/1970		32,04.00	114,52.00		915m
EXPLOSIVES	VIC		32	boxes	22/6/1970		36,35.00	151,43.00		4575m
DETONATORS	VIC		2331	cases	23/7/1970		39,02.00	142,20.00		732m
EXPLOSIVES	VIC		144	boxes	23/7/1970		39,02.00	142,20.00		732m

Appendix G - Database of Ammunition dumping episodes

Type	State	Quantity	Quantity (units)	Description	Start Date	Finish Date	Latitude DMS	Longitude DMS	Other Detail of Dumping Position	Depth
CORDTEX	VIC	168 cases	55lb in each case		23/7/1970		39,02,00	142,20,00		732m
EXPLOSIVES	TAS	130 cases	Explosives		4/8/1970		42,02,00	144,34,00		915m
CORDTEX	TAS	130 cases			4/8/1970		42,02,00	144,34,00		915m
PYROTECHNICS	VIC	1 ton	Obsolete pyrotechnics		30/8/1970		38,22,00	152,16,00		
VARIOUS	WA	1 ton	Ordnance/Medical stores		23/10/1970		32,04,00	114,52,00		915m
VARIOUS	WA		Fuzes,Shell, Grenades,cartridges,signal heads		1971		31,55,00	114,43,00		1098m
DEPTH CHARGES	WA		Depth charges		1971		31,53,00	113,30,00		2470.5m
VARIOUS	WA		Ammunition,depth charges,grenades		1971		32,03,00	114,52,00		1098m
AMMUNITION	WA		Ammunition		1971		22,20,00	108,56,00		4026m
VARIOUS	NSW		Signals,fuzes,ammunition		1971		35,05,00	151,27,48		4758m
CARTRIDGES	NSW		Cartridges		1971		34,22,48	151,31,36		915m
CARTRIDGES	NSW		Cartridges		1971		33,59,00	151,51,30		1189.5m
CARTRIDGES	NSW		Cartridges		1971		34,08,00	151,45,06		1189.5m
CARTRIDGES	NSW		Cartridges		1971		34,21,00	151,33,00		1006.5m
VARIOUS	NSW		Ammunition,smoke bombs,signal cartridges,signal floats,explosive cutters,flares,bolt ammunition,fuzes,shell star,shell heads,plastic explosive,cordtex		1971				(33,39,00/152,03,00)(33,10,00/152,33,00) Dumped in straight line between these points	1006.5m
VARIOUS	NSW		Shell,explosives,cartridges,fuzes		1971				(33,36,00/152,06,00)(33,15,00/152,22,00) Dumped in straight line between these points	1006.5m
CARTRIDGES	NSW		Shell cartridges		1971				(33,35,00/152,07,00) Dumped in straight line between these points	1006.5m
WEAPONS	SA	74 cases	Weapons		Oct-71		36,26,00	135,50,00		915m
NITRAMON	WA	594 lbs			9/11/1971		32,1,00	115,17,00		
NITRAMON	WA	32 tonnes			9/12/1971		32,7,00	114,48,00		
VARIOUS	WA		Smoke floats,cartridges		1972		32,02,00	115,00,00		1123.62m
CARTRIDGES	WA		Cartridges		1972		31,59,00	115,03,00		1281m
VARIOUS	NSW		Flares,primers,bombs,smoke floats,signals		1972		35,06,00	151,06,00		1098m
VARIOUS	NSW		Rocket flares,depth charges,mortar bombs		1972		34,13,00	151,40,00		1098m
VARIOUS	NSW		Flares,smokes,smoke candles, markers, grenades, rockets, cartridges, fuzes, 25lb practice bombs		1972		33,25,00	152,21,00		915m
VARIOUS	NSW		Cartridges,flares,primers,shell,practice bombs,fuzes, grenades, bolt ammunition		1972		33,36,00	152,09,00		915m
VARIOUS	NSW		Rifles,machine guns		1972		33,16,00	152,31,00		915m

Appendix G - Database of Ammunition dumping episodes

Type	State	Quantity	Quantity (units)	Description	Start Date	Finish Date	Latitude DMS	Longitude DMS	Other Detail of Dumping Position	Depth
FUZE COMPONENTS	VIC	720 lbs		Surplus fuze components	7/3/1972				3.6m S of Cape Schanck Light	58.56m
AMMUNITION	NSW	306 tons		Also rocket heads	2/5/1972		33,25.00	152,21.00		
EXPLOSIVES	TAS	23 tons		Explosives	19/5/1972		41,24.00	143,57.00		2196m
FLARES	TAS	19 drums		5 gallon drums; Obsolete flares	26/7/1972		43,40.00	145,34.00		1281m
PYROTECHNICS	WA	unknown		Outdated pyrotechnics	Sep-72		32,00.00	115,03.00		915m
FUZE COMPONENTS	VIC	2024 lbs		Surplus fuze components	26/9/1972		38,31.48	148,43.24		
BOMBS	NSW	500 kg		GP bombs	Nov-72		34,10.00	151,55.00		2196m
MARKERS	WA			Markers	1973		34,00.00	113,31.00		3015.84m
MORTAR	NSW			Mortar bombs	1973		34,10.00	151,55.00		
AMMUNITION	QLD			40/60 ammunition; 16 rounds (40mm practice ammo comprising cartridge propellant and solid round in one unit)	23/8/1973		16,30.00	146,30.00		1500m
RIFLES	TAS	4 boxes		.303 rifles	4/11/1973		41,40.00	148,40.00		915m
MARKERS	WA			Markers	1974		18,00.00	110,30.00		4928.19m
CARTRIDGES	QLD			40/60 cartridges	1975		24,23.24	153,24.36		
AMMUNITION	QLD	2 drums		44 gallon drums	Apr-81		26,58.54	153,57.30		2000m
AMMUNITION	QLD	150 kg		19 rounds (40mm), 200 rounds 0.5 calibre, 150 pounds of plastic explosives	5/12/1981		17,58.30	147,21.00		1030m
DEPTH CHARGES (UNEXPLODED)	WA						16,06.57	123,36.51		
DEPTH CHARGES (UNEXPLODED)	WA						16,05.35	123,35.20		
DEPTH CHARGES (UNEXPLODED)	WA						20,23.02	115,39.57		
DEPTH CHARGES (UNEXPLODED)	WA						21,29.00	114,39.42		
DEPTH CHARGES (UNEXPLODED)	WA						31,45.12	115,13.12		
DEPTH CHARGES (UNEXPLODED)	WA						31,47.30	115,14.18		
DEPTH CHARGES (UNEXPLODED)	WA						31,58.30	115,32.01		
DEPTH CHARGES (UNEXPLODED)	VIC						38,13.58	144,49.39		
DEPTH CHARGES (UNEXPLODED)	VIC						38,11.35	144,51.55		
DEPTH CHARGES (UNEXPLODED)	VIC						38,08.54	144,50.35		
DEPTH CHARGES (UNEXPLODED)	VIC						39,05.44	146,45.05		
DEPTH CHARGES (UNEXPLODED)	VIC						39,38.06	146,46.30		
DEPTH CHARGES (UNEXPLODED)	VIC						38,07.24	148,00.52		
DEPTH CHARGES (UNEXPLODED)	NSW						35,15.30	150,38.00		
DEPTH CHARGES (UNEXPLODED)	NSW						35,15.13	150,41.20		
DEPTH CHARGES (UNEXPLODED)	NSW						35,12.00	150,38.00		
DEPTH CHARGES (UNEXPLODED)	NSW						35,06.41	150,48.07		
DEPTH CHARGES (UNEXPLODED)	NSW						34,53.12	150,57.48		
DEPTH CHARGES (UNEXPLODED)	NSW						34,52.00	150,58.00		
DEPTH CHARGES (UNEXPLODED)	NSW						34,50.00	150,59.00		
DEPTH CHARGES (UNEXPLODED)	NSW						34,27.37	150,55.48		

Appendix G - Database of Ammunition dumping episodes

Type	State	Quantity	Quantity (units)	Description	Start Date	Finish Date	Latitude DMS	Longitude DMS	Other Detail of Dumping Position	Depth
DEPTH CHARGES (UNEXPLODED)	NSW						34,18,00	151,03,00		
DEPTH CHARGES (UNEXPLODED)	NSW						34,10,00	151,15,00		
DEPTH CHARGES (UNEXPLODED)	NSW						33,50,27	151,16,17		
DEPTH CHARGES (UNEXPLODED)	NSW						33,50,35	151,16,19		
DEPTH CHARGES (UNEXPLODED)	NSW						33,50,58	151,16,15		
DEPTH CHARGES (UNEXPLODED)	NSW						33,51,02	151,16,13		
DEPTH CHARGES (UNEXPLODED)	NSW						33,34,45	151,27,33		
DEPTH CHARGES (UNEXPLODED)	NSW						32,59,10	151,48,47		
DEPTH CHARGES (UNEXPLODED)	QLD						26,54,42	153,08,33		
DEPTH CHARGES (UNEXPLODED)	QLD						27,14,24	153,15,40		
DEPTH CHARGES (UNEXPLODED)	QLD						22,14,18	150,25,24		
DEPTH CHARGES (UNEXPLODED)	QLD						19,10,18	146,55,00		
DEPTH CHARGES (UNEXPLODED)	QLD						16,47,18	145,55,18		
DEPTH CHARGES (UNEXPLODED)	QLD						16,41,54	145,51,36		
DEPTH CHARGES (UNEXPLODED)	NT						12,21,48	130,46,29		

Appendix H - Database of Other dumping episodes

Material	State	Artificial Reef	Quantity	Quantity (units)	Description (1)	Description (2)	Start Date	End Date	Latitude DMS	Longitude DMS	Other Detail of Dumping Position	Depth
VARIOUS AIRCRAFT	NSW NSW		180	tons	Placed on Hopper lighter No. 292-towed by steam tug Woonona	Coke, breeze, bricks and some paper-probably March	15/3/37 Jan-46		33,53,00	151,38,30	5 to 6 m E of a straight line drawn from South Head signal station to Outer North Head	
WAR PLANES	NSW					Obsolete war planes	18/1/1946	23/1/1946			096deg, 23 miles from Macquarie Light;also in 5mm circular area 119 deg Macquarie Light 18 miles - presumably a diameter measurement	217.8m
WAR PLANES	NSW					Obsolete war planes and engines	15/4/1946		34,00,00	151,36,00		274.5m
AMPHIBIOUS VEHICLES	SA		9	vehicles	Lost in Stockton Bight area-probably in 16-19 fathoms	One was recovered	8/3/1954		33,33,00	137,51,24	1 is at 2m, two at 7.9m, 1 at 12.9m and 1 at 14m from the shore of the Nobbys Lighthouse while another 3 are at 064 deg 6.7miles, 067 deg 12 miles & 066 deg 14 miles from the LH SA-Port Broughton	10m
CAR BODIES	QLD		0.50	ton		Motor vehicle bodies	1960s		26,59,00	153,57,00		823.5m
MEDICAL STORES/SULPHUR DRUGS	QLD		0.25	ton			2/2/1966		26,59,00	153,57,00		823.5m
MEDICAL STORES FROM WATER POUCE	QLD		500	tons approx			20/12/1966		25,16,20	152,58,12		11-16m
PIPES & SLABS	QLD	R	10000	tyres		Roy Rufus Artificial Reef	1968	1971	25,16,20	152,58,12		11-16m
TYRES	QLD	R	2600	car bodies		Roy Rufus Artificial Reef	1968	1971	25,16,20	152,58,12		11-16m
CARS	QLD	R	36	tonnes		Steel pontoons	Aug-68	1990	27,06,07	153,21,00		40-70
PONTOONS	QLD		7	ton		Concrete pipes	Jan-69		27,06,07	153,21,00		40-70
PIPES	QLD		0.50	ton		RAAF stores metal	22/1/1969		26,59,30	153,57,00		823.5m
METAL	QLD		10	tons			15/2/1969		27,6,6	153,21,30		
TYRES/CAR BODIES	WA		8	tons			2/10/1969		32,04,00	114,52,00		915m
ARMY WEAPONS/MEDICAL STORES					Macquarie Is	Dumped by resupply vessels just off coast	70s-early 80s					
FOOD SCRAPS												

Appendix H - Database of Other dumping episodes

Material	State	Artificial Reef	Quantity	Quantity (units)	Description (1)	Description (2)	Start Date	End Date	Latitude DMS	Longitude DMS	Other Detail of Dumping Position	Depth
RUBBISH					Macquarie Is - LARC boats dumped waste from field huts on 4-5 occasions	Rubbish was put in 44 gallon drums, burnt & then dumped	70s-early 80s				0.5m approx off West & East sides of Macquarie Is	
TYRES	QLD		5000	tyres			1970	1977	27,06,07	153,21,00		40-70
TYRES/CAR BODIES	QLD		9	tons			28/1/1970		27,6,18	153,22,9		
ARMY WEAPONS/MEDICAL STORES/EQUIPMENT	WA		7	tons			19/3/1970		32,04,00	114,52,00		915m
SCRAP METAL	VIC			unknown		Late July	Jul-70		38,25,00	148,32,00		
TYRES/CAR BODIES	QLD		10	tons			2/8/1970		27,6,18	153,22,9		
ORDNANCE/MEDICAL STORES	WA		1	ton			23/10/1970		32,04,00	114,52,00		915m
TYRES/CAR BODIES	QLD		8	tons			29/11/1970		27,6,18	153,22,9		
CERAMICS	WA		100	tons	Also in April 1970?	Ceramics contaminated with arsenic	Dec-70		32,00,00	114,30,00		
TYRES	SA		5000	tyres		Added to 1983-see various 1983	1971		33,05,43	137,36,23		10m
SCRAP METAL	QLD		1	ton		Scrap metal in drums	17/8/1971		26,59,30	153,57,00		823.5m
TYRES	SA		2000	tyres		Bundles of 5-6	1972		34,45,20	135,55,50		
RESIDUE FROM GRAIN CLEANING	WA		30	drums	44 gallon drums	Residue from grain cleaning-30 drums	Oct-72		32,04,00	114,52,00		
CONCRETE PILES	QLD		60	piles		Steel encased concrete piles	Dec-75	Mar-76	10,43,00	142,19,00		
DREDGE SPOIL	SA		100 000	m3	Dredge HC Meyer	Maintenance dredging	1976		34,46,00	138,26,00		
DREDGE SPOIL	SA		9000	m3	Dredge Andrew Wilson	Maintenance dredging- Inner harbour	1976		34,46,00	138,26,00		
DREDGE SPOIL	SA		624 300	m3	Dredge HC Meyer	New Dredging works- No. 6 O/H & approaches	1976		34,46,00	138,26,00		
DREDGE SPOIL	SA		960 000	m3	AD Geopotes I	New Dredging works	1976		34,46,00	138,26,00		
DREDGE SPOIL	SA		10 000	m3	Dredge Andrew Wilson	New Dredging works-No 6 O/H	1976		34,46,00	138,26,00		
EXHAUST VALVES	NSW		6	boxes	3000 valves in each box- from aircraft engines	Unservicable sodium filled engine exhaust valves	17/1/1976		34,00,00	151,36,00		300m
DREDGE SPOIL	SA		90 000	m3	Dredge HC Meyer	Maintenance dredging	1977		34,46,00	138,26,00		
DREDGE SPOIL	SA		8600	m3	Dredge Andrew Wilson	Maintenance dredging- Pt Adelaide	1977		34,46,00	138,26,00		

Appendix H - Database of Other dumping episodes

Material	State	Artificial Reef	Quantity	Quantity (units)	Description (1)	Description (2)	Start Date	End Date	Latitude DMS	Longitude DMS	Other Detail of Dumping Position	Depth
DREDGE SPOIL	SA		573 000	m3	Dredge HC Meyer	New Dredging works-No 6	1977		34,46,00	138,26,00		
DREDGE SPOIL	SA		104 000	m3	AD Geopotes I	New Dredging works	1977		34,46,00	138,26,00		
DREDGE SPOIL	SA		13 500	m3	Dredge Andrew Wilson	New Dredging works	1977		34,46,00	138,26,00		
DREDGE SPOIL	SA		2000	m3	Dredge Andrew Wilson	New Dredging works-No 6 O/H	1977		34,46,00	138,26,00		
DREDGE SPOIL	SA		100 000	m3	Dredge HC Meyer	Maintenance dredging	1978		34,46,00	138,26,00		
DREDGE SPOIL	SA		487 000	m3	Dredge HC Meyer	New Dredging works	1978		34,46,00	138,26,00		
DREDGE SPOIL	SA		22 000	m3	Dredge Andrew Wilson	New Dredging works	1978		34,46,00	138,26,00		
VARIOUS	QLD					Bricks,concrete pipes & machinery	1978		25,05,50	152,34,42		9m
EXHAUST VALVES	NSW		6	containers	322 valves per container	Unservicable sodium filled engine exhaust valves	Jun-78		34,00,00	151,35,00		200m
EXHAUST VALVES	NSW		322	valves	421 valves per container	Unservicable sodium filled engine exhaust valves	Dec-78		34,00,00	151,35,00		200m
DREDGE SPOIL	SA		90 000	m3	Dredge HC Meyer	Maintenance dredging	1979		34,46,00	138,26,00		
DREDGE SPOIL	SA		6 500	m3	Dredge Andrew Wilson	Maintenance dredging-Pt Adelaide	1979		34,46,00	138,26,00		
DREDGE SPOIL	SA		588 000	m3	Dredge HC Meyer	New Dredging works	1979		34,46,00	138,26,00		
DREDGE SPOIL	SA		22 615	m3	Dredge Andrew Wilson	New Dredging works	1979		34,46,00	138,26,00		
PONTOON	NSW		1	pontoon	From South East Pound-Garden Island	Old landing pontoon/lighter	8/8/79		33,43,6	151,20,48		33m
EXHAUST VALVES	NSW		169	valves			1/10/1979		34,00,00	151,35,00		200m
DREDGE SPOIL	SA		315 000	m3	Dredge HC Meyer	Maintenance dredging	1980		34,46,00	138,26,00		
DREDGE SPOIL	SA		10 000	m3	Dredge Andrew Wilson	Maintenance dredging	1980		34,46,00	138,26,00		
DREDGE SPOIL	SA		5 000	m3	Dredge Andrew Wilson	North Haven	1980		34,46,00	138,26,00		
DREDGE SPOIL	SA		166 000	m3	AD Victoria	New Dredging works	1980		34,46,00	138,26,00		
DREDGE SPOIL	SA		5 000	m3	Dredge Andrew Wilson	New Dredging works-Osborne	1980		34,46,00	138,26,00		
SODIUM EXHAUST VALVES	NSW		138				Aug-80		34,00,00	151,36,00		200m
DREDGE SPOIL	SA		138 000	m3	AD Victoria	Maintenance dredging	1981		34,46,00	138,26,00		
DREDGE SPOIL	SA		8 000	m3	Dredge Andrew Wilson	Maintenance dredging	1981		34,46,00	138,26,00		
DREDGE SPOIL	SA		422 000	m3	AD Victoria	New Dredging works	1981		34,46,00	138,26,00		
DREDGE SPOIL	SA		180 000	m3	AD Victoria	New Dredging works	1981		34,46,00	138,26,00		
DREDGE SPOIL	SA		4 500	m3	Dredge Andrew Wilson	New Dredging works	1981		34,46,00	138,26,00		
DREDGE SPOIL	SA		366 000	m3	AD Victoria	Maintenance dredging	1982		34,46,00	138,26,00		

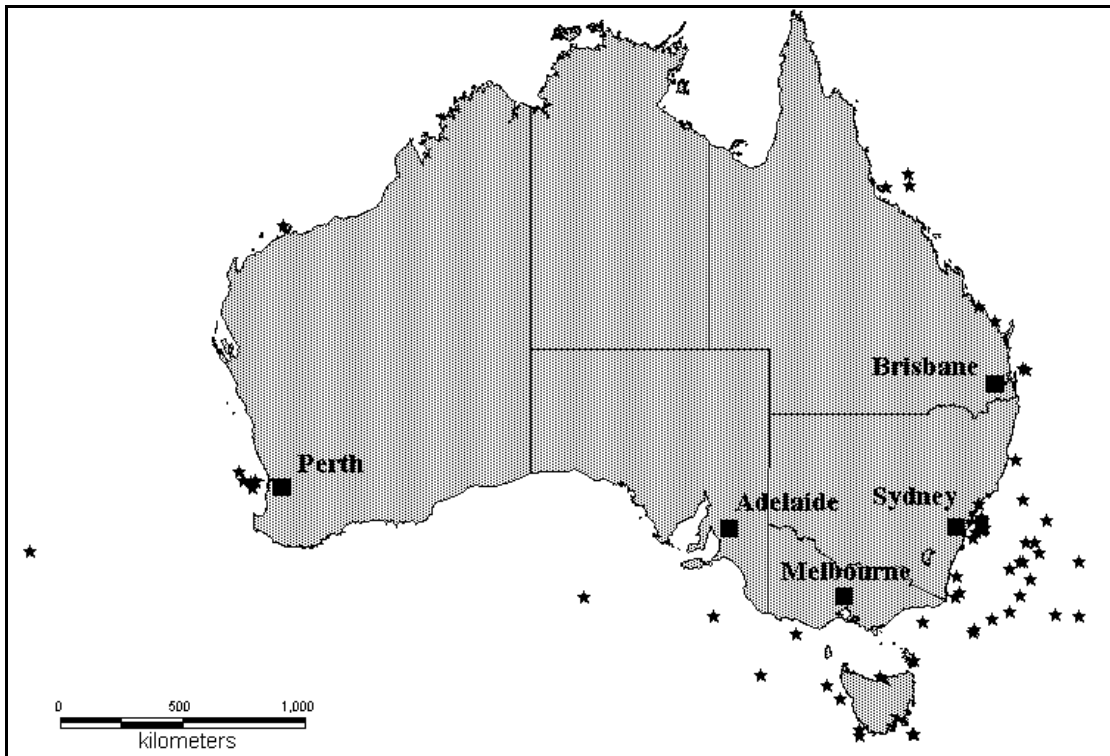
Appendix H - Database of Other dumping episodes

Material	State	Artificial Reef	Quantity	Quantity (units)	Description (1)	Description (2)	Start Date	End Date	Latitude DMS	Longitude DMS	Other Detail of Dumping Position	Depth
DREDGE SPOIL	SA		5 100	m3	Dredge Andrew Wilson	Maintenance dredging	1982		34,46,00	138,26,00		
DREDGE SPOIL	SA		304 500	m3	AD Victoria	New Dredging works	1982		34,46,00	138,26,00		
DREDGE SPOIL	SA		97 400	m3	AD Victoria	New Dredging works	1982		34,46,00	138,26,00		
DREDGE SPOIL	SA		23 800	m3	AD Victoria	New Dredging works	1982		34,46,00	138,26,00		
DREDGE SPOIL	SA		7 000	m3	Dredge Andrew Wilson	New Dredging works	1982		34,46,00	138,26,00		
SODIUM EXHAUST VALVES	NSW		822				25/8/1982		34,00,00	151,36,00	Buffer of radius 3nm	200m
IRON ORE	WA		1005	tonnes		Shinyo Maru	1/12/1982		20,20,00	116,30,00		
DREDGE SPOIL	SA		237 000	m3	AD Victoria	Maintenance dredging	1983		34,46,00	138,26,00		
DREDGE SPOIL	SA		163 000	m3	AD Victoria	Maintenance dredging	1983		34,46,00	138,26,00		
DREDGE SPOIL	SA		3 250	m3	Dredge Andrew Wilson	Maintenance dredging	1983		34,46,00	138,26,00		
VARIOUS	SA					50 tonnes tractor tyres (large) & 10 tonnes concrete steel structures	1983		33,05,43	137,36,23		15m
DREDGE SPOIL	SA		29 000	m3	AD Victoria	Maintenance dredging	1984		34,46,00	138,26,00		
DREDGE SPOIL	SA		106 000	m3	AD Victoria	New Dredging works	1984		34,46,00	138,26,00		
DREDGE SPOIL	SA		380 000	m3	AD Geopotes I	New Dredging works	1984		34,46,00	138,26,00		
TYRES	SA	R	33600	tyres	Artificial reef	28 tyre modules	Jul-84	Oct-84	34,55,6	138,24,00		18m
NAVIGATION BUOYS	QLD		9	buoys	Harbours and Marine, Brisbane	3x2m	29/7/1984		27,06,07	153,21,00		40-70
DREDGE SPOIL	SA		7 000	m3	AD Victoria	Maintenance dredging	1985		34,46,00	138,26,00		
DREDGE SPOIL	SA		226 000	m3	AD Victoria	New Dredging works	1985		34,46,00	138,26,00		
DREDGE SPOIL	SA		5 000	m3	Dredge Andrew Wilson	New Dredging works	1985		34,46,00	138,26,00		
DREDGE SPOIL	SA		345 000	m3	Resolution	New Dredging works	1985		34,46,00	138,26,00		
TYRES	SA	R	25200	tyres	Artificial reef	28 tyre modules	Jun-85		34,58,48	138,26,24		18m
TYRES	SA	R	18200	tyres	Artificial reef	28 tyre modules	Dec-85		35,08,12	138,26,30		20m
DREDGE SPOIL	SA		210 000	m3	AD Victoria		1986		34,46,00	138,26,00		
DREDGE SPOIL	SA		3 000	m3	Dredge Andrew Wilson	Maintenance dredging	1986		34,46,00	138,26,00		
TYRES	SA	R	12600	tyres	Artificial reef	28 tyre modules	Jul-86		35,41,12	137,40,12		18m
TYRES	SA	R	33600	tyres	Artificial reef	28 tyre modules	Jul-86		32,58,6	137,47,54		18m
TYRES	SA	R	11200	tyres	Artificial reef	28 tyre modules	Jul-86		32,58,42	137,47,6		18m
TYRES	SA	R	28000	tyres	Artificial reef	28 tyre modules	Jul-86		33,05,12	137,54,18		18m
TYRES	SA	R	28000	tyres	Artificial reef	28 tyre modules	Jul-86		32,40,00	137,45,48		18m
CONCRETE DOLPHIN	QLD		57	tonnes			Nov-90		27,06,07	153,21,00		40-70

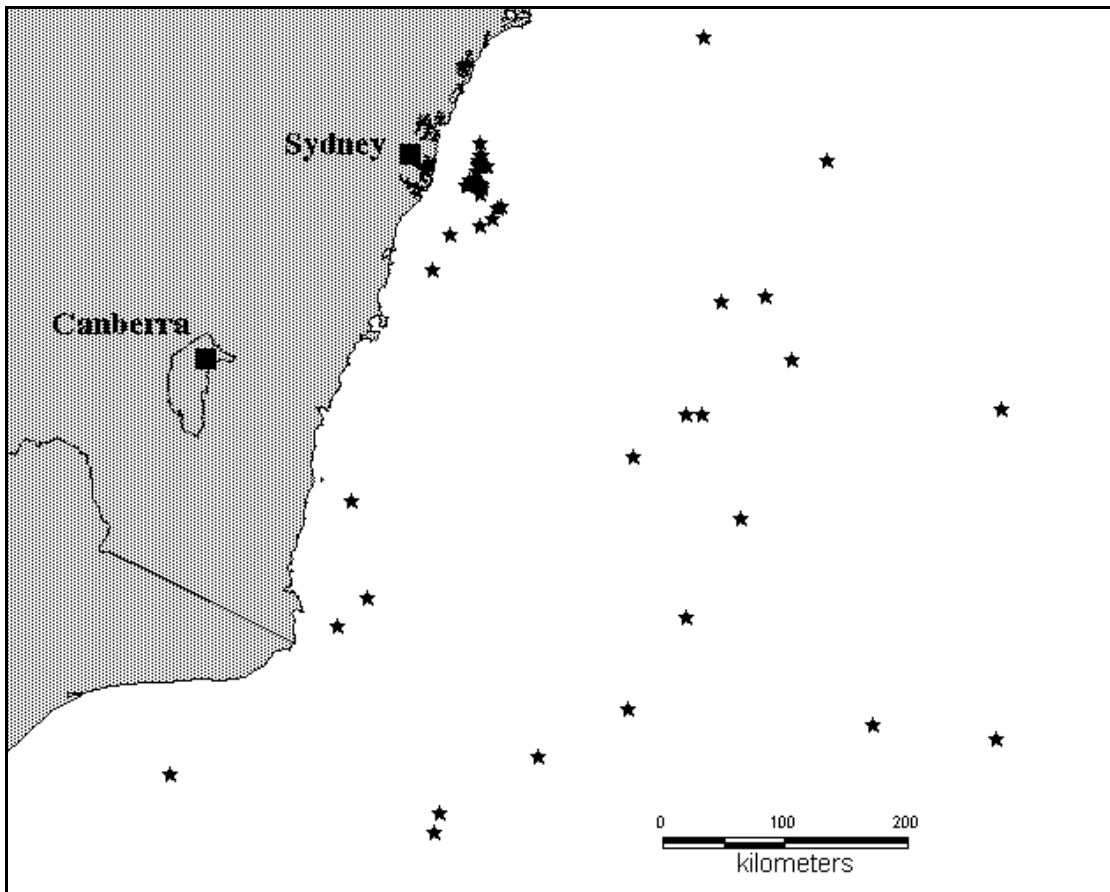
Appendix H - Database of Other dumping episodes

Material	State	Artificial Reef	Quantity	Quantity (units)	Description (1)	Description (2)	Start Date	End Date	Latitude DMS	Longitude DMS	Other Detail of Dumping Position	Depth
LOADING FACILITY	TAS					Port Latta Loading facility	Dec-90		40,51,00	143,23,00		9-17m
TYRES	SA	R	2800	tyres	Artificial reef	28 tyre modules	1991		35,02,48	137,47,24		15m
TYRES	SA	R	2800	tyres	Artificial reef	28 tyre modules	Oct-91		32,44,00	134,15,00		9m
PONTOONS	QLD			pontoons	Built from spoil-now covered and reclaimed land	Called Bishop Island-located in Moreton Bay			27,22,00	153,10,30		
CAMEL PONTOONS	QLD			pontoons	Built from spoil-now covered and reclaimed land	Called Bishop Island-located in Moreton Bay			27,22,00	153,10,30		
SIGNAL STATION AND HOUSES	QLD				Built from spoil-now covered and reclaimed land	Called Bishop Island-located in Moreton Bay			27,22,00	153,10,30		
CARBODIES	QLD		60			Now rotted away			27,06,07	153,21,00		40-70

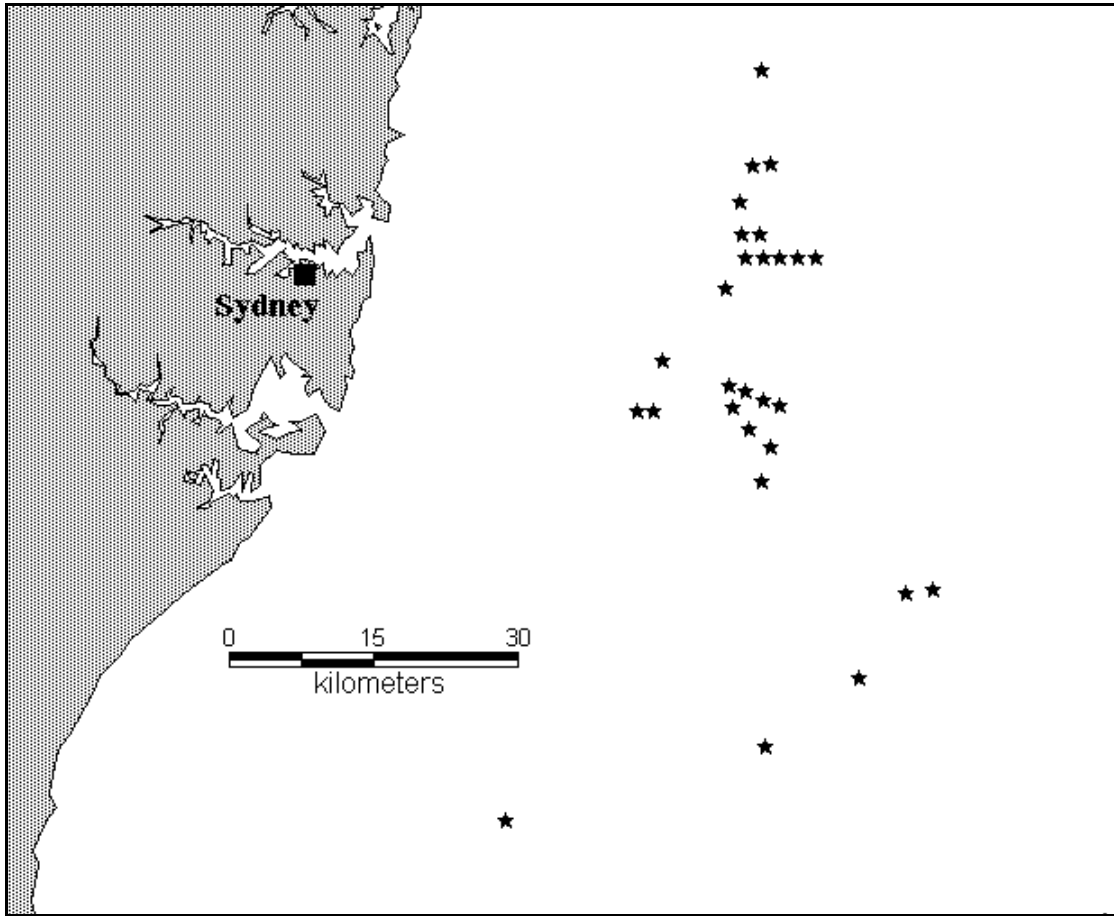
Appendix I - Visual presentation of Chemical dump sites



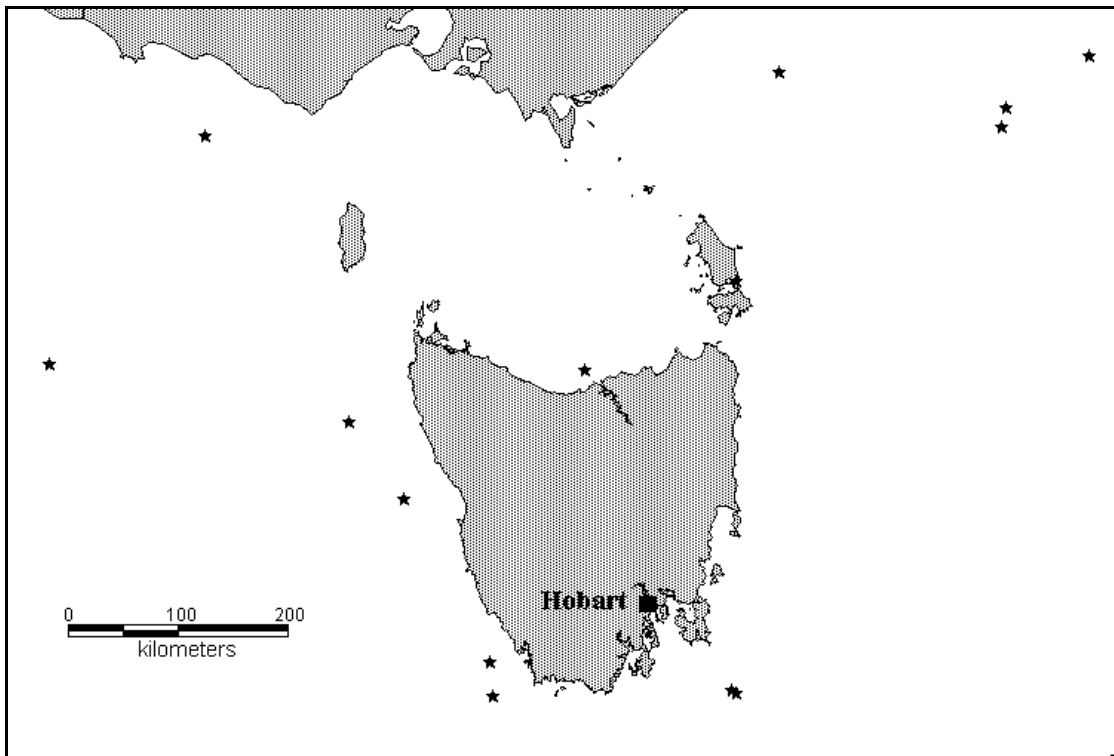
Australia



New South Wales

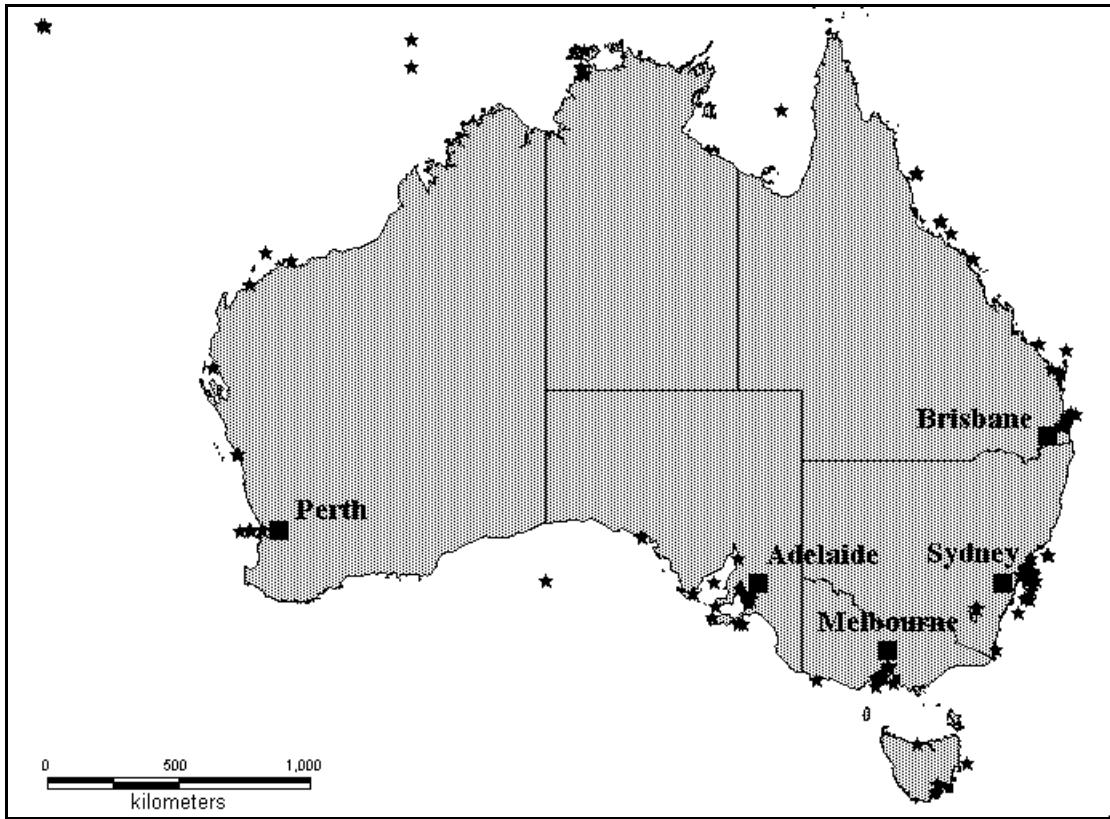


Sydney

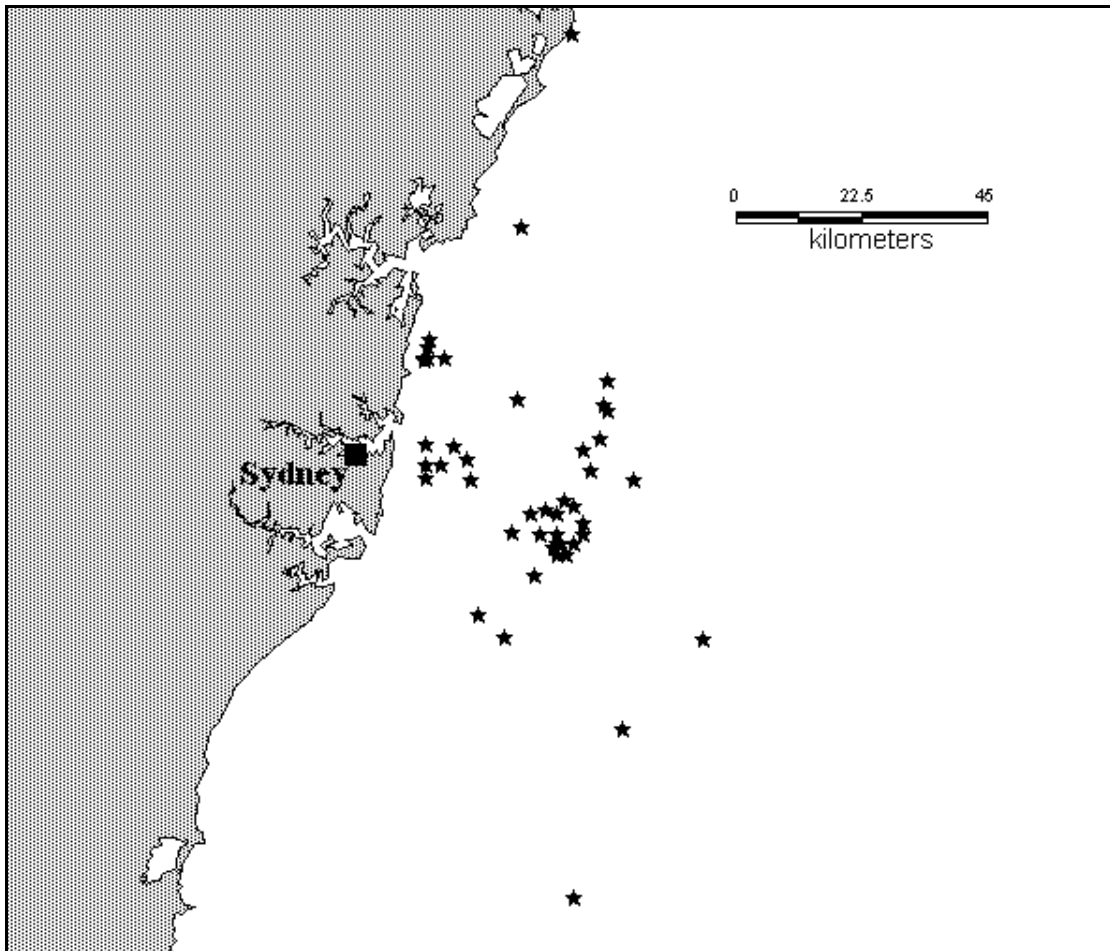


Tasmania

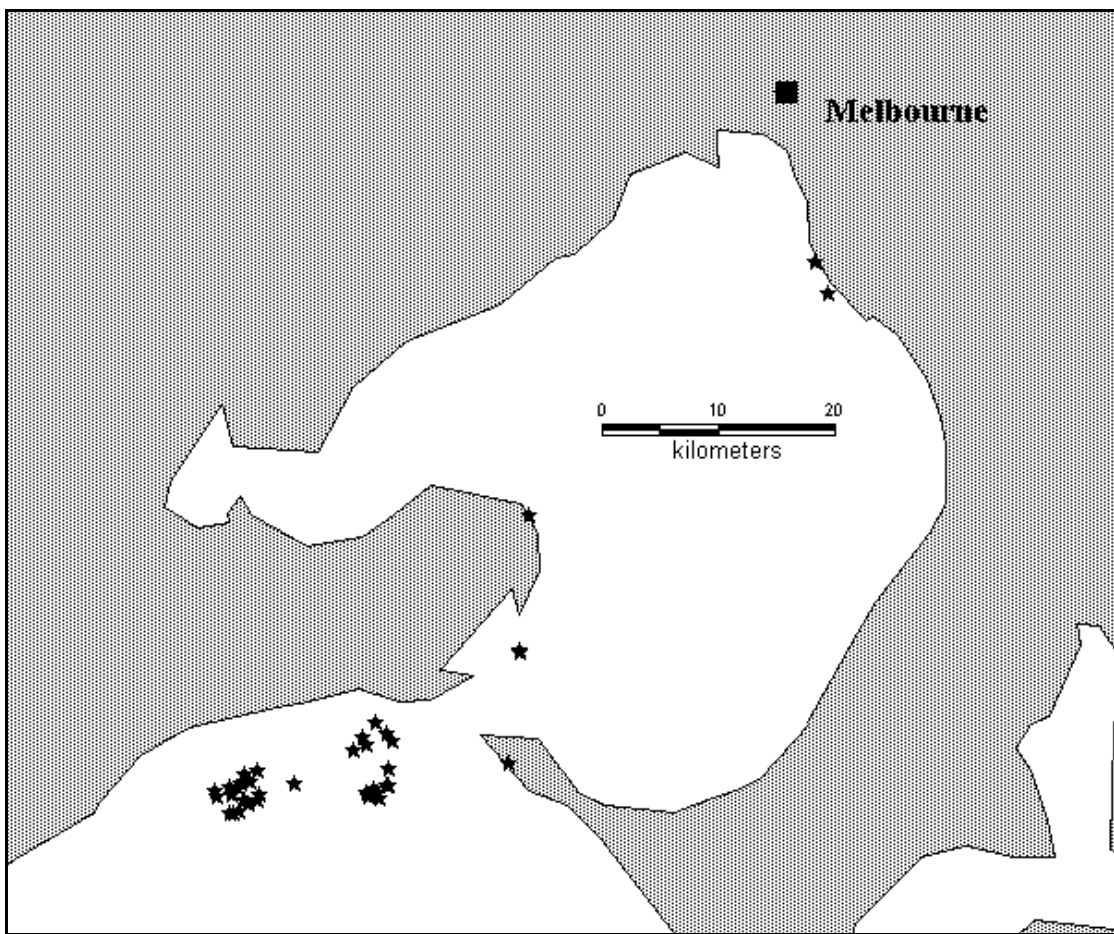
Appendix J - Visual presentation of Boat dump sites



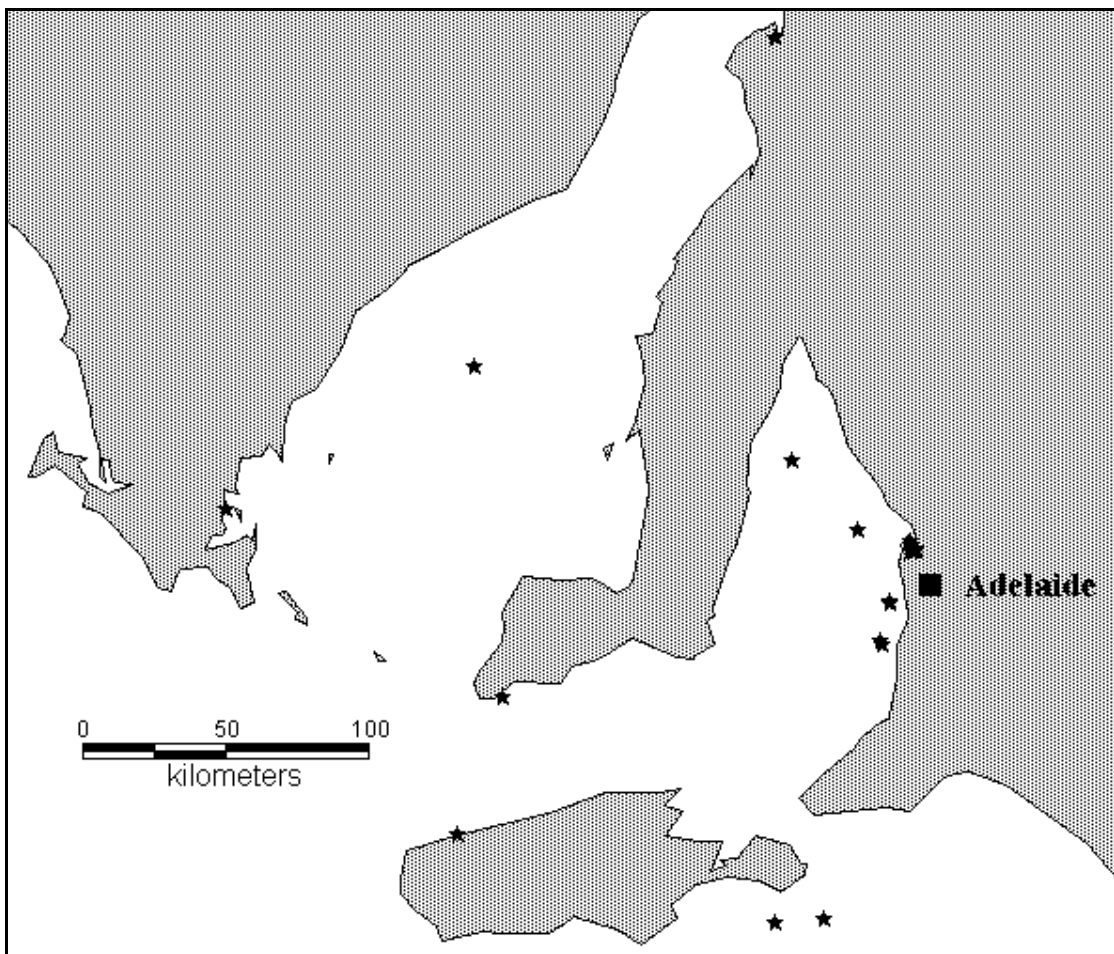
Australia



New South Wales

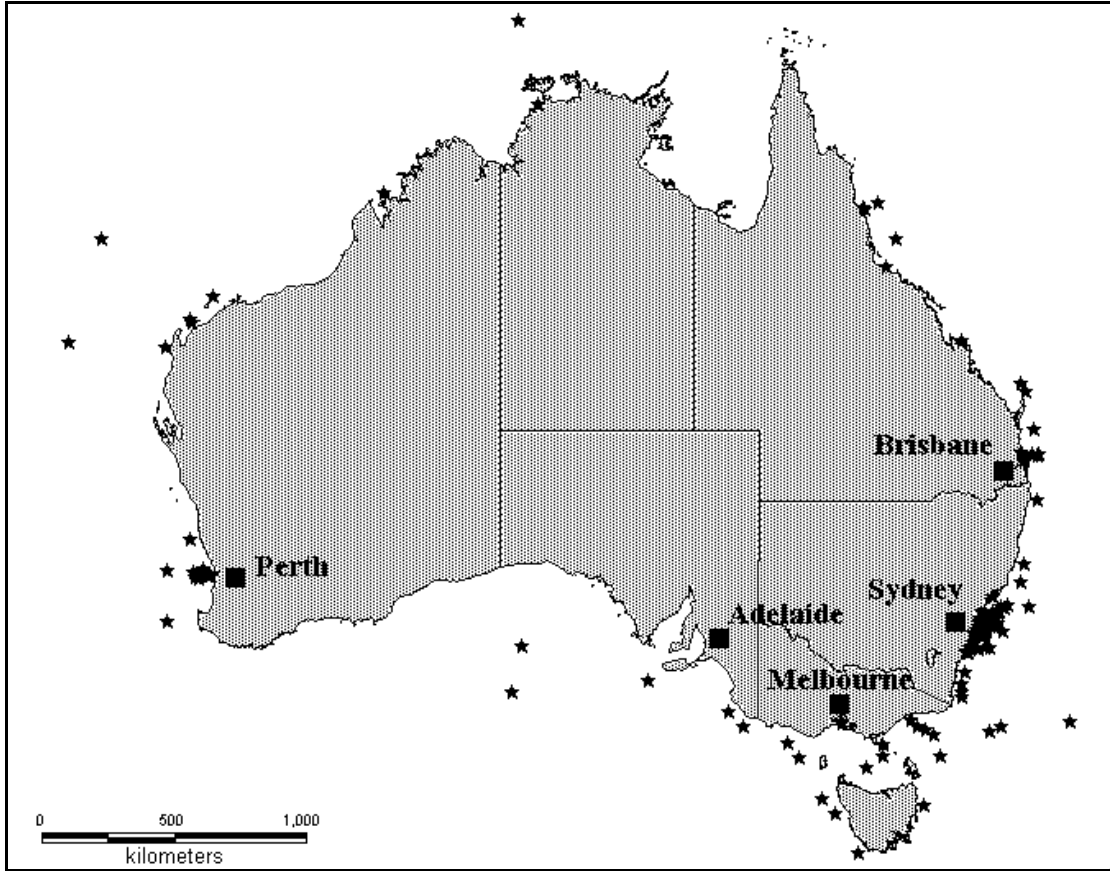


Melbourne

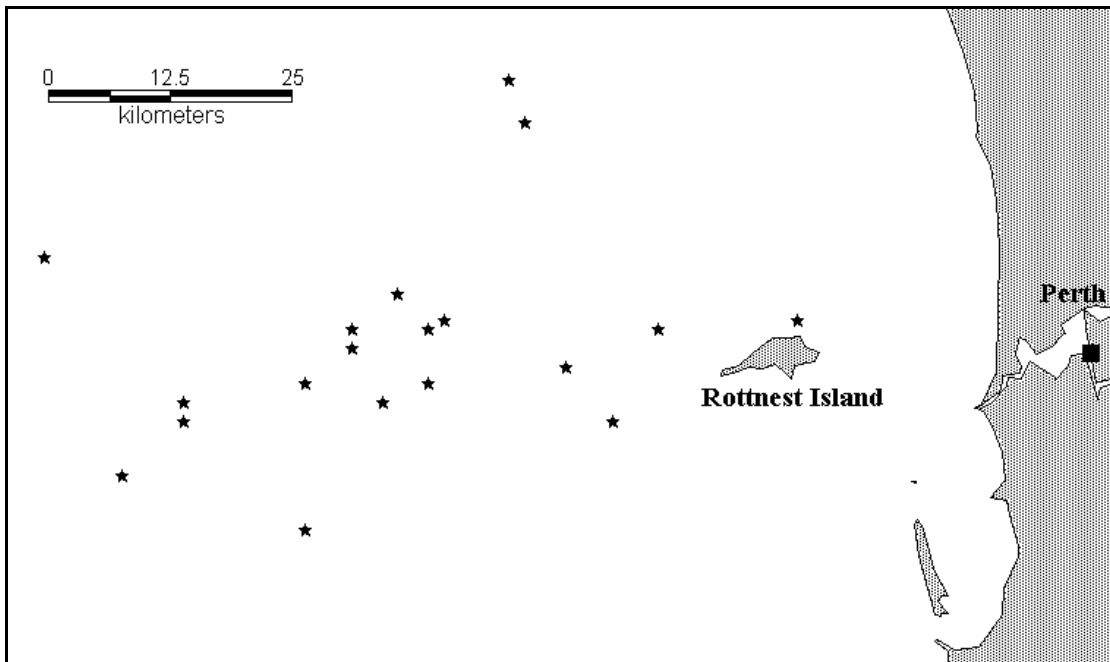


Adelaide

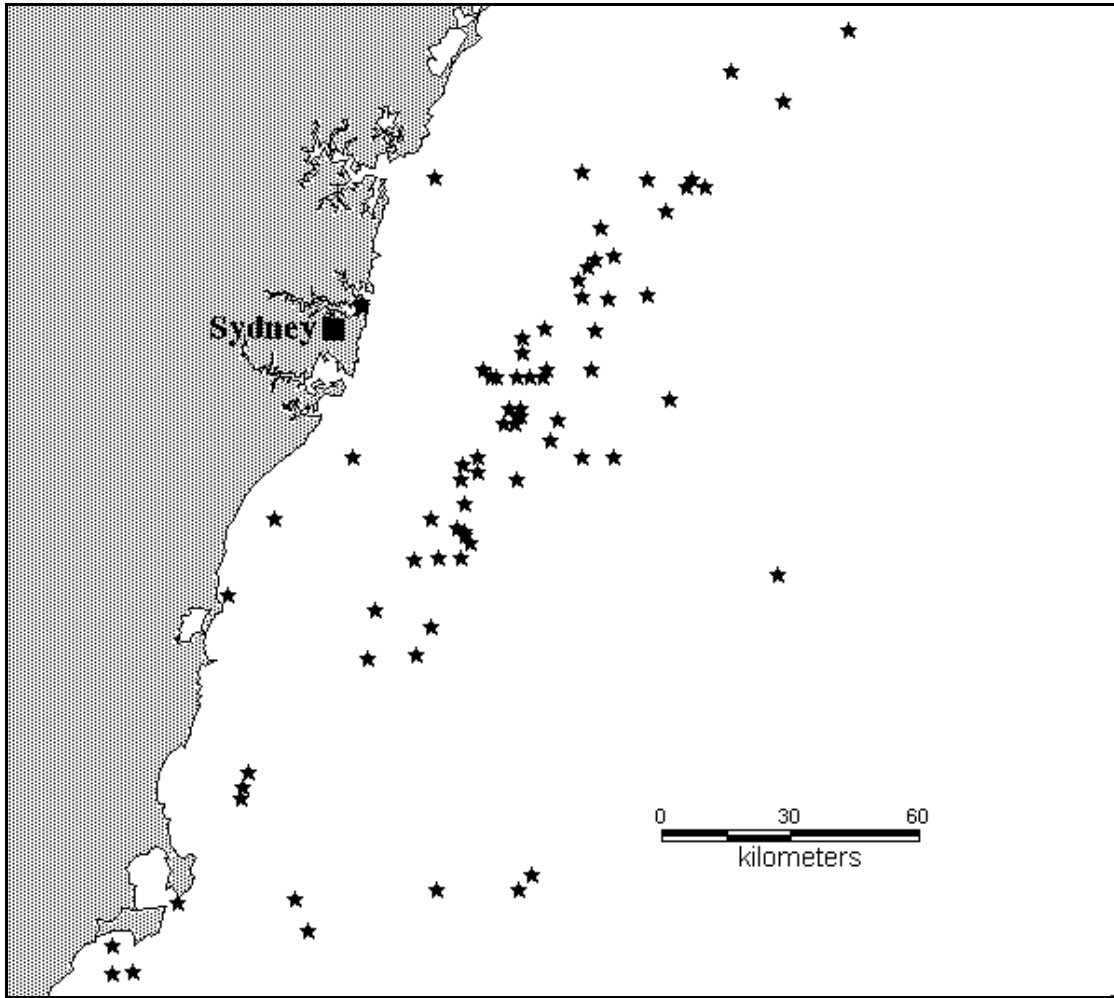
Appendix K - Visual presentation of Ammunition dump sites



Australia

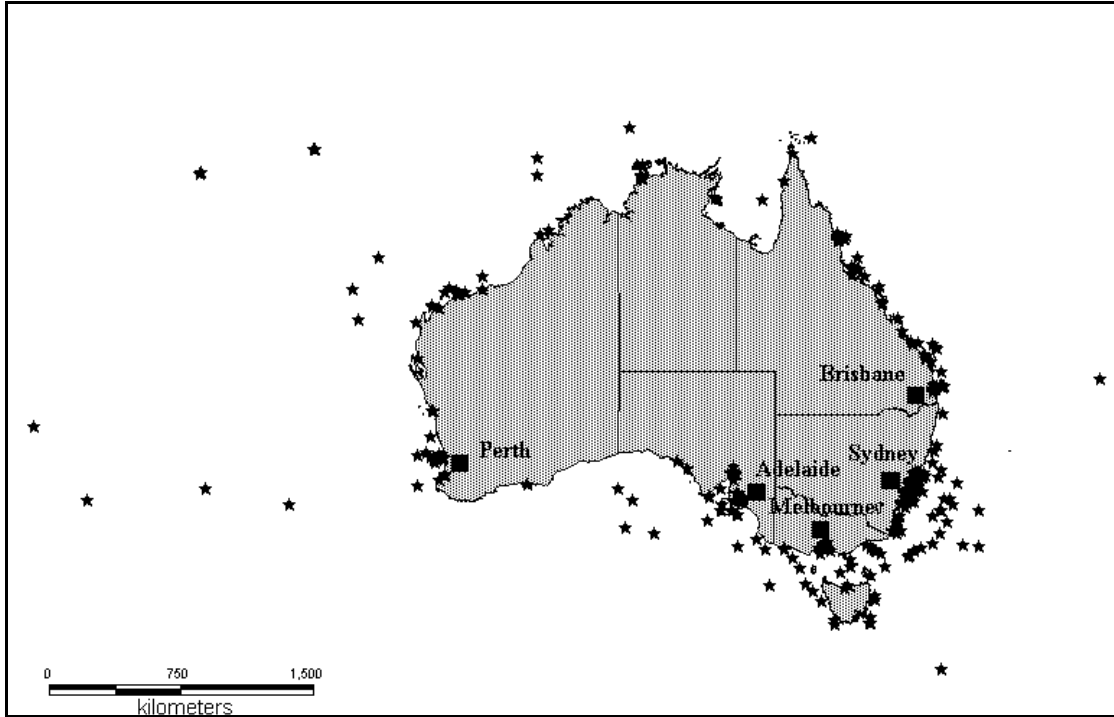


Perth

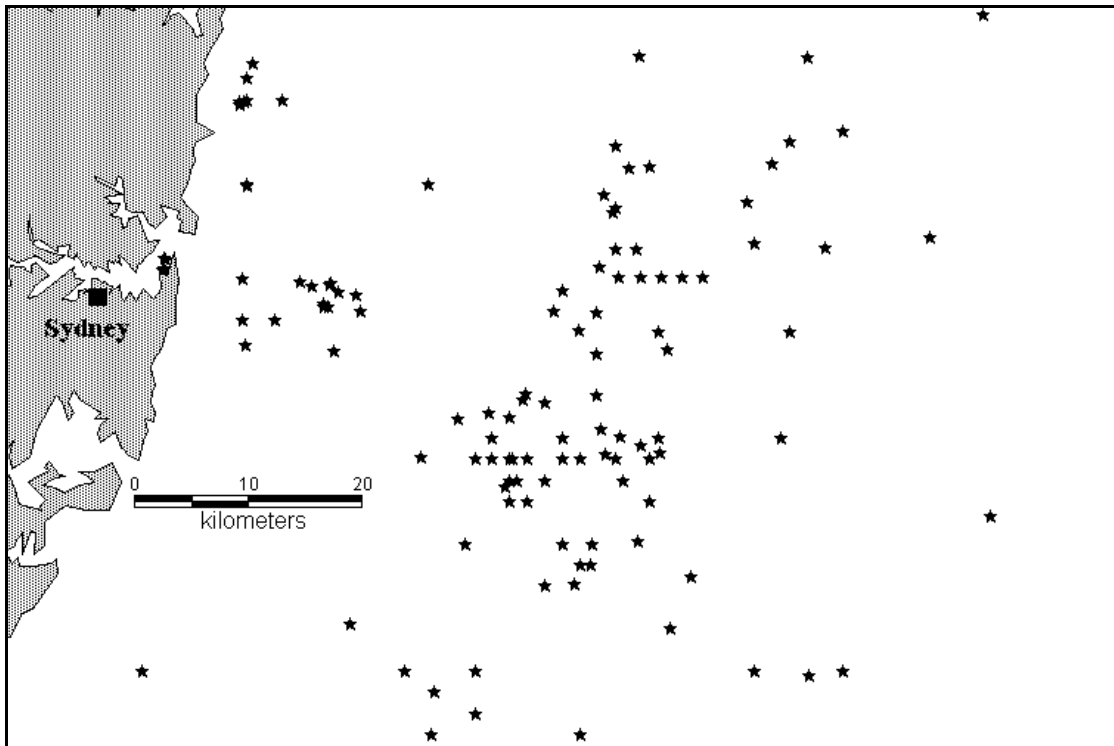


New South Wales

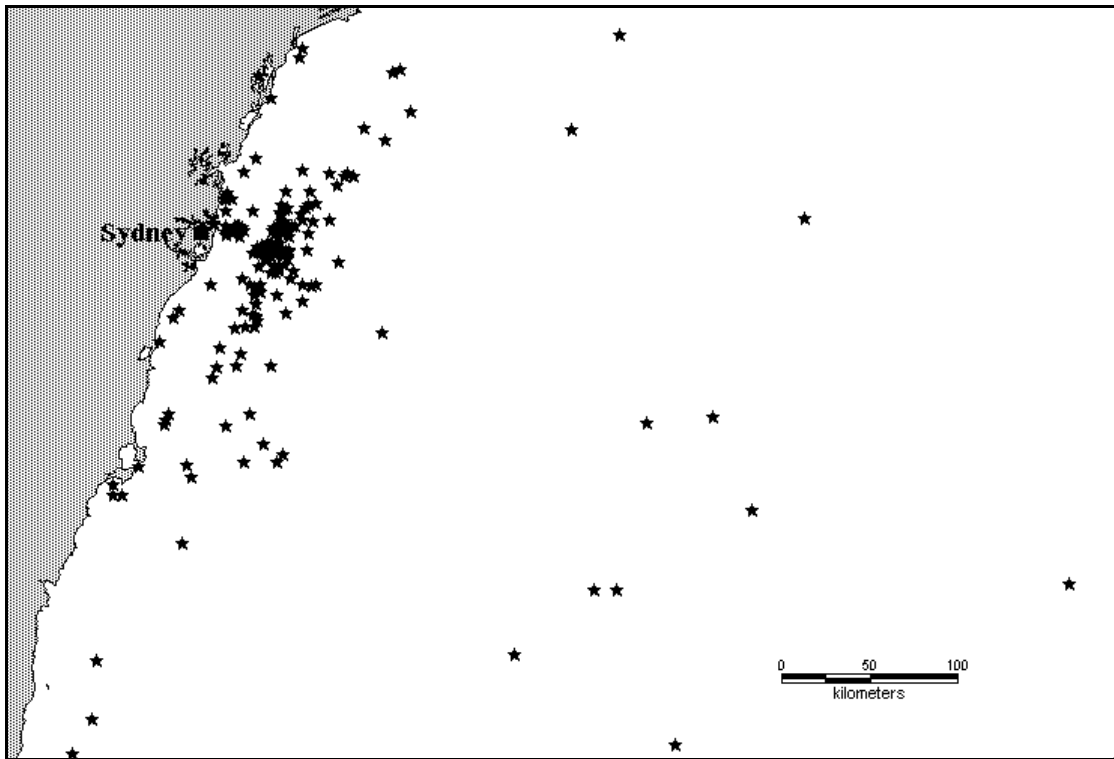
Appendix L - Visual presentation of all dump categories combined – Australia & New South Wales



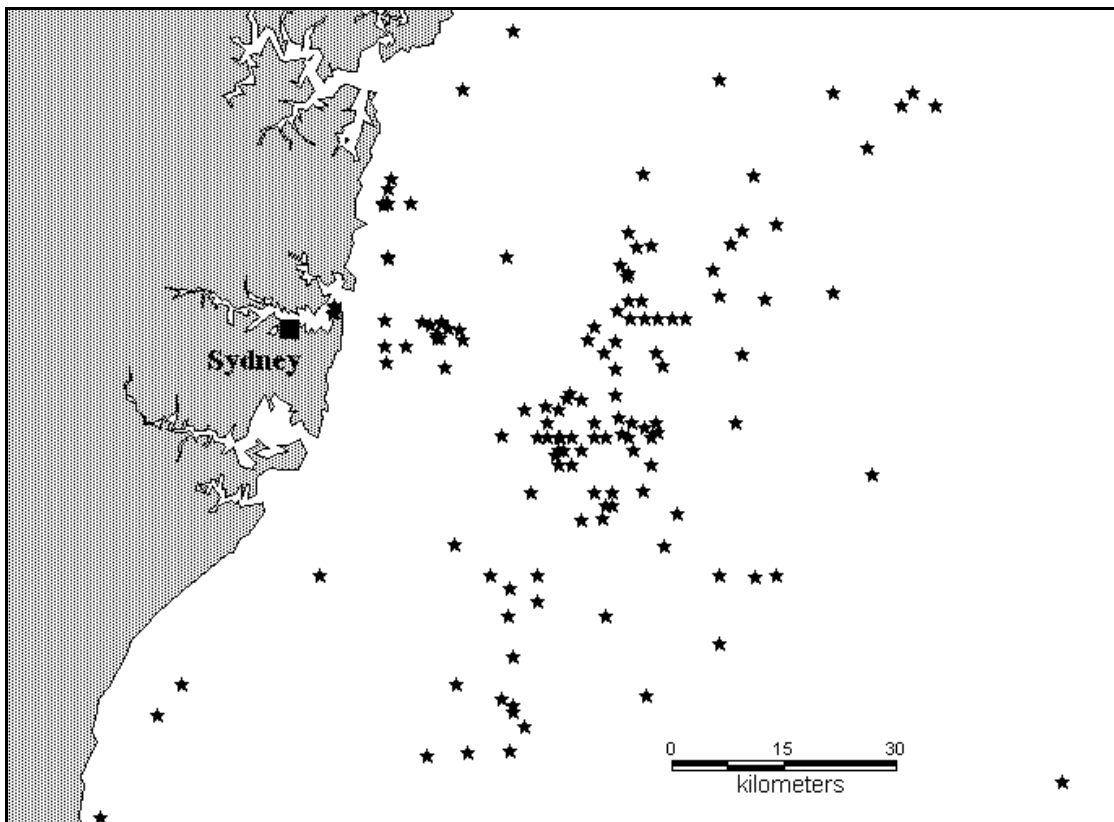
Australia



New South Wales

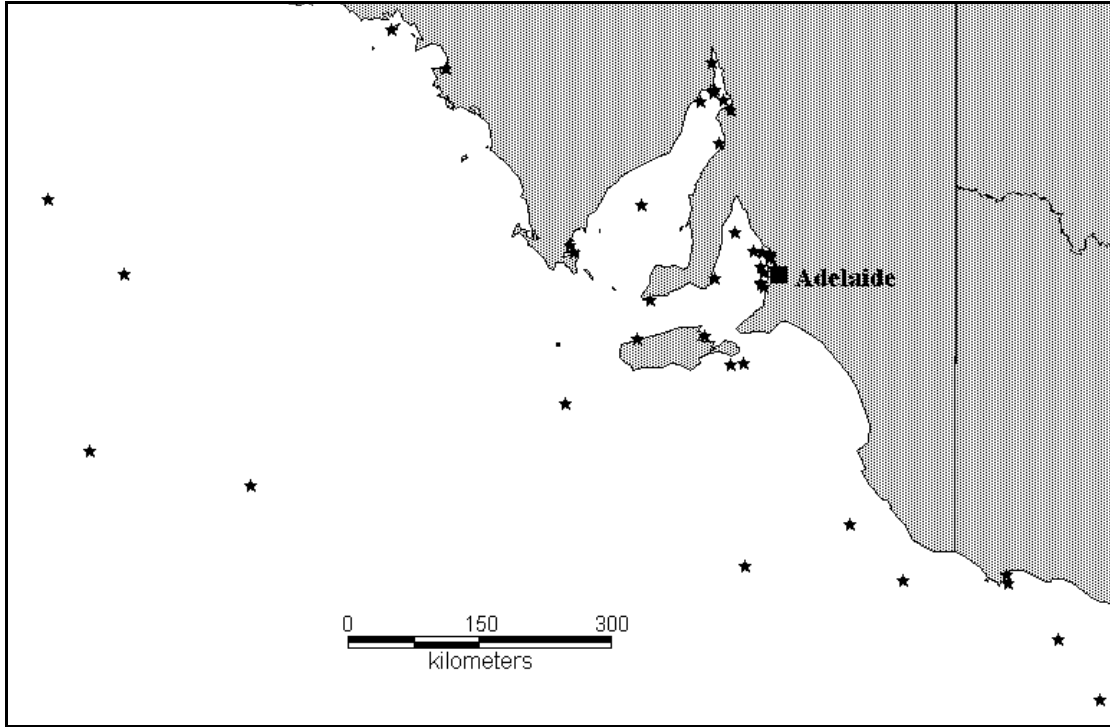


New South Wales

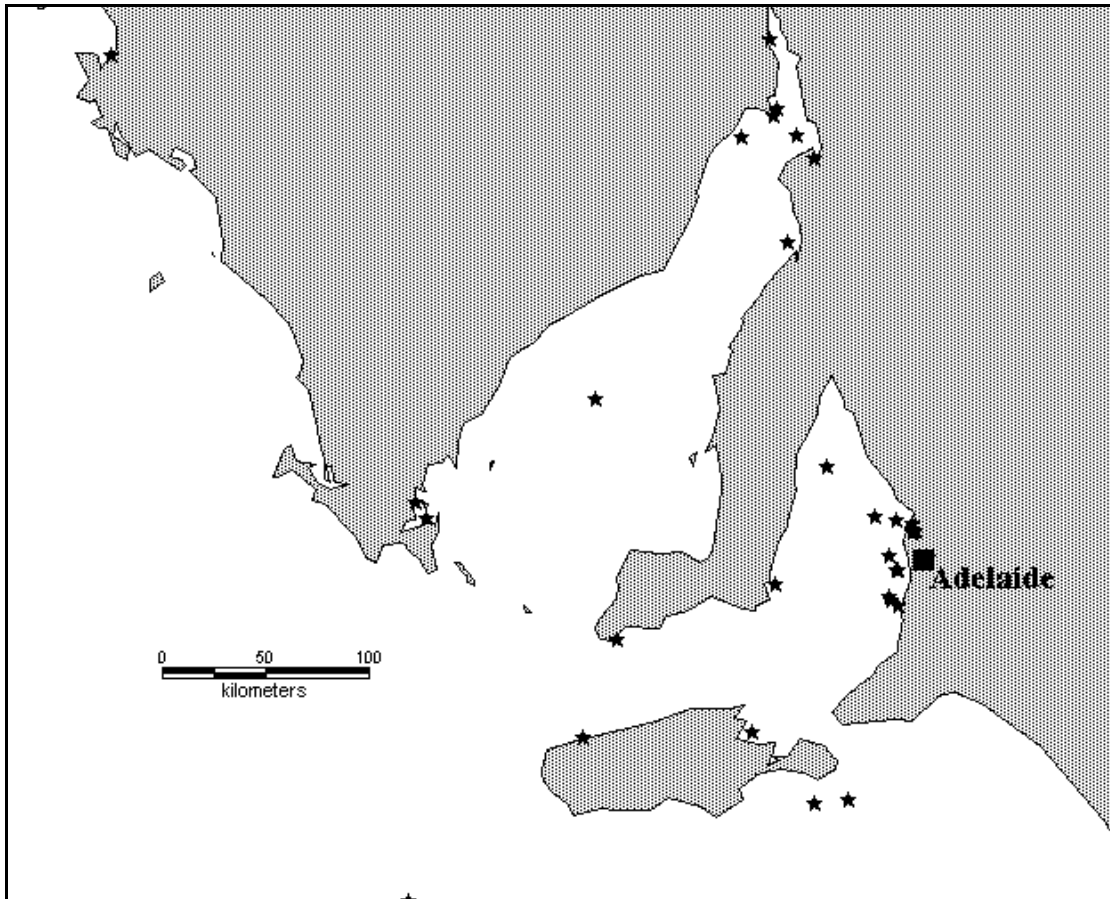


New South Wales

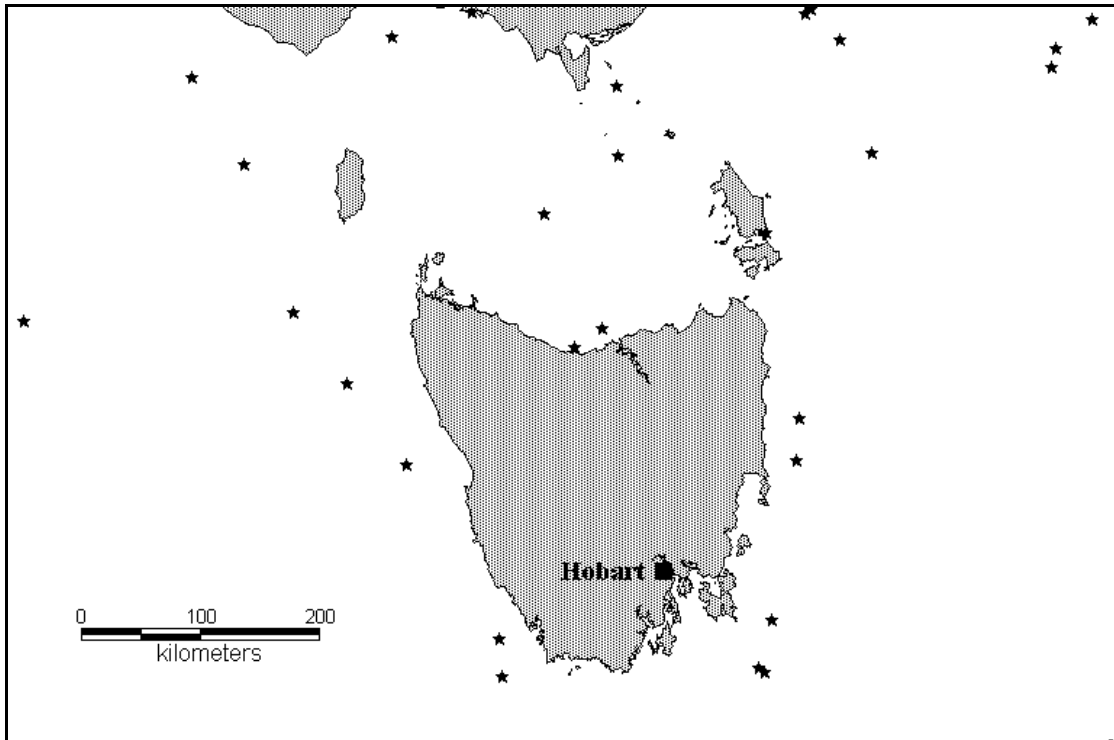
Appendix M - Visual presentation of all dump categories combined - Adelaide, Tasmania, Queensland



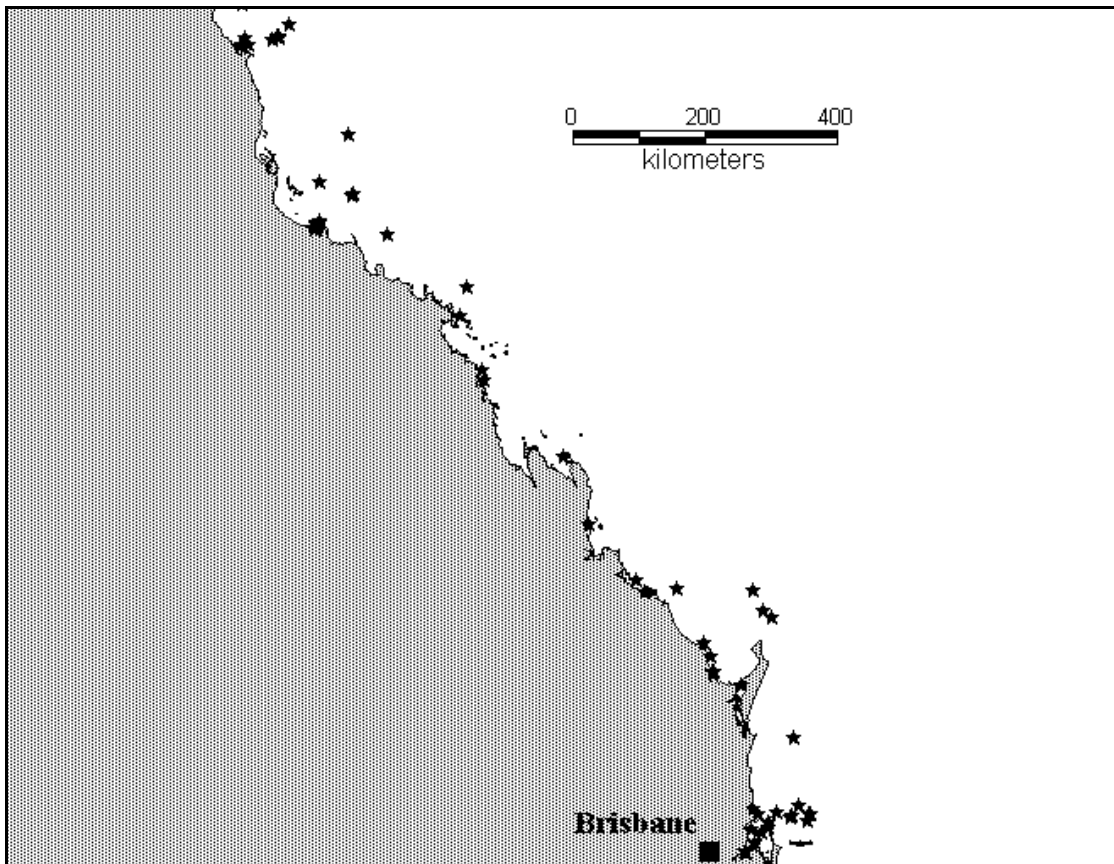
Adelaide



Adelaide

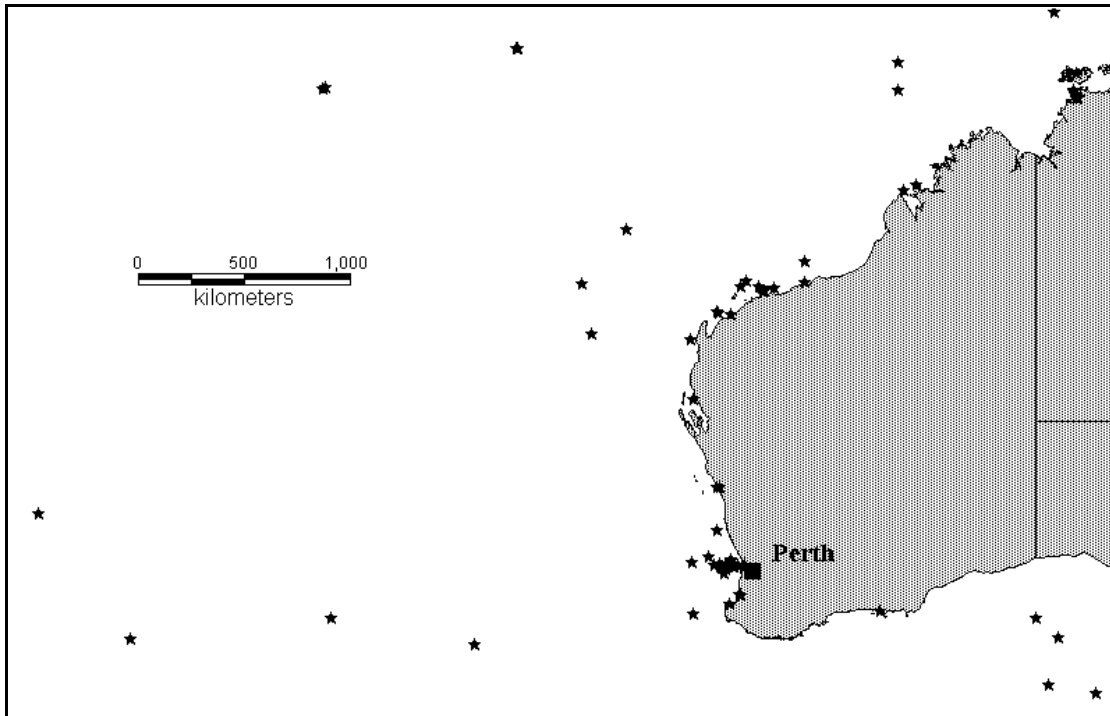


Tasmania

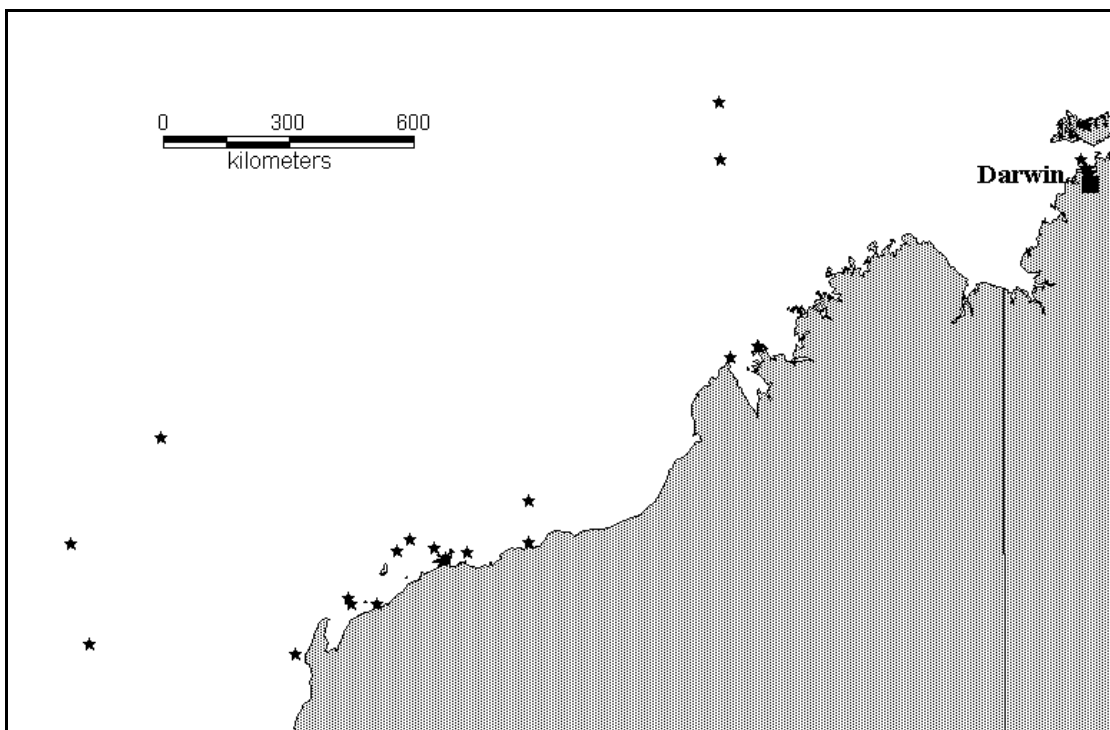


Queensland

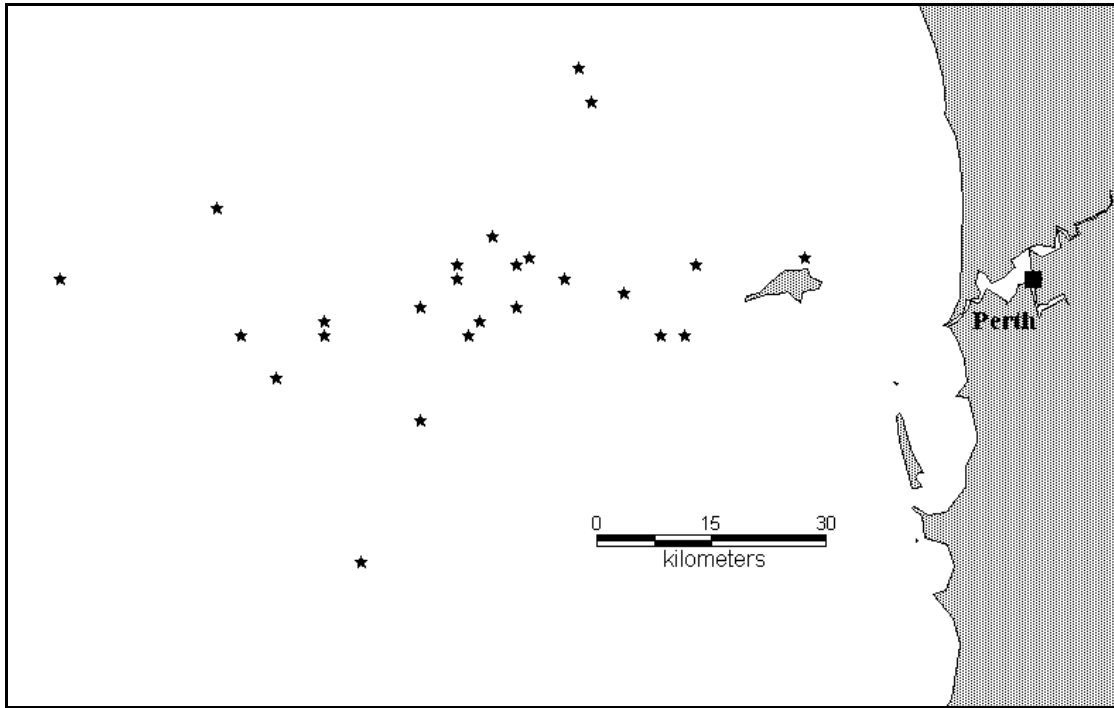
Appendix N - Visual presentation of all dump episodes combined - Western Australia, South East States



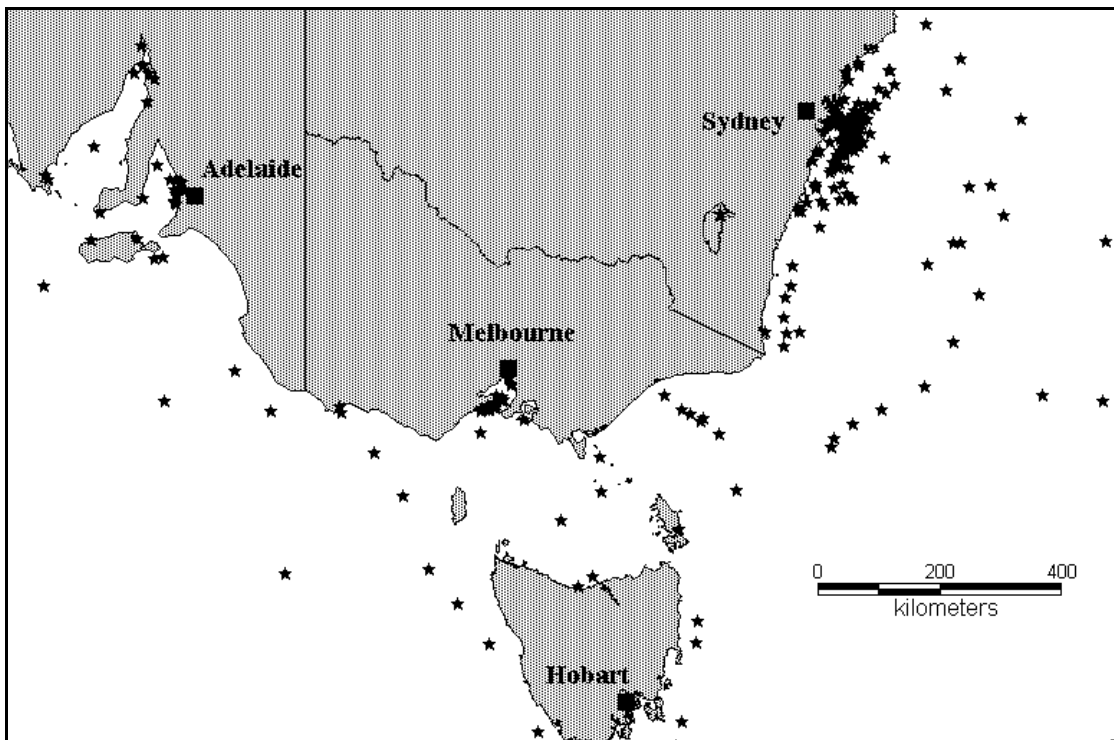
Western Australia



Western Australia



Western Australia



South East States

Scuttled and Abandoned Ships in Australian Waters¹

(2nd Edition 1998)

Ronald Parsons and Geoff Plunkett

Key to Abbreviations Used

acq	Acquired	np	Non powered
AUSN	Australasian United Steam Navigation Co.	NSW	New South Wales (State)
aux	Auxiliary	oa	Overall
B	Built	ON	Official number
bhp	Brake horse power	ps	Paddle steamer
bkn	Barkentine	Qv	As before
Bq/bq	Barque	RAN	Royal Australian Navy
ctl	Constructive total loss	Reg	Registered
comp eng	Compound engine	Rn	Renamed
Comp. osc. eng	Composite oscillating engine	S/Stl	Steel
disp	Displacement	Sch	Schooner
dwtr	Dead weight	shpg	Shipping
Eb	Engine manufactured by ship builder	Ss	Steam ship
ex ps	Ex paddle steamer.	Stm	Steam
F&A	Fore and aft	Sv	Sailing vessel
HMAS	Her Majesty's Australian Ship	svcs	Services
g	Gross (tons)	t	Tons
I	Iron	Tss	Twin screw steamship
Ihp	Indicated horse power	V&W	Navy Destroyer class
m	Metres	W	Wooden
Mbf	Motor boat fishing	WA	Western Australia (State)
mv	Motor vessel	2 mast kt	2 mast ketch
n	Net (tons)	3X	Triple expansion steam engine
nhp	Nominal horse power		

All dimensions are in feet as per standard British practise (length x beam x depth hold) in tenths of a foot.

¹ **FOREWARD:** Apart from a list which I helped the late Mr. R. 'Mac' McKenna, of Fremantle, prepare some years ago (published in 'A Review of the past four years involvement in Maritime Archeology and History' produced for the Maritime Archeological Association of Western Australia, Inc.) there does not seem to have been any meaningful record made of vessels discarded around Australia, yet many of those vessels, that had come down from full powered, or fully rigged vessels, to the role of lighter or hulk, had, in many instances, historic associations with some part of country. A recent collaboration with my co-author revealed just how difficult it could be to discover reliable information about many of these vessels and it was this discovery that has prompted the production of this work. Details of vessels are from the files of the Australasian Maritime Historical Society: Custom House registers of British Ships and/or insurance registers such as those issued by Lloyd's of London, etc. and from contemporary press reports. I know that some vessels will have been missed and we would welcome any reliable information about them. **Ronald Parsons** - This study was first published by the first author in May 1995 (ISBN 0 909418 51 9). This is the revised edition, September 1998 (ISBN 0 909418 61 6). There are vessels for which we have full information of the disposal but do not have accurate detail of the craft. These craft await further research and are not included in this study (see also Appendix F). For assistance in assembling my list I wish to thank - Narelle Blackaby: Mark Bolger: Rebecca Bower: Nick Burton: Paul Clark: Lynne Curnow: Warren Delany: Frank Grant: Peter Harvey: Bill Jeffery: David Lennon: Pip Linnell: Mike McCarthy: Rod McLeod: Mike Nash: David Nutley: David Ramm: Alan Smith. **Geoff Plunkett**

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NEW SOUTH WALES

ABILITY W ps drogher, abt. 140t. Not reg. 100' x 27'6" x 6', comp stm. eng. 15nhp. Owners: Alan Taylor & Co. and employed in the timber trade about Pt. Stephens. Transferred to Williams river as gravel barge c.1958/9. Settled in the river by the end of 1959. Raised 6 months later and variously reported as scuttled off Newcastle June 3, 1960 and off Sydney Apl. 30, 1965.

AJAX I ss 344g, 189n, No ON. 128.7 x 21.0 x 12.0, B.1873 Mort's Dock & Engineering Co. Balmain as pilot steamer/rescue vessel for Newcastle with towing capacity. Owners; Government of NSW. Rebuilt as full time pilot steamer in 1896/7. Withdrawn from service Dec.20, 1927 and stripped. Sometime in 1928 the remains of her hull were put upon a mudbank near Walsh Island and the remains are still visible about 500 metres upstream from Stockton Bridge, Newcastle.

ANGLIAN I hu1k ex ss 2158g, ON68820, 314.0 x 35.8 x 26.4, B. 1873 Glasgow. for UK-Sth Africa service. Acq. for Huddarts 1894 and finally in Sydney-Hobart service until hulked c.1913 at Pt. Adelaide. Scuttled off Sydney August 2, 1933.

ANTELOPE unidentified vessel reported scuttled off Sydney Heads 1929-1930.

ANZAC HMAS S triple screw ss destroyer, 325' oa x 31', B.1916/17 Dumbarton. Sold Aug.1935 for demolition and remains sunk by gunfire from RAN units, off Sydney Heads, May 7, 1936.

ARAWATTA S hulk ex ss 2114g, ON96649, 300.0 x 37.1 x 24.0, B.1889 Dumbarton for AUSN's Interstate passenger service, reg. Sydney. Sold 1924 W. Waugh Ltd and hulked. Sydney Morning Herald Sept. 14, 1936 'towed 20 miles off Heads and scuttled'.

ARCHER Iron hulk, ex ss, 633t, ON87082, 200.2 x 29.0 x 13.2, B.1882 Glasgow comp. eng. 95 nhp. EB. Owners Qld. Stm Shpg: AUSN: Dec.1901 Newcastle & Hunter River S.S. Co. for Sydney - Newcastle service sold Jan. 1933 Stacey & Williams for hulking. Scuttled off Sydney Jan.10, 1946.

AROONEE yacht 17m x 3m, built of Ferro-concrete, seized by Customs in 1978 and the subject of lengthy legal debate during which the vessel deteriorated to the extent it was not worth repairing. Scuttled 34 degrees South x 151 degrees 36 minutes East on or about Apl. 9, 1991 by the Customs Dept.

AUSTRALIA HMAS steel battle cruiser, 18,000 t disp. 590' x 80', B.1911/13 Clydebank, for RAN. Sunk by gunfire from other naval units off Sydney Heads, April 12, 1924.

AYRFIELD S ss, 1140 g, ON131496, 239'oa mach aft. B. 1911 as CORRIMAL renamed 1952. Last owner RW Miller & Co. A '60 miler'. Sold for demolition April 1969, remains abandoned in Homebush Bay and probably covered in preparations for the 2000 Olympics.

BALLINA obsolete dredge, no other detail located. Scuttled off Newcastle (33 degrees 4 minutes South x 152 degrees 24 minutes East) Oct.3, 1934 while being towed to appointed area when a N.E.Gale sprang up.

BANTAM S ss 3322g, 323.0 x 48.2 x 20.5, B.1929 Rotterdam, 3X 233 nhp. for KPM Batavia. Bombed and badly damaged at Oro Bay, New Guinea Mar.28, 1943. Beached and later towed to Sydney and scuttled 36 miles off Sydney Sept.24, 1946.

BARCOO S coal hulk, ex ss 1505 g, ON91876, 250.1 x 36.1 x 15.5, B.1885 Dumbarton, 3X 308 nhp. Operated by AUSN as intercolonial passenger ship. Sold 1911 when converted to coal hulk, sold to RAN for same use 1914. Towed outside Sydney by HMAS Platypus Feb. 1, 1924 and used as target for gunnery practice. [Some records say sunk Jan.31]

BAR-EA-MUL W ss (trawler) 237g, ON152011, 127.8 x 23.4 x 13.2, B.1918 Morrison & Sinclair Sydney. 3X Scuttled off Sydney Dec. 19, 1950.

BARRABOOL I hulk ex ss 942g, ON64795, 224.8 x 30.5 x 14.8, B. 1874 Jarrow on Tyne, Eng. 140 nhp. Owners: Howard Smith and employed on almost every service they operated. Converted to a hulk after stranding in the Fitzroy River Q. May 17, 1912. Scuttled off Sydney August 2, 1950.

BELLAMBI S ss collier 956 g, ON125217, 215.2 x 33.1 x 13.9, B.1909 Glasgow and named FIVE ISLANDS rn 1916, 3X eng. mach.aft. Owner: Bellambi Coal Co.Ltd.reg Sydney. Withdrawn from service and sold 1954 to Stride, Blackwattle Bay for demolition, slowly stripped and bare hull towed 20 miles outside Sydney Heads and scuttled Mar. 18, 1971.

BELLUBERA S ss double ended ferry, 499g, 340n, ON125244, 210.0 x 32.2 x 14.1, B.1910 (Launched Apl. 6) Mort's Dock & Engineering Co.Ltd, Balmain, NSW. 3x 110 hp. re-eng. 1935/6 diesel-electric prop. and almost destroyed by fire in process and almost rebuilt Now 505 g. When commissioned in 1910 the largest and fastest ferry on Pt.Jackson but accident prone. On Apl.2, 1914 run down and cut in two the tug KATE: on Sept 9, 1941 hit the launch SYDBRIDGE, killing the coxswain; On Oct. 19,1948 she was in a serious collision near Sydney Heads and there was a collision with HMAS Parramatta near Clifton Gardens on Feb.29, 1970 etc.etc. Owners: Port Jackson & Manly S.S.Co.Ltd, reg.Sydney. Withdrawn from service Nov. 1973 she was moved around the harbour, gradually rotting away until she was scuttled to help form a reef off Long Reef, just north of Sydney Heads, August 1, 1980.

BINNGARRA S ss 442 g, 301 n, ON122108, 190.5 x 31.7 x 13.5, B.1905. Mort's Dock & Engineering Co.ltd, Balmain, double ended ferry, 3X 105 nhp EB. Owners: Pt.Jackson Co-Op SS Co, reg. Sydney Nov.1907 Port Jackson & Manly S.S.Co.Ltd. Converted to a lighter in 1933. Scuttled off Sydney Dec. 11, 1946.

BIRUBI S ss pilot steamer, Newcastle. 427 g, 130.0 x 26.0 x 16.9. B. 1927, Government Dockyard, Walsh Is, Newcastle, 3X EB. Decommissioned 1959 and sold. Buyer intended refitting as luxury yacht never completed. She remained at McMahon's Point, Sydney, derelict for some years before vanishing. Since then much speculation about her fate, and believed scuttled or abandoned in some dumping ground such as Homebush. No definite information discovered.

BOOMERANG see entry for 'G.F.HOLDEN'

BOSUN Wood, crane lighter. Scuttled off Sydney Sept. 29, 1976.

BRIGHTON I ps 417g, ON83792, 220.2 x 23.0 x 10.7, B.1883 T.B.Seath & Co, Rutherglen, comp. osc. eng. 160 nhp A.Campbell & Sons, Glasgow., double ended ferry. Steamed from Scotland arriving Sept. 1 1883, 89 days out. Owners: Pt.Jackson SS Co, reg. Sydney: Oct. 1898 Pt. Jackson Co-Op SS Co: Nov. 1907 Pt.Jackson & Manly S.S.Co. Hulked 1916 and used as a storeship for timber exporters Pt.Stephens, reportedly abandoned in 'The Duckhole' Pt.Stephens.

BURRA-BRA see next entry

BURRA-BRU S ss grab dredge, 453 t, B.1956 Owned by Maritime Services Board, Sydney. Scuttled off Sydney July 14, 1971. The 'Target Barge' ex RAN scuttled July 12, 1972 was all that remained of the former Manly ferry BURRA-BRA .

BURRINBAR S ss, 876 g, 442 n, ON125224, 205.1 x 33.1 x 11.4, B.1909 Greenock & Grangemouth Dockyard Co.,Grangemouth. 3X 142 nhp Dunsmuir & Jackson, Glasgow. Last owners North Coast S.N.Co., reg. Sydney Hulked 1932 and stripped remains scuttled about 20 miles east of the Sydney Heads Nov. 16, 1934.

BUSTLER S ss tug 74 t, ON150195, 75.5 x 16.6 x 9.4, B.1917 Cockatoo Dockyard, Sydney. eng 38nhp. Wallace Tugs Pty/Ltd reg. Sydney. By 1968 being dismantled in Blackwattle Bay Sydney. The remains of the hull were welded to the old dredge HERCULES and scuttled off Sydney July 18, 1972.

CAKOBAN I hulk ex ps, 178 g ON836687, 111.3 x 19.3 x 7.6. B. 1882, Sydney for CSR. After many years working as a barge on the Clarence River, abandoned in the mangroves opposite Harwood Mill, remains still visible.

CAMRO S ss (trawler) 96 g, 41 n, ON146041, 86.0 x 18.6 x 9.2, B.1918 Aberdeen and was named JANE WRIGHT until 1928. last owner C.Caminiti (abridged to Cam later). Out of service from 1933. Scuttled off Sydney March 22, 1939.

CAPTAIN COOK see next entry.

CAPTAIN PHILLIP S ss 396 g, 172 n. No ON, 155.8 x 25.2 x 13.0, B.1893 Mort's Dock & Eng. Co.Ltd, Balmain. 3x 86 nhp. EB. Owner.? former Sydney Pilot vessel, replaced 1939 and renamed (ex Captain Cook) and employed during WW2 as training vessel for Army Water Transport Section. Towed 17 miles E.S.E. of Sydney and sunk with 4 charges of gelignite Oct. 3, 1948. [Some reports say 1947]

CAVAN I 4m bkn, 731 g, 657 n, ON67794, 252.2 x 27.3 x 14.5, B.1876 Laird Bros, Birkenhead as passenger paddle steamer for City of Dublin S.P.C.later sold and converted to sailand named ERO. about 1904 reverted to Cavan. Owners. William & Stephen Brown, reg. Newcastle. NSW. Sold to W.Waugh for scrap and scuttled Dec. 2, 1932, 8700 yards ENE off South Head Signal Station.

CECIL RHODES S tss tug, 160 g, 5 n, ON90134, 104.0 x 21.1 x 11.2, B.1896 R.& H.Green, London. Owners: (1909) Townsville Harbour Board,reg. Townsville, 1926 Sydney Harbour Board, which became M.S.B. Scuttled off Sydney Sept. 17, 1951.

CERES I lighter, lately owned by J.Fenwick & Co. scuttled off Sydney Nov.3, 1949. Was a former NSW Public Works Dept tug, sold in 1913.

CIRCE 778 g ,B.1912 Hong Kong and owned in Singapore, and became HMS aux. minesweeper 1939: escaped from Japanese and became HMAS MEDEA 1942. Scuttled off Sydney Jan.23, 1948.

CITY OF GRAFTON I lighter ex ps B.1876 Glasgow, for north coast of NSW services. Sank 3 miles off Sydney Heads, Oct.28, 1930 while being towed to usual scuttle area on the 18 miles mark.

COBAKI W hulk, ex ss, B.1918 Balmain. Used by Army as AB431 for training in WW2. Services wanted to burn it in April 1946 but vandals sunk it at Salt Pan Creek, Middle Harbour alongside ITATA.

COLAC S, B.1041 Mort's Dock as AS/MS 'corvette' made into tank cleaning vessel 1962. Used a target by HMAS Ovens off Jervis Bay, Feb.17, 1987, when no longer required.

COMMODORE I ps tug, 187 g, ON74986, B.1878 South Shields. Last owners: A & J Brown. Scuttled 12.30pm off Newcastle, NSW Sept. 8, 1931.

COOLOOLI S dumb dredge. B.1955 Maritime Svcs Bd. Scuttled Aug.29, 1980 as artificial reef off Long Reef.

CRANE BARGE No.4 Owned Maritime Services Bd. Scuttled 12m ESE of Sydney Heads, June 22, 1972.

CURL CURL S ss, ON155335. Manly ferry. B. 1928 Glasgow. Arrived under own steam Oct.1,1928. Withdrawn 1962/3. Scuttled off Sydney Aug. 12, 1969.

CURRAJONG I lighter 984 t, ON101108, B.1875 Hamburg and named ARGO. Blown up by coal cargo when anchored Neutral Bay Jul.24,1893. Raised & made coal hulk by Bellambi Coal. Scuttled off Sydney July 24, 1946.

CYCLOPS S ss rockbreaker. Owner: Maritime Services Board. Scuttled off Sydney Dec. 22, 1971.

DEE WHY S ss, 799 g, ON155336, 220.0 x 36.1 x 14.8, B.1928 (5) Napier & Miller Ltd, Glasgow. 3X (4cyl) D&W Henderson & Co, Glasgow. double ended ferry. Owner: Pt.Jackson & Manly S.S.CO, reg. Sydney. Sold to Stride Brothers for scrapping July 1968 and remains scuttled to form artificial reef May 25, 1976, off Long Reef.

DOOMBA S tss 750 g, 264 n, ON147468, 219.4 x 28.6 x 16.8, B.1919 Wm.Simons & Co. Renfrew. 2 x 3X 1800 ihp as HMS WEXFORD, sold 1923 for use as excursion steamer to Brisbane Tug & SS CO in 1923. Taken up for war service 1940. Sold by RAN Feb.1947 and converted into lighter named MEGGOL and laid up 1970. Scuttled near Dee Why Dec. 9, 1976.

DORIC lighter? reportedly scuttled Apl.12, 1957.

DUROBY W lighter ex SS 195 g, 119 n, ON112567, 121.8 x 24.7 x 9.5, B.1902 Manning River, NSW. Last owner. Illawarra & S.C. S.N.Co., badly burnt while at anchor Double Bay, Sydney Mar.14, 1923 and sold for lighter which is reportedly in 'The Duckhole' Pt.Stephens, NSW.

DURRAWEEEN S ss trawler 271 t ON148224, 125.7 x 23.5 x 12.7. B. 1919 Collingwood, Ontario as SEVILLE. Last owner Red Funnel Trawlers, reg. Sydney. Stripped at McMahon's Point, Sydney, about 1956 and probably scuttled.

DRYABBA W ss 89 g, 60 n. ON56182. B. 1882 North Sydney. Comp. eng. Owners: Colonial Sugar Refining Co., reg. closed 1929 'broken up' but remains abandoned .in mangroves opposite CSR's Broadwaer Mill.

EAGLE a vessel said to have been scuttled by the RAN and described as a steel dredge of 100 tons was sunk off Sydney, apparently, Dec. 2, 1952.

EAST STAR see entry for **KURRARA**

EDEN S tss 693 g, 361 n, ON112502, 197.0 x 26.6 x 16.6, B.1900 Russell & Co, Glasgow 2 x comp.750 nhp. Rankine & Blackmore, Glasgow. Passenger/cargo vessel for south coast of NSW. Sold 1932 for demolition, remains scuttled off Sydney May 11, 1933.

EGERIA wooden hull of tug was reported scuttled off Sydney Nov. 26, 1945.

ELAMANG Iron hulk ex tss 946 g, 490 n, ON74903, 229.9 x 29.2 x 18.5, B.1876 Blackwood & Gordon, Pt.Glasgow. Eng 200 nhp. Last owners AUSN Ltd, reg. Sydney. Scuttled Feb.3 1905 to help form northern breakwater at Newcastle NSW.

EMU W ss tug 69 g, 47 n, ON88973, 93.5 x 17.0 x 8.0, B.1884 Callen Bros., Stockton NSW.eng.40 nhp. Last official owner Wallace Tugs, reg. Sydney. After accident Jan.10, 1949 declared CTL & scuttled off Sydney May 17, 1949.

ENCOUNTER S ss light cruiser 5880 t displ. 376' oa x 56', B.1902/1905 Devonport Dockyard, UK. Loaned to RAN July 1912 and transferred to RAN 1919. Paid off in 1929 and stripped at Cockatoo Dock and the bare hull sunk by gunfire Sept.14, 1932; 5 miles off Sydney Heads.

ERRINGHI W lighter ex ss, 96 g, 55 n, ON113153, 101.0x 21.0x 7.5, B.1907 Clarence Town, NSW stm eng 32 nhp. last owner Mackenzie & Petersen Ltd, reg. Sydney. Scuttled Jan 13, 1951 off Sydney Heads.

GABO S lighter ex ss 2060 g, 1246 n, ON79541, 279.7x38.4x20.0, B.1883 J. Key & Sons, Kinghorn, Scot. Comp.eng.300 hp.EB. Last official owner Patrick S.S.Co.Ltd. reg.Sydney, built as cargo passenger ship for Howard Smith and for a period 1917-1921 owned by China Australia Mail SS Line. Hulk 1925. Scuttled 18 miles off Sydney Heads, Nov 30, 1933.

GABRIELLA S mv Dutch heavy lift vessel 1327gt, B.1974 capsized and sank alongside her berth at Pt.Kembla Aug. 14, with the loss of 2 lives. Refloated, upside down Nov. 24, 1986 and delivered to her owners Dec.2 and was taken about 30 miles off Pt.Kembla Dec. 10,1986 and scuttled.

GANNET Iron hulk, ex ps tug 243 g, ON88928, 134.1 x 22.1 x 11.1, B 1884 Barrow S.B.Co. Barrow. Comp. eng. 108 nhp. Imported by Melbourne Harbour Trust, last official owner J.Fenwick & Co, reg. Sydney. Hulked June 1941 and scuttled off Sydney Jan. 24, 1946.

GEEBUNG W ss, tug, 25 g, 17 n, ON112511, 52.4 x 12.0 x 6.9, B.1896 W.Dunn, Berry's Bay, Nth.Sydney. stm eng. 15 nhp. last official owner McEnnally Bros & Co.Ltd, reg. Sydney. Scuttled off Sydney Aug. 6, 1947.

GERANIUM HMAS S ss sloop/minesweeper. 1250 t disp. 262.5' x 33', B.1915/16 Greenock, presented to RAN 1919. Paid off Nov. 1927. Stripped at Cockatoo D.Y. and scuttled off Sydney Apl. 16, 1935.

G.F.HOLDEN S tss 228 g, 30 n, ON120727, 115.0 x 22.1 x 10.0, B.1898 Fleming & Ferguson, Paisley, 2 x 3X 40 nhp. EB. tug. Originally named PELICAN, rn.1906 by Geelong harbour Trust. 1918 Allen Taylor & Co, Sydney and hulked. Apparently named BOOMERANG sometime after being hulked. Scuttled off Sydney Dec. 12, 1945.

GOOLWA I ps, 191g, 116 n, ON48675, 130.0 x 21.1 x 10.3, B.1864 (1) Palmer Bros, Jarrow on Tyne, eng. 90 hp by J.Thompson & Co, Ncle/Tyne. built for Adelaide owners and employed in various services until sold 1870 for tug/passenger services on Pt.Jackson to Manly. Jan.1874 sold to H.Finch & Partners, Newcastle: reg.Newcastle. Jan. 1876 enrolled by Newcastle Co-operative Steam Towing Co. who sold to John Brown June 1878. Sold July 1905 presumably for scrap. Sank at moorings about 1919, raised and ran up on the bank near Hexham. Still visible at low water.

GOVERNOR BLACKALL I hulk, ex ss 487 g, 331 n, ON64390, 194.4 x 23.8 x 15.6, B.1871 (1) Mort's Dock & Eng.Co, Balmain. Stm eng. 90 nhp. EB. Built for Qld.Govt who intended operate between Brisbane and Sydney but government forced to resign for ordering her without parliamentary sanction. Sold to ASN, reg. Sydney. From June 1888 worked as a collier until hulked 1910 and acquired by Howard Smith Ltd. Scuttled off Sydney July 16, 1931.

GOVERNOR MUSGRAVE I ss 170 g, 40 n, 130.0 x 21.0 x 13.8, B.1874 Mort's Dock & Eng.Co, Balmain, stm eng. 250 IHP. EB. Owner: Marine Board of South Australia as lighthouse tender. Transferred to Commonwealth Govt c.1914 and sold about 1925. Made into a lighter to store timber awaiting export from Pt.Stephens. Remains reportedly in 'The Duckhole' Pt.Stephens.

HENRY BOLTE S mv tug, 393 t, B.1966 State Dockyard Newcastle, NSW for Victorian Government and operated by Dept of Public Works, usually at Western Port. 136.9 x 33.1. Acq. Apl.1985 by Charter Craft & Marine Sv s.P/L Eden for possible spares for their TASMAN HAULER. Scuttled off Twofold Bay July 30, 1988.

HERCULES S non powered bucket dredge, 561 t, B.1915 Owner Maritime Services Board. Welded to old tug BUSTLER, q.v. and scuttled July 18, 1972.

HEROIC S ss tug, 268 g, ON125198, 125.3 x 24.2 x 10.8, B. 1909 J.P.Rennoldson & Sons, Sth. Shields. 3X EB Owners: J.Fenwick & Co, reg. Sydney requisitioned by RN in 1917 and named EPIC till decommissioned. Returned to Sydney Jan. 1920. In 1960 boiler replaced by one from dismantled pilot steamer CAPTAIN COOK. For last 20 years of work stationed at Newcastle. Last tow made Feb.6, 1967. Sold for demolition and what was left was abandoned in Homebush Bay c.1973 and is now part of a 'heritage' park in that bay AND marked BUSTLER.

HIMMA S ss tug, 274 g, ON168788, 105.2 x 26.6 x 12.2, B.1942 (8) Cochrane & Sons Ltd, Selby. 3X. named EMPIRE PAT rn 1949 by J.Fenwick & Co, reg. Sydney. Sold 1973 for conversion to cargo ship for use in New Guinea but during conversion she was damaged by a collision with a berthing containership then the new owner died and she remained derelict until scuttled Aug. 30, 1977 at the artificial reef off Long Reef.

HUON HMAS S ss torpedo boat destroyer, 700t displ. 250' x 24.5', B.1914/15 Cockatoo Dock, Sydney. turbines. Paid off 1928 and dismantled 1929. Sunk by gunfire from HMAS Australia and Canberra Apl. 10, 1931 off Sydney.

ILUKA I lighter, ex ps, 128 t, ON75036, 110.9 x 18.3 x 7.2, B.1879 W.M.Ford, Blue's Pt,Sydney for CSR. Register closed 1911 - made into a lighter. Terry Callen, Stockton, NSW reports that it was later made into a screw prop. drogher for use in the timber export industry at Pt. Stephens, and ultimately abandoned there.

INCA W hulk, ex 5m sch, 1014 g, 907 n, ONUS100624, 215.5 x 41.3 x 16.5, B.1896 Hall Bros, Pt.Blakeley, Wash. owners: G.E.Billings, reg. San Francisco. Dismasted in the Tasman Sea and towed into Sydney Dec. 18, 1920 and sold for hulking. Burnt off Sydney Heads Dec. 22, 1926 as part of the film 'For the Term of his Natural Life'.

IRON DUKE It is reported that a 44 t barge of this name was scuttled off Sydney Apl. 22,1950 (or 27th).

IRRESISTIBLE S ss tug, 136 g, ON87172, 109.0 x 21.0 x 9.0, B.1883 Edwards & Symes, Cubitt Town, (London) Comp.eng.90 hp Owners: J.Halstead,reg.Sydney: Feb.1885 Pt.Jackson S.S.Co.Ltd:Sept.1898 J & W Brown. Scuttled 4.05 pm, 6 miles N.E. of Newcastle, NSW Aug. 27, 1931.

ITATA S 3mbq 950 g, 927 n, ON87910, 202.1 x 33.0 x 19.9, B.1883 R & J Evans, Liverpool. Owners: Newark Shpg Co.Ltd, reg. Liverpool, burnt and damaged by explosion in nitrate cargo at Newcastle NSW Jan. 12, 1906. Remains towed to Sydney and ultimately abandoned in Salt Pan Creek, Middle Harbour (also called 'Wreck Bay').

JUNO S ss ladder dredge 336 t, B.1915 owners: NSW Ports & Rivers Dept. Scuttled Oct. 9, 1970 33 miles ESE of Newcastle NSW.

KARA KARA S hulk ex ss double ended vehicular ferry - cargo vessel. 525 t, ON152035, 187.0 x 26.6 x 14.5, B.1926 J.Crichton & Co. Saltney, UK. for Sydney Ferries Ltd. Acq. by RAN 1941. Hull sunk as a target about 30 miles off Jervis Bay, Jan. 31, 1973.

KARANGI HMAS S ss 'Bar' class boom defence vessel, ss 730 t disp. 178' x 32', B.1941 Cockatoo Dock, Sydney. 3X 850 IHP.EB. sold Aug. 1965 for demolition. Remains abandoned Homebush Bay. Still visible.

KARPOINT see entry for **Oil Fuel Lighter 1208**

KARoola S mv, 388 g, 156 n, ON177248, 158.7 x 26.9 x 9.5, B.1947 Trieste and named EGENES; rn 1948 ERDSTAAL; rn 1951 QUININA: rn KORARA by Adelaide SS Co:rn Karoola 1971 by Stannard Bros. who took it to Sydney July 1971 and sold the engine for use in HIMMA q.v. and hull sunk by RAN by gunfire off Sydney Apl. 2,1974.

KATOOMBA I hulk, ex tss 1006 g, 489 n, ON74976, 249.8 x 19.0 x 19.0, B.1878 Pt.Glasgow 2 x comp.eng.200 nhp. Scuttled to form northern breakwater Newcastle NSW Feb. 1905.

KEMBLA I hulk ex ps, 449 g, 283 n, ON36869, 209.2 x 22.6 x 11.5, B.1860 Glasgow. Built for South Coast of NSW services. Register closed 1934 'hulked c.1917'. Scuttled off Sydney Jan.7.1936.

KESTREL scuttled off Sydney Sept. 21,1965. No detail located.

KIANGA W tss 338 g, ON150176, 135.6 x 32.0 x 8.2, B.1922 R.J.Lucey, Narooma, NSW. 2 x comp.eng 40 nhp. Mort's Dock. Mach.aft. Scuttled off Sydney July 7, 1948.

KOOKABURRA HMAS RAN's 1st boom defence ship, B.1938 Cockatoo. 553 t, 135' x 25.5' Sold for scrap 1967 and while breaking up sank in Rozelle Bay. Stern section being towed out for sinking Aug. 12,1971 when it sank only 4 miles from the Heads.

KURAMIA W boom defence vessel ex ss double ended ferry. 335 t, ON136383, 156.5 x 33.2 x 12.3, B.1914 David Drake Ltd, Balmain NSW 3X 69 nhp Mort's Dock. Sold 1940. Hull requisitioned by RAN 1942, acq by RAN 1943. Hull used as target by aircraft off Sydney Oct.10, 1953.

KURING-GAI S ss double ended Ferry, 407 g, ON112524, 171.5 x 31.3 x 14.7, B.1901 Mort's Dock & Eng. Co.Balmain, 3X 85 nhp EB Owners: Pt.Jackson Co-op SS Co: Nov. 1907 Pt.Jackson & Manly SS Co.reg. Sydney: 1928 Newcastle Ferries Ltd, hulked 1934. Hull still visible seaward side of Hexham bridge, over the Hunter River.

KURNELL S ss 194 g, 99 n, ON150194, 138.0 x 32.1 x 8.5, B.1916 Commonwealth Dockyard, Cockatoo Is. stm eng. 20nhp. double ended ferry named BILOELA, sold & renamed ROMANTIC 1924: Oct.1925 renamed KURNELL and sold Newcastle Ferries: June 1939 N.D.Hegarty:May 1940 Luna Park Ltd. Dec.1941 Penguin Ltd and hulked. Scuttled off Sydney June (14?) 1946.

KURRARA I ss 387g, ON89493, B.1883 Holland. Became EAST STAR Mar.1928, reg. Sydney Reg.closed Mar.1936 'broken up' but became storeship for timber in Pt.Stephens and reportedly abandoned in 'The duckhole'.

KYOGLÉ I ps, 106 g, 67n, ON83632 100.4 x 18.6 x 6.0. B. 1881. Mort's Dock for C.S.R, reg. closed 1907 'broken up' but is abandoned in the shallows Emigrant Creek, nr Ballina NSW.

K.12 former Dutch submarine. B. 1924 800 t.disp. abt. 60m. Damaged in Java by Japanese, reached Australia and refitted but found to be unserviceable and laid up. Sold after war & leased to PJ&MSS Co as tourist attraction. Buffeted in heavy winter weather 1949 and it was decided to move it to quieter waters, and on June 5 the tug WARANG took it in tow but the towline parted and she ran at Fairlight. After several attempts refloated and taken up the Parramatta river near Ryde and demolished.

LEWES HMS ex USS Conway - Oct.1940: B.1918. Damaged in air attack, 1943.Scuttled off Sydney May 25 1946 vide RN; Others say Aug.13,1955.

MAHINAPUA see entry for **SYDNEY**

MALACHITE S hulk, ex ss, collier, 605 g, ON104580, B.1894 Bowling. Owners: Bellambi Coal Co. Hulked after capsized in 1928. Scuttled off Sydney May 28, 1946.

MALLOW HMAS, Flower class sloop, S ss B.1915/16 Glasgow. Presented to RAN 1919; paid off Nov.1925. Scuttled off Sydney Aug. 1, 1935.

MANNING I ps 89 g, ON74962, B.1878 Sydney. Last owner NCSN Co On riverbank, Taree, a declared historic wreck.

MARGARET Hopper barge, owned by J&J Daley, scuttled May 10, 1935.

MARGUERITE HMAS Flower class sloop, S ss B.1915/16 Glasgow. Present to RAN 1919. Paid off July 1929. Scuttled Aug. 1, 1935.

MARJORIE S hulk ex ss collier, 944 g, ON109960, B.1898 Sunderland. Owners: Bellambi Coal. hulked 1929. Sunk by gunfire off Sydney Sept.2, 1952.

MARRAWAH S hulk ex ss 472 g, ON129125, B.1910 Holland. Guttled by Riverside Dock & Eng.Co. and sunk by RAAF off Sydney May 10, 1951.

MATAGALPA S tsmv 1174 g, B.1920 Quincy, Mass as USN OSBORNE, converted & RN 1933. When a transport for US Govt took fire No.2 Glebe, Sydney June 26, 1942 and badly damaged. Not repaired, and scuttled off Sydney Sept. 6,1947.

MEDEA see entry for **CIRCE**

MEDUSA S ss B.1913 Hong Kong.Reg.Singapore and 1939 became HMS aux.minesweeper: Escaped and 1942 HMAS MERCEDES. Sold 1945 and scuttled off Sydney Jan. 20, 1948.

MEGGOL see entry for **DOOMBA**

MERCEDES see entry for **MEDUSA**

MORIB S tsmv hopper barge, 682 g, 302 n, ON169417, 162.0 x 33.1 x 15.1, B.1944 Wm.Simons & Co.Ltd, Renfrew Scuttled off Sydney Jan. 8, 1971.

MORTLAKE BANK S ss 1371g, ON147708, 235.1 x 36.1 x 15.3, B.1924 Swan, Hunter & Wigham Richardson, Newcastle on Tyne, and named ELFSTONE rn 1937. 3X mach aft. owners: McIlwraith, McEacharn Ltd, '60-miler' collier. Sold to breakers Aug. 1969 and remains abandoned in Homebush Bay.

MUNMORAH S ss collier 1273 g, ON157618 231 x 14.1 x 14.1. B. 1934 H. Robb & Co. Leith. Mach. Aft, 3X. Wallarah Coal, reg. Sydney. Wrecked May 18, 1949 and subsequent Notice to Mariners said it was not breaking up and was approx 133 deg distant 1800 feet from the Bellambi Jetty, 34 deg 22 min x 150 deg 55.42 min E (approx).

MYEE S tss 145 g, ON117603, 100.0 x 20.1 x 6.4, B. 1903 North Coast S.N.Co. Sydney. 2 x comp. Owner: North Coast S.N.Co. Scuttled off Sydney Aug. 3. 1933.

NAMOI S ps 1415 g, ON89250, 245.2 x 31.6 x 21.7, B.1883 J.Key & Sons, Kinghorn. Osc. eng. 350hp. EB for Sydney - Newcastle passenger service. Register closed 1925 'broken up' remains scuttled off Sydney June 16, 1933.

NANCY Iron hopper barge property J & J Daley, reported scuttled April 5, 1935. Not registered.

NEWCASTLE S ps 1251 g, ON88978, 264.6 x 32.9 x 15.9, B.1884 J.Key & Sons, Kinghorn, Comp.osc.eng. 500nhp EB. Built for Sydney-Newcastle passenger service. Sold Aug. 1928 to shipbreakers. Scuttled off Sydney Heads June 1. 1933.

NUMBERED CRAFT No.5 Hopper barge 250 t capacity Owned -Maritime Svcs Bd. Scuttled off Sydney Jul.23, 1954: No.8 scuttled off Sydney May 13,1953: No.15 and No.16 Side delivery hopper barges of M.S.B. Scuttled off Sydney Heads April 21, 1948: for reasons unknown some numbered barges were given names such as No.653 became Nowie and No.654 Noorai, although this NOT confirmed. No.969 no detail, scuttled outside the Heads Aug.6, 1947.

No.651 S hopper barge 350 t, B.1952 Owners: Maritime Services Board, scuttled off Sydney Apl. 29, 1987.

No.653 S Hopper barge 206 t, B.1955 Owner:Maritime Services Board, scuttled off Sydney Mar. 21, 1987 .

No.654 S Hopper barge, 206 t, B.1957 Owners: Maritime Services Board, Scuttled off Sydney, Apl. 8, 1987.

No.656 S Hopper barge 206 t, B.1957 Owners: Maritime Services Board, Scuttled at Narrabeen Artificial Reef, June 10, 1980.

OIL FUEL LIGHTER 1204 RAN vessel. Reportedly scuttled off Sydney Sept. 24, 1985.

OIL FUEL LIGHTER 1208 S lighter B.1945 Evans, Deakin, Brisbane and named KARPOINT. Towed from Sydney Feb. 25, 1987 and used for target practice by vessels of the Navy.

OSPREY S ss tug, 208 g, ON89095, 125.3 x 22.1 x 12.5, B.1885 Pearce Bros, Dundee, and named EAGLE rn Aug.1890 Comp. eng. 95 nhp. Owners: J. Brown, reg. Newcastle (from Apl. 1922) Scuttled 5 miles east of Newcastle, Nov. 27, 1931.

OUR ELSIE W t ss 213 g, 112 n ,ON125163, 119.3 x 28.5 x 7.6, B.1908 A.W.Settree, Laurieton NSW 2 x comp.eng. 28 nhp Mort's Dock. Last owners A.& E.Ellis Ltd, reg. Sydney. Register closed 1928 'dismantled' remains reported scuttled off Sydney Heads Nov. 14, 1932.

PHYLLIS A 200 t lighter of this name reportedly owned by Penguin P/L was reported scuttled off Sydney Sept. 16, 1936. Not identified.

PIONEER HMAS S ss cruiser 2200 t displ. 314' x 36', B.1899/1900 Chatham RN Dockyard. Transferred to RAN 1913. Withdrawn from RAN 1923 and stripped at Cockatoo Dock. Scuttled off Sydney Feb. 18, 1931.

POSEIDON S suction dredge 261 t, Owner:Maritime Services Board, reported scuttled off Sydney May 9, 1947.

PREMIER a launch of this name reportedly owned by Penguin P/L was said to be scuttled off Sydney May 5, 1942. Not registered.

PROMAYLE W tss 191 t formerly unregistered drogher MYALL owned by Allen Taylor & Co.Ltd and acquired by Nicholson Bros in 1961 with the view of chartering her to MSB as a crane barge. This failed to eventuate and the hull was finally scuttled, after a long layup, off Sydney June 2, 1967.

PROVINCIAL TRADER S mv 419 t, ON196905, 139' x 32'8", B.1959 (12) Evans Deakin & Co, Brisbane, Diesel eng by Crossley. Built as fire fighting tug named BP PARMELIA for use at Kwinana, WA. In 1986 sold to Cairns and renamed CLARENCE BEACH, subsequently altered for work in fisheries and renamed. In 1993 it was reported the vessel was going to revert to towage duties, but she sank at her moorings in Twofold Bay, was raised and scuttled in deep water off the coast Mar. 24, 1995.

PYRMONT II S ash barge built to dump ash from Pyrmont Power House. Harbour Lighterage Owners. Scuttled at the Artificial Reef, off Long Reef, July 5, 1977, dimensions 112' x 24' x 12'.

PSYCHE HMAS S ss light cruiser. 2135 t 314' x 36', B.1898/100 Devonport RN Dockyard. Commissioned in RAN 1915 sold and hulked July 1922 and employed at Pt. Stephens NSW as a timber lighter until she sank in Salamander Bay. From 1950 till 1973 RAN Clearance Diving Teams used the sunken hull for exercises and her remains are now scattered.

RAMORNIE I pontoon, ex swps, 86 g. ON59528. 92.9 x 22.0 x 4.7. B. 1869 ASN Co. Pymont. Last official owner: NCSN Co. Reg closed 1944 'no longer required' early 1950's made into pontoon landing at Grafton for flying boat service. When no longer needed towed up river and scuttled near Mountain View, Clarence River.

RHEA W barge, ex US war built wooden minesweeper 260 t displ. 135' x 24'. When scuttled Sept 20, 1945 was loaded with mines and depth charges ex U.S.Navy.

RICHMOND obsolete dredge was being towed to scuttling position off Newcastle by ss BOAMBEE when it broke adrift about 2.30am Nov. 24, 1934 and was believed to have sunk about 33 degrees 30 minutes South x 152 degrees 14 minutes East.

ROBERT R. HIND W 4 mast sch, 564 g, 520 n, ON (US) 111223, 162.5 x 36.8 x 12.8, B.1899 Hay & Wright, Alameda, Calif. Last owners Hind, Rolph & Co, reg. San Francisco. Destroyed by fire Kerosene Bay, North Sydney, Feb. 11, 1929, having been laid up for years. (This vessel appears to be entered as 'scuttled' in some records in error - R.P.).

SAMSON Barge, scuttled off Sydney Feb.19, 1972 (possibly former steam lighter owned by Maritime Services Board, B.1912 and measuring 255 t).

SCOUT S lighter ex ss 77 t, ON89382, 81.7 x 17.0 x 5.5, B.1885 Foster & Minty, Balmain. Eng. 16 nhp. Last official owner J.Keane, reg. Sydney. Reg.closed 1931 'no longer required' Scuttled Aug. 20, 1932.

SEAMEG Lighter, scuttled off Sydney Mar. 1, 1972. Not identified.

STALWART HMAS S tss destroyer 1075 t displ. 276' x 26', B.1918/19 Swan Hunter, Newcastle on Tyne. turbs. Placed in reserve Dec. 1925. sold for demolition to Penguin P/L June 1937. Scuttled off Sydney July 22, 1939.

STORMCOCK W ss tug, 148 t, ON88985, 130.6 x 20.8 x 10.2, B.1885 Callen Bros, Stockton. comp. eng 91 nhp Last owners J & A Brown, reg. Newcastle. Register closed Feb.1930 'broken up' remains reportedly scuttled off Newcastle.

STRAHAN HMAS S tss, 650 t displ. 186' x 31' 2 x 3X 1800 ihp. B.1943 Newcastle D.Y. NSW. Sold for demolition Jan. 1961. Remains scuttled Jan. 7, 1971.

SUCCESS HMAS tss destroyer, 1075 t displ. 276' x 26', B.1918, W.Doxford, Sunderland. Turbs. Placed in reserve May 1930. Sold June 1937 to Penguin P/L for demolition, remains scuttled by bombing by aircraft off Sydney Dec. 20, 1941.

SWALLOW S lighter, ex ss hopper barge, cargo ship and train ferry. 859 g, 497 n, 206.0 x 33.1 x L4.3, B.1908 W. Simons & CO , Renfrew, 95 nhp. for Sydney Harbour Trust. Converted to cargo ship in 1921 and in 1928 converted for use as a train ferry at Grafton NSW for the Sydney-Brisbane main line. Hulked when the bridge was built. Reported scuttled Aug. 22, 1946.

SWAN HMAS S torpedo boat destroyer, 700 t disp. 250' x 24.5' B.1915 Cockatoo Is. Syney. Paid off 1928. Stripped of armament and turbine engines etc., and together with ex HMAS PARRAMATTA were handed to NSW government in 1930 as accommodation ships to be moored in Hawkesbury river for convicts building a road in Ku-ring-gai Chase. The plan was never carried out; the hulls were sold in 1933 and were briefly used as barges. In Feb.1934 the hulls were being towed to Sydney for demolition when they broke free and SWAN foundered on the 2nd. The Parramatta went into the mangroves and ultimately part of her hull was placed in a memorial in the City of Parramatta but the whereabouts of the SWAN was unknown till January 1994 when Greig Berry confirmed that he had located it.

SWORDSMAN HMAS S tss destroyer 1075 t disp. 276' x 26' B.1918 . Sold for demolition June 1937 to Penguin P/L. Scuttled Feb. 8, 1939.

SYDNEY S lighter, ex tss MAHINAPUA 458 g, 239 n, ON75280, 160.0 x 26.8 x 12.6, B.1881 W.Denny & Bros. Dumbarton 2 x comp.eng. 80 nhp hulked 1911, and converted for use in timber trade at Pt.Stephens and renamed. Foundered in 1925 at Pt.Stephens Oct. 7th.

SYDNEY Iron hopper barge, ex ps CITY OF BRISBANE, rn SYDNEY Dec.1884. 634 g, 504 n, ON49275, 230.8 x 27.3 x 12.9. B.1863 A & J Inglis, Pointhouse. eng.220 nhp. Built for ASN and when renamed entered Sydney - Newcastle passenger service. Hulked Aug. 1911. Last owners J. & J.Daley, scuttled off Sydney March 21, 1935.

SYLVAN I ss 196 g, 113 n, ON46968, 119.4 x 20.2 x 8.9, B.1882 Murdoch & Murray, Pt.Glasgow. Comp.eng. 36 nhp. Built for Wilson, Hart & Co. Maryborough, Q. Last official owner (May 1921) J.A.Callen who supposedly hulked the vessel. Sank at her moorings Dec. 1924, raised and run upon the bank. Remains still visible at Stockton just south of the Bridge.

TASMAN HAULER S mv tug 419 t, ON196904, 139' x 32'8", B.1959 (11) Evans, Deakin Brisbane as B.P.COCKBURN, a firefighting tug for Kwinana WA, renamed COCKBURN and in 1982 became Tasman Hauler, based at Eden. Scuttled off Twofold Bay Oct. 1, 1988.

TASMANIA HMAS S tss destroyer 1075 t displ. 276' x 26' B.1918 Beardmore. Turbs. Placed in reserve in 1923 and sold for demolition June 1937 to Penguin P/L. Scuttled March 16, 1939.

TATTOO HMAS S tss, destroyer 1075 t. 276' x 26', B.1918 Beardmore turbs. Sold for demolition June 1937 and scuttled May 9, 1939.

TAVIUNI S ss 1465 g, 910 n, ON84500, 250.0 x 34.2 x 18.0, B.1890 W.Denny & Bros. Dumbarton. Owners: Union S S Co of N.Ltd. reg.Dunedin. Laid up in Sydney Dec.1921: Sold to W.Waugh for demolition 1924. Scuttled off Sydney May 12, 1931.

TERARA I lighter, ex ps. 152 g, 96 n, ON89336, 125.3 x 20.0 x 6.7, B.1885 Atlas Engineering Co, Sydney. Comp. eng. 30 nhp EB. Built for Illawarra S.N.Co., July 1896 to North Coast SN Co. May 1914 to NSW Government and used as a ferry for workers at Walsh Is. Hulked.c.1924 and employed in timber lightering Pt. Stephens. Abandoned hulk opposite Tea Gardens, Pt. Stephens.

TORRENS HMAS torpedo boat destroyer 700 t displ. S ss 250'x 24', B.1915/16 Cockatoo Dock, Sydney. turbs. Paid off 1926 Sunk Nov. 9, 1930 off Sydney by gunfire from HMAS Canberra.

TUNCURRY W tss 286 g 114 n, ON125205, 147.0 x 28.1 x 7.0, B.1909 J.Wright, Cape Hawke, NSW. Last official owner S.G.White, reg. Sydney. Reported scuttled off Sydney Apl. 19, 1950 although some other sources say burnt in Kerosene Bay, Sydney in June 1952.

VALIANT S mv tug, 72 t. B.1945 Melbourne for Harbour Trust. Sold 1978 and taken to Pittwater NSW for conversion to fishing. Not done. Reported scuttled in 1981 however the press in 1982 said 'sunk about 0.5 km off Palm Beach.....while being towed to its burial at sea.....was a 25m former firefloat.....'

VENETTA HMAS V&W class destroyer, S tss 1090 t disp. 312' x 29', B.1917 Fairfield, Glasgow. turbs. Trans to RAN in 1933. Paid off Nov. 1945, and scuttled off Sydney Heads July 1, 1948.

VERDIER S hopper barge, 231 t, B.1912 and formerly owned by Townsville Harbour Board, sold to Sydney mid-1970s . Scuttled to help form artificial reef off Narrabeen July 1983.

WALLSEND S hulk, ex ss, 518 g, 196 n, ON106245, 165.4 x 24.3 x 12.3, B.1899 Murdoch & Murray, Pt.Glasgow. Comp. eng. machinery aft, 3 masts. Sydney - Newcastle collier. Hulked 1934 by Penguin P/L and scuttled off Sydney Feb.7 in some records; MSB say Feb. 15th, 1935.

WEXFORD HMS see entry for **DOOMBA**

WICKLOW Hopperbarge reportedly owned by J. & J.Daley, scuttled Dec. 14, 1933.

WODONGA S hulk, ex ss, 2341 g, 1473 n, ON98127, 310.2 x 39.1 x 22.4, B.1890 A & J Inglis, Glasgow. 3X 379 nhp EB. Interstate passenger liner built for AUSN. sold May 1924 W.Waugh Ltd, for dismantling. Sunk at moorings Kerosene Bay, Feb. 1931, raised and towed 6 miles off Sydney Heads and scuttled April 30, 1931.

YAMBA I tss tug, 104 g, ON136464, 91.0 x 18.5 x 8.0, B.1886 Atlas engineering Works, Sydney 2 x comp. 65 nhp Rankin & Blackmore, Greenock. Owners: J. Fenwick & Co, reg. Sydney. Towing to sea to be scuttled sprang a leak and foundered Feb.16, 1949 5 miles off South Head Port Jackson.

YARRA HMAS torpedo boat destroyer, S ss 700 t disp. 250' x 24', B. W.Denny, Dumbarton, turbs. Paid off 1920, demolition commenced 1929 remains scuttled Aug. 22, 1932. [Some reports say July]

YULOO S ss, 407 g,197 n, ON128809, 145.0x 24.1 x 10.4, B.1910 W.Harkness & Son, Middlesbro' comp.eng. machinery aft, collier. Originally named TEESWOOD m 1912. Last owner (as a hulk) Penguin P/L. Scuttled Nov. 14th, 1933.

NORTHERN TERRITORY

Darwin Harbour is littered with wartime wrecks and some vessels lost in Cyclone Tracy but there are also some artificial reefs formed for recreational purposes. Those vessels sunk for that purpose are listed below but the information is very incomplete. Other vessels disposed of in the Darwin area include the confiscated **MIYO MARU** scuttled 10 miles east of New Year Is, May 7, 1972: **YU HAN 22** and Chinese refugee wooden fishing boats with an average size of 25m x 6m x 2m that had been given identification names by Darwin authorities scuttled Feb.8, 1995, **BROLGA**, **COCKATOO**, **EAGLE**: and on Mar.16,1995 **GALAH**, **HERON**, **JABIRU**, **KOOKABURRA**.

HAM LUONG S 15m Vietnamese refugee vessel. Scuttled Jan. 26, 1985.

JOHN HOLLAND S barge 18m x 12m according to some sources, larger by other reports. Said to be a 'dump barge' Scuttled in July 1984.

MARCHART 3 S tsmv 244 g, 142 n, ON332020, 90.0 x 26.0 x 9.5, B.1969 James McLarty & Son, North Fremantle as a seismic survey vessel, later used for other purposes. Scuttled Darwin harbour Aug. 8, 1988.

SONG SAIGON S 38m. Vietnamese refugee boat. Scuttled Nov. 4, 1982.

DSAC BARGE S dumb barge, approx 12m x 20m x 2.2m. Scuttled by the Darwin Sub-Aqua Club, Dec. 15, 1988 at the end of its useful life.

QUEENSLAND

ADONIS Comp.p.s 160 g, 116 n, ON87314, 109.8 x 21.6 x 7.1, B.1883 Brisbane. Owners: (June 1915) John Burke & Co., reg. Brisbane. Register closed Mar. 30, 1927 with 'Run ashore and burnt on Hercules Bank, mouth of Brisbane River, since renamed Bishop Island'.

ALCESTIS I hulk ex 3m bq 423 g, 398 n, ON58022, 149.6 x 27.2 x 16.1, B.1857 and rebuilt 1868 (5) Iiff, Mounsy & Co. Sunderland. Owner: Adelaide SS Co. Ltd. Scuttled off Green Is. 1931. Sometimes reported as Mission Bay.

ALERT S ss, tug, 194 g, 80 n, ON101956, 115.0 x 21.1 x 11.8, B.1892 (12) J.T.Eltringham & Co. S.Shields. Comp.eng. 99nhp G.T.Grey, S.Shields. Owners: Townsville Harbour Board, reg. Townsville. Reg. closed 'scuttled Aug. 18, 1959, 4 miles south of Cape Cleveland'.

ALEXANDRA I hulk, ex ss 6881 g, 496 n, ON45657, 243.8 x 27.1 x 14.3, B.1863 Blackwood & Gordon, Pt.Glasgow. Eng. compounded 1878 = 140 nhp, EB Owner: (Aug. 1903) Burns, Philp & Co. Ltd. Reg. Sydney. Reg. closed Mar. 1906 'Sunk to protect Eastern Breakwater, Townsville'.

BADGER A steam launch used as a tender to government dredgers. Abandoned Bishop Is.

BARRAMBIN S mv 228 t, 32.309m x 8.69m, B.1943/44 for Army. Owners: Riverside Coal Transport Co. Scuttled at Curtin artifical reef, Moreton Bay Aug. 1, 1987.

B.D.5 S bottom dump barge, 105' x 19'6' x 8', B.1946. Owner: Townsville Harbour Board. Scuttled 18 degrees 47 minutes South x 147 degrees 25 minutes East Feb.27, 1968.

BEE Said to be abandoned at Pt. Douglas. There was a small iron ss (44 g, B.1865) purchased by a Pt.Douglas resident in 1882. No further information could be found and reg. closed 1956. Then another small vessel of this name (Wss 25 g, B.1884) owned by Robert Hayles of Magnetic Is, ran aground in Picnic Bay, Magnetic Island, March 16, 1901 and was supposed to have been broken up although some reports say it was left as protection for a jetty.

BELLE W barge, former swps 101 g, ON87311, B.1883 Sandgate last owners J.W.Hetherington & P.D.Rylance. Reg.closed Jan. 1956 'No trace', reportedly abandoned in Brisbane River, date unknown.

BELLE OF SOUTH ESK W hulk, ex 3m bq, 561 g, ON52786, B.1865 Montrose. Owners from about 1895 Eastern & Australian SS Co, reg. London and used as a receiving hulk at Thursday Island for pearl shell. Reportedly abandoned Goode Island, date unknown.

BERMAGUI Steel gravel barge, ex tss 402 g, ON131533, B.1912 Troon. Scuttled to help form a breakwater at Tangalooma.

BINGERA S triple ss 2092 g, B.1905 Belfast as an express mail steamer between Brisbane and north Queensland ports. Reputed to be the first turbine engine steamer operated in Australia. Withdrawn upon completion of coastal rail lines. Laid up Brisbane c.1922 and sold to Peters Slip Sept. 1928 and engines and fittings removed with the intention of converting her to a lighter but this was not done and her register closed May 1929 'run upon Bishop Island and abandoned'. Remains partially cut for scrap during WW2 and completed during 1961.

BOKO Iron dumb lighter, 194 g, ex ps tug, 203 g, 70 n, ON76494, 125.0 x 21.1 x 10.4, B.1877 Hebburn on Tyne. Last owners Peters Slip. Reg.closed Dec.1949 'broken up'. Remains reported in Aquarium Passage in 'Annual Dogwatch' No.23, 1966 p. 74.

BREAM I ss hopper barge, 260 t, B.1885/7 Walkers Ltd. Maryborough for Queensland Government. Scuttled at Tangalooma August 1963.

BREMER Iron dredge B. circa 1864 P.N.Russell & Co. Sydney for Qld. Govt. Later made rock drilling barge. Laid up about 1904 and abandoned Bulwer Moreton Island, date unknown.

BREMER S mv 433 g, 253 n, ON191392, 176.0 x 26.6 x 10.0, B.1945 Ford Mfg Co. Geelong. Owners: Riverside Coal Transport Co P/L, reg.Brisbane. Scuttled Sept. 29, 1992, Curtin Artificial Reef.

C.H.WATJEN S ship, 1823 t, B.1889 Germany. Hulked at Townsville in 1903 for Burns, Philp & Co. Register closed March 1914 with 'broken up, South End, Goode Island'. Reportedly abandoned.

CAPTAIN COOK W ss former Sydney pilot steamer, 185 g, ON101105, 123.6 x 21 x 12. B.1876 Mort's Dock & Eng. Co., Balmain, NSW. Last Owners: J.E. & W.B.Carr, reg. Brisbane. Register closed Dec.1934 'broken up'. Reportedly burnt for fittings upon Bishop Island.

CASUARINA S ss hopperbarge with rotating cutter on bow. 620 t, ON94163, 170.0 x 34.1 x 12.2, B.1896 Paisley for Queensland Govt. Reg. closed Aug. 1954 with 'Broken up' but reportedly scuttled in Moreton Bay.

CEMENTCO S mv 1471 g, 816 n, ON191388, 197.0 x 50.0 x 19.0, B.1945 Melbourne Harbour Trust Workshop & Slip, Williamstown VIC. for Aust. Army and named CRUSADER, rn 1949. 6 screws and diesel engines by Ruwold Melbourne, ea 6.cy. 8 x 10", 204 bhp. Owners: Queensland Cement & Lime Co, reg. Brisbane. Used as a coral hopper barge. Reported scuttled to form artificial reef in Moreton Bay late 1984/early 1985.

CENTIPEDE Steel lighter, ex ss tug, 133 g, B.1913 Brisbane. Converted to motor driven powered lighter 1960 by Moreton Tug & Lighterage Co. Scuttled Feb. 2, 1990 at Curtin Artificial Reef, Moreton Bay.

CERATODUS S dredge, 406 t, ON109651, 145.0 x 30.1 x 11.1, B.1898 Paisley. Last owners Bundaberg Harbour Board, register closed 1932 when sold and converted into a barge. Reportedly abandoned Fern Creek. Fraser Island. (See 'Port of Maryborough' Parsons).

CERATODUS II S non powered suction/cutter dredge. 350 t, B.1943 for Bundaberg Harbour Board, rg. Bundaberg. Scuttled at artificial reef off Barolin Rocks, near Bundaberg, Oct. 4, 1992.

CITY OF ADELAIDE Iron hulk, ex ss & sv, 1212 t, ON49261, 252.8 x 28.3 x 24.4, B.1864 Govan Made sv 1890 = 843t 4mast barkentine. c.1902 hulked by Howard Smith. Sold 1915 for use as a bath house and scuttled Cockle Bay, Magnetic Island.

CIVILITY W ss 248 g, ON64410, 132.0 x 25.5 x 10.7, B.1872 Rock Davis, Brisbane Water NSW HP eng. 40 nhp Vale & Lacy, Sydney. Built as coastal cargo/passenger ship, drifted into the blue metal trade between Sydney and south coast ports of NSW until 1907 when acquired by A.King & C.McLeod of Brisbane. Register closed 1918 with 'broken up, Brisbane'. Reported abandoned Bishop Island.

CLEVELAND BAY S ss bucket dredge, 389 g, ON128321, 145.4 x 32.6 x 11.5, B.1911 Paisley, Comp. eng. EB. Owners:Townsville Harbour Board, reg. townsville. Scuttled Apl. 6, 1968 Wheeler Reef, 18 degrees 14 minutes South x 27 degrees 45 minutes East.

CORMORANT S tss tug, 162 g, ON94184, 100.0 x 21.8 x 9.4, B.1900 Paisley for Queensland Govt and used in connection with dredge fleet. Register closed May 1932 'converted in to a coal hulk'. Remains reportedly abandoned on Bribie Is.

CROCODILE I ss dredge 364 g ON79546, 150.0 x 32.3 x 10.0, B.1883 Renfrew for Melbourne Harbour Trust, c.1913 Townsville Harbour Board. reg. closed 1928 'hulked'. Believed to have been scuttled off Townsville.

CROYDON see entry for **MORETON**

CRUSADER see entry for **CEMENTCO**

CRUSADER II S mv 69.72m x 15.42m Owners: Queensland Cement & Lime Co., reg.Brisbane. Scuttled July 27, 1985 off Flinders Reef, about 4 miles from Moreton Island light.

CRYSTAL VOYAGER S mfb 231 t, B.1976 is reported scuttled, date unknown, in position 24 degrees 17 minutes South x 153 degrees 18 minutes East..

DERWENT I hulk, ex ss 477 g, ON50005, 196.0 x 25.3 x 13.3, B.1864 Glasgow for Tasmanian S.N.Co. Last owned Howard Smith and used as coal hulk from at least 1915. Scuttled off Townsville 1925.

DICKY I ss 226 g, ON88841, 96.6 x 21.0 x 16, B.1883 Howaldt Bros. Kiel (when enrolled at Brisbane in 1889 the name was shown **DICKEY**). Last owners J.M.Brydon & Wm. Jones. Wrecked on what is now called 'Dicky Beach', Caloundra early Feb.1893. Still visible.

DINGO Reported abandoned on Bribie Is. There were 2 launches of this name operated by the Marine & Harbours, one steam, disposed of in 1910 but these remains are more likely the Iron dumb lighter, 99 g, ON130158, 100.5 x 17.4 x 8.25, B.1879 John Walker & Co, Maryborough, sold by Macdonald Hamilton & Co June 1925 to The Gravel, Sand & Metal Supply Co. who closed the register.

DOLPHIN Iron hopper barge 260 t, B.1885/7 Walkers, Maryborough for Marine & Harbours. Scuttled at Tangalooma August 1963.

DREDGE D Unidentified. Scuttled June 3, 1969, 12m ENE of Cape Moreton.

DUGONG Steel hopper barge, B.1927. Scuttled at Stradbroke Island.

ECHENEIS S tss drag suction hopper barge, 1148 t, B.1953 Walker Ltd, Maryborough for Queensland Govt. Scuttled at Tangalooma June 22, 1984.

ESTRELLA DEL MAR S gravel barge, ex mv HAUTURU, Aug.1952, 290 g, ON153970, B.1927 Greenock. Owners: Wm.Collin & Sons, Scuttled Dec. 17, 1983 Curtin Artificial Reef, Moreton Bay.

ETMOOR S barge ex mv MELINGA, B.1928 for North Coast SN Co. Scuttled August 1995 off Cowan Cowan, Moreton Bay.

EXCELSIOR S lighter ex Pt. Phillip Bay steamer, B.1882. Hulked 1919 and during WW2 taken to Brisbane as floating workshop. C.1948 run upon Bishop Island and abandoned.

FAIRLIGHT I ex ps Manly ferry. B.1878. Hulked 1914 by Cleghorn, Hopkins. Abandoned date unknown about 5m south of Tangalooma. Identified by R. McLeod.

FEARLESS W ss tug 49g ON94121 B. 1895. Peter Callen, Stockton, NSW. Reg closed Oct 1952, "broken up" but reportedly abandoned on Brisbane river bank.

FITZROY S ss suction dredge 766 t, B.1925 for Rockhampton H.B. c.1962/3 to Bundaberg HB. Scuttled off Bundaberg c.1980?

GAYUNDAH S lighter ex tss gunboat B.1883/4; sold 1921 and used as gravel barge. Put ashore at Woody Point, Redcliffe June 2, 1958 to prevent erosion.

GEORGE R.CROWE W 3m bq, 543 t, ON90499, B.1885 Clifton NS, Owner: Jas.Crowe Clifton NS, reg. Halifax NS. Burnt while anchored Brisbane River, Jan. 19, 1887 after arrival from New York Dec. 20. Remains towed to Fishermans Is and blown up.

GEORGE RENNIE Iss Victorian govt, and mentioned since 1856. Sold to Howard Smith for lighter at Townsville. Abandoned 1902 Picnic Bay, Magnetic Is, to protect jetty.

GOORI S barge, ex stmr: ex ss GARTMORE, B.1925. Scuttled Hervey Bay, May 1990. Employed as a timber barge by Wilson, Hart & Co.

GRAZIER W ss 207 g, ON139362, 114.6 x 23.8 x 10.3, B.1924 Drummoyne, NSW. Last owners Wm.Collin & Sons P/L. While working as a coral dredge in Moreton Bay, capsized and swamped Jan. 15, 1948, a total loss, near Mud Island (not far from Bishop Island). 1 life lost.

GROPER Iron dumb lighter (ex bucket dredge 1916) 384 g, 110. x 28.2 x 10.4, B.1876 Whiteinch for Qld.Govt. Register closed Dec.1949 'broken up' remains placed on Bishop Island.

GROPER S ss bucket dredge, ON191415, 738 g, 178.5 x 37.0 x 13.2, B.1954 Paisley. for Marine & Harbours. Sold. Aug.1979 and scuttled at Tangalooma February 1982.

GUNGA See entry for **MORETON**

HERBERT I ss 302 g, ON87320, 140.1 x 25.0 x 7.3, B. 1884 Glasgow for work out of Townsville. Last owners The Adelaide SS Co. Sold for demolition 1932 and remains scuttled off Cape Cleveland Jan. 1933.

HERCULES S tss suction dredge 895 g, ON94188, 230.5 x 34.3 x 13.5, B.1900 Walker on Tyne for Qld. Govt. register closed August 1947 on sale to private owners after removal of all equipment. (History of Marine & Harbours states this was done in 1937 when converted to coral dredging) Scuttled to protect a wharf at Dunwich, Stradbroke Is, 1950.

HOPEWELL S ss 337 g, ON91464, 145.0 x 24.1 x 8.3, B.1900 Paisley. Last owner Hopewell Shpg Co., Maryborough. Register closed 1938 'broken up' but remains put ashore at Comboyuro, Moreton Island.

ICEBERG Iron lighter, ex ss (built as refer to deliver meat to export ships) 244 g, 127.5 x 25.0 x 9.2, B.1882 J.W.Sutton & Co, Brisbane. Last owners Duncanson & Brittain. Scuttled at Tangalooma, Oct. 9, 1975.

JAMES PATERSON Iron hulk, ex ss 569 g, ON46432, 186.3 x 23.2 x 11.6, B.1862 Govan. Last owner AUSN made into coal hulk at Townsville Nov. 1884. Register closed Sept.1891 'abandoned on the beach at Townsville', Such reports began appearing in 1888/9.

JINN CHANG (sometimes 'Jinn Chiang' and 'Gin Jaing') S stern trawler, mv 127g, 28.1m x 9.6, B.circa 1964. Formerly Taiwanese. Scuttled off Cairns Jan. 5, 1984.

JOSEFA I hulk, ex barque 845 t, ON113156, 178.1 x 32.2 x 19.8, B.1872 Glasgow German owners. Dismasted near Newcastle, NSW August 1908 and sold to Adelaide S S Co for use as hulk. Stationed at Townsville. A notice issued by the Marine Dept., Queensland, Oct. 1924 said 'The hulk Josefa has been sunk 3 miles, 1 cable south of Cape Cleveland lighthouse lat. 19 degrees 18 minutes South x 147 degrees 55 minutes East...'

KAIONE mentioned as scuttled - no detail discovered.

KALLATINA S ss 628 g, ON93230 179.1 x 28.2 x 11.4 B.1890 Pt.Glasgow. Last owners John Burke Ltd. sold for demolition 1931 and reg.closed Jan. 1935 'broken up' but remains abandoned at Bulwer, near Comboyuro Pt. Moreton Island.

KGARI S lighter, 248 t, ON108223, 130.0 x 25.1 x 8.9, as tss CAROO for Adelaide SS Co who sold 1954 and made a lighter/logging barge. Kgari is said to be the aboriginal name for Fraser Is. Scuttled at Roy Rufus Reef, Hervey Bay, Sept.19, 1976.

KONOOWARRA S s, hulk, ex ss, 1051 t, ON79520, 1273 g, 246.2 x 33.5 x 16.4. B 1880 Greenock. Last owners Howard Smith, Townsville. Reported scuttled of Townsville March 27, 1938.

KOOKABURRA W m.1. 58.0 x 13 x 6.3, B.1934 Evans, Anderson, Phelan & Co, Kangaroo Point, Brisbane and used by Marine & Harbours as anchor launch. Scuttled to help form a boat harbour at Tangalooma Aug. 1963.

KOS I S ss 254 g, ON191409, 116.0 x 24.2 x 14.1, B.1929 Middlesbro'. Whale chaser. Scuttled at Tangalooma April 18, 1971.

KOS II S ss 254 g, ON191410, 116.0 x 24.2 x 14.1, B.1929 Middlesbro'. Scuttled at Tangalooma Oct. 1, 1974.

KYOGLE S ss 735 g, ON112551, 180.1 x 30.1 x 13.1, B.1901 Pointhouse, Glasgow. Owners: (1932) Queensland Lime & Cement Co., Brisbane and used as coral carrier. Reg.closed July 1951. Hull sunk 10 km east of Cape Moreton by RAAF bombing practice May 12, 1951.

LADY LAMINGTON see entry for **MORETON**

LADY LOCH I lighter ex ss (lighthouse tender) 531g, ON88946, 182.7 x 24.6 x 14.4, B.1886 Campbell, Sloss & McCann, South Melbourne. Last owners: Moreton Tug & Lighter Co. Scuttled 1962 at Dunwich, Moreton Bay.

LADY NORMAN Iron lighter, 194 g, ON94148, 130.0 x 22.0 x 7.4, B.1884 Walkers, Maryborough as ps SEAHORSE, converted to screw with engine from DICKY (q.v.) converted to lighter in 1918. Last owner Wm.Collin & Sons. Scuttled Feb. 15, 1969 Curtin Artificial Reef.

BALOR S ss tug, 232 t, ON165257, B.1942 Aberdeen and named EMPIRE MINOTAUR, rn 1949 by Townsville Harbour Board. In Apl. 1968 to Stannard Bros and dismantled, Scuttled off Townsville early Sept. 1969 vide contemporary press, other reports say early January. Position 18 degrees 46 minutes South x 147 degrees 25 minutes 50 seconds East.

LAMPREY Small wooden barge b. 1923 South Brisbane Drydock for Marine & Harbours, made into a suction dredge in 1964 but not very effective. Abandoned at Bulwer.

LASS O'GOWRIE Iron lighter, ex ss 202 g ON62965, 136.8 x 20.2 x 8.7, B.1878 Kinghorn, Scot. last owner Wilson, Hart & Co, Maryborough. Scuttled Roy Rufus Reef, Hervey Bay, July 28, 1975.

LOCHEIL W 3 mast sch, 227 g, ON65361, 113.4 x 24.1 x 12.6, B.1875 Peterhead, Scot. last owner Charles E.young, Bundaberg. Reg. closed June 1907 with 'broken up at Bundaberg' some records say abandoned on Bishop Island.

LOEVESTEIN S mv tug, 60 g. B.1946. Scuttled July 29, 1984 Curtin Artificial Reef.

LUCINDA steel coal lighter, ex ps 301 g, ON94139, 172.6 x 25.1 x 9.2, B.1884 Dumbarton for Qld Govt. Sold 1923 and became coal lighter for The Riversdale Coal Transport Co P/L. reg. closed May 1932. Remains put upon Bishop Island.

MAIDA W hulk ex 3mast bq, 519 g, ON21392, 147.4 x 25.2 x 19.2, B.1857 Moulamein. Abandoned on Bishop Island and burnt for her metal. Hulked c. 1886.

MARYBOROUGH I ss dredge, B.1885 Walkers Ltd for Qld Govt. Scuttled at Tangalooma August 1963.

MELBOURNE S ss tug, 496 g, ON177228, 137' x 32', B.1952 Aberdeen and named HOWARD SMITH, rn. and capsized Pt. Phillip Aug.10,1972 with loss of 5 crew. Salvaged by Joe Engwinda who took it to Brisbane but was unable to find economical employment for hull and it was scuttled Jan. 1979 Curtin Artificial reef.

MERINO S mv 549 g, ON152402, 187' x 33', B.1949 Bowling, Scot. mach aft. cargo ship. Last work associated with Prawning fleet. Scuttled Jan. 28, 1987 Lat.140 degrees South x 14 degrees East.

MINER tug operated by Marine & Harbours, put on Bishop Island 1953.

MOLTKE I hulk ex ship rig s.v. 827 t, 191.6 x 32.2 x 19.3, B.1870 Hamburg. stranded near Cape Bowling Green, Apl. 1890 and acquired by Burns, Philp for use as hulk in Townsville. Sold in 1913 to be scuttled to protect the landing at Geoffrey Bay, Magnetic Is. Sank in wrong place and was washed away and abandoned.

MORETON I ss 356 g, ON80429, 180.6 x 22.1 x 10.8, B.1878 Glasgow and named GUNGA, rn CROYDON Feb.1893: LADY LAMINGTON Oct.1898 and MORETON Dec.1900. comp.eng. Last owners. JE & WB Carr, sewerage contractors. Register closed Dec.1934 'abandoned Bishop Island'.

MORWONG S tss suction hopper dredge. 1000 g, 214.0 x 38.0 x 15.5, B.1925 Poole & Steele, Pt. Adelaide named No.4. RN 1935 Marine & Harbours, Qld. Scuttled to form breakwater Tangalooma, April 1973.

MOUNT KEMBLA I ss, 716 g, ON91836, 180.0 x 28.0 x 13.0, B.1885 Stockton on Tees, Comp. eng. last owners J.E.& W.B.Carr, sanitary contractors, Reg. closed Dec.1934 'broken up at Brisbane' remains reportedly put ashore at Bulwer, Moreton Island.

MOURILYAN s np grab dredge, 103' 24' x 9', B.1910 Brisbane for Marine & Harbours. Sank at Mourilyan Aug.31, 1959 with loss of 3 lives. Raised and repaired. Sold June 1979 for work at Hamilton Island. Scuttled to form an artificial reef at Hamilton Dec. 2, 1982.

MYORA I ss 38 g, ON130152, 60.1 x 12.5 x 7.7, B.1890 Tooth & Co, Maryborough, Q. Comp.eng. Last owner: Histed Bros., Reg.closed March 1956 'vessel then derelict at Kangaroo Point, Brisbane'.

MYSTERY remains of a tug reportedly abandoned in Brisbane river - possibly a lighter ex 55 tug 22 t, ON74834, 57.9 x 11.1 x 4.8, B.1878 Newcastle, NSW. When owned by Macdonald, Hamilton & Co, sold Nov.1925 to Electric Construction Company who closed the register having removed the machinery in Feb. 1927.

NEVILLE BONNAR Not identified. Said to be a small gravel barge, owned at one time by Bowen Tug Company. Scuttled at Curtin Artificial Reef July 25, 1983.

NORMANBY I ss, 97 g 66 n, ON87315 B. 1884. Last owner, Cleghorn, Hopkins & Co. Reg. Closed 1927 'broken up'. Remains are near FAIRLIGHT on Moreton island, recently identified by R. McCleod.

No.25 S lighter 217 g, 183 n. Not reg. B.1906/7 Brisbane. 103' x 31' Owners: Riverside Coal Transport. Scuttled Curtin Artificial Reef Feb.8, 1990. (or 11th?)

OIL FUEL LIGHTER ex 1206 of RAN in 1968. B.1945 Williamstown Victoria., 187'oa x 37'3". Scuttled June 19, 1993 at Curtin Artificial Reef.

OTTER S lighter ex S tss tug, 272 t, ON87323, 128.6 x 21.2 x 10.16, B.1884 (7) Ramage & Ferguson, Leith. 2 x comp.eng. Reg.closed 1949 after sale to Hyne & Sons, Maryborough for use as logging barge. Scuttled Roy Rufus artificial reef, Hervey Bay, July 31, 1969.

PALMER Steel logging barge, whose remains are in Deep Creek, Fraser Island. Originally S ss 267 t, ON89588, 140.2 x 26.0 x 8.5, B.1884 (5) J.Fullerton & Co, Paisley. for Australasian S.N.Co reg.Sydney: 1887 to AUSN Ltd.: 1920 Victorian Shipping Co: Mar.1924 John Burke Ltd, reg.Brisbane: 1927 Cleghorn, Hopkins Ltd who converted her to a lighter at a date unknown passed to Maryborough owners and abandoned apparently before WW2.

PELICAN I mv/barge ex tss tug, 81 t, ON79518, 80.2 x 17.0 x 6.7, B.1880 Johnson's Tyne Foundry, Yarrabank. last owners Hyne & Sons. Scuttled Roy Rufus Reef Hervey Bay, Dec.1971. [See 'Port of Maryborough' Parsons].

PLATYPUS I tss bucket dredge, 818 g, B.1883 Renfrew for Qld Govt. Sunk to form breakwater off Peel Is, Moreton Bay in 1926.

PLATYPUS II S tss bucket dredge, 1229 t, 200.0 x 40.0 x 14.8, B.1927 Walkers Ltd, Maryborough for Qld.Govt. Scuttled at Tangalooma March 7, 1966.

POINT LOOKOUT former ferry, scuttled Curtin Artificial Reef June 26, 1993. Probably = B.1964 once operated by Hayles, Townsville.

PORPOISE I ss 125 g, ON73341, 103.8 x 17.9 x 6.9, B.1875 ASN Pyrmont, NSW. 1908 to John Burke. Reg. closed 1949 'totally lost 1948'. Remains identified by Dr. R.McLeod on Moreton Is, south of Tangalooma.

PRESTO I hulk, ex 3m bq, 394 g, ON64122, 134.0 x 27.7 x 14.1, B.1862 W & A Meursing, Amsterdam.Owners: Adelaide SS Co. Sunk Townsville in 'Sigma' cyclone Jan.25, 1896. Raised and sold W.Bright and sunk to provide a breakwater, Nellie Bay, Magnetic Is.

PROTECTOR S ss warship built for Sth.Australian Government Newcastle/Tyne 1884. 960t displace 188'oa x 30': known as CERBERUS from Apl.1921 till 1924 when sold and converted to a lighter which was renamed SIDNEY in 1931 now = 564 t, ON153939, 180.0 x 30.0 x 14.3, owner Victorian Lighterage P/L reg.Melbourne. Taken over for US Army in 1943, was being towed to war theatre when the towline parted off the Queensland coast. A tug, tried to pick her up but crashed into her causing considerable damage and she arrived in Gladstone in sinking condition and in 1944 was put upon Heron Is.

QUEENSLAND S ss, 461 t, ON99249, 160.0 x 25.6 x 11.2, B.1894 (7) J.Scott & Co Kinghorn 3X EB Owners: built for R.Hart; c.1917 Cleghorn, Hopkins Ltd, Brisbane and converted into gravel lighter and eventually abandoned on Bishop Island (other sources say scuttled off Cape Moreton).

REMORA S tss suction dredge 1045 gt, ON130162, 213.5 x 37.3 x 15.9, B.1912 F.Schichau, Elbing, Ger. 2 x 3X 204 nhp EB. owners; Queensland Govt. Scuttled to form breakwater at Tangalooma in August 1963.

RODERICK DHU W bgn, later coal hulk, 163 t, ON70327, 102.6 x 24.6 x 11.4, B.1875 McQuarrie & McCallum, Auckland. Owned in Maryborough until July 1908 when sold to Cleghorn, Hopkins Ltd, who probably hulked her immediately. Ultimately abandoned on Bishop Island.

ST.KILDA Iron hulk, ex 3mast sch, 189 t, ON60367, 127.3 x 22.0 x 10.1, B.1868 J Fullerton & Co, Renfrew. Owners:(1911) Cleghorn, Hopkins Ltd, reg. Auckland, employed in Brisbane. Register closed July 1929. Abandoned Bishop Island.

SCHNAPPER I ss hopper barge, 260 t, ON94131, 135.3 x 23.1 x 10.3, B.1887 Walker & Co, Maryborough, end 47nhp. Owners: Queensland Government reg. Brisbane. Register closed Jan.1936 hull being used as a breakwater at Bishop Island.

S.D.1 & 2, side delivery barges owned by Qld Dept Marine & Harbours, purchased from RAN in 1947, were put ashore at Redcliffe to try and reduce corrosion, in 1963.

SEA HORSE see entry for **LADY NORMAN**

SEAL S ss hopper barge 644 t, B.1927 Pt.Glasgow. Scuttled at Tangalooma Breakwater Dec. 12, 1966.

SIDNEY see entry for **PROTECTOR**

SIR CHARLES COWPER I ss tug, 25 g, ON64394, 67.2 x 10.0 x 5.0, B.1872 Vale & Lacey, Sydney. Owner:MacDonald, Hamilton & Co, reg.Brisbane closed June 1923 'Broken up' but sunk in Brisbane River 1922 and reportedly raised in 1926 and used as a barge until abandoned on the bank.

SOLACE former Canadian ferro-concrete yacht. Scuttled Curtin artificial reef May 12, 1984.

SOUTHERN ENDEAVOUR S mv trawler 514 t, ON185133, B.1952 (10) Cochrane & Sons, Selby, named PRINCESS ELIZABETH rn 1959. Imported for fishery research in Gt.Aust.Bight. Sunk at moorings, Cairns, Aug. 20, 1979, raised and anchored in mangroves until scuttled off Cairns July 2, 1982.

STAR OF HOPE I hulk ex ss 99 g, ON74782, 87.9 x 16.2 x 6.8, B.1877. Foundered Townsville Jan. 26, 1896. Raised made hulk. Scuttled to protect Eastern Breakwater, Townsville Aug.1904.

STINGAREE I ss hopper bge, 260 t. B.1885/7 Walkers Maryborough.Acq. cl963 Riverside Coal Transport. Scuttled Tangalooma breakwater 1966.

SUMATRA S mv 345 t, ON191819, 143'6" x 24'1", B.1938 Holland. Diesel eng. mach. aft, last employment as fish processing factory. Scuttled off Cairns (16 degrees 41 minutes South x 142 degrees 21 minutes East) Sept 15, 1976.

TALDORA I ss, later lighter 232 t, ON82884, 130.6 x 23.2 x 8.8, BB.1881 (5) Campbelltown SB Co. Campbelltown. Comp.eng 50 nhp. Owners: Qld SS Co: 1887 AUSN reg. Brisbane. Register closed 1914 'converted into a lighter' coal hulk for W.R.Black and then Macdonald Hamilton. Abandoned in Aquarium Passage c.1932.

TOONDAH Vessel of this name reported abandoned in Moreton Bay, date unknown. Probably the small steamer used for Oyster Lease inspection etc., by the Department of Marine & Harbours at the turn of the century.

TRINITY BAY S tss suction hopper dredge. 1054 g, ON130161, 214.8 x 38.2 x 14.8, B.1912 (11) F.Schichau, Elbing, Ger. 2 x 3X 2204 nhp EB. Owners: Cairns Harbour Board, reg. Brisbane. Sold 1976 and used variety purposes including floating restaurant. Towed to sea and sunk by RAAF Nov. 24, 1981 (16 degrees 43 minutes South x 146 degrees 15 minutes East).

TRUE BLUE I hulk ex 3m bq, 425 t. ON60915, 152.0 x 26.0 x 15.8, B.1869 Oswald & Co.Sunderland and sometime named MATHIAS. acq. by Adelaide Stm.Tug Co. in 1896 and register closed in 1946 when advice received the hulk had been used to form a breakwater in Nth. Qld (Mission Bay).

UKI S mv barge ex ss 525 t, ON150200, 152.9 x 34.6 x 8.5, B.1923 Lithgows Ltd, Pt.Glasgow, 2 x 3X 70 nhp. mach aft. for North Coast SN Co. Sold 1960 Moreton Tug & Lighter Co and made into a diesel engined river barge. Scuttled at Tangalooma late 1977.

UTAH 2 Dumb barge B.1970. Owner: Pacific Tug Co? Scuttled Curtin Reef, March 28, 1994.

WAROOKA I ss, 216 g, ON89401, 150.9 x 19.1 x 10.7, B.1883 Paisley. Last owners Rooneys Ltd, Townsville. Register states: "Scuttled southward of Cape Cleveland, QLD, Aug. 14. 1922".

WOY WOY W ss 78 t, ON112534, 84.2 x 21.0 x 7.4, B.1901 W.Dunn, Berry's Bay, Nth.Sydney. Comp.eng. 20 nhp. Last owner A & C Busuttin, Mackay Q. who tried to operate a passenger service to Lindeman & Brampton Island but failed and laid her up in a creek St.Bees Island, May 2, 1936 awaiting improved conditions. Checking the vessel after WW2 it was found to be falling apart and was abandoned.

YOSEMITE W hulk ex 3mast bq. 1154 t., 183.0 x 37.2 x 23.5, B.1868 Portsmouth, New Hampshire. When owned in San Francisco, condemned in Brisbane c.1906/7 and sold for coal barge. Abandoned Bishop Island date unknown.

SOUTH AUSTRALIA

ALBA I hulk ex 3mast bq, ALBANY, 499 g, ON58232, 155.5 x 26.7 x 17.2, B.1867 (6) Brown & Simpson, Dundee For W.Taylor & Co., reg.Dundee. Ultimately sold foreign without change of name and acquired by Adelaide S.S.Co for use as hulk and eventually sold for scrap November 1966. Remains reported in North Arm, Pt.Adelaide.

ALEXANDRA (sometimes mistakenly ALEXANDRIA) I barge, ex murray river paddle steamer, 86 g, 47 n tons, ON83748, 83.8 x 22.7 x 5.0, B.1882 (9) Wilson & Burkett, Echuca as BANTAM, renamed Oct.1903. Last owner Thomas & Co, Pt.Adelaide, reportedly scuttled Canal Basin, Pt.Adelaide in March 1932 having been used as a barge around Pt.Adelaide. Remains removed and disposed of in unknown manner.

BARGE No.2 W 137 t, 113.5 x 27.5 x 4.8, Built time and place unknown by Melbourne Harbour Trust, acq. by Adelaide S.T.Co. 1901. Wrecked Royston head, on the south east side of Spencer's Gulf Aug. 30, 1920, having broken adrift from the tug LEVERET.

BARGE No.5 Std 309 t, ON117425, 121.6 x 26.0 x 11.6, B.1900 Govt.Railways Workshop, Perth, WA and named GRAMPUS, acq. c.1906 Adelaide Steam Tug Co, reg. Pt.Adelaide and renamed. Sold 1961 and register closed July 1962 and reportedly scuttled May 2, 1962.

BARGE No.10 Owner: S.A.Harbours Board? Scuttled March 13, 1946. No other detail.

BRONZEWING S fishing boat ex tug, said to have been built in UK about 1930 but there is no trace of such a craft and it is believed the vessel was actually the tug built for the RAN by Mort's Dock in 1946 that was paid off in 1975 and sold to Burnie in 1977 for conversion to fishing boat. Scuttled off Pt.Lincoln July 1. 1990.

DOROTHY H.STERLING W 6 mast schooner, 2526 g, 2350 n, ON (US)220005, 267.0 x 49.6 x 25.2, B.1920 Peninsula SB Co. Portland, Oregon and named OREGON PINE. Last known owners: Sterling S.S.Corp, reg. Seattle. Abandoned by her owners upon arrival in Pt.Adelaide from Oregon in 1929. Sold for demolition for non payment of harbour dues in 1930 and stripped in Port Adelaide and remains abandoned in the North Arm.

DOROTHY S W 2 mast sch, 51 g, 42 n, ON53985, 72.7 x 19.0 x 7.4, B.1868 Henry A.Warnecke, Sandridge V. named STEPHEN rn.1920 aux eng.60 bhp added. c.1922. Last official owner F.H.Clausen, reg. Pt.Adelaide. Reg. closed 1935 'vessel broken up' reportedly abandoned June 12, 1928 in North Arm.

ELENI K S ss 7245 g, 4448 n, 441'7" x 57'1" x 27'9.5" dr. B.1943 Bethlehem Fairfield SB Co, Baltimore as JOHNS HOPKINS, renamed THETIS in 1946; SANTA ELENA 1952 and Eleni K in 1960. Liberty Ship. Owners: Eleni Shpg Co., reg. Piraeus. On a voyage from Pt.Lincoln to UK with wheat broke in two Sept.26, 1966 and foundered in shallow water near Thevenard, Sa. Refloated and put on Goat Island Nov. 17, 1966.

ENTERPRISE I hulk es ss, 36 g, 24 n. ON59532. 78.7 x 12.5 x 5.2. B. 1868. J Matthew, Sydney eng 18 nhp. Last owner Adelaide Steam Tug Co. Reg. Pt Adelaide closed, August 1913 'unfit for further service' and abandoned in North Arm.

EXCELSIOR W coal hulk, ex 3mast bq, 399 t, ON60283, 128.5 x 27.7 x 16.3, B.1867 - Birnie, Montrose. owners: Huddart, Parker & Co, reg.Melbourne. Sank in a gale at Outer Harbour, Port Adelaide April 25, 1910. Raised, towed into Gulf of St.Vincent and scuttled by explosives. Location unknown.

EXCELSIOR S coal hulk ex ss, 301 g, 155 n, ON104743, 131.0 x 27.2 x 11.0, B.1897 Gourlay Bros. Dundee, stm eng. 60 nhp EB. Last official owners S.A. Farmers Co-op Union, reg. Pt.Adelaide. Sold 1931 for conversion to hulk by S.A. Harbours Board. Abandoned in a creek on Le Fevre Peninsula c.1945 in an area since reclaimed although remains still visible.

FLINDERS I Hulk, ex ss, 947 g, 499 n, ON57600, 227.1 x 28.3 x 20.1, B.1878 A.& J.Inglis Glasgow. Comp.eng. 200 nhp. EB Last official owners Adelaide SS Co. reg. Melbourne. Badly damaged by fire in 1911 and converted into a hulk for use in Pt.Adelaide. Sold in 1927 for dismantling and remains abandoned in North Arm, Pt.Adelaide.

GARTHNEILL S hulk, ex 3mast bq, 1470 g 1340 n, ON99207, 238.0 x 36.0 x 21.7, B.1895 Russell & Co, Pt.Glasgow as INVERNEILL last official owners: Marine Nav.co of Canada Ltd, reg. Montreal. Hulked in Pt.Adelaide 1926, and later converted to floating grain mill. Being dismantled in 1935 and remains abandoned in the North Arm.

GEORGE DINSDALE S ss tug 105 g, ON133224, 90.0 x 18.1 x 8.4, B.1913 Scott & Sons, Bowling. 3X Last owners: Ritch & Smith Ltd, reg. Pt.Adelaide, sold 1963 to Hines metals for demolition and remains abandoned in the North Arm late 1963.

GLAUCUS I hulk, ex ss 1362 g, 884 n, ON68988, 238.5 x 34.2 x 18.0, B.1878 J.Laing, Sunderland. Comp. 150 nhp. Laid up at Williamstown late 1927; used to store barley until taken to Pt.Adelaide and hulked in 1928. Reported July 1935 as being demolished in Portland Canal, Pt.Adelaide. Remains Abandoned in North Arm -late 1935.

GRACE DARLING S ss 622 g, 327 n, ON122722, 175.0 x 27.0 x 12.8, B.1905 Van Vliet & Co, Hardenfeld, Holland, 3X 90 nhp. Owners: John Darling & Co, reg. Pt.Adelaide. Register closed June 19, 1931 'sunk and abandoned in North Arm, Port river'.

H.A.LUMB S mv, tug, later mfb 153 g, 64 n, ON61775 78.05 x 23.8x 8.8, B.1943 Decatur Iron & Steel Co, Decatur, Alabama,USA. Diesel 700bhp GMH, Cleveland OH as YTM470 for US Navy. 1956 acq. Geelong Harbour Trust Commissioners, reg. Geelong, when sold converted for deep-sea trawling. Acquired by S.A.Dive Industry Association and scuttled for form artificial reef Dec.9, 1994 2km off O'Sullivan's Beach St.Vincent Gulf, Sth. Australia.

HOPPER BARGE Marine & Harbours, scuttled Apr. 10, 1984.

HOPPER BARGE Marine & Harbours, scuttled Apr. 11, 1984.

HOUGOMONT S 4mast bq, 2428 g, 2239 n, 292.4 x 43.2 x 24.1, B.1897 Scott & Co, Greenock, owner:G.Erikson, reg. Mariehamn, Finland. On a voyage to South Australia to load grain dismasted south of Kangaroo Island April, 20, 1932. Limped into Pt.Adelaide 19 days later but damage too costly to repair and sold for use as a breakwater at Stenhouse Bay, scuttled there in Jan.1933.

JUNO S ss, 241 g,102 n, ON117416, 129.9 x 23.1 x 8.5, B.1903 G.Brown & Co. Greenock. Comp. eng. 84 nhp. Last owners Coast Steamship Co (1913) Ltd, reg. Pt.Adelaide. Register closed March 1931 'broken up' - remains reportedly abandoned in the North Arm.

KADINA W hulk, ex ship 662 t. ON43150, 149.0 x 31.0 x 21.7, B.1852 Phippsburg, Maine, as Jeanie W.Paine, m 1865. Owned by Elder Smith & Simpson, reg.Pt.Adelaide. Stranded Wallaroo May1875, recovered and hulked. owners Wells & Thompson. Badly damaged by fire while moored in North Arm Apl. 4, 1879. Remains destroyed by dynamite June 6, 1879.

KARATTA S ss 553 g, 239 n, ON117428, 175.0 x 28.1 x 11.4, B.1907 G.Brown & Co. Greenock, 3X eng. Last owner Coast Steamship Co., reg. Pt.Adelaide. Made her last voyage from Kangaroo Island. Nov. 3, 1961 and was cut up for scrap on the bank of Port River, completely, task finished Feb.1962. (Remains said to be in North Arm, IF there is anything there it is the very bottom of the hull although contemporary photos in the Adelaide press show the vessel was completely demolished on the bank).

KARINA G S mfb (tuna fishing) 232 t, B.1966 owned by Lukin Enterprises, Pt.Lincoln. Got aground 25km east of Eucla Jan.24, 1990 and the hull was to be scuttled but this proved impossible and under strict supervision the hull was destroyed by explosives where it lay Apl. 4,1990. It was reported to have been blown into pieces small enough to be removed, although later there were accusation of pollution from the blasted remains.

LADY DALY W 2m F&A sch, 68 t, ON74648, 90.8 x 19.6 x 6.3, B.1876 Williamstown, V. Last owners: Fricker, Edwards & Campbel, reg. Pt.Adelaide. Register cancelled Sept 6, 1929 'vessel dismantled and hulk sunk in Port River'.

LADY PALMERSTON see entry for **PAM**

LOCH TAY Iron hulk, 1191 t, ON60468, ex 3m ship, 1250g, 1191n. 225.4 x 35.5 x 21.6, B.1869 Barclay, Curle & Co, Glasgow. acq.by Huddart, Parker & Co, 1909 and converted into coal hulk for Pt.Adelaide. Register closed Apl. 1958 'broken up'. Remains reportedly in the North Arm.

LOTTIE W 2mast kt, 17 t, ON79326, 46.1 x 11.3 x 5.0, B.1880 Pt.Adelaide. register closed in Nov.1932 'no longer required - used for pleasure purposes only' and the 'Advertiser' May 24, 1935 reported '...blown ashore at Outer Harbour, about 1933, and broken up'. Remains reportedly in North Arm.

LULU W 2mast kt, 43t, ON31905, 55.0x 16.3 x 7.0, B.1878 Grant & Co, Belfast.V. Abandoned on bank of Port River in mid 1930s.

MANGANA I hulk ex ss 752 g, 428 n, ON57573, 208.3 x 27.1 x 19.3, B. 1875 Glasgow for Tasmanian S.N.Co. Hulked by Huddart, Parker c.1900 for Pt.Adelaide. Put ashore in North Arm Mar. 23, 1931.

MASTER JACK S dumb bge, ex bucket dredge H.C.MEYER 1000 t, B.1964. Capsized in Port river Oct.1, 1979, raised not repaired hull sold c.1983 Marine Industries, refitted as barge. Under tow of tug E.H.PRICE took ground May 8, 1984 nr Cape Spencer. Freed itself and found drifting and taken in tow but broke adrift and wrecked near Cape Forbin Kangaroo Island, May 10th.

MOE I hulk, 748 t, ON74493 ex 3mast bq, 765 g, 187.9 x 30.8 x 18.8, B.1876 Liverpool, named ZOE, later HEBE. Purchased 1912 by McIlwraith, McEacharn and hulked. Sold for demolition in 1930 and remains abandoned North Arm, Sept. 25,1931.

MYEE barge, unreg. acq.c.1925 Adelaide S.T.Co, for Pt.Pirie, cut up for scrap shortly after WW2 and remains abandoned Pt.Pirie.

PAM Iron hulk, 1310 t, ON48805, ex 3m bq, and originally ship rigged and named LADY PALMERSTON, 1247 g, 213.5 x 35.4 x 22.5, B.1864 R.Steele, Greenock. Hulked at Pt.Adelaide and renamed in 1909 by Adelaide SS Co and reg. Pt.Adelaide. Towed to a position south of Kangaroo Is, March 20, 1934 and sunk by gunfire from HMAS AUSTRALIA and CANBERRA.

QUORNA S ss 606 g, 265 n, ON122740, 175.5 x 28.1 x 11.6, B.1912 J.Fullerton & Co, Paisley, 3X 100 ihp, and named WARRENER owned by George Wills & Co, reg. Pt.Adelaide. Renamed 1913 when sold to Adelaide SS Co. Laid up in Pt. Adelaide c.1947 and gradually stripped. Hull presented to the RAAF and towed to sea Oct.30, 1950 and sunk off Kangaroo Island by bombers.

SANTIAGO Iron hulk, ex 3mast bq, 484 g, 460 n (Br. ON15391), 160.6 x 25.9 x 17.4, B.1856 Henry Balfour & Co, Leven. (Methil) When owned by Norwegians was dismantled off Eastern Australia c.1900 and purchased by Adelaide Steam Tug Co for use as coal hulk for tugs. Taken out of service early 1945 and abandoned in North Arm.

SARNIA Comp.dredge B 1877/8 Pt.Adelaide for Govt. abt 115' x 20' x 10', Abandoned North Arm after seams opened Nov.26,1926.

SAURIAN (Dredger No.16) Iron, B.1871, 164.0 x 30.2 x 11.8. Owners SA. Marine & Harbors Dept. Scuttled Nov. 24, 1954 N.W. of Pt.Noarlunga Jetty, about 5kms from Oil Refinery jetty, to form an artificial reef.

SOUTH AUSTRALIAN S ss suction dredge 395 g, 142 n, 137.5 x 31.1 x 10.7, B.1911 A.F.Smolders, Schiedamn, for South Australian Harbors Board. Scuttled off Adelaide to provide an artificial reef Jan. 16, 1985.

STANLEY Iron water tank, ex ps. tug, 85 g, 39 n, ON79696, 80.0 x 17.2 x 8.6, B.1879 John Fullerton & Co, Paisley, eng. 32nhp built for Govt of S.Aust. Sold out of service Feb.1886 and in 1913 made into a water carrier to serve ships at anchor etc. Vessel sold for demolition in 1930 and remains reportedly abandoned Oct. 7, 1930 in the North Arm.

SUNBEAM I hulk, ex 3mast bq, 442 t, ON20477, 141.5 x 27.1 x 16.8, B.1857 John Brown & Co, Kirkaldy, co.Fife. Acq 1886 by Huddart, Parker & Co and converted into hulk and eventually stationed in. Pt.Adelaide. Stranded on Garden Island, North Arm and abandoned October 1910.

TANCRED S diesel-electric salvage tug, 505 g, 203 n, 135.5 x 33.1 x 14.6, B.1943 Gulfport Boiler & Welding Works, Pt.Arthur, Texas. Sold by S.Australian Harbors & Marine c.1983 the buyer disappeared and the vessel was ultimately moored in the North Arm pending disposal by the authorities wine: she slipped her mooring early in 1994 and went ashore in the North Arm.

TELFOR BARGES Metal hull, unnamed, but marked I & II. 70.5 x 49.2 x 11.5, scuttled with the dredge SAURIAN Nov.24, 1954 off oil refinery jetty, Gulf of St.Vincent.

THOMAS & ANNIE W 2m aux. kt, 21g, 17 n, ON57563, 48.0 x 15.4 x 4.4, B.1874 Pt.Cygnnet, T. Enrolled Pt.Adelaide May 1876 and register closed in Dec. 1945 with 'Sold to an American subject, and abandoned in the North Arm, Pt.Adelaide'.

TRAFALGAR Comp. ps 116 g, 103 n, ON74916, 105.7 x 18.9 x 7.9, B.1877 T.J.McDonald, Echuca V. engine removed March 1937 and made a barge. Register closed 1961 'Broken up' however demolition commenced 1954 and in Sept.1958 the keel, stern post and a few plates could be seen near the railway bridge in Pt.Adelaide.

ULLOCK Iron hulk 790 t ,ON70955, ex 3mast bq, 815 g, 779 n, 186.0 x 32.1 x 18.8, B.1875 A.Hall & Co, Aberdeen, as Ullock but sold Norwegians and renamed JOHANNE. Reverted 1911 on acquisition by Huddart Parker and converted to Hulk, reg. Pt. Adelaide Register closed Oct.1937 'broken up'. Remains reportedly abandoned North Arm May 7, 1937.

ZOE see entry for **MOE**.

TASMANIA

ADVANCE W hulk, 77 t, ON88981, ex ss 77 g, 53 n, 85.0 x 22.6 x 6.6, B.1885 Callen Bros, Stockton NSW. stm eng. 14 nhp. Owner; Nov. 1896 Union SS Co of NZ Ltd, and described as a lighter at Strahan with register closed 1914 and reported broken up Oct. 1925 although remains reportedly still visible.

ALDEBARAN Iron hulk 429 t, ON106250, ex 3mast bq, 150.9 x 27.3 x 15.9, B.1869 Oswald & Co, Sunderland and named CONCORDIA, rn 1899 in Sydney. Hulked 1912 by Union SS Co and placed at Hobart. Sold Apl. 1948 and used to form a breakwater at Dunalley, near Hobart.

A.N.M. 3, 4, 5, 6 300 t dumb lighters all built 1944 owned by Australian Newsprint Mills. (3 - Oct. 30, 1984): (4 scuttled Oct.1,1984): (5- scuttled Oct. 31, 1986): (6 scuttled Oct. 30, 1984).

DERWENT HUNTER W 3mast bq, 368 t, ON32094, 106.2 x 29.0 x 18.6, B.1810&1811 Kensington, Philadelphia. named NORTH AMERICA, m. 1861. Employed as a whaler until laid up c. 1884 in Hobart. Later dismantled and scuttled at the Domain Slip, Hobart for a wharf. Burnt to water's edge Dec. 25, 1907.

GAIL JEANETTE II Reported scuttled in Tasmania waters. No details located.

GLENTURK W ss (lighter) 71 g, 34 n, ON119239, 83.4 x 22.5 x 5.8, B.1905 J.Eden Heron, Pt.Esperance, Tas. eng. 14 nhp. Last official owner L.F.Rapp but other sources say E.Grining & Sons, Strahan. Register closed 1968 'no trace' but remains still visible off the Esplanade, Strahan and it was apparently abandoned in the 1940s.

H.T.L. 1,2 & 4 Dumb lighters, presumably owned by Derwent Tug Co. reportedly scuttled January 1986. No detail located. It has been reported these were all tied together and sunk.

IRON BARON S mv, bulk carrier, mach.aft, 21975 g, 12,358 n, 37,557 dwt t. 188.02 x 28 x 15.42m, B.1984 Japan. Bareboat charter to B.H.P. Ltd, reg.Melbourne. Stranded Hebe Reef, Tamar, TAS on July 10,1995; refloated July 16 and scuttled July 30, 1995 in deep water, Bass Strait, having broken in two prior to sinking.

JAMES WALLACE S ss tug 188 g, ON151990, 100.0 x 23.6 x 9.7, B.1924 Ferguson Bros Ltd, Pt. Glasgow. Comp.eng. Last owners: Launceston Marine Board, reg. Launceston. Laid up Sept.1968, stripped and hull cut down to waterline by scrap metal merchant and remains scuttled off Hebe Reef, Jan. 12, 1971.

J.H.ASTELL S ss sand pump/Hopper barge, 537 t , B.1892. Owners Marine Board of Devonport.Tas Scuttled 28 miles N.W. off Low Head Tas. March 29 or April 19, 1968.

KATHLEEN W ss (launch) about 50 t, 57' x 11'6", B.1876 J.B.CHandler, Hobart. stm eng. 14 nhp. Originally the Hobart ferry SUCCESS of O'May Bros. Sold.1899 renamed and taken to Macquarie Harbour. Apparently abandoned there in c.1943.

LEURA I hulk, ex ss 1186 g, 758 n, ON74685, 250.8 x 32.8 x 16.2, B.1878 W.H.Potter, Liverpool. Comp. eng. 220 nhp J.Jack & Co.Liverpool Owners: Howard Smith Ltd, reg. Melbourne. sold Apl.1920 to Electrolytic Zinc Co, Hobart, and hulked. reg. closed 1921. Remains scuttled Storm Bay, near Hobart 1932.

LEVEN S hulk ex ss dredge/hopper barge 683 g, ON189435, 162.0 x 33.1 x 14.1, B.1945 Paisley. Demolished by Port of Devonport Authority and permission granted to scuttle the remains but due to increased price offering for scrap metal sold to metal merchant.

LOTTAH W ss 53 g, 44 n, ON57637 67.3 x 15.0 x 5.7, B.1895 John Wilson, Pt.Cygnnet, T. Sold Sept. 1916 for use on Macquarie Harbour and ultimately abandoned at West Strahan, date unknown, but probably the 1930s.

LYNK W ss abt 40 t. unreg, 42' x 9' 4'6", B.1895 Geo.Miller, Hobart as the steam yacht ALICE and having been rebuilt after a serious collision in 1907 she moved to the Tasmanian east coast and at a date unknown was renamed LYNX and ended her days working on Macquarie Harbour. At a date unknown abandoned.

MACQUARIE S ss, sand pump hopper dredge 225 g, ON124539, 123.2 x 23.1 x 9.4, B.1908 W.Simons & Co, Renfrew. Comp.eng. EB Always owned in Tasmania. Vandalised May 1975 and went ashore in Prince of Wales Bay, Hobart. Scuttled between the Swiftness and William Cowper near Betsey Island Dec. 17, 1984.

MAITLAND I ss 150 g, 40n, ON89420, 100.0 x 18.2 x 9.5, B.1885 John Knox & Co. Hylton, nr Sunderland. comp. eng. 45nhp. last owners: Launceston Marine Board, reg. Launceston (who used her almost exclusively as a tug). Stripped during 1955 and scuttled in 15 fathoms in Spring Bay, Tamar River, T. Dec. 15, 1955.

MUSGRAVE S tss 904 g, 467 n, ON89280, 211.1 x 30.2 x 15.4, B.1883 J.Reid & Co. Pt.Glasgow as FIONA rn 1908 2Xcomp.178 nhp. Last owner.W.J.Gibson, flour millers, register closed with 'broken up' in 1930, but hull reported scuttled in Storm Bay, near Leura.

NELLIE W ss 16 g, 11 n, ON79290, 46.2 x 11.4 x 4.7, B.1889 Jack & Moore, Launceston. Register closed at Launceston in 1971 'no trace' but Graeme Broxam's researches indicates she was last employed in Macquarie Harbour and her remains are near those of LOTTAH at West Strahan.

OTAGO Iron lighter 367 t, ON60463, ex 3mast bq, 367 g, 345 n, 147.0 x 26.0 x 14.0, B.1869 A.Stephen & Sons,Glasgow. Used as a lighter/ coal hulk in Hobart by Huddart Parker from c.1903 till sold Jan.1931 to Mr.H.G.Dodge who had her run upon the east bank of the Derwent Jan. 25, 1931 where she slowly rotted away.

SILVER CLOUD W hulk, 304 t, ON68550, ex 3mast schooner, 304 g, 292 n, 130.6 x 27.0 x 12.8, B.1874 Richard Thompson, Sunderland. Came to New Zealand in 1877 and in 1908 was acquired by Union SS Co and converted into a coal hulk for Hobart. Register closed in 1909 and reportedly broken up in 1932, but the remains were still visible under Mt.Direction in the 1950s.

SWIFTFNESS S mv, tug, 147 g, 3n. ON144464, 98.4 x 22.3 x 10.1, B.1920 Fleming & Ferguson Ltd, Paisley, 3X EB and named FISHGUARD, then PLOVER and rn Swiftness 1937 and reg.Melbourne: converted to diesel 1958 = 750 bhp Norwegian engine and now owned in Hobart. Last owners Derwent Tug Co. Stripped, burnt and scuttled nr Little Betsey Is, Storm Bay Aug. 21,1979.

WESTRALIAN S tss, 123 g, ON120008, 128.9 x 16.0x 9.3, B.1905 Hoskins & Co, Perth.WA from frames etc of tss MANX FAIRY B.1887 T.B.Seath & Co, Rutherglen, 2 x comp. 300 ihp by Huston & Corbett, Glasgow for excursion work in UK. came to Australia, under sail, in 1897. Last official owner A.J.Challenger, reg. Hobart. Run ashore at East Risdon, River Derwent in 1940s and stripped. Remains still visible in 1960s.

WILLIAM COWPER S ss hopper barge, 689 g, ON148510, 170.6 x 33.2 x 13.4, B.1924 NV Schsb en Machrao 'de Klop', Sliedrecht, 3XEB and named TATHAM IV, renamed 1928 by Melbourne Harbour Trust, reg. Melbourne, Last official owner Derwent Tug Co, Hobart. Burnt and scuttled near Little Betsey Is, Storm Bay, Aug. 21, 1979.

WILLIAM PITT S barge, 432 g, ON118389, B.1904 Monmouthshire. Last owner: Hobart Bridge Co.Ltd, reg. Hobart. Reportedly scuttled July 2, 1953 outside Hobart.

VICTORIA

AMSTERDAM IV S mv hopper barge, 325 t, B.1939 Owners: Australian Dredging & General Works. Having been laid up at Geelong for several years towed to Point Lillias, Corio Bay in 1981 for demolition and remains apparently abandoned in shallow water nearby.

AMSTERDAM V Details and fate as for previous entry.

AURIGA. Ironhulk, 487 t, ON62537, ex 3mast bq, 540 g, 518 n, 164.5 x 28.1 x 17.3, B.1869 Iliff & Mounsey, Sunderland. acq.1914 by Howard Smith as a hulk, reg. Sydney (register closed 1951 no trace of vessel). Reported scuttled in ships' graveyard, Barwon Heads Feb. 5. 1930.

BATMAN I ss hopper bge, 388 t, ON79548, 153.6 x 26.1 x 12.2, B.1883 W.Simons & Co, Renfrew. comp.eng.75nhp EB. Owners: Melbourne Harbour Trust, reg.Melbourne. Dismantled and sunk off Arthur's Seat, Pt.Phillip Bay, May 21, 1935. (another report says sunk off Barwon Heads).

BEVERWYK 19 S dredge 319 t scuttled May 7, 1963 in 25 fathoms off Barwon Heads.

BIRCHGROVE (orig. BIRCH GROVE) W lighter 218 t, ON13789, 134.5 x 28.0 x 9.0, ex 3m bq, 543 t, 138.8 x 28.6 x 18.7, B.1856 Sunderland, cut down and converted into a lighter and reg.,closed 1888. Re-reg as lighter 1919 by Victorian Lighterage P/L, Towed outside Pt.Phillip Feb. 12, 1932 and fired believing it would burn to the waterline and sink, but this did not happen and hull went ashore near the Nobbies, Phillip Island and went to pieces.

BRUNETTE I 3 mast bq (toward end of her career used as a lighter) 375 t, ON28093, 141.0 x 25.4 x 15.8, B.1859 Chas.Lungley, Deptford, London as PRIDE OF THE WEST rn.prior 1870 Owners: McIlwraith, McEacharn & Co., reg.Melbourne. Towed outside Pt.Phillip Heads and scuttled July 1913.

BUNINYONG S ss 2076 g, ON79539, 279.9 x 38.1 x 20.2, B.1883 Caird & Purdie, Barrow. comp.eng 300 nhp. J.Jack & Co, Liverpool. Owners: Australian Steamships P/L, reg.Melbourne. Dismantled at Melbourne 1925 by J.E.Hill & Co., hulk scuttled off Pt.Phillip Heads Feb. 11, 1926.

BUNYIP Iron lighter, 379 t, ex tss dredge, 317 t, ON80454, 160.5 x 28.2 x 9.8, B.1879 W.Simons & Co., Renfrew. 2 x comp.eng. 65 nhp EB. Owners: Melbourne Harbour Trust. sold and converted into a lighter May 1921 by Victorian Lighterage reg.Melbourne. On Nov. 20, 1954, loaded with wool she broke adrift from Princes Pier, Pt.Melbourne and was washed against the sea wall and broke her back. Remains scuttled Apl. 13, 1955.

BURKE I SS hopper barge, 345 t, ON95961, 128.0 x 30.0 x 9.5, B.1884 S.A.Govt Dockyard, Pt.Adelaide. for Marine Board. Sold 1889 Melbourne Harbour Trust commissioners, reg. Melbourne. Dismantled and sunk outside Pt. Phillip Heads, Sept 23, 1935.

CAMPANA Iron lighter, 711 t, ON70967, ex 3mast bq, 815 g, 772 n, 192.5 x 31.7 x 19.3, as lighter - 187.0 x 31.1 B. 1875 R.& J.Evans, Liverpool. Owners: (1912) McIlwraith, McEacharn Ltd, reg. Melbourne. Scuttled July 30, 1929. Sunk by explosive charges off Pt. Phillip Heads.

CASABLANCA Iron hulk, 547 t, ON58905, ex 3mast bq, 601 g, 569 n, 172.1 x 28.0 x 17.5, B.1868 T.Royden & Sons, Liverpool. Owners: (1912) Melbourne S.S.Co. reg. Melbourne. Scuttled off Barwon Heads Feb. 16, 1950.

CHILDERS HMAS ex HCS torpedo boat, ss, 65 t. 118' oa, B. 1883 Thornycroft, UK for Victorian Govt., 1911 to RAN. Sold 1918 and scrapped, hulk put ashore Swan Is Pt. Phillip.

CERBERUS HMAS, ex HCS turret/monitor ship. I ss 225' x 45'. B.1868/1870 Palmers SB & I Co, Jarrow on Tyne for Victorian Govt. Passed to RAN in 1911. In 1921 renamed PLATYPUS and became depot ship at Geelong for 'J' class submarines. Sold out of service in April 1924 and on Sept. 2, 1926 scuttled at Black Rock in Pt. Phillip to act as a breakwater.

COLUMBIA W 3 mast ship 595 t, American owned. Arrived at Geelong April 2, 1854 from New York and then moved to an anchor in Hobson's Bay and was found to be afire Apl. 26, 1854. The captain seeking assistance to fight the flames, found the crew had deserted. The burning hull was taken to shallow water near Sandridge and scuttled but the vessel was totally destroyed.

COOGEE S ss 762 g, 286 n, ON93722, 225.0 x 30.2 x 13.5, B.1887 J.L.Thompson & Sons Sunderland, named LANCASHIRE WITCH rn 1888. 3X 216 nhp. Owners; Huddart, Parker & Co. reg. Melbourne. Sold for stripping Jan. 1927 to G.Allen and scuttled Feb. 27, 1928 vide HP House Magazine.

COUNTESS OF HOPETOUN HMAS ex HCS S ss torpedo boat, 73 t, 130' oa, B. 1891 Yarrow, UK. for Victorian Govt. to RAN 1911. Sold out of service April 1924 stripped and hull put ashore Swan Is, Pt. Phillip.

COURIER S ss 728 g, 223 n, ON95231, 220.8 x 30.0 x 12.6, B.1887 (9) C.S.Swan & Hunter, Newcastle/Tyne, 3X 320 nhp. Owners: Huddart, Parker & Co, reg. Melbourne. Sold. Dec. 1927 for demolition to Morris & Watts, remains scuttled March 29 1928.

D. McLENNAN S. dredger 424 g, 355 n, ON151828, 165.5 x 29.2 x 8.0, B.1912 Holland. Owners: Melbourne Harbour Trust. reg. Melbourne. Scuttled June 8, 1949 off Barwon Heads.

DOMINION W lighter 1217 t, ON69667, 199.9 x 37.1 x 24.4, ex 3 m ship, 1325 g, 1256 n, 198.7 x 38.0 x 23.9, B.1875 - Baldwin, Quebec. Owners: Howard Smith Ltd, converted to lighter in 1902. Register closed 'burnt' Purchased 1925 to form breakwater at Indented Head and soon after arrival burnt by vandals.

DON DIEGO Iron lighter ex 3mast bq, 320 t, ON3275, B.1855 Greenock, 146.6 x 24.2 x 13.9. Last owners: Australian Steamships Ltd (Howard Smith), Melbourne. who advised: 'scuttled about 8 miles from Point Lonsdale May 26, 1916'.

DUNLOE Iron hulk, 674 t, ON63445, ex 3mast ship, 704 g, 674 n, 180.9 x 30.4 x 18.4, B.1870 Dobie & Co. Glasgow. Owners: (1909 when hulked) James Paterson & Co. reg. Melbourne. Scuttled July 2, 1947.

ELIZA W 3mast ship, 1378 t, ON30611, Owner: W.H.Ross & Co. reg. Liverpool. Took fire while anchored in Hobson's Bay about 3.45am Mar. 1, 1870. An attempt to scuttle her by torpedo blew a hole in the stern and she sank in shallow water but the hull was not covered with water and burnt all day.

EMILY S S mfb built 1946 Mort's Dock, Sydney, as a tug. In 1947 acq by Melb.Harb.Trust (and named VIGOROUS - originally Army AT2382 FREDA). reg. Melbourne. Sold 1977 and converted for fishing and named KD, unofficially, and given the number LFB6944. Ultimately renamed Emily S owned by Emily Kristina P/L, Portland V. Out of survey sold to a local diving club and scuttled as an artificial reef Sept 1, 1991 near St. Lawrence Rocks, about 4 miles S.E. of Portland.

EURO S ss tug, 257 g, 4 n, ON104742, 130.0 x 22.5 x 12.2, B. 1897 Gourlay Bros. Dundee 3X 92 nhp. EB. Owners: Australian Steamships P/L reg. Melbourne. Scuttled outside Pt. Phillip June 10, 1948.

FAIRYLAND (2nd of the name) W mv, B.1945 from a Richmond Brewery barge at Burnley, Yarra River. petrol engine, 64'6" x 26'6" x 5', Owners Harding Launches, sold 1958 to Julian Dyson, and burnt four months later. Remains now at the bottom of the deep quarry at Burnley.

FAWKNER I ss hopper barge, 388 g, ON79549, 153.6 x 26.1 x 12.2, B.1883 W.Simons & Co, Renfrew, 2comp.eng.75 nhp. Owners: Melbourne harbour Trust, reg. Melbourne. Dismantled and sunk outside Pt. Phillip Heads May 20, 1935.

FRANCIS HENTY, I tss dredger, 430 g, ON95975, 146.5 x 32.2 x 11.3, B.1889 W.Simons & Co, Renfrew, 2 x comp. eng. 80 nhp. EB. Owners: Melbourne Harbour Trust, reg. Melbourne. Register closed 'Sunk as breakwater at Picnic Point, Hampton, Aug.15 1950.'

GEO.KERMODE S ss dredge, 1380 g, 576 n, ON159581, 230.1 x 44.1 x 17.1, B.1914 Fleming & Ferguson, Paisley as SIR WILLIAM MATTHEWS. rn. 1943 by Melbourne harbour Trust. reg. Melbourne. Scuttled Apl. 1, 1976. Off Phillip Is, Western Port.

GIRAFFE W hulk/lighter, ex 2mast brig, B.1834 South Shields 150 t, ON31658, 85.0 x 25.0 x 10.8, first in Australia in 1839 at Sydney, to Melbourne, not rigged in 1857, and May 1871 W.H.Smith & others. Oct.1883 William Howard Smith Ltd., reg. closed in 1888 with 'aground and abandoned in Salt Water Creek, unseaworthy'.

H.C.PIGOTT see entry **PIGOTT**

HELEN vessel this name reportedly abandoned at/near Cape Schank in 1935. Possibly - W lighter, 304 t, ON49280, ex 3 mast bq, 1913 when converted to lighter, 135.3 x 25.3 x 15.8, B.1864 R.Steele, Greenock. Last owners: Victorian Lighterage Co P/L: reg.Melbourne. Register closed 1938 with 'broken up'.

HENRY MEAKIN S ss dredger, 348 g, 177 n, ON111251, 139.9 x 28.15 x 10.15, B.1900 Wm.Simons & Co. Renfrew, named KHARKI for Natal Harbour Board: 1906 acq. Geelong Harbour Commissioners and named PETER PATERSON, rn. Apl.1908. Out of service and partially demolished by owners during 1947. Remains scuttled Feb. 20,1948 Corio Bay in vicinity of Point Wilson Quarry.

HILARIA W ship, 1711 g, 1598 n, ON92355, 225.0 x 41.5 x 24.3, B.1886 J.K.Dunlop, St.John NB. Owner: W.Thomson & Co, reg. St. John NB. Burnt Pt. Melbourne July 7, 1895, scuttled, raised and broken up.

HILLMEADS W tss 206 g, 84 n, ON121178, 126.4 x 27.5 x 9.2, B.1907 E.Pritchard, Jervis Bay, NSW. 2 x tandem comp. 28 nhp. Chapman & Co, Sydney. Last owners: Western District Timber Co P.L, Geelong, reg. Launceston. Scuttled of Pt. Phillip heads July 18, 1937.

HYGEIA S ps, 986 g, 427 n, ON95969, 300.0 x 32.0 x 11.3, B.1890 Napier, Shanks & Bell, Yoker (Glasgow) 3X 4 cyl.eng. Owners: Bay Steamers Ltd, reg. Melbourne: May 1931 to shipbreaker. Remains stranded off Rosebud, Pt. Phillip, Aug.25,1931 when broke away from tug. On June 9, 1932, she was towed clear of the Roebud beach and taken to Barwon Heads where explosives were used to scuttle what remained of her.

J.P.WEBB S ss hopper barge, 967 g, 300 n, ON196732, 207' x 36'1", B.1954 Ferguson Bros (P.GL.) Ltd, Pt. Glasgow, 3X mach aft. Melbourne Harbour trust. Dismantled and abandoned in shallow water off Pt.Lillias, Corio Bay, 1981.

JOHN NIMMO I ss dredge 1209 g, 547 n, ON132460, 228.2 x 46.5 x 15.5, B.1887 Melbourne. eng. 98nhp. Owners: Melbourne Harbour Trust. reg. Melbourne in 1916. Scuttled Aug.10, 1931.

JULIA PERCY see entry for **LEEUWIN**

KU-RING-GAI II W mv, ferry, 43 t, ON171257, 61.8 x 17.7 x 7.8, B.1924 W.L.Holmes & Co. Lavender Bay, NSW. as WANGI WANGI, rn 1939 PROVIDE, RN Ku-ring-gai II in 1970s. 3 cyl diesel, 266 pass. ferry. owner: French Is. Co-op Ltd. Western Port. Vic. Burnt Apl. 9, 1980 at Rhyll. Later moved to Pt.Phillip and broke her moorings and sank about 100 metres off Beaumaris Jan. 28, 1981.

LEEUWIN I ss, 580 g, ON73806, 219.0 x 24.2 x 13.0, B.1876 T.Wingate & Co, Glasgow. as JULIA PERCY, rgn.1906 stm eng. 160 nhp. EB. Converted to lighter 1910 Owner: Melbourne S.S.Co., reg. Melbourne. Scuttled Dec. 28, 1934.

MALAITA S ss, 940 g, ON90910, 200.0 x 30.2 x 12.3, B.1893 Grangemouth Dockyard Co, Grangemouth, as ANTILLIA rn 1906 3X eng. last owner: Burns,Philp & Co. reg. Sydney, hulked at Sydney in 1914 and sold to Melbourne harbour Trust for use as coal lighter. Sold 1919 and re-engined by H.B.Black & Co, reg. Melbourne. Laid up Sept 1921 and driven from anchors in Hobson's Bay by wild storm Nov.17, 1926 and drifted into the Men's Swimming baths and only refloated in April 1927. Sold for scrap the remains were scuttled off Pt.Phillip Nov. 20, 1928.

MARGARET POYNTER W 3mast bq, 271 t, No ON, B.1840 Clyde, Owner: J.Hay, reg. Glasgow. Arrived Melbourne Oct. 7, 1853. Sold, filled with rubble and scuttled to form the basis of Sandridge Pier, Pt.Melbourne c.1854.

MILORA S ss, 3347 g, 1919 n, ON151541, 331.0 x 47.9 x 23.6, B.1920 Commonwealth Naval Dockyard, Williamstown V, as EMITA, rn 1926. 3X 516 nhp. Owners A.U.S.N.Co.reg.Melbourne. Grounded in the Rip near Point Lonsdale, Sept. 21, 1934 and eventually refloated Sept.23 and taken to Melbourne. Found to be too expensive to repair and towed to sea and scuttled about 3 miles off Torquay by opening sea cocks and exploding a few charges of gelignite Mar. 8,1935.

MISSISSIPPI W ps/mv ferry on Yarra. 60' x 17', B.1938 Jack Savage Williamstown V. Withdrawn from service in 1961 and remains abandoned in the Bluestone Quarry, Burnley.

NOR 'WESTER Iron hulk, ex 3mast bq, 567 g, 547 n, ON50348, 160.0 x 29.2 x 17.0, B.1864 Laurence Hill & Co.Pt.Glasgow for London owners. Eventually became Danish and was blown ashore at Hamelin Bay, W.A., July 22, 1900. Salvaged and sold to Adelaide SS Co who rigged her down to a hulk. Usually stationed in Melbourne. Scuttled Nov. 21, 1928 off Port Phillip.

OZONE S ps, 572 g, 113 n, ON88947, 260.0 x 28.1 x 10.6, B.1886 Napier, Shanks & Bell, Yoker (Glasgow) Comp. eng. 314 nhp. Owners: Bay Steamers Ltd., reg. Melbourne: Sold March 1925 to J.Nill for demolition. Scuttled October 1925 near Indented Head in an unsuccessful attempt to form a breakwater.

PALACE W lighter, 277 t, ON50878, ex 3 mast mbq, 355 g, 339 n, 132.0 x 28.7 x 12.9, B.1866 Miramichi, NB. as CONFEDERATE STAR, m 1869. To Melbourne 1874: New Zealand 1878 and returns to Melbourne 1886 and converted to lighter. Last owner - Victorian Lighterage Co P/L. Details of fate same as for BIRCHGROVE q.v.

PAUL JONES W 3 mast ship, 1206 t, ON(US) 150127, 195.2 x 39.0 x 23.4, B.1877 W.F.Fernald, Portsmouth, N.H. Owners: C.H.Mendum & others, reg. Portsmouth NH. Burnt off Victorian Coast in vicinity of Cape Otway, March 19, 1886 and scuttled.

PHOENIX W 3 mast ship, 1266 t, B.1854 - Blanchard, Cape Elizabeth, Maine, Owner: Charles Caron, reg. New York. Ready to sail for England she was anchored in Hobson's Bay when badly damaged by fire Feb. 28, 1860. She was scuttled to quell the flames. She was raised early in March and press Aug 20, 1864 says hull used to construct floating dock in Saltwater river, opposite Footscray.

PIGOTT actually H.C.PIGOTT S ss hopper, 495 g, 200 n, ON132439, 160.0 x 28.1 x 12.6, B.1912 Fleming & Ferguson, Paisley, 3X 54 nMp. Owners:Melbourne Harbour Trust, reg. Melbourne. Scuttled off Pt. Phillip Oct. 14, 1935.

PIONEER S ss dredge (sand pump), 543 g, 210 n, ON120520, 170.0 x 37.2 x 10.3, B. 1905 Pt.Glasgow. Owners: Victorian Dept of Board of Works, reg. Melbourne. Scuttled March 9, 1950.

RED BIRD S ss 57 g, 19 n, ON132458, 70.5 x 14.0 x 6.7, B.1915 Public Works Department, Williamstown V. 60 hp tug. and named ANZAC name changed when Federal Parliament passed rule the name could not be used for commercial purposes. Owners: Melbourne Harbour Trust, reg. Melbourne. Sold Dec.1934 J.L.Dyson. Moored in Western Port in 1938 reportedly for conversion to fishing vessel. Blown ashore on mudbank near Hastings, and abandoned.

ROTOMAHAMA S ss, 1727 g, 864 n, ON75224, 298.2 x 35.2 x 23.7, B.1879 W.Denny & Bros, Dumbarton, Comp. 380 nhp. Owners: Union SSSo of NZ Ltd. reg.Dunedin, sold to shipbreakers in April 1925 after some years laid up in Melbourne and hull scuttled off Pt.Phillip (3 miles to sea) May 29, 1928. First large steamer built of mild steel. Noted for yacht-like appearance, speed and elegance of accommodation but expensive to operate.

S.F.HERSEY W hulk, 961 t, ON88941, ex 3 mast ship - 1891; 168.8 x 33.0 x 22.8, Owners: Union Line, c.1914 Melbourne SS Co.Ltd. Sunk to form a pier at Swan Is, near Queenscliff, May 21, 1923.

ST.ANNE W mv pleasure craft (ferry) on Yarra, 46'0 x 16'6" x 4', operated from at least 1943 till 1954 and then abandoned near 'Quarry Cut' at Burnley on the Yarra.

SIR WILLIAM McPHERSON S ss dredge, 482 g 241 n, ON151829, 158.5 x 32.3 x 10.3, B.1912 Kinderdijk, eng. 118 nhp. Cwners: Melbourne Harbour Trust, reg. Melbourne. Scuttled May 12, 1949.

SUBMARINES J class S mv 1210 t disp surfaced: 1820t submerged. Built 1916/17 R.N.Dockyards 274' x 23' No.s 1, 2, 3, 4, 5 & 7 transferred to RAN in Mar. 1919

J1 - scuttled off Barwon Heads May 26, 1926.

J2 - scuttled off Pt.Phillip June 1 or 4, 1926.

J3 - used to form a breakwater at Swan Is. Pt. Phillip in January 1926.

J4 - sank at moorings at Williamstown July 10, 1924, raised and scuttled off Pt. Phillip May 28, 1927.

J5 - scuttled off Queenscliff, Pt. Phillip June 1,1926.

J7 - scuttled 1930 to form a breakwater at Hampton, Pt. Phillip and now rests in shallow water below a pier at the Sandringham Yacht Club, Hampton, sunk Aug.6, 1930.

URALBA W ss, 603 g, 312 n, ON174694, 154.8 x 37.0 x 9.3, B.1942 E.Wright, Tuncurry, NSW. 3X blt.1914 Mort's Dock. Sold for demolition June 1964 and remains scuttled Nov.4, 1971 41 miles off Mordialic.

VENUS W ps 68 g, 9 n, ON32070, 81.6 x 15.2 x 8.8, B.1845 East Jarrow on Tyne, Stm. eng. 40 np. Victorian Govt. tug. Burnt, a total loss, in Hobsons Bay Sept. 13, 1861.

VHB 53 Described as a hopper barge. Details not located. Reportedly scuttled Feb. 19, 1971.

VHB 54 Described as a hopper barge, details not located, reportedly scuttled Dec. 17, 1970.

VICTORIAN I hulk 769 t, ON74779, ex ss 7118 g, 415 n, 225.8 x 26.4 x 13.5, B.1876 D.& W.Henderson, Glasgow. for Adelaide SSSo. Gutted by fire August 1895 in Sydney and converted into a hulk. The hull was condemned in Melbourne in 1925 and scuttled outside Pt.Phillip Heads, May 8, 1925.

WAREATEA I ss 475 g, 272 n, ON84486, 170.2 x 26.1 x 11.4, B.1883 H.McIntyre & Co, Paisley. Comp.eng 70 nhp 350 ihp Fleming & Ferguson, Paisley. Owners: W.Holyman & Sons P/L reg.Melbourne. At the time of her withdrawal in 1944 was the oldest vessel in regular service round the Australian coast. Gutted in Melbourne and scuttled off Barwon heads Mar. 16, 1945.

WERFA I hulk 862 t, ON89167 ex ss, 935 g, 570 n, 216.0 x 30.2 x 15.5, B.1883 Palmers SB & I.Co, Jarrow, Comp.eng. 98nhp EB for Cardiff owners; Jan.1899 Bellambi Coal Co., reg. Sydney: Oct. 1913 sold for use as a hulk, owner McIlwraith, McEacharn Ltd, reg. Melbourne. Employed as coal hulk and sunk in the Yarra Aug 5, 1925 after being holed by USS MacDONOUGH as the destroyer was going slowly astern prior to being swung. Raised and repaired. She was condemned and scuttled March 21, 1929.

WESTERN PORT car ferry. One of the 4 non propelled lighters known as 'RN Sullage Lighters' built at Williamstown D.Y. in 1945. 50 t, dwt. 56'oa x 17' which was operated for a short time as a vehicle ferry between Stony point and tankerton was later abandoned in Western Port.

WHITEPINE Iron lighter, 447 t, ON77453, ex 3 mast bq, 495g, 467 n, 167.9 x 29.1 x 13.6, B.1879 A.Hall & Co, Aberdeen, and named QUATHLAMBA, rg. HAZEL CRAIG in 1905 and Whitepine in 1916. Owners: Melbourne Harbour Trust, reg. Melbourne. Made into a lighter in 1922. Scuttled Jan. 14. 1947.

WILLS I ss hopper barge, 345 g, ON95960, 128.0 x 30.0 x 9.5, B.1884 South Australian Govt. Dockyard, Pt.Adelaide. comp.eng. 30 nhp. Owners:Melbourne Harbour Trust, reg. Melbourne from 1889. Scuttled outside Pt. Phillip Heads, Aug.22, 1935.

WESTERN AUSTRALIA

ADROIT HMAS Attack class patrol boat. 146 t disp. 107' x 20' 2 x diesel engs. B.1968 Evans, Deakin, Brisbane. Obsolete and sunk in naval exercise off Rottnest Island Aug. 8, 1994.

ADVENTURE W lighter 46 g, ON120023, 69.7 x 19.0 x 7.0, Built year unknown by W & S Lawrence, Perth, WA. Owners: The Swan River Shipping Co.Ltd, reg. Fremantle. Scuttled north of Rottnest Island during February 1945.

AGNES supposedly scuttled at Rottnest ship's graveyard in 1955. No trace.

ANN(E) MELHUISE W hulk, ex 3 mast bq, 344 t, ON1846, 112.0 x 26.2 x 17.6, B.1849 Portmadoc, Wales. Last official owner D.Williams, reg. Newcastle, NSW. That register closed in 1972 with advised left to rot on the bank at Stockton, NSW, while other reports claim she was used as a coal hulk at Albany WA and sunk in 1899, raised and scuttled in 1900.

ATHENA W hulk, ex 3 mast bq, 426 g, 412 n, ON56081, 131.0 x 26.5 x 16.7, B.1868 Middle Dock Co, South Shields, acq. Dec.1896 McIlwraith, McEacharn, reg. Port Adelaide, and converted into hulk. Burnt at Albany. W.A. March 13. 1912.

AWHINA W ss, tug, 135 g 5 n, ON87528, 100.0 x 21.3 x 10.4, B.1884 H.McQuarrie, Auckland. Eng. 50 nhp. Last official owners Messrs.Douglas; Armstrong & others, trading as Albany Tug Co., reg.Fremantle. Laid up c.1935 at Albany and sank while being stripped. Refloated she was put upon Gull Rock, Albany and burnt April 19, 1936.

BANKFIELDS I lighter ex 3 mast bq, 859 g, 807 n, ON74533, 195.4 x 32.1 x 19.7, B.1876 Osbourne, Graham & Co, Sunderland as JAMES BEAZLEY. rn in 1878. Acq. Adelaide SS Co 1911 and hulked. Taken to Fremantle in 1918. Lyttelton register closed 1932. Towed, June 7, 1950 to a position south west of Rottnest Island and at 12.40pm was attacked by Mustang aircraft of No. 25 City of Perth, RAAF, squadron and hulk disappeared at 1.10pm.

BEN DEARG S ss trawler 280 g, 109 n, ON144518, 125.5 x 23.5 x 12.7, B.1920 Beverley, eng. 86 nhp. Owners Anglo-Australian Trawlers P/L, (Perth, Western Australia) reg. Fleetwood. Scuttled off Rottnest. c.1951.

CAMEL W barge, 137 g, 117 n, ON101716, 85.0 x 21.6 x 11.5, B.1861 W.& G.White, Williamstown,Vic. Last official owner Feb. 1915 James Ball, lighterman. Register closed in Sept. 1971 when Ball & Son P/L advised she was taken to ships graveyard and sunk. Other sources say she was burnt at Albany in 1926.

CAPE OTWAY S ss 996 g, 341 n. ON157597, 197.1 x 34.1 x 15.1, B.1931 Commonwealth Shipping Board, Sydney (Cockatoo Dock) 3X Eb. built for Commonwealth Govt as lighthouse tender. Sold out of service April 1963 to J.Krasnostein & Co, Scuttled west of Rottnest Island Sept. 7, 1968.

CARAVAN reported scuttled at Rottnest graveyard Sept. 30, 1970 - not identified.

CHEYNES S ss whale chaser, 248 g, 85 n, ON140234, 115.7x 23.9 x 13.2, B.1929 Akers Mek.Verks. Oslo. Acq. Aug. 1953 from Norway and renamed by Cheynes Beach Whaling Co P/L, Albany, reg. Fremantle.reg. closed Nov. 1961 sold for demolition. Reportedly abandoned in King George Sound, same year. [Scuttled 0.25 mile off Michaelmas Island?]

CHEYNES III S ss whale chaser 441 g, 152 n, ON196927, 148.5 x 27.6 x 15.7, B.1947 Smiths Dock Co.Ltd, Middlesbro' 3X 1800 ihp EB ex Norway register May 1962 renamed LOOMA III, rn Cheynes III June 1963 by Cheynes Beach Whaling Co.Ltd, Albany. reg.Fremantle. On June 23, 1982 taken to a position on the lee of Michaelmas Is, King George Sound and scuttled to form an artificial reef.

CLEVEDON Iron coal hulk, ex 3 mast ship, 1860 g, 1714 n, ON69328, 261.6 x 41.8 x 23.8, B.1873 Potter & Hodgkinson, Liverpool and named CHRYSOMENE. Owners Fremantle Coal Co.Ltd. Register closed July 1922. Vessel scuttled Rottneest Graveyard. Oct.1930.

COLONA Iron hulk, ex 3 mast ship 1499 g, 1435 n, ON78785, 238.6 x 38.0x 22.8, B.1878 Richardson, Duck & Co. Stockton as SIERRA COLONA rn 1903 acq by Adelaide SS Co in 1914 and hulked in Pt.Adelaide. Taken to Albany in 1917. Oct. 31, 1952 towed out of Albany by the tug UCO to a position off Bald Head and sunk by aircraft of the City of Perth RAAF Squadron.

CONCORDIA Iron hulk, ex 3 mast bq, 1239 g, 1076 n, ON131643, 231.6 x 35.5 x 20.7, B.1890 J.Lange Vegesack, blown ashore at Balla Balla in a cyclone, while Norwegian owned, March 1912 and damaged, but salvaged and taken to Fremantle and sold to McIlwraith, McEacharn for use as hulk. reg. Fremantle. Towed to Rottneest graveyard and scuttled April 20, 1948.

COMMILES S ss trawler, 264 g, 105 n, ON143943, 125.6 x 23.4 x 12.6, B.1918 South Shields, and named Daily Herald. stm. eng 61 nhp. Owners Anglo-Australian Trawlers P/L, Perth, WA, reg. Fleetwood, scuttled May 15, 1953 Rottneest graveyard.

CONFERENCE Iron hulk, ex 3 mast bq, 421 g, 399 n, ON25992, 164.8 x 26.3 x 15.9, B.1855 Tayleur & Co, Warrington, Lancs. When owned in Sydney sold to Adelaide SS Co and in April 1895 took a cargo of coal to Albany and converted into a hulk. Reportedly scuttled 20 miles north of Fremantle Apl. 22. 1904.

COPELAND Iron hulk ex 3 mast bq, 688 g, 670 n, ON58900, 176.4 x 30.0 x 19.1, B.1868 R.Williamson & Son, Harrington as JANE SPOTT, later became COPELAND ISLAND. Acq. 1902/3 by Adelaide SS Co and hulked and named Copeland and used in Albany. Taken to Gull Rock, near Albany and scuttled on May 18.1928 by the use of explosives.

COUNTY OF CAITHNESS Iron hulk, ex 4 mast bq, originally 4 mast ship 262.0 x 38.8 x 24.4, B.1876 Barclay, Curle & Co. Glasgow, acq.1914 by McIlwraith, McEacharn reg.Fremantle and made coal hulk. Scuttled at Rottneest graveyard April 2. 1931.

DERWENT HMAS River Class frigate. S ss 2100 t displ. 370' oa x 41' B.1961/64 Williamstown Naval Dockyard, V. turbs. Taken out of service early 1994 and used for experiments at HMAS Stirling before remains scuttled Dec.21, 1994 position 32 degrees South x 115 degrees 12 minutes East.

DRAGON W lighter 164 g, 158 n, ON120024, 118.7 x 24.7 x 8.7, B.1906 W & S Lawrence, Perth, WA. Owners: The Swan River Shipping Co.Ltd, reg. Fremantle. Scuttled in permit area Jan. 2, 1948.

DUCHESS W ps, 71 g, 39 n. ON119043, 73.1 x 18.1 x 5.8, B.1899 w & S Lawrence, Perth WA as a ferry. Last owner: (1935) A.E.Tilley & Co, reg. Fremantle. Register closed 1966 upon advice received the vessel had been broken up in 1946. Other sources say remains scuttled in Rottneest graveyard in 1945.

EGMONT Iron hulk ex ss 670 g, 456 n, ON50039, 200.0 x 24.8 x 18.3, B.1864 Henderson, Coulburn & Co, Renfrew for the Panama, New Zealand & Australian RMSP Co. and passed to Australasian S.N.CO thence AUSN and was hulked c.1892/3 and acq.by Adelaide SS Co in 1900 and stationed at Fremantle. Scuttled Jervoise Bay March 31, 1910.

ELLEN W hulk, ex 2 mast brig, 243 t, ON35550, 105.0 x 24.9 x 13.2, B. 1857, Bathurst, New Brunswick. First in Australia in 1863. In 1883 as a hulk acq. by Adelaide SS Co and register closed. Abandoned Woodman's Point, Cockburn Sound March 8, 1890.

ENTERPRISE W barge, 48 g, 44 n, ON120010, 73.5 x 19.5 x 7.0, B.1896 W & S Lawrence, Perth, WA owners: The Swan River Shipping Co. reg.Fremantle. Scuttled north of Rottneest Is. during February 1945, vide register.

EUCLA S ss 574 g, 292 n, ON115233 187.9 x 28.0 x 14.5 B.1901 G.McKnight & Co, Ayr, and named WEXFORD rn 1912 3X 700 ihp Ross & Duncan, Govan. Owners: State Shipping Service, reg.Fremantle. Register closed March 1931 'vessel dismantled'. Reportedly scuttled Rottneest graveyard March 1932.

FLEETWING W coal hulk, ex 3 mast bq, 786 t, ON79515, 164.0 x 33.0 x 21.9, B.1854 Medford, Mass. Acq. Aug. 1888 by The Adelaide SS Co. who loaded her with coal and sent her to Broome to act as coal hulk. Her Melbourne register was closed in 1913 with 'broken up'. Someone unknown has assumed she was scuttled but there is no evidence to substantiate this statement.

FREMANTLE W 2 mast sch, 19 g, 15 n, ON125027, 42.5 x 12.5 x 6.4, B.1907 David Ferres, Broome, WA Owner: (Jan. 1927) H.Sewell, reg. Fremantle. Register closed February 1928 'vessel derelict' Reportedly scuttled Rottnest graveyard 1936.

GEMMA W 2 mast brig, 306 g, 267 n, ON91856, 120.0 x 26.7 x 13.5, B.1868 Elsfleth and named 'H.Beenke' rn c.1885 Owners: C.Bethell & Co, reg. London. Sent to Fremantle for use as a hulk. Scuttled Aug 15, 1893 Jervoise Bay.

GOVERNOR S ss dredge 486 t, B.1898 in Holland for W.A. Government to use in construction of Fremantle Inner Harbour, but subsequently employed in Geraldton and Bunbury. Towed by tug YUNA to 'ships graveyard 11 miles south west of Rottnest' Oct. 7, 1955 and sunk by Meteor jets of the RAAF's 75 Squadron visiting WA from Williamstown NSW.'

GUNGA Iron hulk, ex ss 1257 g, 798 n, ON51415, 257.6 x 32.2 x 20.1, B.1864 C & W Earle, Hull. Comp.eng. Built for Bombay & Bengal SS Co in 1877 acq. by Australasian S.N.CO which became AUSN in 1887. In mid 1890s converted to hulk in Fremantle and on station from at least 1897. Scuttled Dec.1, 1912, probably in Rottnest graveyard.

HARMONY mv, fishing vessel?, sunk in storm scuttled 8 May, 1995.

HERSCHEL Iron coal hulk, ex 3 mast ship 814 g, 787 n, 165.4 x 30.2 x 19.7, B.1857 Canada Works, Birkenhead, UK. and named EDITH BYRNE, rn, c. 1870. Acq. Feb.1893 by Adelaide SS Co for conversion to coal hulk at Pt. Adelaide and eventually sent to West Australia. Reported abandoned Albany July 2, 1908.

HOPPER BARGE S approx 21m x 7m x 3m. Owner Harbour & Light Dept. WA. Sunk in bad weather at Geraldton July 1973. As it was feared it would slip into the navigation channel it was moved to the spoil ground about Lat. 28 degrees 44 minutes South x Long.114 degrees 44 minutes East in Aug. 1973 and eventually partially covered with spoil from dredging operations.

J.L.HALL Iron hulk, ex 3 mast bq, originally 3 mast ship rig. 707 g, 682 n, ON27045, 166.8 x 30.6 x 19.6, B.1859 Marshall Bros., South Shields. Acq Aug.1895 by Adelaide SS Co for use as hulk at Albany. Condemned and handed to RAN for gunnery practice and sunk by HMAS Parramatta and Albany off Albany July 1916.

JUNEE ex HMAS Bathurst Class as/ms 790 t disp. S tss 186'oa x 31', B.1943 Poole & Steele, Sydney 2 x 3X 1800 ihp. Sold out of service 1962 and remains scuttled Rottnest graveyard Sept.7, 1968.(or 6th?).

KINGFISHER Iron coal hulk, ex 3 mast bq, 164 t, ON31991, 120.4 x 18.8 x 9.3, B.1854 Renfrew. Owners: (1858) Peninsular & Oriental S.N.Co. reg.Melbourne. From at least 1861 stationed at Albany. Register closed with 'Wrecked Albany Harbour, 1895', other sources claim it was abandoned at albaney c.1883/5.

KIRKCUDBRIGHTSHIRE I hulk ex 3 mast ship 1582 g, 1482 n, ON89952, 250.0 x 38.3 x 22.9, B.1884 Russell & Co, Pt.Glasgow. Owners: June 1922 The Fremantle Coal Co.Ltd, reg. Fremantle and hulked. Scuttled April 4, 1934 ships' graveyard off Rottnest Is.

KNOWSLEY Iron hulk, 644 g, 603 n, ON51032, 167.7 x 29.0 x 20.2, B.1864 T.R.Oswald, Pallion. later became German as EUTERPE then Danish as ANNA MARIA SCHWALBE and under that name became a hulk at Albany before being acq. by McIlwraith, McEacharn in 1913. Register closed October 1923, vessel sunk. Reportedly scuttled Oct 3 at Rottnest Is 'graveyard'.

KOOLAMA S tsmv 4068 g, 2113 n, ON140184, 348.0 x 54.2 x 18.5, B.1938 Harland & Wolff, Glasgow. Diesel eng 808 nhp EB Owners: State Shipping Service, reg. Fremantle. On usual voyage from Darwin attacked by a 4 engine Japanese bomber in Joseph Bonaparte Gulf, Feb. 20, 1942 and severely damaged. She was put ashore and refloated next day and taken to Wyndham. On March 3, at Wyndham jetty she was attacked again and rolled on her side, a total wreck. The gutted hull was raised in 1948 and towed to sea and scuttled.

KORDA W lighter 83 t, ON140150, 84.7 x 20.5 x 7.0, B.1896 W.A.Chamberlain, Fremantle. Owners: McIlwraith, McEscham, reg. Fremantle. Scuttled west of Rottnest Island, February 1945.

KOS VII S lighter ex ss whale chaser, 253 g, 108 n. ON191411, 116.0 x 24.2 x 12.75 B.1929 Smith's Dock Ltd, South Bank on Tees, 3X 850 ihp EB. Last official owner Cheynes Beach Whaling Co.Ltd, reg. Fremantle. Scuttled off Rottnest Is, June 22. 1968.

KUNMUNYA No detail, scuttled 14 Dec. 1996.

LADY JOYUS mv, fishing trawler. Scuttled by Carnavon Artificial Reef Committee, 13 Feb. 1995.

LADY PAMELA mv, fishing vessel, went down in cyclone and vessel dragged onto a reef for inspection, abandoned 18 May, 1995.

LALLA W 3 mast bq, 1070 g, 991 n, ON118542, 183.7 x 37.1 x 20.9, B.1874 J.O'Brien, Maccan, NS. Owners: Apl.1904 (ex Horten, Norway) G.F.Gallop: Mar.1906 sold G.& W.Chamberlain and cut down for a lighter = 180.2 x 37.1 x 18.8 and used in conjunction with Collie coal movements: Jan. 1912 owners The Melbourne SS Co.vessel destroyed by gunfire from HMAS Brisbane on Aug. 18, 1917.

LARKINS W vessel 700 t B.1808 Bombay,acq by P&O 1853 and arrived at King George Sound July 11, 1853 for use as store and coal hulk. Sold 1876 and reportedly broken up. Some sources say scuttled Sept. 8, 1876.

LOCH NESS Iron hulk 1203 t, ON60461, ex 3 mast ship 1258 g, 225.2 x 35.6 x 21.6, B.1869 Barclay, Curle & Co, Glasgow. acq. Aug.1908 by German-Australia Line for a coal hulk at Pt.Adelaide but enrolled there in Oct.1908 by Stevedoring & Shipping Co.Ltd. agents for the European operator. Reportedly taken over by RAN in WW1 because it was German owned, but this was not the legal position, however it remained in WA and officially registered as a British vessel until Sunk by gunfire off Rottneest Island August 18, 1926 vide her register.

McDERMOTT DERRICK BARGE No.20 S welded hull, 9, 280gt, 122.2 x 30.5 x 8.8m, with revolving gantry crane on the stern, Owner McDermott S.E. Pte.Ltd, Singapore. vessel reg. Panama, built c.1968. In Apl. 1989 Cyclone 'Orson' drove her from her moorings west of Dampier and she grounded near the N.E. tip of Eaglehawk Island and damaged beyond economical repair. It was refloated and scuttled Oct. 20, 1989 in position 20 degrees 8 minutes South x 115 degrees 57 minutes East.

MARANDA Iron hulk, 1465 t, (Br, ON60038) ex Norwegian 3 mast bq, 1518 g, 224.2 x 37.8 x 23.5, B.1867 T.Royden & Son, Liverpool as LORD CANNING. Acq. by Adelaide SS Co. in 1910 and hulked at Pt.Adelaide. Taken to Fremantle April 1915 towed by ss LAMEROO. Scuttled off Rottneest June 16, 1933.

MARGARET W hulk 1143 t, ON101148, ex 3 mast bq of San Francisco in 1896. 201.0 x 39.2 x 23.3, B1874/5 Brunchorst & Dekke, Bergen as NORDSTJERNEN:acq 1896 by McIlwraith, McEacharn in Sydney and converted to hulk and sent to Western Australia. Register closed 1945 'condemned and sunk' some reports giving the position as Salmon Beach, Albany.

MARIUS RICOUX Iron hulk 803 t, ON76139, ex French 3 mast bq, 195.9 x 32.6 x 18.5, B.1877 Birrell, Stenhouse & Co, Dumbarton, and named RISING STAR, later Italian SOLLECITO before French owned. Acq.1911 McIlwraith, McEacharn reg. Sydney as hulk. Register closed 1945 'condemned and sunk'. Reportedly scuttled off Bald Head Albany May 18, 1928.

MINILYA S ss whale chaser, 248 g, 118 n. ON140229 116.0 x 23.9 x 13.2, B.1930 Akers Mek.Verks, Oslo and named THORVARD, m June 1951. 3X 96 nhp. EB. Owners: (Feb. 1961) Cheynes Beach Whaling Co. Reg. Fremantle. Register closed April 1965 'broken up' remains reported scuttled Feb.26, 1965 King George Sound.

NIRIMBA W lighter ex steam lighter 1906 59 g, 55 n. ON120021 92.5 x 26.2 x 6.5 B.1895 W & S Lawrence, Perth, WA. Owners: The Swan River Shipping Co.Ltd, reg.Fremantle. Scuttled north of Rottneest Island, during Feb. 1945.

NORWHALE S lighter ex tsmv 365 g, 306 n, ON140216, 184.7 x 30.1 x 7.1, B.1943 Redpath, Brown & Co. Glasgow, 2 x diesel Davey Paxman & Co. (believed to have been built as an L.C.T. for British Army). Reg.1950 by the Nor-West Whaling Co., reg.Fremantle and employed conveying water and stores to the whaling station. July 1966 sold to J & M Franetovich and while supplying oil to a vessel in Fremantle Feb. 1968 sank, and raised with difficulty Apl. 6 and taken over by Fremantle Port authority who sold to Goldfields Metal Traders who scuttled her off Rottneest Island June 20, 1968.

PREMIER W barge, said to be 69 t and scuttled in 1938 at Rottneest graveyard. The only registered vessel of that name was a riverine barge built 1872 at Echuca V. ON95997 and built for use by a sawmill operator. That register was closed in 1962 'no trace of vessel or owner'. It was not unknown to take riverine barges to seaports to work but there is no confirmation that this happened in this instance.

REDEMPTORA W ship details unknown. Arrived Fremantle Oct.1888 in distress and condemned. Sold to J.Lily, Fremantle agent of Adelaide SS Co in Nov. 1888 for use as a coal hulk. In September 1892 sank after receiving 2,300 tons of coal from ss Colac and ss Barrier but refloated in November and seems to have been abandoned near Woodman's Point. There is, however, a reference to her salvage about 1898 and again in 1910, but this would have probably only been for demolition.

RITA reported sunk 3 miles north of Cape Cuvier WA Feb. 17, 1971. No detail located. Possibly a Barge?

ROCKINGHAM W barge 182 g, 167 n, ON120040, 138.0 x 26.8 x 8.25, B.1903 Millar's Kauri & Jarrah Co. (1902) Ltd., Rockingham WA. Owners: The Swan River Shipping Co.Ltd, reg.Fremantle. Scuttled Jan. 2, 1948 Rottneest 'graveyard'.

ROBERT MOORE S lighter ex ss whale chaser, ON196896, 138.4 x 26.4 x 15.0, B.1939 Smith's Dock Co. Ltd. Middlesbro' 3X 136 nhp EB. Owners:J.Franetovich & Co, reg. Fremantle. (formerly the Norwegian vessel TERN, m Feb.1958). Scuttled July 10, 1968 Rottnest Island 'graveyard'.

ST.LAWRENCE W hulk reportedly hired by Adelaide SS Co at Albany between 1890-1893 and it was probably = W 3 mast ship 1131 g, ON29115, 179.1 x 37.4 x 21.4, B. 1861 - Smith, Newcastle on Tyne. Registered in Sydney in 1882 and that was closed with 'abandoned off the coast of West Australia 1889'. The incident was when she was en route to Fremantle with coal and was dismasted off Breaksea Island and taken into Albany under jury rig where she was abandoned as a Constructive Total Loss and probably sold for hulking. The remains have been reported as being scuttled in Oct. 1898.

SAMUEL PLIMSOLL Iron hulk, 1491 t, ON 65097, ex 3m ship, 241.3 x 39.0 x 23.1, B.1873 Walter Hood & Co. Aberdeen. acq.1903 by J & A Brown, Newcastle coal factors and converted into a coal hulk and towed to Albany by ss DUCKENFIELD. Acq. Jan.1922 McIlwraith, McEacharn & Co., reg.Fremantle. Register cancelled April 1948 with 'vessel sunk in Fremantle Harbour June 18, 1945' She had sunk June 18, 1945 following a collision with the BISN's DALGOMA and was raised in sections and the pieces dumped on the wreck site of the LYGNERN, Beagle Rocks, to the south of the South Mole, Fremantle.

SEAHORSE W, Scuttled by Carnarvon Artificial Reef Committee, 13 Feb. 1995.

SESA Iron hulk, ex 3 mast bq (Br. ON63289) 211.8 x 37.4 x 22.6, B.1869 Lune S.B.Co, Lancaster, UK and named MALLOWDALE, sold foreign and named ADOLPHE acq. 1904 by Adelaide SS Co. and hulked. Scuttled south west of Rottnest in 50 fathoms June 10, or July 4, 1928.

SHARK vessel of this name reportedly sunk off WA before WW2 - not traced.

SUBMARINE K.II former Netherlands vessel, S mv 611 t disp. 218'oa x 19' B.1924 Fijenoord, Rotterdam. Reported scuttled in Rottnest Is 'graveyard' in 1952.

SWAN a vessel of this name scuttled Rottnest Graveyard Oct. 13, 1972 - possibly mv ferry 19 t, B.1962 Owners 'Fremantle Harbour Works'.

TAMERLANE Iron hulk, ex 3 mast bq, 795 g, 768 n, ON29820, 196.4 x 32.1 x 18.6, B.1861 Scott & Co, Greenock. acq.c.1896 by Adelaide SS Co for use;as a coal hulk in Fremantle. Sunk Sept. 23, 1918 when struck by ss DIMBOOLA, only salvaged with great difficulty being refloated May 1919 to be repaired and resume duty. Towed to a position off Rottnest Island Sept, 10, 1926 and scuttled by explosive charges.

THORNLIEBANK Iron hulk, 1363 g, 1311 n, ON93336, 240.8 x 36.8 x 21.9, ex 3 mast bq, 1492 g, 1405 n, 244.5 x 37.6 x 21.5, B.1886 Russell & Co, Pt.Glasgow for Andrew Weir & Co (Bank Line),reg. Glasgow, Gutted by fire Feb 6/8, 1891 while anchored Owens Anchorage, Cockburn Sound WA. Declared a constructive total loss and sold for use as a hulk to J.Batman & Co.: Mar. 1914 McIlwraith,McEacharn & Co. reg.Fremantle. Register cancelled April 1928 'broken up'. Actually scuttled Rottenest Is, Graveyard by explosives.April 18, 1928.

TOCOPILLA I hulk, 478 g, 439 n, ON50442, 149.0 x 26.0 x 17.7, ex 3m bq, 496g, 449n, 156.3 x 26.9 x 17.5, B.1865 A.Stephen & Sons, Glasgow. acq. 1902 ex Danish RIBE by McIlwraith McEacharn, reg. Melbourne trans.to Fremantle 1907. Employed as coal hulk. Reg.closed Feb. 1924 'towed to sea and sunk'. Scuttled Rottnest Is Graveyard Feb. 26, 1924.

TORRENS I ss ex dredge 135 g, 38 n, ON76800, 100.4 x 21.0 x 8.8, B.1877 W.Simons & Co, Renfrew for South Australian Co.reg. Pt. Adelaide thence Melbourne Harbour Trust Feb. 1897 McIlwraith, McEacharn & Co. and converted to cargo. trans.to Fremantle reg. 1904 and that register never closed. Last official owner. North Coast Shipping Co.Ltd. Press (Sth.Aust.Register June 3, 1927) - Scuttled Nov. 9, 1926 outside North Mole Fremantle. Her last role, with engine removed, was to be anchored at Crawley for use of Sea Scouts.

W.H.GEMINI S dumb drill barge, 860 t, B.1978 reported scuttled off West Australia Sept. 9, 1993.

ZEPHYR W hulk, ex 3 mast ship 1336 g, 1312 n, 189.1 x 37.3 x 25.7, Built time and place unknown (1854?) Sold by order of Vice-Admiralty Court of South Australia May 1884 to Adelaide SS Co who made her into a coal hulk at Albany. Register closed June 1903 with 'broken up at Albany'.



Australian Government

Department of Defence

Chemical Warfare Agent Sea Dumping off Australia

Revised and Updated Edition

2003

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Department of Defence, Australia

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Chemical warfare agent sea dumping off Australia

First edition, — Electronically only, 2000 (Royal Australian Navy Hydrographic Office website; <http://www.hydro.gov.au>)

Second edition, — Hard copy, 2002

Third edition, — Hard copy, 2003. This edition, Revised and Updated.

Publisher

Defence Publishing Service
Department of Defence
CANBERRA ACT 2600

National Library of Australia Cataloguing-in-Publication

Plunkett, Geoff.
Chemical warfare agent sea dumping off Australia.

Revised and updated edition
Bibliography.
Includes index.

ISBN 0 642 29587 5.

1. Chemical agents (Munitions) — Environmental aspects — Australia.
2. Chemical weapons disposal — Environmental aspects — Australia.
3. Waste disposal in the ocean — Environmental aspects — Australia.
- I. Australia. Dept. of Defence.
- II. Title.

363.728760994

Full cataloguing available on the National Library of Australia web site
<http://www.nla.gov.au>

Chemical Warfare Agent Sea Dumping off Australia

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FIGURE 2 CWA dump areas off Sydney

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FIGURE 4 CWA dump area off Victoria

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SUMMARY

Although the disposal of material in the sea is now very restricted, historically, the disposal of unwanted waste in the ocean has been a very common practise in many parts of the world. Due to its immense size the ocean was thought to have an unlimited absorptive capacity, with any dumped waste having only a very localised effect. Moreover, the material would be well away from any human activity. Even for fishing trawlers operating in the early 1970s, a depth over 120 metres was considered as "very deep water". Nowadays, however, trawlers work in depths to 1,500 metres and material dumped decades before can be accidentally recovered. It is important to know where any hazardous material may lie, both to prevent human contact and to assess the possible ecological consequences.

Sea dumping of unwanted Chemical Warfare Agents (CWA) has occurred at many sites around the world. Most of the dumping episodes occurred after the end of World War II when unused war stocks needed disposal. An estimated 300,000 tonnes of CW munitions were dumped in West European and North Atlantic waters. It appears at least 21,030 tons of Chemical Warfare munitions were dumped into Australian seas at the end of World War II by the United States Army and the defence forces of Australia. This figure probably includes the weight of the containers which housed the agent (be it an artillery shell, bomb or storage vessel) and hence the amount of actual chemical agent could be much *less* than 21,030 tons. The sea dumping of all significant amounts of CWA war stocks had occurred by the end of 1946, aside from the dumping of 1,634 tons of CWA off Victoria during August/September 1948. Records indicate there have been two ad-hoc dumping episodes since then, one in 1965 and another in 1970.

Dumping can be confirmed in the seas off three states, Queensland (east of Cape Morton), New South Wales (south east of Sydney) and Victoria (west of King Island). Some of the CWA was loaded onto disused ships which were scuttled under supervision. The remainder was dumped in containers or as loose shells or bombs. Mustard gas² was the most common type of CWA sea dumped.

During the disposal operation there were several contact incidents with workers handling the CWA or members of the public encountering CWA that had floated to the shore. Since World War II there have been only two accidental recoveries of CWA from the marine environment, both one ton cylinders of mustard gas trawled by fishermen. The bulk of the Chemical Warfare Agents dumped off Cape Moreton are away from current trawling areas but could pose a threat to other activities including sea bed mining. The material off the coast of Sydney appears to be located in an old ocean dumping ground. The area is not used by trawlers. Mustard gas is only slightly soluble in water, but once it

² Mustard gas is the historical name given to sulphur mustard blister agent (2,2' - dichloroethyl sulphide).

dissolves, it hydrolyses (reacts with water) rapidly. Mustard gas leaking at a slow rate through corroded containers will hydrolyse and should break down close to the dump positions. At worst, leaking mustard gas should only pose a threat to biota living on or near the discarded drums and artillery shells. The hydrolysis products are thought not to have a significant effect on fish and the dump sites do not correlate with designated marine sensitive environments.

Overseas experience has shown that public knowledge of CWA dumping sites can decrease accident rates. Knowledge of the CWA dumping sites in Australia will help to prevent possible exposure. As the locations of CWA dump sites in Australian waters are in rarely fished or known foul areas, the risk of accidental recovery by a trawler is low. The risk to the general public contacting a CWA container or munition is virtually nil. However, if recovered, ANY ordnance (chemical or non-chemical) must not be touched or tampered with. Inappropriately handled ordnance can be very dangerous. Chemical Warfare Agents recovered overseas have caused serious injury even though the material is over 50 years old. When notified, the local police will contact the relevant authority for its appropriate disposal.

INTRODUCTION

Although the disposal of material in the sea is now very restricted, historically, the disposal of unwanted waste in the ocean has been a common practice in many parts of the world. Due to its immense size the ocean was thought to have an unlimited absorptive capacity with any dumped waste having only a very localised effect. Moreover, the material would be well away from any human activity. Many items, including boats, chemicals, ammunition, inorganic waste and other hazardous material were dumped in the world's seas. There was often little understanding of the possible dangers to human safety and the ecology of the sea³. It was not realised the dumping areas would be exploited for their resources in later years. Even for fishing trawlers operating in the early 1970s, a depth over 120 metres was considered as "very deep water". Nowadays, however, trawlers near Australia work in depths to 1,500 metres⁴ and material dumped in previous decades has been accidentally recovered. This was drawn to the public's attention in 1972/1973 when several drums of industrial waste were recovered by trawlers off Sydney. There were immediate moves to limit sea dumping which culminated in the introduction of the Environment Protection (Sea Dumping) Act 1981. Currently, most permits are only issued for dredge spoil disposal and for the creation of artificial reefs [Plunkett (2003)].

During World War II CWA stocks were held at many sites around Australia. The Japanese had reached as far as Papua New Guinea and had been known to use CWA during warfare. Australia had reserved the right to use CWA to retaliate. The stocks of CWA in Australia were held under General MacArthur's Chemical Warfare plan for the South West Pacific Area (SWPA). Although their use was dependent on the direct order of General MacArthur, the stocks were stored in Australia under either US Army, Royal Australian Air Force (RAAF), Australian Army or Navy supervision. None of the CWA munitions were used during combat and at the end of the war the material was in need of elimination [see The Gillis Report and Plunkett (in prep.)⁵ for more on the history of CWA in Australia].

This report, using all currently available Federal Government records⁶ and other published material, details all knowledge of where and how much CWA has been sea dumped⁷ in Australian seas. The report also examines what may have happened to the containers after they were dumped, including the corrosion rate of the cylinders and the breakdown of mustard gas as it reacts with the sea water. It is important to know

³ Based on conversations with some of those involved in the CWA dumping operations off Australia. See also Plunkett (2003).

⁴ Bureau of Rural Sciences (BRS) pers. comm.

⁵ Chemical Weapons in Australia during World War II.

⁶ The information is fragmentary, partly due to the lack of records kept at the time the dumping operations were undertaken but also due to the as yet incomplete cataloguing of old archives. Other material may exist on files with a title that may not accurately reflect its contents or may exist in state government archives or in other sources.

⁷ Dumping of CWA was often referred to as "sea drowning" at the time.

where any CWA may lie, both to prevent human contact and to assess the possible ecological consequences. Although, in most cases, the amount and types of CWA dumped is not known, inventories are available on CWA stocks supervised by the US forces in Australia. This is important, as evidence suggests most of these stocks were eliminated by sea dumping. The RAAF and Australian Army (after conducting tests) burnt, buried or vented (e.g. phosgene) as well as sea dumped a proportion of their supervised stocks.

Chemical Warfare Agent Sea Dumping Episodes

International Dumping of CWA

The dumping of CWA at the end of World War II is a well documented phenomenon around the world. Large amounts of CWA were dumped in West European and North Atlantic waters. It is estimated 300,000 tonnes of Chemical Warfare munitions were dumped near Europe after WWII. During 1945-1949 Great Britain sank barges with 175,000 tonnes of its own and German CW munitions near Ireland. More than 200,000 tonnes were apparently accumulated in Baltic ports and sent for dumping. The 300,000 tonnes of dumped CW munitions apparently consisted of more than 600,000 objects [for detail on CW dumping in European waters see the papers in Kaffa (1996) and Leewis (1991)]. Upwards of 4,900 tons of CWA, (included in 118,000 shells and 574,000 canisters) was dumped off Japan by Japanese workers under orders from the US occupation forces (Kurata 1980). Dumping was seen as the best method of disposal, there being too much to store or burn. The dumping was sometimes done by loading an old ship and scuttling the ship and its contents or by dumping loose bombs or containers of CWA. The size of these overseas operations can put some perspective on the scale of the Australian operation.

CWA Dumping in Australian Waters

Because of the manpower commitment and possible danger involved in maintaining large stocks of chemical weapons⁸ (CW) over a long period as they became unserviceable, on 8 September 1945, the Department of Air proposed that if a decision was made to destroy all or part of the RAAF stocks, that the only feasible method of doing so would be drowning at sea at 500 fathoms (914 metres)⁹. The weapons to be disposed by this method were described as the following types (a) aircraft bombs of various weights charged with phosgene and mustard gas (b) aircraft spray installations charged with mustard gas¹⁰ and (c) steel drums of various capacities (3-1/3 gallons¹¹ to 90 gallon drums) charged with mustard gas. The areas

⁸ The terms Chemical Warfare Agent, Chemical Weapon and War Gas were used interchangeably by the British and Australians while toxic (gas) was the term principally used by the Americans.

⁹ The Navigation Directorate of the Department of Supply and Shipping was asked to advise on suitable locations and instructed the RAAF to dump in at least 500 fathoms of water off the continental shelf.

¹⁰ See footnote 44.

¹¹ Chemical, Special No. 6 drum.

designated as suitable for disposal, where a depth of 500 fathoms was available, were (a) 250 miles from Darwin (b) 100 miles from Townsville (c) 120 miles from Bowen and (d) 25 miles from Sydney. During this time preparations were being made at No. 1 Central Reserve (CR)¹² for the weapons to be drowned eg; the September 1945 report from the Commanding Officer (CO) notes that “CW items are receiving regular attention pending arrangements being completed for disposal by drowning¹³”.

Following a request from the High Commissioner’s office in the UK (with a view to saving on transport and shipping costs), trials were started to investigate the practicability of disposing of large stocks of mustard gas by burning¹⁴. In a RAAF HQ letter, 3 October 1945, it was advised that mustard gas ammunition would still be most likely disposed of by sea dumping but that burning trials were being carried out. Two experimental burns were subsequently undertaken to consider the efficiency of destruction of a range of munition types. The successful completion of the trials at the Australian Field Experimental Station (Proserpine) and Army stocks from 1 BAD (Base Ammunition Depot), led to a decision that CW stocks were to be disposed not only by sea dumping, but also by burning and venting (for the phosgene weapons only).

Before the CWA were sea dumped, tests were often held on the individual types to assess their buoyancy in the marine environment¹⁵. It is known, however, that not all the dumped CWA sank to the seabed as some material was recovered from the shore (see below). Sea dumping of CWA will be discussed for each State.

Northern Territory

An area north of Bathurst Island was designated as a disposal area for CWA stocks held in No. 5 Central Reserve (RAAF). The area was bounded by the following coordinates, [(8° 51' S, 129° 12' E)¹⁶; (8° 56' S, 129° 12' E); (8° 51' S, 129° 16' E); (8° 56' S, 129° 16' E)]¹⁷. It is unlikely any CW material was dumped here as it is now

¹² RAAF No. 1 CR Head Quarters was based at Marangaroo. The reserve also encompassed 3 CW subdepots in New South Wales, being Glenbrook, Picton and Clarence, all of which were tunnels.

¹³ Also, a little later in a monthly report (either October or November 1945) the CO report reads “CW stocks are being inspected with a view to disposal by sinking at sea”.

¹⁴ On 21 September 1945 the success of a burning trial of 65 lb bombs in the UK was noted, although it was still uncertain as to whether Australia would burn or sea dump stocks; “present opinion is that Australia may consider burning rather than sea dumping”.

¹⁵ For an example see the table in Appendix A, CW stocks at No. 1 CR, Data to show behaviour on immersion in sea water. Australian Archives, National Office, Parkes, ACT. Series Number A705, Control Symbol 15/31/19. The assessment was undertaken by determining weight (crated and uncrated) 2. establishing the limits of minimum and maximum weights when variations were found to exist 3. determining the overall volume of all stores and 4. calculating the weight of sea water displaced by each item. If the weight of the munition/container was greater than the weight of sea water it displaced then it would sink.

¹⁶ Symbology for co-ordinates: °=degrees, '=minutes, " =seconds, S=South, N=North, E=East and W=West.

¹⁷ Australian Archives, National Office, Parkes, ACT (Australian Capital Territory, Canberra). Series

known that 2000 tons of CW held at 88 mile (the only known storage site for RAAF munitions in the Northern Territory) were destroyed by burning at Fenton Airfield¹⁸.

Queensland

A war diary entry for the RAAF Chemical Research Unit (CRU), dated 21 September 1945, states that leaking M47A2 bombs¹⁹ were disposed of by burial at sea. Two sites were chosen near Bowen to dump CWA from the RAAF No.19 Replenishing Centre at Talmoi and the CRU at Bowen (figure 3). For the most westerly site the bounding coordinates were [(18° 00' S, 147° 55' E); (18° 15' S, 147° 55' E); (18° 00' S, 148° 10' E); (18° 15' S, 148° 10' S)]. The more easterly site had an area described by the following geographic locations [(18° 05' S, 148° 30' E); (18° 20' S, 148° 30' E); (18° 05' S, 148° 45' E); (18° 20' S, 148° 45' E)]²⁰. Two experimental sea dumpings were made using stocks of CWA from the CRU and the Australian Field Experimental Station at Prosperine²¹. The tug "Keera" was loaded with 320 mustard charged M47A2 100 pound bombs which were dumped at 18° 30' S, 148° 5' E at 1,098 metres (600 fathoms) on 12 October 1945. The bombs (crated) had been loaded as deck cargo. Limited tests were made en route regarding the possible buoyancy of the bombs. A single bomb was attached to a 10 fathom line and dropped over the side and immediately paid out to its full length, indicating the bombs would sink. On arrival the bombs were uncrated and dropped singly over the side²². On 14 October 1945 the same boat dumped 700 mustard charged 65 pound bombs at 18° S, 148° E at a depth of 1,098 metres (600 fathoms). As for the M47A2 bombs, a buoyancy test was undertaken with 3 - 65 lb bombs attached in turn to a 10 fathom line and dropped over board. In this case the bombs floated and a decision was made to pierce each bomb. Personnel wearing impregnated clothing removed the bombs from the crates and

Number A705, Control Symbol 15/31/19. We determined the coordinates from an old map found on these files.

¹⁸ Based on the war diary records of 8 Stores Depot (RAAF) which took over the management of 88 mile from No. 5 CR and also from interviews with the RAAF CW Armourers who undertook this disposal.

¹⁹ This type of bomb was imported by the United States forces in Australia, although some were held by the CRU for aerial tests in conjunction with the CW research facility, initially located at Innisfail and then Proserpine.

²⁰ Australian Archives, National Office, Parkes, ACT. Series Number A705, Control Symbol 15/31/19. We determined the coordinates from an old map found on these files.

²¹ Australian Archives, National Office, Parkes, ACT. Series Number A705, Control Symbol 15/31/19. These dumping episodes are also mentioned in the war diary for the CRU. An entry in the CRU war records also states that 65lb bombs were loaded onto trucks and transported to the marine section FBMU (Flying Boat Maintenance Unit) for disposal at sea on 15 February 1945.

²² The crates were returned to the CRU for burning.

holding the bomb over the side pierced it 3 times with a pick axe (on the side of the bomb away from the vessel and low down). Mustard flowed into the sea and the bombs sank immediately. Due to rough seas, contaminated spray flew over personnel operating astern²³. The CW munitions from this latter dumping fall within the coordinates of the more westerly dump square (see figure 3).

In late 1945²⁴ sea dumpings also occurred off Cape Moreton near Brisbane. Records state a total of 8,000 tons of CW munitions, believed to represent all the stocks of CWA stored in Australia under US control were disposed of here²⁵. This figure probably includes the weight of the containers which housed the agent (be it an artillery shell, storage container or bomb) and hence the amount of actual chemical agent could be *less* than 8,000 tons. What was dumped is unknown, however an inventory from 1943 is available which shows the US CWA reserves included bulk mustard, tear gas (CNS), lewisite and solid adamsite candles (see Appendix A). As shown in Appendix A, the US controlled stocks of CWA at sites far removed from Brisbane including Geelong in Victoria, Kingswood in New South Wales, Charters Towers and Kangaroo in northern Queensland. It is very unlikely the stocks at these

²³ As for the first dump the crates were returned to the CRU for burning. See also footnote 61.

²⁴ Haug (undated) has the dumping operation occurring from 2 October 1945 to 20 December 1945. Based on a memorandum it is known tear gas grenades that had washed ashore at Maroochydore, 60 to 70 miles north of Brisbane, had been jettisoned by US personnel on or before 4 September 1945 [Memorandum dated 4 September 1945 signed by the Acting Deputy Director of Navigation and Lighthouses, State of Queensland. Ref NQ 45/5 W/S, M45/195/1/3846. Former Department of Transport file. EPA 94/6789 {This number refers to specific files in the former Environment Protection Agency (EPA) (files now held by the Department of the Environment and Heritage, Canberra) file Series Number: EPA - Waste Management Bch - Sea Dumping Records - Database. Federal Government and other records concerning CWA sea dumping have been compiled and collected into this file Series Number}], Also it is known mustard gas shells were dumped before 3 October 1945 [Letter dated 3 October 1945, signed by Assistant Secretary (Marine) - Department of Supply and Shipping. M45/195/1/3849. Former Department of Transport file. EPA 94/6789]. Although it is not known where the Maroochydore material had been sea dumped by the US, the mustard gas shells had definitely been dumped off Cape Moreton. Although this data does not dispute 2 October 1945 as a start date for sea dumping off Cape Moreton we can conclude other CWA dumping operations were underway, somewhere north of Brisbane, by early September 1945.

²⁵ The amount dumped varies between records. Haug (undated) who had access to other dumping records states 8,000 tons of adamsite candles alone were dumped here [Her entry is ambiguous. It reads {...876 containers of mustard, 93 containers of lewisite, 8,000 tonnes of adamsite candles, projectiles (75mm, 105mm and 155mm) containing an unidentified gas, 314 drums (55 gallon) of CNS, and 432 drums (55 gallon) of CNB} It could mean a combination of adamsite and projectiles at 8000 tonnes]. The available data on stocking rates tends to be contradictory. The differences could be due to a number of variables including the inventories being undertaken at different times (it is known CWA stocks were moved between sites, that stocks were added to and that defective stock was destroyed). The listings could also have been made by different personnel with possibly different objectives or be due to record transcription errors. A number of records have 8,000 tons as the figure dumped. They include records from 1945, made just prior to the dumping operation, which state 8,000 tons was soon to be dumped [Memorandum dated 3 October 1945 signed by the Acting Deputy Director of Navigation and Lighthouses, State of Queensland. Ref NQ 45/5. Former Department of Transport file. EPA 94/6789]. It is not known whether this was an up to date estimate of the CWA stocking levels or based on an older estimate.

sites were transported to Brisbane to be dumped off Cape Moreton²⁶. Only the US stores of CWA in South East Queensland are likely to have been dumped off Cape Moreton. It is known that a large quantity of CW from the US depot at Darra (Brisbane) was sea dumped off Cape Moreton as shown in this extract from a newspaper article²⁷; “although the disposal had been going on for months, there was still 2,400 tons of gas to be dumped²⁸”.

The US Army originally proposed to dump the 8,000 tons of CWA munitions along the 183 metre line (100 fathoms) (see figure 1), some 10 to 12 miles off Cape Moreton. At 12.5 nautical miles east of the northern tip of Cape Moreton there was a designated dumping site as proclaimed by the *Beaches, Fishing Grounds, and Sea Routes Protection Act 1932*, with a centre point of [27° S, 153° 42' E at 256 metres (140 fathoms)] and a diameter of five nautical miles (being the most westerly circle in figure 1). This was one of fourteen dumping sites designated around Australia by a Federal Government Act of Parliament. Although originally chosen as sites to dump derelict boats, these sites were used as general waste dumping grounds where chemicals and other material were dumped [Plunkett (2003)]. This site became an official Australian Army dumping position for unserviceable ammunition although the date of its first use is unknown. It is known some of the 8,000 tons of CWA was dumped beyond the 183 metre line (100 fathom line)²⁹ and it is almost certain a proportion was dumped within the designated dump site³⁰. Some government records

²⁶ The fate of the CWA at these more distant sites is not known, however, it is possible it was sea dumped near the site of storage.

²⁷ "Daily Telegraph", 17 November 1945.

²⁸ The gas was brought from one side of Brisbane in contractors trucks, over the Story Bridge and through The Valley to Pinkenba where it was loaded on the “City of Fort Worth”.

²⁹ Information based on a letter dated 3 October 1945, signed by Assistant Secretary (Marine) - Department of Supply and Shipping. M45/195/1/3849. Former Department of Transport file. Also various newspaper articles including the Melbourne "Sun", 19 November 1945; "Daily Telegraph" and "Courier Mail" - Queensland, both dated 17 November 1945. Also the fact that a one ton cylinder of mustard gas was retrieved at a depth of less than 110 fathoms off Cape Moreton (see further on), EPA 94/6789.

³⁰ If only because the west point of the dump circle is very close to the 100 fathom line (see figure 1 ; note the 100 fathom line is actually closer to the dump circle than is shown in this figure) and any boats dumping beyond this line would land some of the CWA within this dumping ground. More importantly, we know the dump circle was an official "Old" Australian Army dumping ground that was being deliberately targeted by the forces before and after World War II for the dumping of unserviceable ammunition and *dangerous materials* (my emphasis - based on a warning notice to fisherman issued by the Australian Army; an equivalent dump ground off Sydney was also being used by the Defence forces during 1945/1946; see figure 2 and footnote 86).

The "Old" Army dump circle was replaced by a "New" Army dumping ground (date unknown) located further to the east and in deeper water at 27° S, 154° E (figure 1 shows the "Old" dump circle being the most westerly and the "New" dump circle further to the east; see also footnotes 83 & 84). One record states the CWA was most likely dumped in the two gazetted areas off Cape Moreton as stated in the Notice to Mariners. The Notice to Mariners lists the dump areas as proclaimed by the *Beaches, Fishing Grounds, and Sea Routes Protection Act 1932* and as there is only *one* gazetted area off Cape Moreton, this reference must be referring both to the gazetted area and the "new" Army dump ground in deeper water.

also indicate some of the CWA was dumped further out to sea at 25 miles east of Cape Moreton at 27° S, 154° E [1,098 metres (600 fathoms)]³¹. These co-ordinates were the centrepoint for another official Australian Army dumping site, again with a diameter of 5 nautical miles. This second Army dump circle replaced the Army dump circle closer to Cape Moreton at an unknown date (see footnote 30 & 84). In conclusion, CWA could be found scattered from the 183 metre line (100 fathom line) to the 1,097 metre line (600 fathom line) within the rectangle shown in figure 1. It is not known where the majority of the chemical warfare munitions are located within this area. United States authorities have also confirmed that 6,396 tons of toxic material and 1,600 tons of small arms ammunition were dumped “off the coast of Australia – site unknown”³². This matches the entry in Haug (undated).

In 1957, after a clearance operation of the former US CW storage depot at Darra, Brisbane, CW contaminated soil³³ was packed into 40-50 lb sacks and dumped into the sea into 600 feet of water³⁴.

In the Gillis Report, an eyewitness involved with CWA operations during the war remembers dumping mortars (number unspecified) in Mourilyan Harbour. Originating from Innisfail they had been fired experimentally. After firing, fifty percent were UXBs (unexploded bombs) which were sea dumped in order to avoid further mustard gas contamination of the firing range. Other dumping operations appear to have been undertaken off Queensland. A one ton cylinder of bulk mustard gas was encountered by a trawler at 20° 42.8' S, 153° 35.7' E in 69 fathoms (19 January 1970) and later in the 1970s a one ton cylinder came ashore in the same area [both from Haug (undated)]. Two 155mm (6 inch) mustard gas (HD) filled projectiles have been recovered in the last 4 years from the Moreton Bay area. It is understood that they were recovered during dredging operations in the shipping channel which passes between Moreton Island and Bribie Island³⁵.

³¹ Letter dated 23 November 1945, signed by Acting Deputy Director, Navigation and Lighthouses, State of Queensland, M45/195/1/3949, former Department of Transport file. EPA 94/6789. This letter was in response to a query as to where the boat, the "City of Fort Worth" was dumping CWA. However an eyewitness on the boat (accepting he is recalling events of 50 years ago) believes it was unlikely the boat would have been able to travel the approximate 60 miles required on the daily trip and concludes the material was probably dumped closer to Cape Moreton (exact location between the 100 and 600 fathom line unknown) (Ron Parsons, pers. comm). *See also* Haug (undated).

³² Although the disposal site has been linked with John Brewer Reef, this has never been confirmed. A suggestion of CW being discarded at Bouganville Reef (off Cookstown) at 15° 58' 5" S, 147° 21' E is also unconfirmed.

³³ Which had been treated with bleach.

³⁴ Newspaper article “The Courier Mail”, Brisbane 16 May 1957.

³⁵ Considerable rust scaling had occurred reducing the outside diameter of the projectiles by up to 12mm. The most likely leakage point for CWA from these type projectiles is at the fuze adapter in the nose of the projectile. This is the thinnest point on the projectile and therefore the most vulnerable point for the action of corrosion and erosion. The long period which these projectiles have been in the sea makes accurate identification extremely difficult if not impossible, given the condition of identifying features (length, diameter, shape, stamped markings, driving band etc) and the addition of heavy marine growth. It was later found that the projectiles, initially believed to be safe to move (no

Another record indicates half of a ton of mustard gas was dumped³⁶ within the second dumping circle 25 nautical miles east of Cape Moreton at 26° 59' 30" S, 153° 57' E on 23 January 1970 at 450 fathoms³⁷. It is not known where the material originated.

New South Wales

An eyewitness report from the person responsible for overseeing the sea dumping of Australian Army supplies of CWA stated most of the chemical munitions were dumped 18 miles south south east of Sydney's South Head. This correlates with (or is at least very near) the dump circle designated off Sydney by the *Beaches, Fishing Grounds, and Sea Routes Protection Act 1932* where it is known the defence forces dumped ordinary ammunition and other material after World War II (figure 2). This dump circle had a centrepoint at 34° S, 151° 36' E with a 5 nautical mile diameter. The depth at the centrepoint is approximately 275 metres (150 fathoms).

About 5000 tons of CW munitions from the Army site at Albury is believed to have been disposed off Sydney³⁸. The initial dumping operations consisted of loading chemical munitions into the hulks of ships³⁹ damaged by enemy action or ships no longer required. These ships were towed to the dumping site and sunk using explosive charges placed in the ship's keel (at both bow and stern) or by naval gunnery fire using solid armour piercing rounds. Records exist for two of the dumped boats. These were scuttled away from the main dump site 18 miles from Sydney Heads. The first ship used was the SS BANTAM which had been bombed and badly damaged at Oro Bay, New Guinea 1943 (see Parsons and Plunkett 1995⁴⁰). It was towed to Sydney and after the war was loaded with 27,500 chemical rockets, 8,000 4.2 inch chemical mortars and High Explosive shells⁴¹. It was scuttled 136° Macquarie Light at 32 miles

initiating mechanism - fuze), were now likely to contain CWA. The exact site of their recovery and their origin is not known (Captain Peter Ritchey pers. comm.). The calibre strongly suggests they were dumped by the United States forces in Australia (see Appendix A), although several of these projectiles were sea dumped during the 1957 disposal operation. An eyewitness also recalls seeing 44 gallon drums of CW being pushed into the Whitsunday Passage off a barge at the end of World War 2, although again, there is no corroborating evidence.

³⁶ By vessel "Landing Craft Mechanised (LCM) 1059".

³⁷ This data was obtained from a listing headed "Army Dumping Activities" which covered the date range, 7 March 1962 to 9 December 1971.

³⁸ Based on an interview conducted 26 May 1992 with the overseer of the dumping operation. Some of the information in this paragraph was collected by Major Chris Hely. This dump circle is more strictly *south east* than south south east of South Head. However, the point 18 nautical miles from south head in a south south east direction gives a depth of 144 metres, some 2 nautical miles short of the continental shelf. It was explicitly stated the CW was dumped over the shelf.

³⁹ It was concluded the use of a hulk was a more suitable method than chartering a vessel. It was cheaper and "there would be no subsequent flotation of items and the plugs would not need to be removed. All the chemical warfare material could be sunk at any depth, at any desired distance from shore, all in one sealed hold". Australian Archives, National Office, Parkes ACT. Series Number A705, Control Symbol 15/31/19.

⁴⁰ Reproduced in Plunkett (2003).

⁴¹ Which, due to their type, must have come from the from the Army's CW ammunition depot at

on 24 September 1946⁴² (34° 18.8' S, 151° 43.6' E at 1829 metres)⁴³ - see figure 2. The Bantam is also reported to have been loaded with Smoke Curtain Installation (SCI)⁴⁴ bombs from the RAAF CW stores at Picton⁴⁵. The ammunition disposed of in the BANTAM was all stored inside the ship's hold. The ships used for scuttling became progressively smaller until eventually old Manly ferries and dredges were used. In the case of these the ammunition was not always stored in the hold. Another ship the ex Manly ferry the BINNGARRA was scuttled 11 December 1946 with an unknown quantity of CWA. The disposal position was 122° Macquarie Light, 35.5 miles at 1100 fathoms⁴⁶ (2012 metres) [34° 10.2' S, 151° 53.1' E] which is within a proposed RAAF CWA dumping area (see figure 2 and below). Eventually the supply of old ships was exhausted and dumping operations continued by taking the ammunition out as deck cargo and pushing it overboard. The CWA was shipped by train from Albury to the timber wharf at Rozelle. It was then loaded on ships for dumping. From 1 July 1946 to 1 September 1946 records show a number of trainloads of CWA stores consisting of 3 inch mortar, 4.2 inch mortar and 25 pounder

Albury (1 BAD).

⁴² Australian War Memorial file AWM78 228/1 'HMAS MURCHISON: Reports of Proceedings' - "During the dog watches an army scuttling party was transferred to the 9,000 ton hulk Bantam, which was loaded with lethal gas and ammunition, and had been towed to a position 136° Macquarie Light 32 miles by the tug Tancred. After scuttling charge fuzes had been ignited and the party re-embarked, HMAS Condamine and HMAS Arunta carried out FC firings [This term, in the context of the shoot, most probably means Fire Control rather than Full Charge; definition from Major Graeme Andrews and Major Keith Parker pers. comm.] at the hulk, which sank 10 minutes after the first charge detonated and disappointingly before HMAS Murchison could open fire. Direct hits by HMAS Condamine were observed"; Report of Proceedings month ending 30 September 1946. The following is reputedly detailed in 'HMAS CONDAMINE: Reports of Proceedings' - "...at 1705 when we engaged the Bantam, our first salvo was reported 100 yards over and Murchison observed 3 direct hits on Bantam. Due to the heavy swell firing conditions were most difficult" (From Major Chris Hely notes).

⁴³ See also the Sydney Morning Herald, 9 April 1992, frontpage. A different coordinate is given in a Fishing Grounds and Sea Routes Protection Regulations "Report of Sinking of Ship at Sea" which gives 34° 07' S, 151° 151' E at 100 fathoms [record held by Royal Australian Navy (RAN) Hydrographic Office].

⁴⁴ Originally designed to provide smoke screens for camouflage purposes, they were modified to spray mustard gas from planes. Also referred to as Smoke Cloud Installation.

⁴⁵ Based on an interview with RAAF CW Armourers who were involved with the loading of the Bantam. According to the No. 1 CR Commanding Officer's report of March 1946 all SCI stocks from Picton had been moved to the wharf for dumping. From March to July the RAAF gas weapons were loaded onto the Bantam (Kevin Garr pers. comm., based on personal diary notes).

⁴⁶ Australian War Memorial file AWM78 228/1. "...on Wednesday 11th [HMAS] Murchison transferred an army scuttling party to the 1,200 ton hulk Binngarra, an ex Manly ferry which had been towed to its sinking position by a tug. The hulk, which was loaded with ammunition and gas, sank at 1757K four minutes after the scuttling charges detonated. The sinking position was 122° Macquarie Light 35.5 miles and the depth 1100 fathoms"; Report of Proceedings, month ending 31 December 1946. A coordinate given in a Fishing Grounds and Sea Routes Protection Regulations "Report of Sinking of Ship at Sea" matches this entry (34° 10' S, 151° 53' E at 1100 fathoms [record held by Royal Australian Navy (RAN) Hydrographic Office].

ammunition were shipped to Sydney for seadumping⁴⁷. Also on 2 December 1946 a shipment of 334 tons of 5 inch bombs and 25 pounders was moved to the coast for sea dumping⁴⁸. An inventory from 1943 gives an idea of the range of types of CWA that may have been dumped (Appendix B).

A few other short records are available regarding sea dumping of CWA off New South Wales. From March to May 1946 the Commanding Officer of No. 1 CR noted the following; March 1946 “All charged SCI from Picton⁴⁹ and charged bombs at Marangaroo⁵⁰ have been convoyed by motor transport to the State Explosive Wharf in Sydney for destruction by drowning at sea”; April 1946 “This tunnel (Picton) has recently been cleared of chemical warfare stocks” and also “chemical warfare stocks are now being loaded at Sydney for destruction by drowning at sea” and lastly in May 1946 it again states that “Chemical warfare stocks are also being loaded at Sydney for destruction by drowning at sea”. In the first edition of this report it was stated that sea dumping occurred from the RAAF stores at Clarence during 1947 and 1948. This is based on a misinterpretation of the following war diary entries; 20 October 1947 “Final inspection of the CW disposal site at Clarence” and 20 August 1948 “Inspection and disposal of CW stocks at Clarence”⁵¹. A burn of 2000 tons of CW stock from Marangaroo and Glenbrook occurred at Newnes State forest. The burn site was sometimes referred to as the Clarence disposal area due to its proximity to Clarence tunnel. This is the disposal to which these entries refer and has no relationship to the CW stocks kept at Clarence tunnel.

An old map shows a proposed munitions disposal area for RAAF supplies of CWA [with coordinates (34° 02' S, 151° 42.5' E); (34° 12' S, 151° 42.5' E); (34° 02' S, 151° 55' E); (34° 12' S, 151° 55' E)]. (figure 2). This was near the designated dump circle apparently used by the Army (figure 2). An inventory (Appendix C) shows the range of CWA held at No. 1 Central Reserve. It is important to note that 2000 tons of RAAF

⁴⁷ War records for Albury [Australian War Memorial, ACT – War Diary Records for 1 Base Ammunition Depot, Albury (The Australian Army’s storage depot for CW) - AWM52 13/14/2] detail the following (all mustard gas unless otherwise stated); 1 July 1946, Issued 168 tons 4.2" (inch) mortar for destruction by sea dumping; 7 July 1946, Owing to leakers with first shipment of 4.2" mortar decided to change to 25 pounder (pdr) until all 4.2" inspected. Loaded 270 tons 25 pdr; 8 July 1946, loaded 90 tons 25 pdr completing train of 360 tons; 14 July 1946, Issued 360 tons 25 pdr to Sydney for destruction; 21 July 1946, Loaded 315 tons 25 pdr; 22 July 1946, Loaded 45 tons 25 pdr completing train of 360 tons to Sydney; 29 July 1946, Issued 285 tons 25 pdr to Sydney. Unable to complete train due to shortage of transport; 4 August 1946, 150 tons 4.2" mortar and 118 tons 25 pdr; 11 August 1946, Issued 6,907 boxes 4.2" mortar and 25 pdr for movement to Sydney; 18 August 1946 340 tons of 3" mortar, 4.2" mortar and 25 pdr for Sydney; 25 August 1946, 360 tons 25 pdr to Sydney; 1 September 1946, Issued 279.5 tons to Sydney. This shipment included B [probably meaning BBC (tear gas)].

⁴⁸ This shipment included B4, thickened BBC (tear gas).

⁴⁹ The entry in the first edition of this report has dumping from Picton occurring in February 1948 which is incorrect. There is currently no written evidence of dumping occurring beyond the date that the Bantam was sea dumped.

⁵⁰ Which confirms a suggestion first made by Stoneman (1990) that bombs were sea dumped from Marangaroo.

⁵¹ Also 31 August 1948 “Departure F/Lt (Flight Lieutenant) Archer after disposal of CW stocks”.

CW from No. 1 CR⁵² was burnt at Newnes State Forest. There is currently no evidence that significant sea dumping occurred off New South Wales, beyond the December 1946 date for the Binngarra.

One dumping is known since World War II off New South Wales. Nine filled and two empty mustard gas bottles weighing over 4 pounds were dumped in position 34° 23' S, 151° 26' E on 12 October 1965 in 310 fathoms. These had come from the Nuclear Biological Chemical Defence (NBCD) school⁵³ and probably relates to its defensive work.

Victoria⁵⁴

In preparation of a sea dump of CW ammunition from the Australian Army depot at Albury (1 BAD)⁵⁵, on 5 August 1948, approximately one third of the crew of LST (Landing Ship Tank) 3017 were sent to Albert Park Barracks to see instructional films on chemical warfare shell and ammunition, the films having been supplied by the Army. On 9 August the ships company were supplied with anti-gas respirators and loading of CW shell was commenced at Williamstown in the morning of 10 August 1948⁵⁶. Having loaded with 400 tons of CW shell, dumping was completed in the afternoon of 17 August within a 3 mile radius of (39° 45' S, 142° 34' E⁵⁷) (see figure 4). On 24 August 1948, 402 tons of chemical warfare shell was loaded and then dumped the following day (25 August 1948). Loading of a further 400 tons of CW ammunition was completed on 2 September and the ship proceeded to the dump area west of King Island. Dumping was completed in the morning of 3 September. On 5 September, loading of CW shell was recommenced with the loading of 432 tons of CW ammunition being completed 8 September. Owing to inclement weather, the ship did not proceed to sea until the next day with dumping completed in the dump zone on 10 September. It can be concluded all the 1,634 tons of CW ammunition was dumped within the circle as described above.

⁵² Involving some 20,000 bulk containers (110,000 gallons).

⁵³ Letter stamped 29 October 1965, HMAS ANZAC at sea, ref. No. 169/13. Date of supply of the items was thought to be at least 10 years prior to the dump date. EPA 94/7012.

⁵⁴ Australian War Memorial, Canberra. File AWM78 337/1.

⁵⁵ That the ammunition came from here is based on an interview with Jim Munroe who assisted the dumping operation and also from the file Australian Archives, New South Wales, Series Number SP459/1 Control Symbol 406/1/2575, which in discussing the programs of ammunition dumping for LSTs, including the 3017, notes that "included in the 7,152 tons of ammunition to be sea dumped at Albury is 2,156 tons of heavy cases chemical warfare ammunition" (20 May 1947). It is a reasonable assumption that the 522 ton difference was also dumped in this target area.

⁵⁶ And during the afternoon the CW films were brought on board and shown to the remaining two thirds of the ships company. Decontamination exercises were carried out each day CW shell was on board.

⁵⁷ In excess of 1,000 metres. Royal Australian Navy (RAN) Hydrographic Office (pers. comm.).

Exposure to Dumped CWA

International Incidents

There are several recorded accidental recoveries of drums filled with CWA. During the spring of 1984, eleven Danish fishermen were exposed to mustard gas and were burned while fishing in the Baltic Sea (Aasted 1985). Many accidental recoveries have resulted from trawling in fishing areas around Japan (Kurata 1980). Eight areas off the Japanese coast were designated for sea dumping, although dumping outside these areas is known to have occurred. Fifty two people were wounded in eleven accidents at one dumping site alone. Kurata identified several key factors in the occurrence of accidents.

1. The sites where the CWA was dumped often violated the guidelines developed for dumping in Japanese waters (1000m depth and 18.5 km from shoreline), as they were much closer to the shore.
2. In Japan little attention was paid to the correlation of sites with fishing areas and ecologically sensitive areas.
3. There was insufficient public knowledge of dumping site locations.

Australian Incidents

The Australian public became aware of CWA dumping in Australia in November 1945 when the dumping operation off Brisbane was under way. As US soldiers were loading CWA at the Darra depot in readiness for sea dumping off Brisbane a US soldier was killed and two were injured when a gas shell was dropped and exploded⁵⁸. Other newspaper reports in 1945 revealed a one ton cylinder dumped by the boat, the "City of Fort Worth" and only partially filled, had floated with most of the cylinder underwater⁵⁹. With prevailing currents it was expected to wash up in the northern part of New South Wales⁶⁰. Obviously, it posed a problem for the public if opened deliberately or if accidentally smashed against rocks. Apparently, it was never recovered and most likely sank south of the dump site. Crew members of the tug

⁵⁸ Newspaper article, Sydney "Daily Telegraph", 17 November 1945. The article states that "2,400 tons to be disposed over a period of several months". See also page 11.

⁵⁹ Newspaper articles, "Courier Mail", 19 November 1945 (EPA 94/6789); "Melbourne Sun", 19 November 1945.

⁶⁰ South of Coolangatta.

"Keera" were severely burnt while disposing of mustard gas bombs⁶¹. These bombs had been hung over the side of the tug and axes were used to smash holes in them to prevent flotation⁶². Jettisoned tear gas grenades in wooden boxes also washed ashore at Maroochydore, 60 to 70 miles north of Brisbane in 1945⁶³.

On 25 August 1983 two trawlermen snagged a one ton cylinder of bulk mustard off Cape Moreton⁶⁴. The cylinder was brought ashore on a beach on Moreton Island and the contents were neutralised using chlorine. As trawlers off Cape Moreton do not operate beyond 110 fathoms the cylinder must have been dredged in a shallower depth than this, probably due east of the northern tip of Cape Moreton⁶⁵. As previously mentioned on 19 January 1970 a one ton cylinder of bulk mustard gas was encountered by a trawler at 20° 42.8' S, 153° 35.7' E in 69 fathoms and later in the 1970s a one ton cylinder came ashore in the same area [Haug (undated)]. This is north of the Cape Moreton dumping site and it is not known how material ended up here.

THE FATE OF CWA AFTER DUMPING

Most of the CWA would have sunk close to its dump position, although, under the influence of sea currents there would have been some drift of the lighter material. As mentioned, it is known at least one cylinder floated from the original dump position.

Once on the seabed the cylinders may be buried by sediment or could become encrusted by sea life. The rate of release of CWA will depend on the corrosion rate of the cylinders. Once released it is necessary to understand how the CWA will breakdown in water. With the release of the agent it is also necessary to assess the possible environmental effects and risks to the public. These issues will be considered in turn.

Corrosion of cylinders

The corrosion of ammunition shells is a complex phenomenon. A Russian study (reported in Stock 1996) concluded sea current was the important determinant of corrosion rate. Other reports argue sea conditions are very complex and combinations of external factors can create different scenarios. We do know the 1 ton cylinder

⁶¹ Newspaper article "Herald", 26 November 1945, presumably referring to the disposal operation as outlined on page 9/10.

⁶² Several marksman were stationed at the stern to ensure all the bombs sank (from an eyewitness account).

⁶³ Sometime before 4 September 1945. On 22 August 1945 it was ascertained that the US Army authorities proposed to jettison 473 – 44 gallon drums of tear gas and that the US Army, in tests, had shown the drums would sink to 60 feet and then burst. With the trial completed they "were to proceed with the jettison". The dates suggests these 2 entries may be interrelated. Although not a CWA incident, press reports also revealed a member of the public had been severely burned from liquid chlorine gas after opening a 44 gallon drum near Evans Head in November 1945, Newspaper article "Herald", 27 November 1945, EPA 94/6789.

⁶⁴ Newspaper article, "Courier Mail", 31 August 1983.

⁶⁵ Peter Seib, a long time trawlerman in the area, pers. comm.

retrieved off Cape Moreton had developed a number of small "pinholes" which allowed leakage of the mustard. It was also reported some of the cylinders were already partially rusted when dumped⁶⁶. Bulk cylinders were typically made from relatively thin steel when compared with artillery ammunition, filled with thickened or unthickened mustard gas. Heavy walled artillery projectiles are likely to remain intact longer than other cylinders (Major Keith Parker pers. comm.).

The breakdown of CWA in sea water

Although a variety of CWA was sea dumped, mustard gas was the primary agent involved. Mustard gas, also known as sulfur mustard [di(2-chloroethyl)sulfide], is actually an oily liquid at room temperature. As mustard gas was the primary CWA dumped, this section will concentrate on its behaviour in sea water.

Factors affecting the breakdown of mustard gas in sea water

Although mustard gas has a low solubility in water, once it dissolves it quickly hydrolyses (reacts with water) to primarily form thiodiglycol, together with other compounds including sulphonium and chloride salts⁶⁷. The final products of the hydrolysis are said to be non-toxic (Stock 1996). The dissolution (dissolving) rate and hydrolysis rate are dependent on water quality and other environmental conditions. Some of these important variables include the following; the rates increase with increased temperature, current/ turbulence and with decreased salinity⁶⁸. The effect of sea current and sea temperature at the two main dump sites will be assessed.

Effect of sea currents and temperature on breakdown rate

Sea currents on the east coast of Australia (from about 18° S to 32° S) are dominated by the East Australian Current (EAC) which flows strongly southward (Middleton 1995). Current velocity generally decreases with depth. As the mustard gas leaks at both of the main dump sites (Cape Moreton and Sydney) it should mix in the bottom boundary layer, be diluted and hydrolyse near the dump site. Under the influence of the EAC it will most likely travel to the south at approximately the same depth. The dissolution and hydrolysis rate will be aided by the temperature found at the dump positions. The temperature at 200 metres depth off Sydney is approximately 12 to 14° Celsius during summer⁶⁹. Off Cape Moreton the summer temperature at 250 metres⁷⁰

⁶⁶ Newspaper article, Sydney "Daily Telegraph", 17 November 1945.

⁶⁷ The production of these salts will have different consequences depending on location. Within containment it is likely to concentrate to some extent and lower the pH. This may facilitate corrosion. Outside the container the salts will be diluted by seawater and have little effect (M. Mcleod and R. Mathews pers. comm.).

⁶⁸ See Khordagui & Al-Ajmi 1994 and Trapp 1985 for the chemistry of mustard gas hydrolysis and the measured effect of these different environmental variables on the rate of hydrolysis.

⁶⁹ New South Wales Environment Protection Authority pers. comm.

⁷⁰ This is the depth of the dump circle closest to Cape Moreton. This depth is used for the following modelling purposes.

is slightly higher being approximately 15° Celsius. During the year the temperature at both sites can vary around this average by a few degrees. At the outer limit of the Cape Moreton dumping rectangle eg. 1,098 metres (600 fathoms) temperatures in the range 4° to 6° Celsius have been measured⁷¹. While the melting point of pure mustard gas is 14.4° Celsius, in order for it to be maintained in a solid state, the material would need to be maintained in an environment many degrees below the melting point eg; at least at the freezing point of water, since any impurity would lower the melting point. As the surrounding temperature would be at least 10° Celsius at the shallower dump sites it is virtually certain the material would be present in a liquid state. Even at 4° Celsius at the deepest site off Cape Moreton it should remain liquid⁷². This contrasts with the cooler Baltic waters where the mustard gas is said to be in a solid state⁷³. This higher temperature has a favourable implication for the hydrolysis rate. Conditions in Australia more closely approximate those found in Kuwait waters where Khordagui H & Al-Ajmi (1994) have modelled the hydrolysis rate of mustard gas at 15° Celsius, being the average minimum sea temperature in winter. They predicted a half-life (where half of the mustard gas is hydrolysed) of 3 hours. This is a considerably faster rate than for mustard gas present in a solid state e.g. Epstein J et al (1973)⁷⁴ have estimated that a one ton *solid* cylinder of mustard gas in sea water (presumably without a casing and in still water) would take 5 years to hydrolyse.

Current measurements are available close to the shallower dump circle off Cape Moreton, at a couple of degrees to the south and north. A current meter placed to the south in 1983 (29° 00.4' S, 153° 50.3' E at 190m⁷⁵) revealed a current velocity up to a maximum of approximately 50 centimetres/second. At another site north of the dumped mustard gas (25.85° S, 153.90° E at 300m⁷⁶), Merrifield and Middleton (1994) found flows to a maximum of approximately 25 centimetres/seconds. Current flows off Sydney at 120 metres can reach speeds of 60 to 80 centimetres/second⁷⁷.

⁷¹ South Pacific Cruise Data 1990-1993. New South Wales Environment Protection Authority pers. comm.

⁷² Prof. Damon Ridley pers. comm.

⁷³ Trapp (1985) has noted mustard gas containers dumped in the Baltic Sea are leaking and that the bulk of the mustard gas "remains as dangerous as it was when dumped, being protected against sea-water attack by its solid state, its very low tendency to dissolve, side products of hydrolysis and dimerization products forming a protective phase when turbulence is lacking, and by the container itself".

⁷⁴ Viewed in abstract form only.

⁷⁵ Freeland H, Church J, Smith R and Boland F (1985) *Currents Meter Data from the Australian Coastal Experiment; a Data Report*. Report No. 169. CSIRO Marine Laboratories. The current meter was 12m above the sea bed.

⁷⁶ The current meter was 50m above the sea bed.

⁷⁷ New South Wales Environment Protection Authority pers. comm. As measured during the summer of 1995. The rate of current flow during this summer would be slightly faster than "normal" due to the East Australian Current being particularly active.

Water will ingress through the holes and hydrolyse some of the mustard gas within its housing. This was seen in the 1 ton bulk cylinder dredged off Cape Moreton which contained a substantial amount of water and hydrolysis products⁷⁸. Any remaining mustard will leach slowly through the holes and with the large volumes of water washing past the container, would remain at low concentrations⁷⁹ and hydrolyse quickly.

In conclusion we can surmise that mustard gas will slowly leak as its housing corrodes⁸⁰ and small egress points develop. The combination of slow leakage rate, warm sea temperature and currents will quickly dissolve and hydrolyse the mustard gas, both within its housing and as it diffuses through the holes. At Cape Moreton and Sydney, the hydrolysis products will be rapidly dispersed to the south by the EAC.

Risks to the public in Australia

Due to their locations, the risk of trawlers encountering the dumped CWA is low. Only two cylinders have been snared since the war which indicates the majority of the material is away from current trawling operations. The CWA retrieved would appear to have been stray cylinders (or the others are now buried) eg: the area up to 100 fathoms off Cape Moreton has been extensively trawled by prawn fishermen. The site off Sydney is a well known foul ground and is generally avoided by trawlers. Only one cylinder has washed ashore since world war two so the risk to the general public is virtually nil. This contrasts with overseas experience where there have been many encounters and accidents with trawled or washed up cylinders⁸¹. Although the areas are not currently trawled the CWA may still pose a threat to future possible trawling or other activities including sea mining. As the containers deteriorate, they may become more likely to break open when they hit the deck. If they are heavily corroded their contents will be mainly sea water and hydrolysis products. The more intact the containers, the more likely there will be mustard present.

Potential environmental effects

Literature that addresses the effects of CWA exposure on marine biota is very limited. Ecotoxicity experiments conducted in an aquarium apparently show mustard gas has no significant effect on fish. It is also believed fish do not bioaccumulate the agent (due to its solubility in water) [both reported in Stock (1995)]. There are two sites off Australia where many thousands of tons of mustard gas have been dumped. The site off Cape Moreton covers a large area and as mentioned includes a designated dumping site as proclaimed by the *Beaches, Fishing Grounds, and Sea Routes*

⁷⁸ R. Mathews pers. comm.

⁷⁹ And would never reach saturation level. Mustard which had been thickened with rubber or perspex would flow less freely.

⁸⁰ As already noted the corrosion rate will be faster for bulk cylinders than artillery shells.

⁸¹ CWA effects on health are numerous (see Pechura and Rall 1993) and include respiratory and skin problems. Mustard gas and Lewisite are blister agents, blistering the skin after contact. Mustard gas combines with DNA (that is, it is an alkylating agent).

Protection Act 1932 near Cape Moreton. Originally chosen as a site to abandon derelict boats away from shipping routes and trawling operations, it became a general dumping ground for many sorts of unwanted material. To my knowledge, no biological surveys have been undertaken at the site. The sea bed at the centrepiece is described as sand and shell⁸². Although knowledge of non-CWA dumping episodes over the half century this area was available as a waste dumping ground is limited, the data that exists (for the 1960s) gives an indication of the amount of waste that may have accumulated⁸³. There have been many dumpings close to the CWA dumped 25 miles east of Cape Moreton⁸⁴. Other material would lie on the sea bed within this rectangle⁸⁵. If the cylinders, bombs or shells started leaking they would pose a danger only to biota surviving in this accumulated debris. The hazard, if any, would depend on the rate of leakage of mustard from the container and as argued it should be a slow and gradual leak. Based on the data provided above, fish using the dump areas as artificial reefs should not be affected by the leakage of mustard gas. The nearest *identified* environmentally sensitive area to the dump site is the Moreton Bay Marine Park, declared in 1993. Surrounding Cape Moreton, its boundary extends three nautical miles from the coast. It is a significant distance from the 100 fathom line and thus the closest of the dumped CWA. As discussed, current flows around the mustard gas will be to the south. As the Marine Park is to the west of the dumping circle, the mustard gas should pose no threat. A similar situation exists at the major dumping site

⁸² Royal Australian Navy (RAN) Hydrographic Office (pers. comm.).

⁸³ Federal Government records indicate 1,022.5 tons of ammunition were dumped in the dumping circle between 7 March 1962 and 30 June 1964. A further 4,000 pounds of ammunition was dumped in February 1968 and an old dredge in 3 June 1969. From Plunkett (2003).

⁸⁴ This second site was the centrepiece of a second official Army dump site which replaced the one closer to Cape Moreton. It had coordinates of 27° S, 154° E with a diameter of 5 nautical miles. Data does not indicate when it was first used as a dump circle by the Australian Army. Within the second dump circle the following is known to have been dumped; October 1968, 600lbs of boxed rifle barrels and sulphur bottles; January 1969, 2649 lbs of electric plating vats; 1 ton of ordnance stores on 6 November 1965; 0.5 tons medical stores and sulphur drugs, 2 February 1966; 20 December 1966 - medical stores from water pounce 0.25 tons; 0.5 tons of metal, 22 January 1969 and 1 ton of scrap metal, 17 August 1971. Data from Plunkett (2003).

⁸⁵ Records show after the war non CWA ammunition was dumped beyond the 100 fathom line. US supplies including vehicles, old barges with ammunition and general stores (Peter Seib, pers comm, whose father in law was involved in the postwar dumping) were dumped after the war. Material trawled off Cape Moreton includes typewriters, clothing and medical supplies (Peter Seib pers comm). Six hundred tons of grenades were dumped in the rectangle after the war also (T. Davis pers comm). Conventional ammunition was dumped in unknown quantities by boats such as the MV (Motor Vessel) Katoora.

off Sydney. At least 68 boats have been dumped here. There are also submarine cables running through the area. It was definitely known and used by the defence forces immediately after World War II⁸⁶. The nearest sensitive areas are well away from this dump site.

The Future of Dumped CWA in Australian Waters

As the two main dump areas do not coincide with any sensitive marine environments there is unlikely to be any major environmental impacts from material remaining at the site (however, as noted earlier, material could have floated away from the site during dumping operations, possibly to marine sensitive areas⁸⁷). Retrieval of the dumped CWA would seem to pose an unnecessary risk, both a risk inherent in handling the material and a risk associated with the dangerous waste dumped with the CWA (known to include ammunition and most likely to also include chemicals). Further, it would seem to be impractical to individually locate thousands of scattered bombs and artillery shells, many now presumably buried by sediment and other waste.

International experience has shown that, wherever possible, public knowledge of the location of CWA dumps has been beneficial in avoiding contact incidents. Kurata (1980) has shown that since a national public inquiry in 1972, when information was released regarding the Japanese dumping sites, there have been no casualties from accidents. This compares with several deaths and dozens of wounded from dumped CWA contact in the period from World War II to 1972. He urged the release of such information in other countries to prevent future accidents. As the CWA dumping sites in Australia are not known to the general public their locations have been revealed to prevent possible exposure. As the locations of CWA dump sites in Australian waters are in rarely fished areas, the risk of accidental recovery by a trawler is low. It has been noted there have been only 2 cylinders trawled in the last 55 years. The risk to the general public contacting a drum is extremely small. However, if recovered, ANY ordnance (chemical or non-chemical) must not under any circumstances be touched or

⁸⁶ Limited data shows 300 tons of ammunition was dumped here in August/September 1945. 18 pounder with shell fuzes removed and boxed, and cartridges SAA 50 boxed were dumped 15 April 1945. In 1946 bombs, incendiary rolls, obsolete war planes and engines and more ammunition was dumped. Material dumped in 1976 includes the BOSUN, a crane lighter and sodium filled exhaust valves. More valves were dumped between 1978 and 1982. More recently, in 1993, a human body was buried at sea here. Data from Plunkett (2003).

⁸⁷ There is anecdotal evidence to suggest some trawler operators, off both Cape Moreton and Sydney, after snaring conventional ammunition within fishing areas, redump the material at sea at a site away from trawling operations. This transmigration of the dumped material means that the original coordinates of the dumping sites may no longer hold. It is possible CWA material has been trawled in the past and redumped in this fashion. I thank Major Keith Parker for this suggestion. The following is also offered by Major Chris Hely "There are a number of incidences where dumped Explosive Ordnance (not necessarily CW), although initially sinking appears to have become buoyant at lower levels; probably due to denser layers of water because of temperature etc differences. The items appear to have floated on top of these denser layers and consequently washed up considerable distances from where they were originally dumped. It was probably as a result of these incidences that buoyancy testing became common practice."

tampered with⁸⁸. Inappropriately handled ordnance can be very dangerous. CWA recovered overseas have caused serious injury even though the material is over 50 years old⁸⁹. Any incidents should be reported to the local police. They will in turn contact the relevant authority responsible for its appropriate disposal. If possible one should keep the general public away from the object in question.

The publication of this paper will, hopefully, prevent any accidents occurring at the CWA dump sites where co-ordinates have been revealed. It will also, hopefully, encourage other governments to reveal locations of their CWA sea dump sites for the same purpose.

⁸⁸ In the case of fishermen, no attempt should be made to transfer the container or munition onto the deck.

⁸⁹ These incidents are usually associated with thickened mustard in shallow water (R. Mathews pers. comm.).

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ACKNOWLEDGMENTS

Many thanks to Major Keith Parker and Major Chris Hely who both collected some of the information used in this report and who also made useful comments on the draft. Narelle Blackaby spent many an hour finding crucial Commonwealth files and Wayne Furler and David Bishop gave their total support to the project. I also thank Therese Manning, John Howell, Jason Middleton, Prof. Damon Ridley, Dr James Cook and Robert Mathews, whose suggested alterations were incorporated in this paper. Thanks to Mark Bolger for determining some of the dump coordinates from old maps and to John Gordon-Smith for suggesting amendments to the report.

ACRONYMS

ACT	Australian Capital Territory
AWM	Australian War Memorial
BAD	Base Ammunition Depot (Army)
BBC	Bromobenzylcyanide
CNS	Tear gas
CO	Commanding Officer
CR	Central Reserve
CRU	Chemical Research Unit (RAAF)
CWA/CW	Chemical Warfare Agent
DM	Adamsite
EPA	Environment Protection Agency
FBMU	Flying Boat Maintenance Group
H/HD	Mustard gas
HMAS	Her Majesty's Australian Ship
HQ	Headquarters
L	Lewisite
LC	Light Case (bomb)
LST	Landing Ship Tank
NBCD	Nuclear Biological Chemical Defence (School)
RAAF	Royal Australian Air Force
SCI	Smoke Curtain/Cloud Installation
UK	United Kingdom
US	United States

APPENDIX A

Stockage of Chemical Munitions, US¹

Advance Chemical Depot, Aviation, Charters Towers, Queensland

81 tons mustard (H), in bulk
94 tons lewisite (L), in bulk
15 tons CNS, in bulk
23,500 bombs, M47A2, 100-lb (H)
100 bombs, M47, 100-lb (L)
600 bombs, M47, 100-lb (empty)
496 M10 spray tanks, empty
204 M20 spray tanks, empty

Kangaroo (SOS Dump) (26 miles North of Townsville)

15,540 bombs M47A2, (H) 100-lb
18,168 - 75 mm gun(H)
14,370 - 75 mm howitzer (H)
198 - 105 mm howitzer (H)
1,401 - 155 mm howitzer (H)
1,171 - 155 gun (H)
300 DM Candles (toxic smoke)

Darra (near Brisbane Queensland)

373 tons mustard (H), in bulk
101 tons lewisite (L), in bulk
82 tons tear gas solution (CNS) in bulk
4,945 bombs, empty, 100-lb
5,595 DM candles (toxic smoke)
5,489 - 105 mm howitzer (H)

Columboola (200 Miles west of Brisbane)

26,023 bombs, (H) 100-lb
4,815 - 75 mm gun (H)
36,036 - 75 mm howitzer (H)
83,994 - 105 mm howitzer (H)
10,856 - 155 mm howitzer (H)
585 - 155 gun (H)

¹ From Annex No. 1 To Chemical Warfare Plan, South West Pacific Area. Stockage of Chemical Munitions, 1 November 1943.

Brisbane

4,216 chemical land mines (US) empty
134 M10 tanks, airplane smoke, empty
240 M20 spray tanks, empty
6 M33 spray tanks, empty

Geelong (40 miles SW of Melbourne)

431 tons mustard (H), in bulk

Kingswood (25 miles west of Sydney)

56,909 - 105 mm howitzer (H)
10,825 - 155 mm howitzer (H)

APPENDIX B

Stockage of Chemical Munitions, AUSTRALIAN ARMY¹

Albury NSW

85,300 - 25 pounder shell, base ejection, filled BBC (tear gas)

258,000 - 25 pounder shell, base ejection, filled mustard

26,900 - 6 inch howitzer shell, base ejection, filled mustard

8,000 - 4.2 inch mortar bombs, filled phosgene

39,500 - 4.2 inch mortar bombs, filled mustard

22,500 - 5 inch rocket bomb, filled phosgene

3,900 - mines, chemical, filled mustard

¹ From Annex No. 1 To Chemical Warfare Plan, South West Pacific Area. Stockage of Chemical Munitions, 1 November 1943.

APPENDIX C

Stockage of Chemical Munitions, RAAF¹

No. 1 Central Reserve (50 miles west of Sydney)

8,000 bomb, 30-lb LC charged mustard
400 bombs, 65-lb LC (empty)
4,800 bombs, 250-lb LC charged mustard
3,600 bombs, 250-lb LC charged phosgene
200 bombs, 250-lb LC (empty)

570 SCI² 500 lb charged mustard
3 SCI 500 lb (empty)
75 SCI 250 lb (empty)

¹ From Annex No. 1 To Chemical Warfare Plan, South West Pacific Area. Stockage of Chemical Munitions, 1 November 1943. Bulk storage drums were also held but most of these are believed to have been destroyed by burning.

² The SCI are from an inventory 18 August 1944.

FIGURE 1—LIKELY DUMP AREA FOR 8000 TONS OF CHEMICAL WARFARE AGENT DUMPED OFF BRISBANE

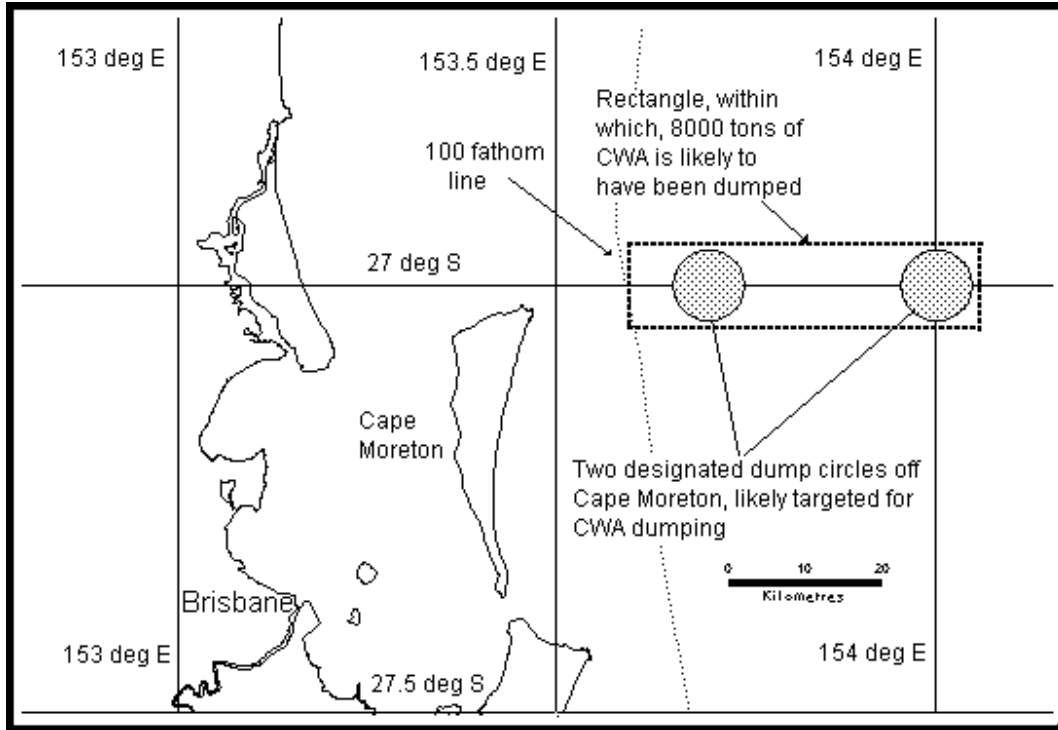


FIGURE 2—CHEMICAL WARFARE AGENT DUMP AREAS OFF SYDNEY

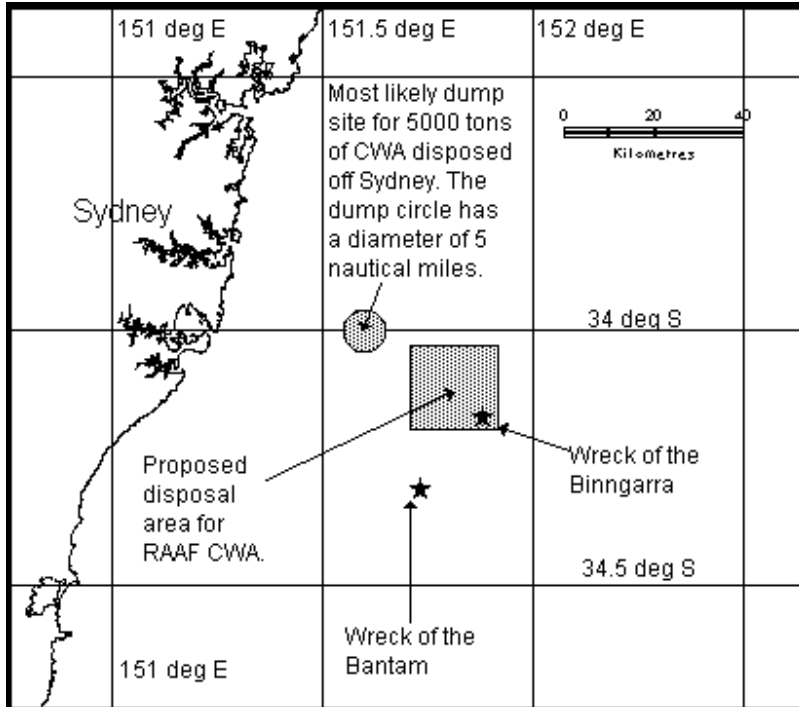


FIGURE 3—CHEMICAL WARFARE AGENT DUMP AREAS OFF TOWNSVILLE

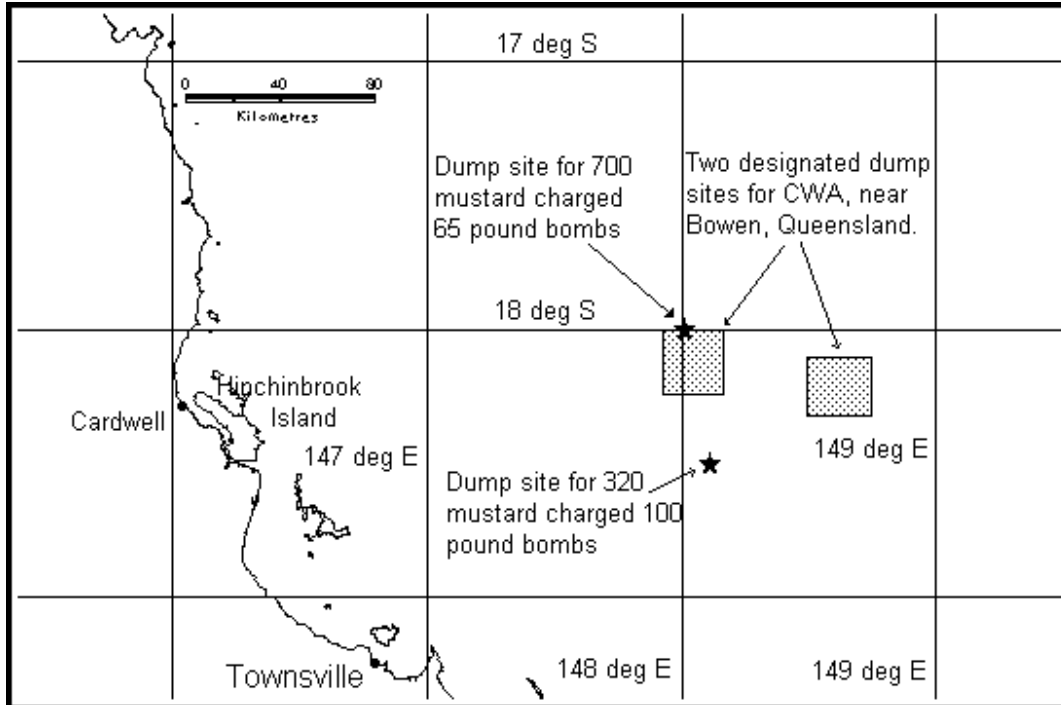


FIGURE 4—CHEMICAL WARFARE AGENT DUMP AREA OFF VICTORIA

