Procedures for the Protection of the Western Australian Marine Environment from Oil Spills

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PROCEDURES FOR PROTECTION OF THE WESTERN AUSTRALIAN MARINE ENVIRONMENT FROM OIL SPILLS

by

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Summary

This Bulletin is a revised version of a Department of Conservation and Environment Bulletin which described procedures in Western Australia made in response to possible adverse effects of spilt oil on the W.A. marine environment.[1] These revised procedures have been accepted by the W.A. Environmental Protection Authority, the W.A. Department of Mines and the State Government. In addition to the necessity for contingency arrangements for spills from marine transport, there exists in W.A. the potential threat of oil pollution from offshore petroleum exploration and production activities. Marine resources have been identified and 67 environmentally significant areas were nominated and designated as environmentally sensitive or special protection localities. Procedures for protection of these localities during offshore oil exploration have been formulated. Some of these procedures will be relevant to the clean-up of oil originating from shipping and other sources.

ORGANISATIONS IN W.A. CONCERNED WITH OIL SPILL POLICIES

The body directly concerned in the event of an oil spill is the State Committee for Combatting Marine Oil Pollution. This committee has no statutory authority but provides an administrative arrangement. It consists of 3 members: the Manager, Shipping and Navigation Division from the W.A. Department of Marine and Harbours who acts as co-ordinator and chairman, the Harbour Master of the Fremantle Port Authority and the Assistant Director from the Commonwealth Department of Transport and Construction in W.A.

The Combat Committee is assisted by a Technical Advisory Committee which has 7 members: representatives from the Department of Fisheries and Wildlife, Department of Conservation and Environment, Department of Mines, State Emergency Service and the Royal Australian Navy and the two W.A. Regional Industry Controllers of the Petroleum Institute Environment Conservation Executive (PIECE).

Both committees thus include representatives from a number of organisations concerned with oil spills. The two committees work closely together and meetings are held at irregular intervals every few months. They are concerned with aspects of oil pollution from all sources including tankers, refineries and offshore exploration activities.

Discharge of oil into W.A. waters from ships or from places on land is controlled by the Prevention of Pollution of Waters by Oil Act (1960) which is similar to Commonwealth legislation controlling discharge of oil from Australian ships on the high seas. This Act is administered by the Department of Marine and Harbours , and within the limits of proclaimed ports via the appropriate port authorities.

Exploration for and exploitation of petroleum resources of submerged lands adjacent to the Western Australian coast is undertaken subject to:

- The Commonwealth Petroleum (Submerged Lands) Act 1967, and
- The Western Australian Petroleum (Submerged Lands) Act 1982.

The exercise of powers and performance of functions of these two Acts is by means of an administrative agreement between the Commonwealth and State Governments. Under the joint legislation the State Minister for Mines is nominated as the "Designated Authority" and is responsible for administering the above arrangements. The advice of the State Combat Committee is sought by the Department of Mines with respect to operator's oil spill contingency plans, and for any spills which may eventuate from offshore petroleum exploration activities.

The National Oil Spill Plan was established to cover oil pollution of the sea by ships, and maintains strategic centres around the Australian coast where anti-pollution equipment funded by a levy on commercial shipping is stockpiled.[2] Two of the centres are at Fremantle and Port Hedland.

The Marine Oil Spills Action Plan (MOSAP) of the petroleum organisation PIECE covers marine oil spills which are the responsibility of the Oil Industry and thus includes pollution from refineries and offshore exploration and production activities.[3] The plan only comes into action on invitation when the spill is beyond the capabilities of the responsible company or clean-up authority, and in W.A. it is mediated by 2 Regional Industry Controllers and 12 Local Industry Controllers. It is intended that the National Plan and MOSAP will support each other when necessary.

Under the National Oil Spill Plan arrangements the Commonwealth has accepted the responsibility for co-ordination and provision of logistic support, material equipment and finance in combating oil spills in both State territorial and Commonwealth waters off all States except W.A., Victoria and Tasmania. In practice Commonwealth representation on the State Combat Committee will enable uniformity of approach and compatibility of State and Commonwealth attitudes to oil spills in W.A. The State Combat Committee has no jurisdiction over oil spills in ports and harbours, although these are subject to the National Oil Spill Plan when the Harbour Authority considers that its resources for clean-up are insufficient.

POSSIBLE SOURCES OF MARINE OIL SPILLS OFF W.A.

(i) Terminal Operations: Only one refinery exists in W.A., at Kwinana, 20 km south of Fremantle, but tanker loading of crude oil at Barrow Island and Broome and unloading of refined petroleum products at Fremantle, Port Hedland, Port Walcott, Dampier and to a limited extent at other ports occurs, while bunkering activities are considerable at the Port of Fremantle. The proposed Woodside Joint Venture just south of Withnell Bay at the Burrup Peninsula will involve transfer of condensate to tankers.

Oil spillages during these operations would be expected to be quickly curtailed and of a small size.

(ii) Marine Transport: According to an estimate by the National Academy of Sciences, USA, marine transportation, including terminal operations and bunkering, accounted for 35% of the total annual input of petroleum hydrocarbons entering the oceans around 1970.[4] Approximately half of the 35% resulted from deliberate discharge of oily waters while only about a tenth of this figure resulted from tanker accidents.

Figures obtained from oil companies for 1977 showed that approximately 560 000 tonnes (3.9 million barrels) of oil were carried to and from W.A. ports per month in about 20 boatloads. The quantity per boat varied from 3000 to 85 000 tonnes and 80% of the oil was transported to and from the refinery at Kwinana in approximately 14 boatloads per month. The oil varied from crude to refined with densities ranging from 0.66 to 1.03. The highest proportion for a single oil type, 43% or 238,000 tonnes per month, consisted of crude oil, density 0.86, transported from the Middle East to Kwinana. Second to this was 13% or 73,000 tonnes per month of crude oil, density 0.84, carried from Barrow Island to Kwinana.

More recent figures from the Commonwealth Department of Transport showed that 8.4 million tonnes of oil were handled annually in W.A. ports, of which 64% was at Fremantle (including Kwinana).[5]

Nearly 80% of the 452 accidental world oil spillage incidents from tankers over 3000 d.w.t. during 1969-73 occurred within coastal waters.[6] This fact, and the considerable oil transport to and from Kwinana, suggests that the sea just south of Perth is the most likely area for an oil spillage to occur. The oil would probably have a density of 0.84 or 0.86 and combative measures should be organised to treat such an oil.

(iii) Oil Exploration and Production: From 1968, when the first W.A. offshore well was drilled, up to June 1983, a total of 185 exploratory wells have been drilled offshore without oil spill incidents. The rate of offshore drilling has increased recently with the importation of several drilling vessels. If encouraging results are found, drilling activity could increase and eventually include production wells.

In addition to exploration activities, gas and condensate are in production from the Woodside North Rankin field in the North West Shelf. This has involved construction of a 132 km pipeline from the production platform to the Burrup Peninsula and the drilling of several development wells. Further expansion of production involving neighbouring gas fields is envisaged.

ENVIRONMENTAL CONCERNS FROM OFFSHORE DRILLING

In view of the remote possibility of a blow-out, harmful effects from accompanying oil spill clean-up procedures, drilling muds and cuttings, and temporary alienation of fishing areas, companies proposing to drill exploration wells in or close to environmentally significant areas (see next section) are asked to provide at least the following information through the W.A. Department of Mines.

(i) The expected radius from the rig within which entry of other vessels would not be encouraged.

(ii) Approximate volume, nature and size of cuttings and procedures for their disposal.

(iii) Quantitative composition of drilling fluid and an estimation of what quantity will reach the sea, at what rate and by what manner, both during and after drilling.

(iv) Suspected grade of oil likely to be encountered, assessed from previous drilling results in the area, if any.

(v) Seven copies of the company's oil-spill contingency plan which must include the type and quantity of dispersant carried and a flow chart indicating the order in which personnel and Government bodies would be informed of an oil spill.

(vi) Details of local winds and currents in relation to the most probable direction and speed of flow of a hypothetical oil spill from the well.

Further information may be required depending upon the particular well and locality (see page 4).

From January 1977 to June 1983, 105 drilling applications were approved by the Designated Authority. Ten of these applications, namely

- Bundegi No. 1 well in the prawn fishery of Exmouth Gulf.
- Peel No. 1 well in the vicinity of Garden Island, Rottnest Island and metropolitan beaches.
- Houtman No. 1, Batavia No. 1, Geelvink No. 1 and Indoon No. 1 wells in the vicinity of the Houtman-Abrolhos reserve and the Geraldton-Dongara rock lobster fishery.
- Jurabi No. 1 well in the vicinity of the Ningaloo Reef Tract (since proposed as Ningaloo Marine Park), Rowley Shelf and Exmouth Gulf.
- South Pepper No. 1, Serrurier No. 1 and Isabella No. 1 in the vicinity of the Rowley Shelf,

were assessed in detail because of their proximity to environmentally significant areas (see Table 1 and Figure 1). As a result of such assessments and discussions with the Mines Department and respective companies, additional safeguards to protect the environment were agreed to, and in the case of Bundegi No. 1 well the operator agreed to drill during the off-season for prawning.

RESOURCE MAPS AND DELINEATION OF ENVIRONMENTALLY SIGNIFICANT AREAS

The marine resources of W.A. have been mapped by the Department of Fisheries and Wildlife in order to define environmentally significant areas and as an aid to rapid decisions on measures to be taken in the likelihood of events, such as oil pollution, which could be detrimental to the marine environment. The resources considered are fin fish, crustaceans, molluscs, sea birds, salt water crocodiles, dugongs, turtles, seals, mangroves, sea grasses, seaweeds, algal mats, stromatolites, reefs, beaches, coquina beds, recreational areas, scientific research areas, anchorages, ports, industries and reserves. The condition of the resource throughout the year is included, e.g. different stages in the life-cycle of an organism, time of entry of young seals into the sea, level of utilisation of a bathing beach.

In addition to the resources, details of hydrological, meteorological and coastline characteristics will be incorporated into the map for use in assessing where, on the basis of current knowledge, dispersant application will be recommended or advised against.

Information from the resources map has been used by the Departments of Conservation and Environment and of Fisheries and Wildlife for a classification of each environmentally significant area as it pertains to off-shore exploratory drilling and production operations and transportation. This will enable the relevant planning authorities to know well beforehand which areas are considered to be "high risk" in terms of the resources present.

In this classification five broad criteria were used, each of which is sufficient for assessment of an area as a "high risk" area from oil pollution. These are:

A. Areas considered to have global ecological significance – this category to include internationally protected species.

B. National or State ecological significance – to include at least A class and aquatic reserves and marine parks.

C. High economic importance – fisheries (to be of significance to fisheries, e.g. contributes a significant part of the catch of an important commercial fishery; also to include nursery areas, embayments and estuaries), subsistence aboriginal fisheries, ports, marinas, tourism, marine dependent industries.

D. Areas of high recreation utilisation.

E. Scientific research and educational areas.

Of these areas, nine (Rowley Shoals, Dampier Archipelago, Exmouth Gulf, proposed Ningaloo Marine Park, Shark Bay Region, Houtman-Abrolhos Reserve and Associated Coral Reefs, Rottnest Island and Associated Reefs, Cockburn Sound, and King George Sound, Albany) were considered to warrant a more comprehensive environmental assessment and were designated as environmentally sensitive localities (ESL). The other fifty eight were designated as special protection localities (SPL).

Localities thus classified are given in Table 1 and shown in Figure 1. They are also depicted in greater magnification on 1 : 1,000,000 maps from the Department of Mines.

PROTECTION OF ENVIRONMENTALLY SENSITIVE LOCALITIES AND SPECIAL PROTECTION LOCALITIES DURING OIL EXPLORATION

In order to afford protection to each ESL and SPL during oil exploration, two categories of buffer zone have been designated which together extend not less than 50 km from the outer edge of the ESL or SPL. They are an inner nominal 8 km immediate protection zone (IPZ) and an outer special conditions zone (SCZ) which occupies a nominal 42 km from the outer edge of the IPZ (see Figure 1). The outer limits of the buffer zones are defined by the blocks shown in the 1 : 1,000,000 maps accompanying the Petroleum (Submerged Lands) Acts. Copies of these maps, showing the localities and their buffer zones are available from the W.A. Department of Mines.

8 km immediate protection zone (IPZ)

Within the 8 km zone it would be preferable to avoid the use of dispersants, especially as it is often a shallow body of water. This zone should allow a sufficient distance and water volume for considerable dilution of oil chemically-dispersed outside its boundary, thereby minimising any toxic effects of oil/dispersant mixtures on the ESL or SPL.

42 km special conditions zone (SCZ)

Within this zone dispersants may be used and the operator should fulfil special conditions imposed by the Department of Conservation and Environment (see next section).

The rationale for selecting a 42 km zone is based on the following two factors:

(i) Oil at sea is generally considered to move at about 3% of the wind speed and thus, if local water currents are ignored, an oil slick under extreme weather conditions of a 30 knot continuous wind would travel from the outer edge of the 42 km zone to the outer edge of the 8 km zone in about 24 hours.

(ii) Although the National Plan does not cover accidents arising from oil exploration and production activities, it is presumed that, if required, its resources would be on-site within 24 hours.

ENVIRONMENTAL ASSESSMENT STATUS OF ENVIRONMENTALLY SENSITIVE LOCALITIES, SPECIAL PROTECTION LOCALITIES AND BUFFER ZONES DURING OIL EXPLORATION

Currently no offshore areas are withheld from exploration activities. The assessment status of environmentally significant areas and buffer zones can be summarized as follows:

(i) ESL and IPZ – For exploration wells drilled in these areas a Notice of Intent[7] (see Appendix) to the Department of Conservation and Environment is required. In addition it is expected that at least the first exploration well will be subject to an Environmental Review and Management Programme (ERMP).[7]

(ii) SPL and IPZ – For at least the first exploration well drilled in these areas a Notice of Intent to the Department of Conservation and Environment is required. There will not be a requirement for an ERMP.

(iii) SCZ – Subject to special conditions suggested by the State Combat Committee, Department of Fisheries and Wildlife and Department of Conservation and Environment. Naturally, these conditions will vary with each drilling application. Factors such as time of drilling and associated biological and human utilisation of a nominated ESL or SPL will be important considerations. However, since the Bureau of Mineral Resources (pers. comm.) has estimated that the spillage rate from an offshore exploratory well off W.A. could be in the order of 2000 barrels

(300 tonnes) per day and since it is considered that chemical dispersant applied to oil that has undergone weathering is often much less effective, especially if a water in oil or "chocolate mousse" emulsion has formed, in most situations the Department of Conservation and Environment will only recommend approval for drilling on the basis of the operators providing for such a spill:

(a) Adequate mechanical diversion equipment at the nearest regional centre to cope for the first 24 hours.

(b) Sufficient approved chemical dispersant at the drilling site or nearest regional centre to cope for the first 24 hours.

(c) The capacity, in conjunction with the MOSAP arrangements of PIECE, to fully disperse the oil before it is 12 hours old and prior to it reaching the IPZ.

However, for drilling within the outer 22-42 km sector of the SCZ, if prospective drillers are able to demonstrate to the satisfaction of the Department of Conservation and Environment that under expected weather conditions oil should not reach the ESL or SPL within 24 hours of a blow-out, then it will be recommended that they be exempt from the above conditions, and operators' approved contingency plan arrangements will suffice.

(iv) All other areas – as for the ESL, SPL, IPZ and SCZ, operators' oil spill contingency plans to be approved by the State Combat Committee. Applications for these areas will also be referred to the Department of Fisheries and Wildlife and the Department of Conservation and Environment.

CLEAN-UP PROCEDURES

It should be emphasised that, as in the National Oil Spill Plan, the preferred method for treatment of oil spills is by mechanical removal at sea. It has been argued that containment booms currently available are ineffective in offshore weather conditions, but their provision in W.A. contingency planning will be made mandatory for offshore drilling activities in the ESL, IPZ and at least the inner 22 km of the associated SCZ on the grounds that:

(i) conditions are by no means always unsuitable for their use,

(ii) booms may be used to divert oil from specially sensitive coastal situations, and

(iii) concentration of oil by booms may facilitate successful dispersion or recovery.

Currently a Troilboom Giant Containment and Recovery System and a Slickbar Boom and Recovery System are available from the Fremantle Port Authority, a Gamlen Boom is available from the Swan River Management Authority and, as part of the National Plan, a Vikoma Seapack Boom and a Komara Skimmer are held at Karrakatta (Perth) and a Marco Skimmer is on loan to the Fremantle Port Authority. In addition, at Port Hedland, a co-operative of W.A. offshore operators have supplied a Vikoma Seapack Boom and Ocean Skimmer and a stockpile of concentrated dispersant.

However, there will be circumstances where containment is clearly impracticable. In such circumstances, depending on the resource at risk, on the position and direction of movement of the oil slick and on the environmental and practical feasibility of later clean-up on land, the approach will be to do nothing or to use dispersants sufficiently distant from the shore, and in waters of sufficient depth, to ensure considerable dilution. It should be emphasised that dispersant use is not favoured within 8km of a shoreline or in waters less than 10m deep (including any reefs or banks rising to within 10m of the sea surface). However, where the use of dispersants is regarded by the Department of Conservation and Environment as a preferable alternative to fouling by oil of an important marine resource, the following procedures are recommended in W.A. for both tanker and offshore drilling and production accidents within the 67 environmentally significant areas and their buffer zones:–

(i) Within the ESL, SPL and IPZ, dispersants are not to be applied unless authorised by the Designated Authority after advice from the Department of Conservation and Environment.

(ii) Within the inner 22km sector of the SCZ, dispersants will be immediately and properly applied irrespective of the direction of flow of the oil slick, unless it is less than 8km from a shoreline or in water depths less than 10m when prior advice from the Department of Conservation and Environment will be necessary. Changes in wind direction which may push the slick towards as ESL or SPL are thus accounted for.

(iii) Within the outer 20km sector of the SCZ, dispersants will be applied if the slick shows any indication of moving towards an ESL or SPL, unless it is less than 8km from a shoreline or in water depths less than 10m when prior advice from the Department of Conservation and Environment will be necessary.

For areas other than the environmentally significant areas and their buffer zones the following procedures will apply:-

(i) In waters less than 10m deep (including any reefs or banks rising to within 10m of the sea surface), together with an 8km wide protective zone around such shallow areas, dispersants are not to be applied unless authorised by the Responsible Authority after advice from the Department of Conservation and Environment.

(ii) Within a zone from 8–30km from the 10m depth contour, dispersants will be applied if considered by the Department of Conservation and Environment to be necessary for the protection of the resources at risk.

(iii) Within a zone from 30–50 from the 10m depth contour, dispersants are unlikely to be required. The use of dispersants will only be considered if there are indications that the oil will move into an environmentally sensitive area.

(iv) For oil floating more than 50km from the 10m depth contour, dispersants should not be needed. They may be applied on the recommendation of the State Combat Committee after it has taken into account meteorological, hydrological and environmental advice.

It is important that only the recommended ratio of concentrate/oil be applied, thus avoiding toxic effects of excessive application, particularly when using concentrated dispersants ("self-mix" dispersants).

In assessing drilling operators' oil spill contingency plans, particular attention is paid to the type and quantity of dispersant carried and the methods proposed for its rapid use. As far as practicable, any dispersant equipment should be compatible for use with the National Plan dispersant. Similarly, informal discussions on dispersant stocks and methods of application have been started with Port and Harbour authorities.

Very little testing of dispersants has been done on Australian marine species and there is no National list of approved dispersants. In W.A., only dispersants which have passed the toxicity and efficiency tests of the U.K. Government, the U.S. Environmental Protection Agency or an authority recognised by the Department of Conservation and Environment will be recommended by the State Combat Committee.

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TABLE 1: ENVIRONMENTALLY SIGNIFICANT AREAS WITH REFERENCE TO OFFSHORE PETROLEUM EXPLORATION, PRODUCTION AND TRANSPORTATION

LOCALITIES AND BOUNDARIES	BASIS OF CLASSIFICATION AND MAIN RESOURCES AND ASSOCIATED ACTIVITIES
1. **CAMBRIDGE GULF AREA** – Comprises the waters contained in the West Arm, the Ord River and their main tributaries (Forrest River, Durack River, Pentecost River and King River) from 15°10'S to 15°45'S and from 127°45'E to 128°30'E.	B.C. Mangrove areas of the Ord River are enclosed within boundaries of the Ord River Nature Reserve. Salt water crocodiles. Subsistence aboriginal fishing. Port.
2. **CAPE LONDONDERRY AREA** – Beauty Point to Curren Point	B. Adjacent to and partly enclosed within boundaries of proposed A Class reserve (System 7 Report). Mangroves. Salt water crocodiles.
3. **NAPIER BROOME BAY** – Ian Bay to King Harman Point via Bluff Point including the King Edward River up to Aragoon.	C. Subsistence aboriginal fishing.
4. **PORT WARRENDER** – Warrender Hill to opposite headland.	B.E. Adjacent to and partly enclosed within boundaries of proposed B Class reserve (System 7). W.A. Museum study area for mangroves. Important bird habitat, including mangrove birds. Salt water crocodiles.
5. **PRINCE FREDERICK HARBOUR** – Cape Torrens to the unnamed cape south of the Anderdon Islands.	B. Proposed aquatic reserve (System 7). Mangroves. Salt water crocodiles.
6. **SAINT GEORGE BASIN** – Uwins Island to Cape Wellington.	B.E. Proposed aquatic reserve (System 7). Mangroves. Crocodile research.
7. **BRECKNOCK HARBOUR, PORT GEORGE IV AREA** – Western edge of Augustus Island south to Wilson Point, and eastern edge of Augustus Island east to mainland.	C. Commercial pearl culture.
8. **DERBY** – Boundary drawn from north of Christine Point via the Mary Islands to the coast west of Escape Point; includes the Fitzroy River down to Langey Crossing.	C. Subsistence aboriginal fishing. Port.
9. **DEEP WATER POINT** – 162 hectares off north-eastern edge of Deep Water Point in King Sound.	C. Commercial pearl culture.
10. **BUCCANEER ARCHIPELAGO** – Swan Point to Skeleton Point via West Roe Island, East Roe Island, Hunt Island and Pelican Rock.	C. Commercial pearl culture. Trochus fishery. Subsistence aboriginal fishing.
11. **THOMAS BAY** – Lombadina Point to opposite headland.	C. Subsistence aboriginal fishing.
12. **PENDER BAY** – Cape Borda to Bell Point.	C. Subsistence aboriginal fishing.
13. **BEAGLE BAY** – North Head to Sandy Point.	C. Commercial pearl culture. Subsistence aboriginal fishing.
14.* **LACEPEDE ISLANDS AND IMMEDIATE SURROUNDING REEFS**	B. Proposed B Class reserve (System 7). Green turtles. Giant clams. Rich variety of corals. Important sea bird nesting area. Type locality for some coral species.

LOCALITIES AND BOUNDARIES	BASIS OF CLASSIFICATION AND MAIN RESOURCES AND ASSOCIATED ACTIVITIES
15. **ROWLEY SHOALS** (Mermaid, Clerke, Imperieuse Reefs) – **ESL** – approximately 300 km west of Broome.	A.B.E. Bedwell Island, within Clerke Reef, is a breeding area for the Red-tailed Tropic Bird, an endangered species. Spectacular coral reefs in a pristine environment. Atypical shelf atolls, biologically and geomorphologically unique in W.A. Huge diversity of tropical marine fauna including rare species and new genera of corals and fish. W.A. Museum study area.
16. **WILLIE CREEK AREA** – Willie Creek and an area opposite 122°9'E to 122°10'E by 17°45'S to 17°46'S.	C.D. Commercial pearl culture. Subsistence aboriginal fishing. Sport fishing.
17. **BROOME** – Station Hill to Entrance Point.	C.D. Tourism. Subsistence aboriginal fishing. Broome beaches and boating areas. Shells.
18. **ROEBUCK BAY** – Entrance Point to Sandy Point.	B.C.D. Important migrant wading bird habitat. Commercial pearl culture. Tourism. Subsistence aboriginal fishing. Boating and yachting. Sport fishing. Shells.
19. **CAPE VILLARET AREA** – An area opposite Cape Villaret 122°00'37"E to 122°03'53"E by 18°17'08"S to 18°18'52"S.	C. Commercial pearl culture.
20. **LAGRANGE BAY** – False Cape Bossut to Cape Bossut.	B.C. Migrant wading bird habitat. Subsistence aboriginal fishing.
21. **CAPE MISSIESSY AREA** – An area opposite Cape Missiessy 121°10'E and 19°00'S, 121°30'E and 19°00'S, 121°00'E and 19°20'S, 121°20'E and 19°20'S.	C. Major area for collection of pearl oysters for culture and for Mother of Pearl.
22. **CAPE KERAUDREN AREA**	B.D. Migrant wading bird habitat. Regional recreation and sport fishing.
23. **BEDOUT ISLAND**	B. A Class reserve. Important seabird nesting area.
24. **BREAKER INLET** – Poissonnier Point to opposite headland and down the inlet to 20°03'S.	B.C. Important seabird feeding areas. Subsistence aboriginal fishing.
25.* **NORTH TURTLE ISLAND**	B. A Class reserve. Important seabird nesting area.
26. **PORT HEDLAND** – Western edge of Finucane Island east to coastline at 118°52'E, 20°13'S, including creeks.	C.D. Port. Subsistence aboriginal fishing. Mangroves. Boating. Sport fishing. Recreational beach. Shells.
27. **COWRIE CREEK**	D. Regional sport fishing.
28. **POINT SAMSON AREA** – From the coast south west of Cape Lambert at 20°37'S and 117°08'E around Point Samson to Reader Head.	C.D. Port. Fishing boat harbour (Sam's Creek). Subsistence aboriginal fishing. Sport fishing. Boating. Recreational beach.
29. **NICKOL BAY FORESHORE**	B.D. Mangroves. Sport fishing. Recreation.
30.* **DAMPIER ARCHIPELAGO – ESL** – Boundary to include West Intercourse Island, Enderby Island, Kendrew Island, Brigadier Island, Cape Legendre, northern point on Dolphin Island, Sloping Point on mainland.	A.B. C.D. E. Dugongs. Rosemary and Enderby Islands are A class reserves. Sand flats support rich intertidal fauna. Turtles. Seabird nesting areas. Coral reefs. Mangroves. Port. Commercial solar salt production at Dampier. Industrial cooling water intakes. A number of islands important for recreation. Boating and yachting. Beaches. Sport fishing. Kendrew Is. is a Museum research area.
31.* **MONTE BELLO ISLANDS**	B.C. Proposed A Class reserve (System 8). Important turtle breeding area. Diverse molluscan fauna. Coral reefs. Commercial pearl culture.

LOCALITIES AND BOUNDARIES	BASIS OF CLASSIFICATION AND MAIN RESOURCES AND ASSOCIATED ACTIVITIES	
32.* **ROWLEY SHELF** – To encompass an area bounded by Ningaloo Marine Park boundary at 114°16'E, 21°43'S and 114°19'E, 21°47'S, Tubridgi Point, the 20 m isobath and the mainland up to 116°E, and to include all islands within this area.	A.B. C.D.	Dugongs near Port Weld. Little Rocky Island is an A Class reserve. Weld, Thevenard (Mackerel), Long (Serrurier), Round and Tent Islands are proposed A Class reserves (System 9). Seabird nesting areas. Coral reefs. Turtle breeding areas. Mangrove and tidal flats. Source of nutrients for surrounding ecosystem. Fish and prawn nursery area. Commercial prawn fishing. Commercial pearl culture off Middle Island. Subsistence aboriginal fishing in Beadon Bay. Offshore fishing. Recreation.
33.* **EXMOUTH GULF – ESL** – Ningaloo Marine Park boundary at 114°19'E, 21°47'S to Tubridgi Point.	A.B. C.D.	Dugongs. Simpson and Whalebone Islands are proposed A Class reserves (System 9). Rich echinoderm fauna. Extensive mangrove and tidal flats. Seabird feeding areas. Turtles. Commercial prawn and fin fish fishery. Commercial pearl culture in Giralia Bay and Gales Bay. Fish and prawn nursery area. Tourism. Sport fishing. W.A. Museum research areas.
34.* **NINGALOO MARINE PARK – ESL** – From Amherst Point at 23°34'S around North West Cape to enclose Bundegi Reef in Exmouth Gulf at 21°53'S.	A.B. C.D. E.	Proposed Marine Park (Ref 13). Important large rich accessible barrier coral reefs with associated flora and fauna, clear waters, sandy beaches and rocky headlands. Mangroves. Turtle breeding areas. Tourism. Recreation. Shells. Sport fishing. Coral Bay marine reserve. Biological research area.
35.* **SHARK BAY REGION – ESL** – Bounded by a line drawn between Point Quobba and Cape Inscription via Bernier and Dorre Islands and includes Wooramel Seagrass Bank, Denham Sound, Freycinet Reach, Useless Inlet, Blind Straight, South Passage, Freycinet Estuary, Hopeless Reach, Disappointment Reach, Lharidon Bight and Hamelin Pool.	A.B. C.D. E.	Stromatolites. Dugongs. Wooramel Seagrass Bank is a proposed aquatic reserve (System 9). Denham Sound, Freycinet Reach and Estuary, Hopeless Reach and Lharidon Bight are proposed as an aquatic reserve (System 9). Turtle breeding areas. Seabird nesting areas. Seagrass meadows. Mangroves. Tidal flats. Commercial prawn and fin fish fishery (mainly snapper). Scallops. Fish and prawn nursery area. Commercial solar salt production at Useless Inlet and Useless Loop. Tourism. Sport fishing. Boating. Shell collecting. Geological/biological research areas.
36. **KALBARRI** – Mouth of Murchison River.	C.D.	Commercial fishing, including rock lobsters. Tourism. Major recreational area. Sport fishing.
37.* **HOUTMAN – ABROLHOS RESERVE AND ASSOCIATED CORAL REEFS** (Wallabi, Easter and Pelsart group) – **ESL**.	A.B. C.D. E.	Breeding islands for Lesser Noddy, an endangered bird species. A Class reserve. Rich and diverse marine flora and fauna. Important seabird nesting areas. Coral reefs. Mangroves. Algae. Sea lions. Major rock lobster fishery. Scallop fishery. Recreation. Sport fishing. Biological research area.
38. **GERALDTON** – Drummond Cove to Cape Burney.	C.D.	Port and fishing boat harbour. Rock lobster fishery. Tourism. Boating and yachting. Recreational beaches. Sport fishing.
39. **DONGARA** – Irwin River to Leander Point. Seven Mile Beach.	C.D. E.	Commercial fishery including rock lobsters and abalone. Marina. Tourism and recreation. Sport fishing. Biological research area.
40.* **JURIEN BAY** – North Head to 30°21'S on mainland following the 20 m isobath and including all islands.	B.C. D.	Seabird nesting areas. Sea lions. Rock lobster fishery. Recreation. Anchorage. Sport fishing.

LOCALITIES AND BOUNDARIES	BASIS OF CLASSIFICATION AND MAIN RESOURCES AND ASSOCIATED ACTIVITIES
41. **MOORE RIVER** (Guilderton).	C.D. Rock lobsters. Recreation. Sport fishing.
42. **TWO ROCKS – YANCHEP BEACH**.	C.D. Marina. Rock lobster fishery. Tourism. Sport fishing. Recreational beaches.
43. **METROPOLITAN BEACHES** – Burns Beach to Woodman Point.	B.C. D. Proposed aquatic reserve, offshore reefs from Ocean Reef to Trigg (System 6). Ocean Reef marina. Entrance to Fremantle Port. Sport fishing. Recreational beaches. Tourism. Boating and yachting.
44. **ROTTNEST ISLAND AND ASSOCIATED REEFS – ESL.**	B.C. D.E. A Class reserve including adjacent rocks and islands and some adjacent waters. Two proposed aquatic reserves (System 6). Rich and varied marine flora and fauna, including coral species. Seabird nesting areas. Professional fishery, mainly rock lobster. Tourism. Recreational beaches. Boating. Sport fishing. Abalone. Biological research and educational area.
45.* **COCKBURN SOUND – ESL** – enclosed by Woodman Point, Carnac Island, western edge of Garden Island and Point Peron.	B.C. D.E. Proposed aquatic reserve surrounding Carnic Is. (System 6). Major fish nursery area. Professional fisheries (principally pilchard, scaly mackerel, crabs and abalone). Sheltered harbour, naval base. Power station and industrial water intakes. Tourism. Sport fishing. High recreational use. Beaches. Boating and yachting. Biological research area.
46.* **SHOALWATER BAY AND WARNBRO SOUND** – Point Peron to Becher Point, including Penguin Island.	B.C.D. Proposed aquatic reserve around Cape Peron (System 6). Nesting area for Little Penguin. Professional abalone fishery. Beach recreation. Boating and yachting. Sport fishing.
47. **PEELHURST – FALCON BAY** – Includes entrance to Peel Inlet, Mandurah.	C.D. Commercial fishery in Inlet. Entrance to fish nursery (Peel Inlet). Tourism. Recreational beaches. Sport fishing.
48. **BUNBURY** – From Leschenault Inlet cut to Back Beach.	B.C.D. Mangroves. Professional fishery. Port. Power station cooling water intake. Tourism. Recreational beaches. Boating and yachting. Sport fishing.
49. **GEOGRAPHE BAY** – To 20 m isobath, from Wonnerup Estuary to Bunker Bay.	C.D. Professional fishery. Fish nursery area. Seagrass. Tourism. Beaches. Sport fishing. Boating and yachting.
50. **YALLINGUP AREA.**	C.D. Tourism. Recreation. Beaches. Sport fishing.
51. **COWAMARUP AREA.**	D. Recreation. Beaches. Sport fishing.
52. **PREVELLY AREA.**	D. Recreation. Beaches. Sport fishing.
53. **HAMELIN BAY AREA** – North Point to Cape Hamelin and including offshore islands.	B.D. Important seabird nesting area. Sea lions. Recreational beach. Sport fishing.
54. **AUGUSTA** (mouth of Blackwood River Estuary).	C.D. Tourism. Recreation. Beaches. Sport fishing. Entrance to fish nursery area (Hardy Inlet).
55. **WINDY HARBOUR.**	B.D. Part of proposed South Coast National Park (System 2). Recreational beaches. Sport fishing.
56. **BROKE INLET** (entrance).	B. Proposed aquatic reserve (System 2). Entrance to fish nursery area.
57. **NORNALUP INLET** (entrance).	B.D. Part of proposed South Coast National Park (System 2). Entrance to fish nursery and fishing area. Recreational area.

LOCALITIES AND BOUNDARIES	BASIS OF CLASSIFICATION AND MAIN RESOURCES AND ASSOCIATED ACTIVITIES
58. **PEACEFUL BAY** (Foul Bay).	D. Recreational beaches. Sport fishing.
59. **WILSON INLET** (entrance) – Includes Ocean Beach.	C.D. Entrance to fish nursery and fishing area. Tourism. Recreational beach. Sport fishing.
60.* **KING GEORGE SOUND, ALBANY – ESL** – Bald Head to Cape Vancouver. Includes Princess Royal Harbour, Oyster Harbour and King George Sound.	B.C. D.E. Important seabird nesting areas. Seals. Diverse mulluscan fauna. Seagrass meadows. Professional fishery (principally pilchard). Port. Tourism. Recreational beaches. Boating and yachting. Sport fishing. W.A. Museum research areas.
61. **TWO PEOPLE BAY** – South Point to North Point.	D. Recreational beaches. Sport fishing.
62. **BETTY'S BEACH** – North Point to coast at 118°15'E.	C.D. Salmon fishery. Recreational beach.
63. **HASSELL BEACH** (Cheyne Beach) – Lookout Point to coast at 118°30'E.	C.D. Salmon fishery. Recreational beach.
64. **BEAUFORT INLET** (entrance).	C.D. Entrance to fish nursery and fishing area. Recreational beaches.
65. **BREMER BAY** – Black Point to opposite headland.	D. Recreational beaches. Sport fishing.
66. **HOPETOUN**.	D. Recreational beaches. Sport fishing.
67.* **THE RECHERCHE ARCHIPELAGO AND ESPERANCE** – Boundary defined by coastline and 34°15'S; 121°35'E and 123°20'E.	B.C. D. Islands of Archipelago have A Class reserve status. Includes Cape Le Grand National Park which extends to low water mark and includes part of Cape Arid National Park which extends to low water mark. Important seabird nesting areas. Seals (especially New Zealand Fur Seal). Diverse molluscan fauna. Scattered corals. Port. Professional fisheries (mainly tuna, shark and abalone). Tourism. Recreational beaches. Boating and yachting. Sport fishing.

ESL – represents an environmentally sensitive locality. All other localities are special protection localities.

Systems 2, 6, 7, 8, 9 – refer to References 8, 9, 10, 11.

A, B, C, D, E – refer to broad criteria used to select environmentally significant areas (see page 3).

* – denotes that at least part of the locality is listed on "The Register of The National Estate" (Ref. 14).

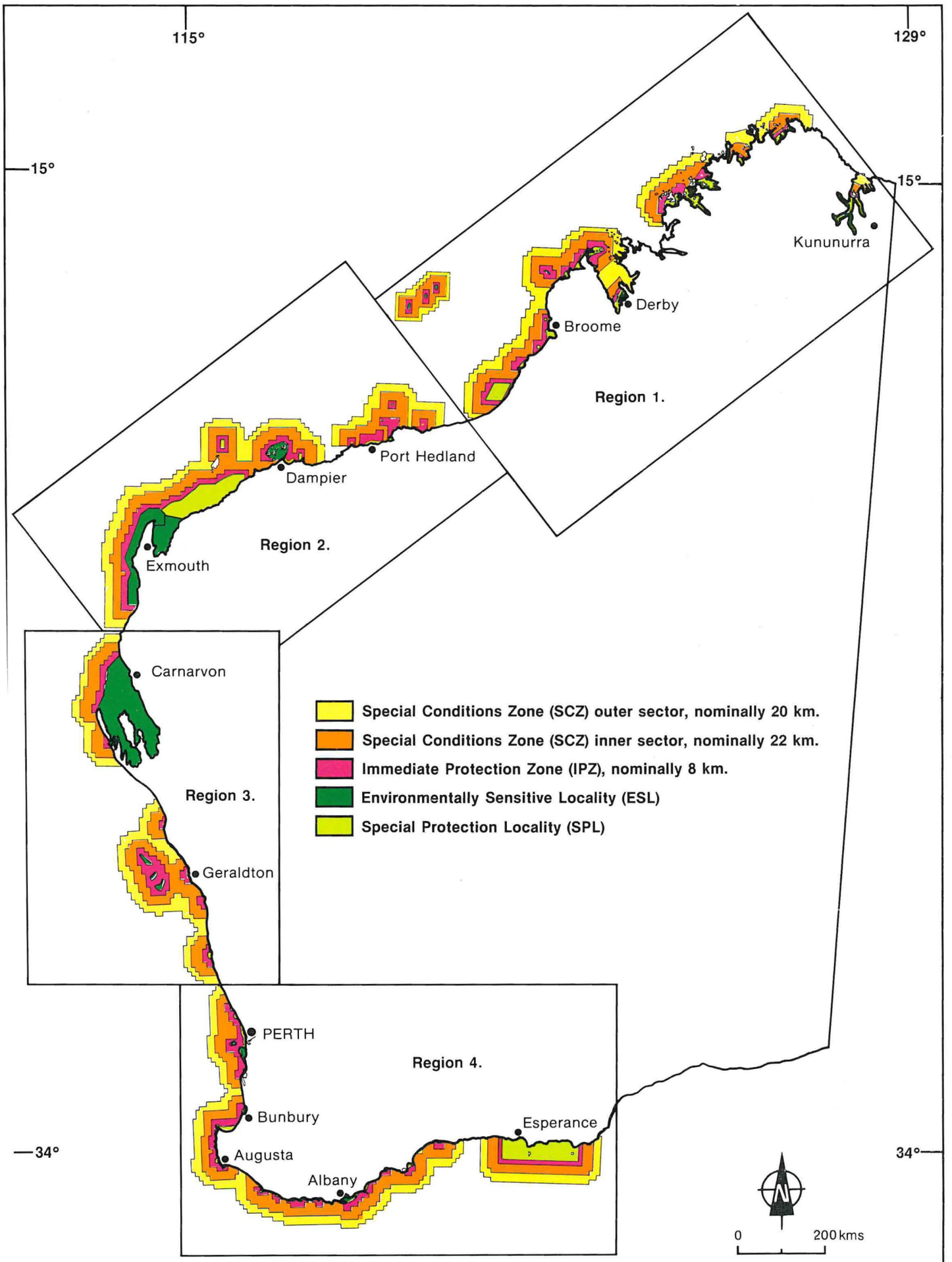
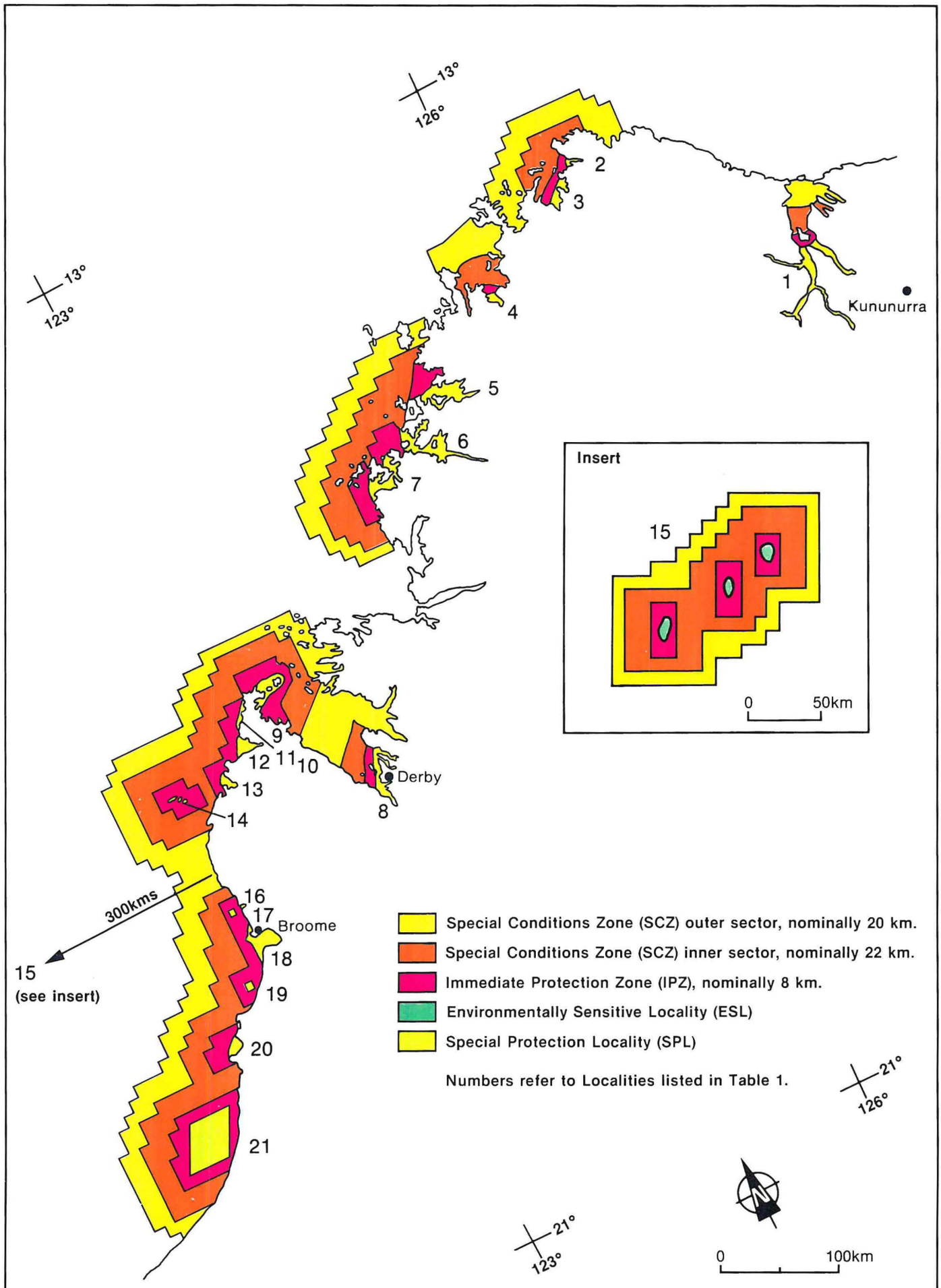
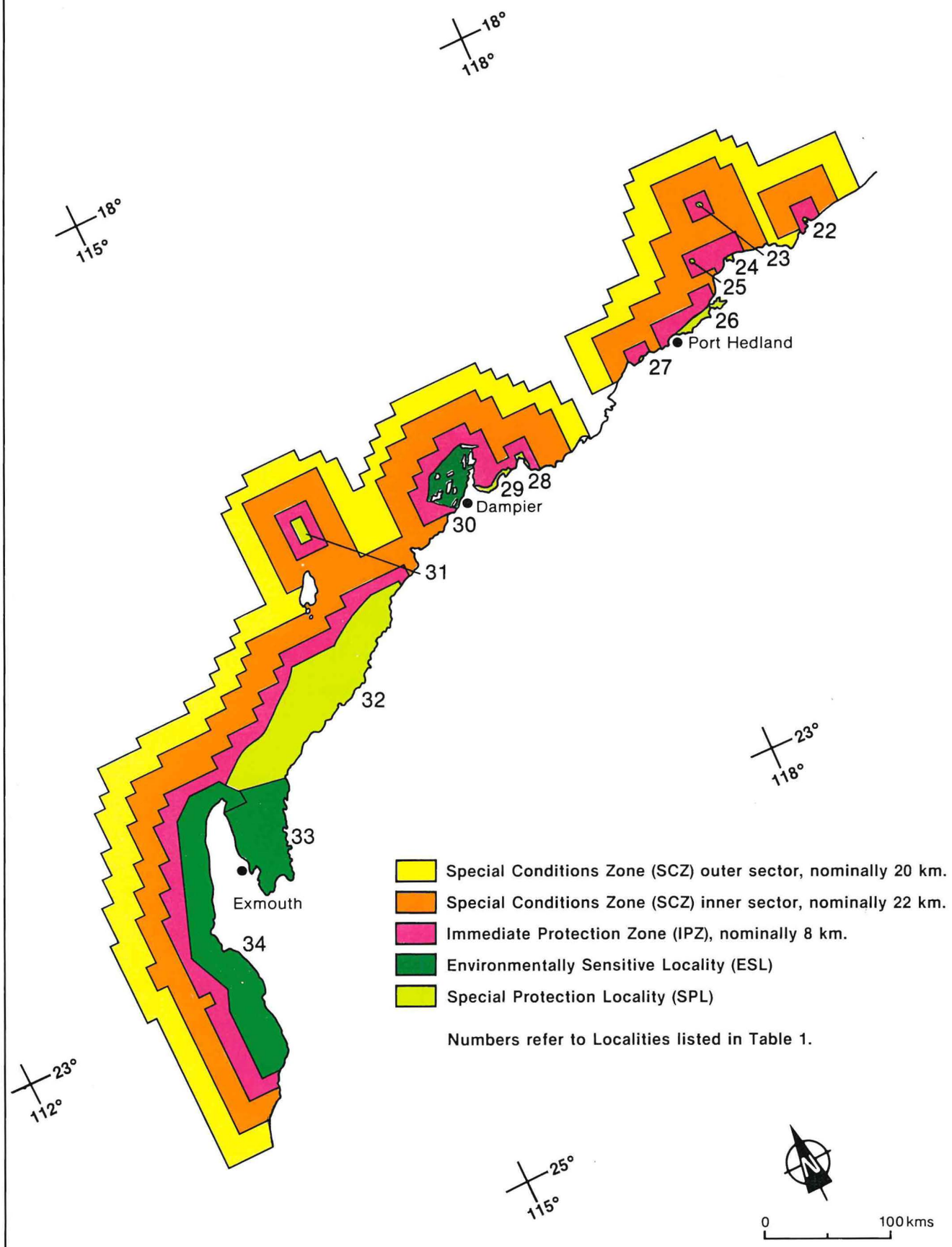


Figure 1 ENVIRONMENTALLY SIGNIFICANT AREAS PERTAINING TO OIL SPILLS.



ENVIRONMENTALLY SIGNIFICANT AREAS AND ASSOCIATED BUFFER ZONES. REGION 1.



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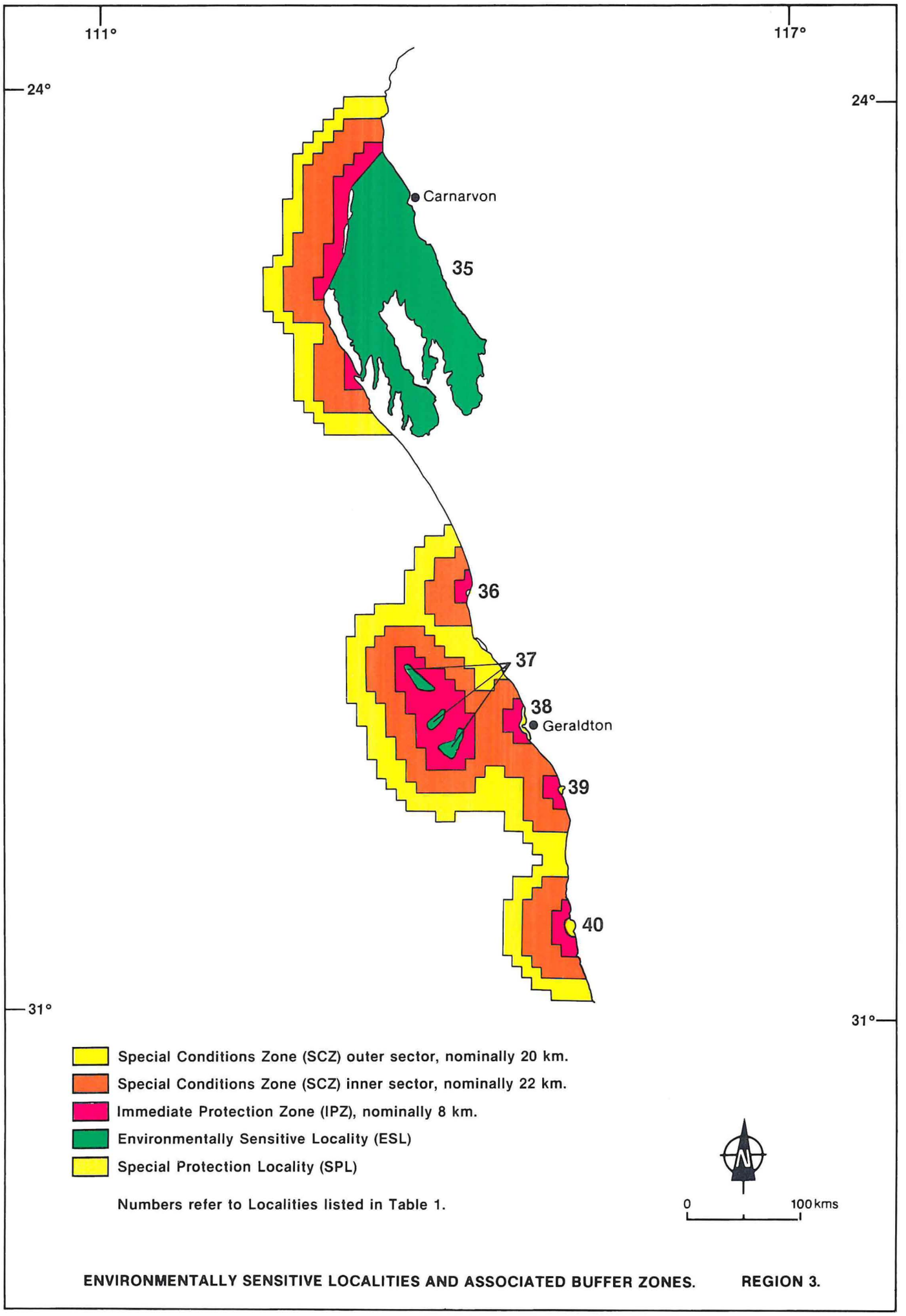
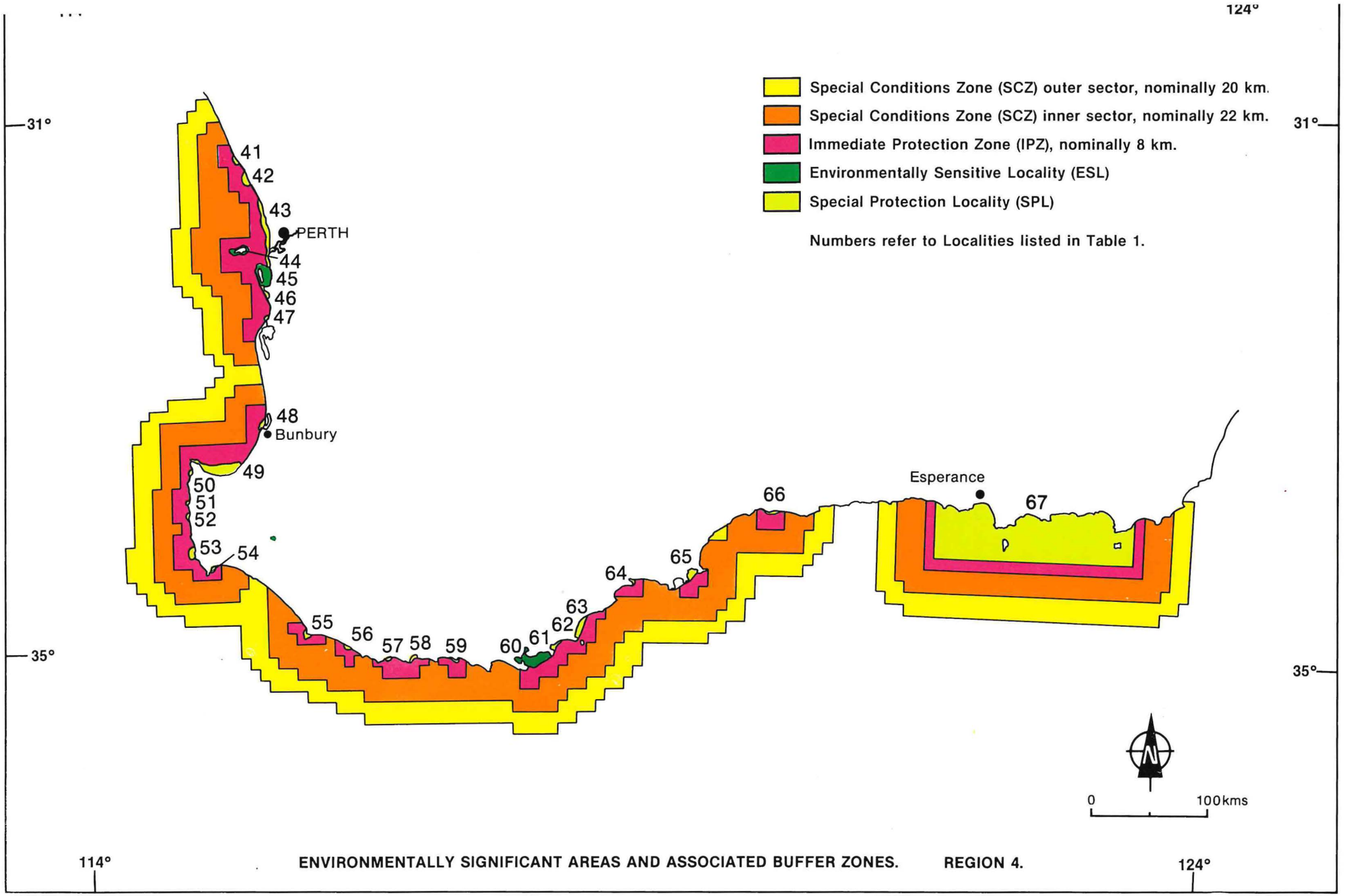


ENVIRONMENTALLY SENSITIVE LOCALITIES AND ASSOCIATED BUFFER ZONES. REGION 3.



ENVIRONMENTALLY SIGNIFICANT AREAS AND ASSOCIATED BUFFER ZONES. REGION 4.

Appendix

GUIDELINES FOR NOTICE OF INTENT DOCUMENTATION FOR ENVIRONMENTAL ASSESSMENT OF OFFSHORE PETROLEUM EXPLORATION WELLS

Notice of Intent (NOI) in respect of:

Environmentally Significant Areas	ESL
Special Protection Localities	SPL
Immediate Protection Zones	IPZ

If it is anticipated that drilling may be undertaken in the above areas during the permit term, a NOI Stage I should be submitted to the Department of Mines for referral to the Department of Conservation and Environment within nine months of the permit award and at least three months prior to the spudding of the first well.

In the nine ESL's and their IPZ's it is anticipated that at least the first well drilled within these areas will be subject to an Environmental Review and Management Programme (ERMP).

In the fifty eight SPL's and their IPZ's there will not be a requirement for an ERMP.

Stage 1 NOI General Statement of Intent (desk study only)

(i) Project outline – to give an indication of expected number of wells, locations, timing of drilling programme; to include a bathymetric map which shows ESL's, SPL's and their buffer zones within the permit.

(ii) Brief description of the biological environment of the ESL or SPL; to include fishing and recreational pursuits. This will not be more than 5 pages.

(iii) Brief description of physical environment in the area; to include:

- (a) Wind patterns, including cyclonic frequency, at a seasonal level of resolution.
- (b) Water circulation – currents/tidal information. Refer to any oil spill trajectory forecasts available.
- (c) Provide listing of available aerial photographs and satellite scenes which cover the permit.

(iv) Summary of preferred drilling programme and associated protective measures taking into account constraints identified in (ii) and (iii) above.

A Stage II NOI document is a more detailed document that specifically relates to a particular proposed well. Some field work may be required. A Stage II NOI is to be submitted to the Department of Mines for the EPA's recommendations at least two months prior to the scheduled drilling commencement date. The scope of a Stage II NOI is outlined below:

Stage II NOI For particular wells – a more detailed Statement of Intent

(i) Ownership/Operator.

(ii) Location/time of drilling.

(iii) Drilling time curve showing hole sizes and casing points etc.

(iv) Details of:

- (a) Type of rig.
- (b) Amount and type of cuttings, method for disposal.
- (c) Drilling muds – composition, volume and method of disposal at sea.
- (d) Other practices which may impinge on the marine environment, including workforce arrangements and rig servicing arrangements (work boats, helicopters).

(v) Expected oil spill trajectory analysis at time of drilling and up to two months after scheduled completion of the well based on available information including that gained during previous drilling programmes.

(vi) Oil Spill Contingency Plan. To relate to (v) and (vii) and to include detailed mobilisation arrangements.

(vii) In ESL's, SPL's and their IPZ's an environmental description of the surrounding area within 40 km of the well site will be supplied from available information.

Where the Department of Conservation and Environment considers that a valued resource exists within 2 km of the well site and at a water depth of less than 20m, which might be affected by normal drilling activities or an oil spill, it may notify the Department of Mines of the nature of the resource (e.g. pearl culture in operation; valued commercial fishery with catch data relative to total WA catch provided; seagrass beds important for dugong grazing), and indicate that a sea bed survey is required in the quadrant in which it is recognised. Where such a resource is defined, a follow-up check of its condition will be required at the time of departure from the well location. It is unlikely that a sea bed survey would be required for areas designated SPL's and their IPZ's on the basis of recreation, tourism, beaches and/or subsistence fishing.