PRELIMINARY ASSESSMENT FOR KANGAROO ISLAND MARINE PARK LOCAL ADVISORY GROUP TO ASSIST WITH THE MEETING ON THE 16TH MAY 2011

Rapid Assessment on Comprehensive, Adequate and Representative (CAR) Principles for the Encounter Marine Park (Marine Park 15, Kangaroo Island side) suggested zoning options

Overview

DENR has undertaken a rapid assessment of the CAR principles for the possible sanctuary zone options for the Encounter Marine Park suggested at the Marine Park Local Advisory Group Meeting held on 17th February 2011.

Community feedback and MPLAG advice has resulted in sanctuary zones suggested at seven locations within the marine park, with alternative zones suggested at six of the locations (Zones R, S, T, U, I, and G).

Using combinations of alternate suggested zones (R2, R3, S1, S2, S3, T1, T2, T3, U1, U2, I1, I3, G2, G4, G5) with the suggested zone (Q1), eight zoning options for the marine park were developed (see Figures 1-8). There are numerous options that could be developed. DENR has chosen eight alternate combinations as examples of possible zoning options.

This rapid assessment[1] helps to determine if the zoning option meets the core biophysical principles of:

Comprehensive: To be comprehensive, examples of all ecosystems and habitats within the marine park should be included within sanctuary zones.

Adequate: To be adequate, the marine parks system should provide for the maintenance of the ecological viability and integrity of populations, species and communities

Representative: To be representative, the system of sanctuary zones should reflect the biodiversity and variability naturally present in the marine park.

MPLAGs should seek to apply the full suite of 14 design principles in any further zoning advice generated.

This assessment has been carried out over the Kangaroo Island coast portion of the Marine Park to advise the Kangaroo Island MPLAG. A separate assessment has been carried out for the Fleurieu coast portion. The Pages Islands are considered in both assessments as both MPLAGs have provided advice on possible zones for this area.

How to use this document

The rapid assessment shows the range of environmental values/features that are included in MPLAG zoning options and that are omitted. It also shows those features that are well represented and those that are under-represented. **For each under-represented feature, the maps in Appendix C show alternative locations where the feature is mapped.**

The rapid assessment also provides a measure of each suggested sanctuary zone to assist consideration of the adequacy of those zones. **Note: It is better to have fewer, larger sanctuary zones than many smaller ones.**

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[1] GIS processing formed the basis of the rapid assessments. A number of data layers captured at various scales were used in the analysis, these include layers such as: state and national benthic mapping; coastal shoreline types; and sea lion haul out and breeding locations. Procedures such as intersections, unions, frequency analysis as well as manual measurements were used in this assessment. All information is subject to the scale and accuracy of the data used.

Possible zoning options for marine park 15 (KI Side)

Figure 1: Zoning Option 1 (10% of MP)
(possible zones: Q1, R3, S1, T1, U1, I3, G4)

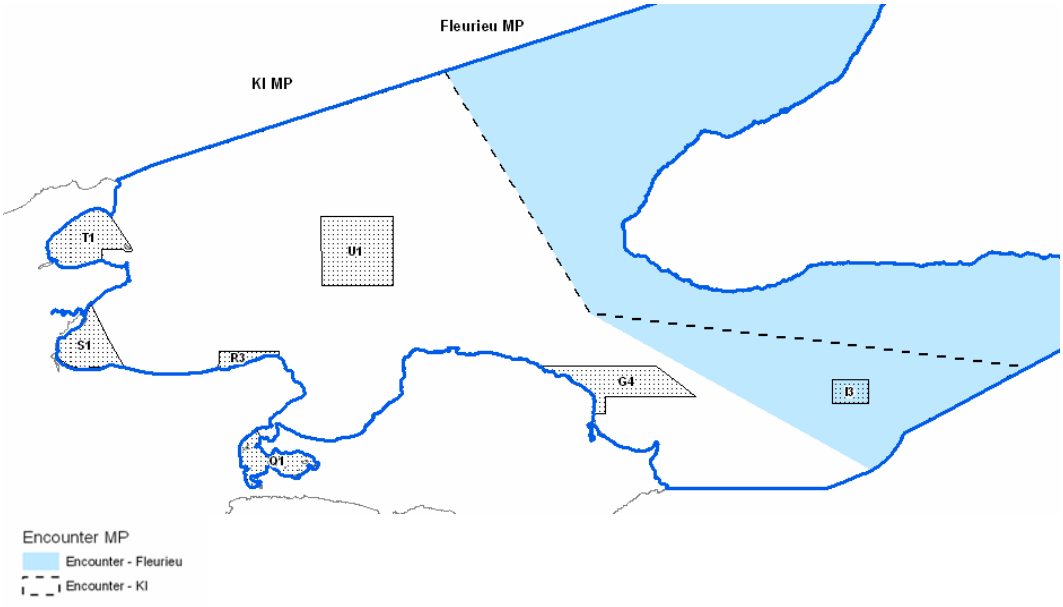


Figure 2: Zoning Option 2 (19% of MP)
(possible zones: Q1, R2, S2, T3, U2, I1, G2)

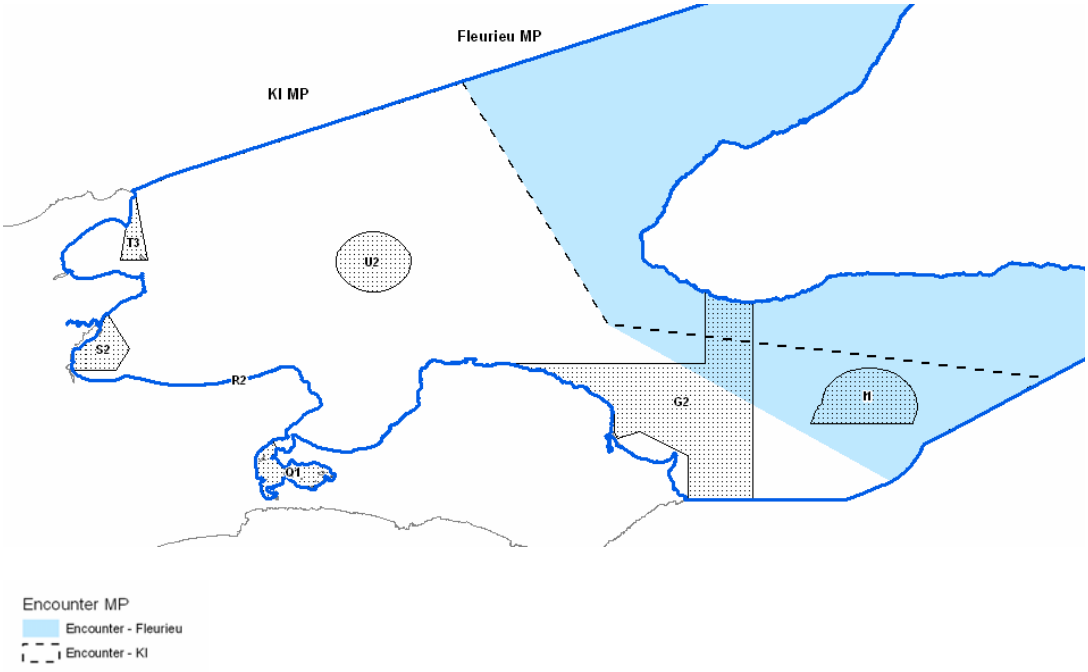


Figure 3: Zoning Option 3 (9% of MP)
(possible zones: Q1, R3, S3, T2, U1, I3, G4)

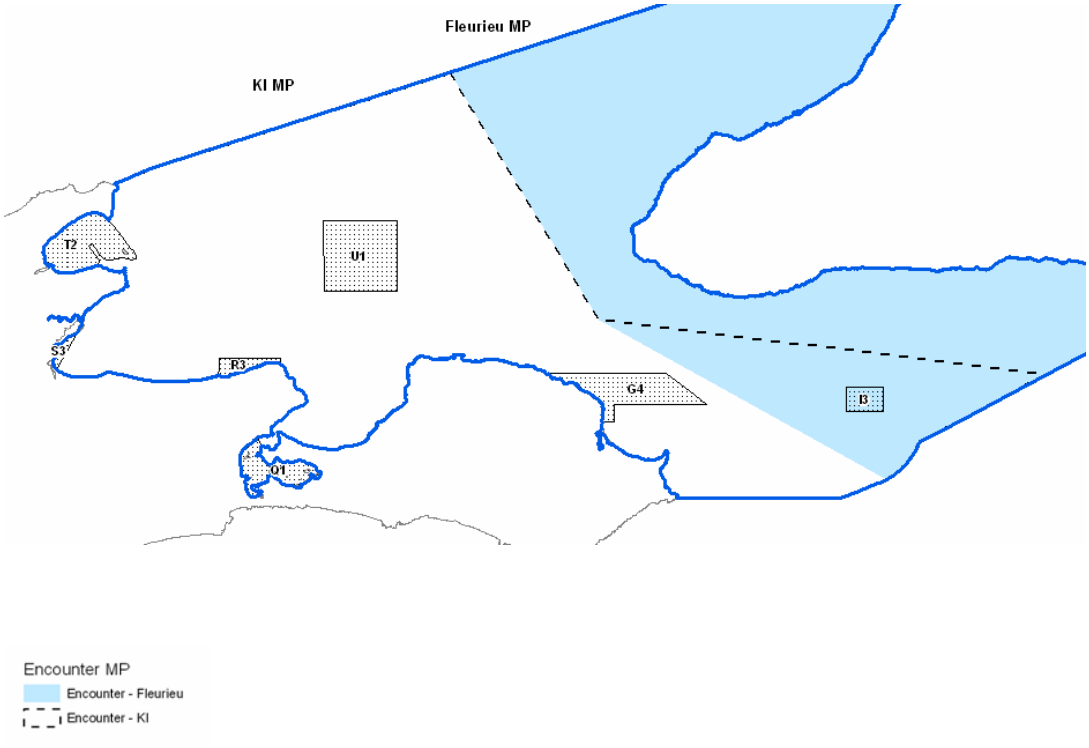


Figure 4: Zoning Option 4 (5% of MP)
(possible zones: Q1, R2, S3, T3, U2, I3, G5)

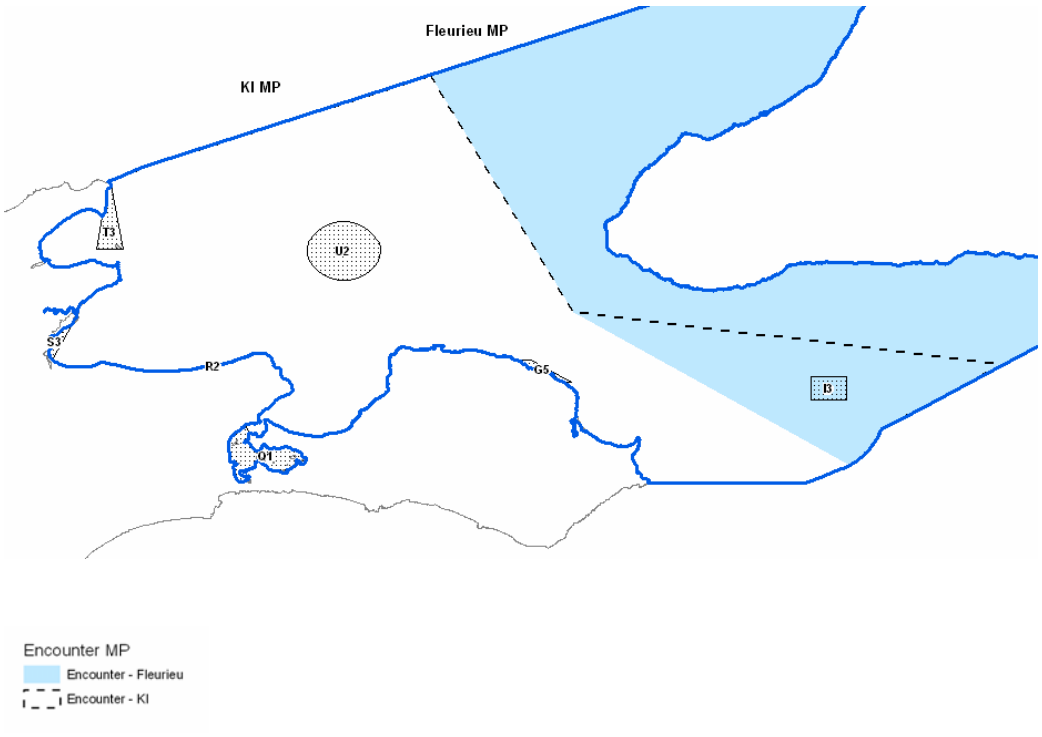


Figure 5: Zoning Option 5 (10% of MP)
(possible zones: Q1, R3, S1, T1, U2, I1, G5)

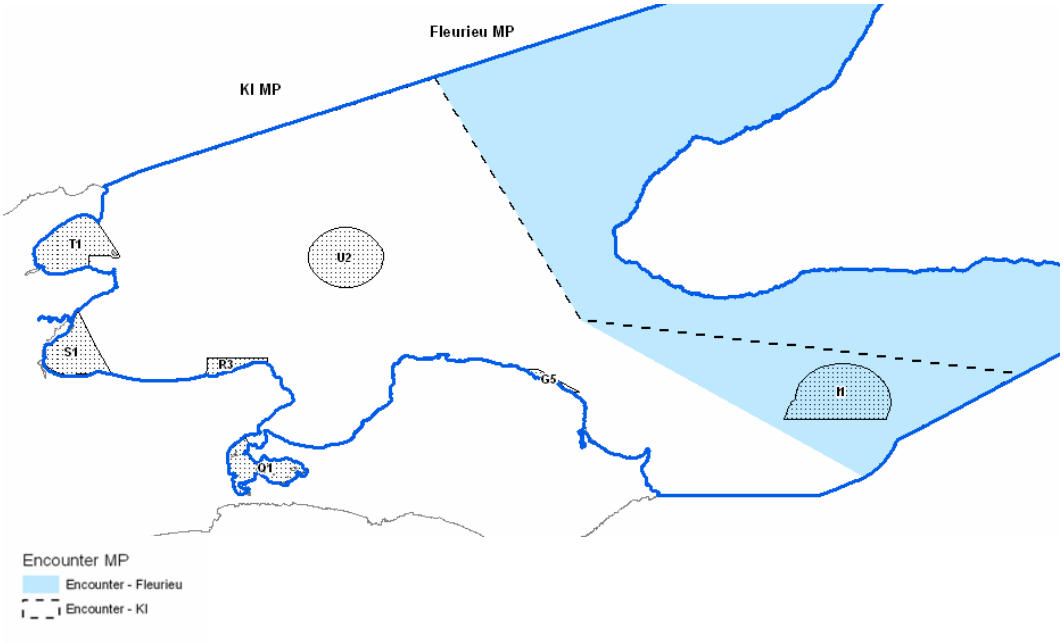


Figure 6: Zoning Option 6 (8% of MP)
(possible zones: Q1, R2, S2, T3, U2, I1, G5)

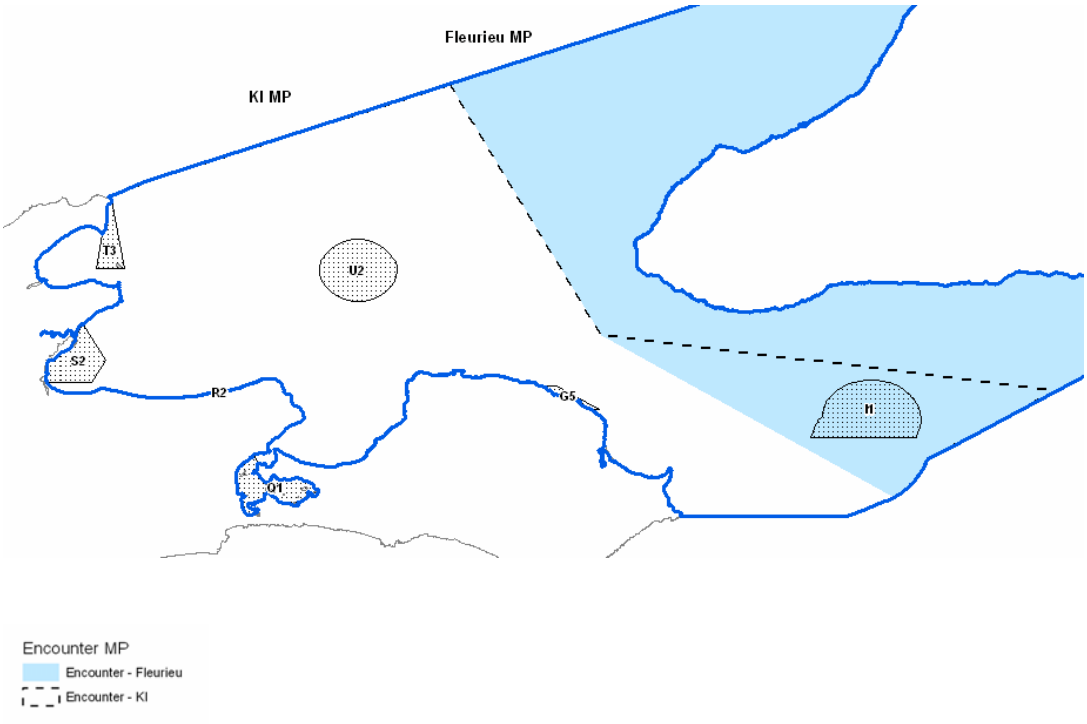


Figure 7: Zoning Option 7 (4% of MP)
(possible zones: Q1, S3, T3, U2)

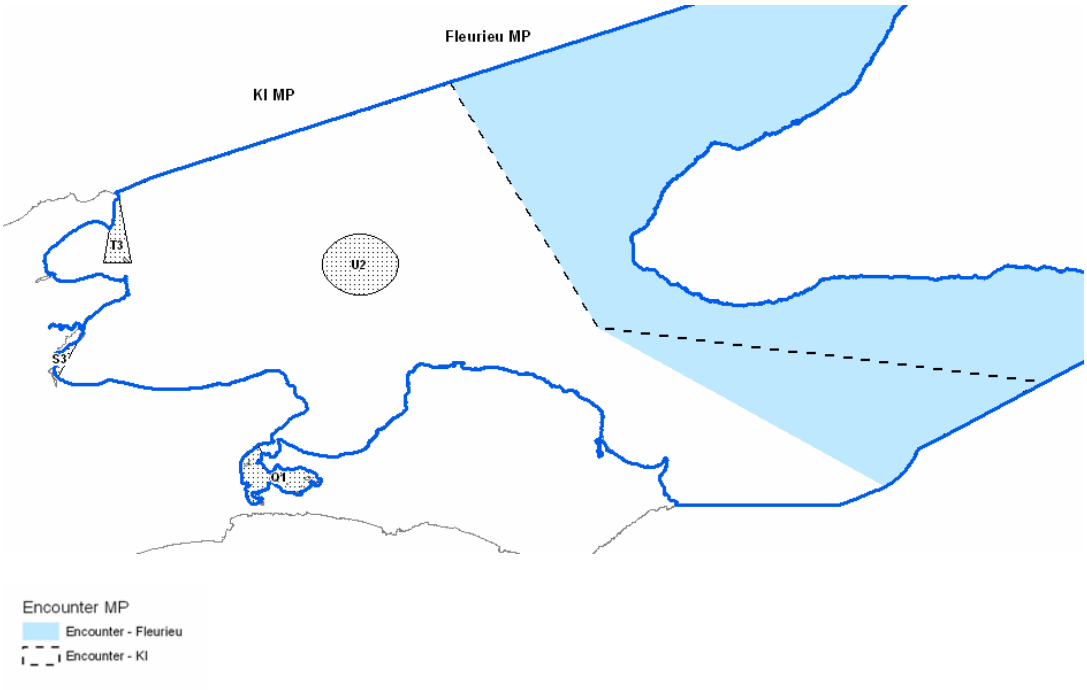
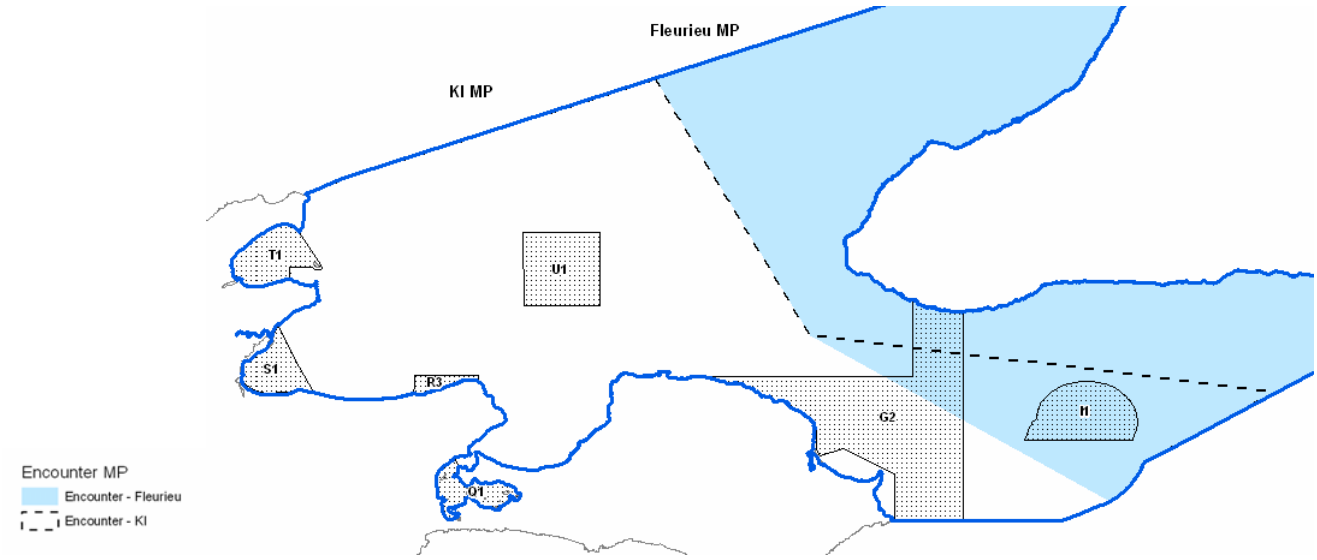


Figure 8: Zoning Option 8 (22% of MP)
(possible zones: Q1, R3, S1, T1, U1, I1, G2)



Comprehensiveness

Each option was assessed for the inclusion of examples of shoreline types and benthic habitats in the suggested sanctuary zones.

All eight zoning options include the following shoreline and seafloor (benthic) habitats:

- ✓ Seagrass
- ✓ Soft bottom habitat
- ✓ Unmapped habitat
- ✓ Mixed beach
- ✓ Mudflats and sandflats
- ✓ Saltmarsh

In addition:
Options 1, 2, 3 and 8 include:

- ✓ Deep Sea sponges

Options, 1, 3, 4, 5, 7 and 8 include:

- ✓ Coarse sand beach

Options 1, 2, 3, 4, 5, 6 and 8 include:

- ✓ Rocky reef
- ✓ Cliff
- ✓ Fine-medium sand beach

All eight zoning options do not include the following shoreline types and seafloor (benthic) habitats:

- × Bedrock platform

In addition:
Options 4, 5, 6 and 7 do not include:

- × Deep Sea Sponges

Options 2 and 6 do not include:

- × Coarse sand beach

Option 7 does not include:

- × Rocky reef
- × Fine-medium sand beach
- × Cliff

Representativeness

Each option was assessed against the proportion of environmental values[2] represented in the suggested sanctuary zones. To consider the full diversity and variability of the coastal and marine features, this assessment included benthic habitat types at different depths, shoreline types at different exposures and a range of other ecologically important features. Each zoning option was assessed for the proportion (as a %) of environmental values represented in the suggested sanctuary zones. Proportions were broken into 4 categories: ≥20%, between 10% and 19%, <10% and 0%. A comparison of the environmental values represented as a proportion of their availability within the park for each option can be seen in Table 1.

Note:

- A more detailed assessment of environmental values and the percentage included in each zoning option can be viewed in Appendix A.
- Environmental values included within each suggested individual zone can be viewed in Appendix B.
- The locations of environmental values that are not included or are under represented are shown in Appendix C.

[2] In this assessment an environmental value include seafloor habitats and shoreline habitats and ecologically important features available within the outer boundary.

Table 1. Environmental values represented within the possible zoning options as a proportion of their availability within the Kangaroo island portion of the park.

✓✓✓ **Environmental values that are represented at a level ≥20%**
✓✓ **Environmental values that are represented between 10-19%**
✓ **Environmental values that are represented at a level <10%**
× **Environmental values that are not represented (0%)**

Environmental Values	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8
Australian Sea lions (breeding)	×	✓✓✓	×	✓✓✓	✓✓✓	✓✓✓	×	✓✓✓
Australian Sea lions (haulout)	×	×	×	×	×	×	×	×
Coastal Wader Bird Sites	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓
COSEMA Endangered Macroalgae	✓✓✓	×	✓✓✓	×	✓✓✓	×	×	✓✓✓
Emergent Land	×	×	×	×	×	×	×	×
Estuary	✓✓✓	✓✓✓	×	×	✓✓✓	✓✓✓	×	✓✓✓
Offshore Islands	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓
Surveyed Reef Fish Sites	✓✓	✓✓✓	✓✓	✓	✓	✓	×	✓✓✓
Sea Bird Sites	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓
Deep Sea Sponges	✓✓✓	✓✓✓	✓✓✓	×	×	×	×	✓✓✓
Rocky Reef (0 to -10m)	✓	✓✓	✓	✓	✓	✓	×	✓✓
Rocky Reef (-10 to -30m)	×	×	×	×	×	×	×	×
Seagrass (0 to -10m)	✓✓✓	✓✓	✓✓✓	✓✓	✓✓✓	✓✓	✓✓	✓✓✓
Seagrass (-10 to -30m)	✓	×	✓	×	×	×	×	✓
Soft-bottom Habitat (0 to -10m)	✓	✓	✓	✓	✓	✓	✓	✓
Soft-bottom Habitat (-10 to -30m)	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓
Unmapped (0 to -10m)	✓	✓✓✓	✓	✓	✓	✓	✓	✓✓✓
Unmapped (-10 to -30m)	✓	✓✓	✓	✓	✓	✓	✓	✓✓
Unmapped (-30 to -50m)	✓	✓✓✓	✓	×	×	×	×	✓✓✓
Bedrock Platform (Moderate)	×	×	×	×	×	×	×	×
Cliff (Exposed)	×	×	×	×	×	×	×	×
Cliff (Moderate)	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	×	✓✓✓
Cliff (Sheltered)	✓✓✓	×	✓✓✓	×	✓✓✓	×	×	✓✓✓
Coarse Sand Beach (Exposed)	×	×	×	×	×	×	×	×
Coarse Sand Beach (Moderate)	×	×	×	×	×	×	×	×
Coarse Sand Beach (Sheltered)	✓✓✓	×	✓✓✓	✓✓✓	✓✓✓	×	✓✓✓	✓✓✓
Fine-medium Sand Beach (Exposed)	×	×	×	×	×	×	×	×
Fine-medium Sand Beach (Moderate)	×	×	×	×	×	×	×	×
Fine-medium Sand Beach (Sheltered)	✓✓✓	✓✓	✓✓✓	✓✓	✓✓✓	✓✓	×	✓✓✓
Mixed Beach (Sheltered)	✓✓✓	✓✓✓	✓✓	✓	✓✓✓	✓✓✓	✓✓	✓✓✓
Mudflats and Sandflats (Sheltered)	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓
Saltmarsh (Sheltered)	✓✓✓	✓✓✓	✓	✓	✓✓✓	✓✓✓	✓	✓✓✓
Seagrass (Sheltered)	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓

Adequacy

Each of the suggested zones was measured for their approximate lengths (from coast to offshore or longitudinal lengths) and widths (coastline or latitudinal lengths), these are shown in Table 2. The total area of each of the eight options was then calculated, as shown in Table 3.

Note: The guideline is that a zone should include whole habitats or areas with minimum linear dimensions of 7-10 km (or 5km where State waters are limited to 3 nautical miles). Smaller dimensions are likely to have a value but not for all organisms.

Table 2. Approximate length, width and size of each suggested zone (lengths rounded to the nearest whole number).

Zone	From the coast to offshore (or length) (km)	Coastline along shore (or width) (km)	Size of zone (km^2)
G2	21	12	161
G4	9	3	28
G5	1	4	2
I1	6	8	39
I3	2	3	7
Q1	4	6	16
R2	1	1	<1
R3	1	5	5
S1	5	7	19
S2	5	5	15
S3	1	4	2
T2	7	5	27
T3	6	2	8
U1	6	7	41
U2	6	7	30

Note: size is not necessarily length by width, it will vary because of the shape of the zones and because the numbers have been rounded to the nearest whole number.

Areas of alternative Options 1-8

Eight alternative zoning options were developed using different combinations of the individual zones suggested at each of the seven locations.

A comparison of the total area (km^2) of each of the zoning options and the percentage sanctuary zones in each option can be seen in Table 3.

Table 3. Comparison of the total area and percentage of sanctuary zones in each zoning option

Suggested zoning option	Total area (km^2) of sanctuary zones in the Kangaroo Island portion of the Encounter Marine Park	% of sanctuary zones located in the Kangaroo Island portion of the Encounter Marine Park
1	143	10
2	269	19
3	128	9
4	66	5
5	137	10
6	110	8
7	56	4
8	307	22

Comparing the eight zoning options

- Option 8 includes 22% (307 km^2) of sanctuary zones within the KI portion of the park. Option 2 includes 19%, Options 1 and 5 both include 10%, Option 3 includes 9% and Option 6 includes 8%. Options 4 and 7 are the smallest with sanctuary zones representing 5% and 4% respectively.
- Option 1, 2, 5 and 8 are very similar as far as the environmental values that are being included. However, Option 8 includes 19 environmental values with ≥20% representation; Option 1 and 5 include 15; and, Option 2 includes 14.
- Option 8 includes 24 of the 33 environmental values.
- Options 4, 6 and 7 have the lowest percent of sanctuary zones within the KI portion of the park, they all include more environmental values with <10% representation as well as having a larger number of environmental values not included within the zones.
- Options 8, 1 and 5 have the highest shoreline habitat representation.
- Options 2 and 8 have the highest benthic habitat representation.

Appendix A.
Table 3: The percentage of each environmental values included in zoning Option 1- 8
(% rounded to the nearest whole number)

Environmental Values	Option 1 Total in all zones (%)	Option 2 Total in all zones (%)	Option 3 Total in all zones (%)	Option 4 Total in all zones (%)	Option 5 Total in all zones (%)	Option 6 Total in all zones (%)	Option 7 Total in all zones (%)	Option 8 Total in all zones (%)
Ecological Features	%	%	%	%	%	%	%	%
Australian Sealions (breeding)	0	50	0	50	100	100	0	50
Australian Sealions (haulout)	0	0	0	0	0	0	0	0
Coastal Wader Bird Sites	71	66	59	57	74	69	54	71
COSEMA Endangered Macroalgae	23	0	23	0	23	0	0	23
Emergent Land	0	0	0	0	0	0	0	0
Estuary	33	33	0	0	33	33	0	33
Offshore Islands	20	40	20	40	60	60	20	40
Surveyed Reef Fish sites	10	31	10	2	5	5	0	31
Sea Bird Sites	64	77	64	77	91	91	64	77
Underwater Habitats	%	%	%	%	%	%	%	%
Deep Sea Sponges	31	95	31	0	0	0	0	95
Rocky Reef (0 to -10m)	9	18	9	8	8	8	0	18
Rocky Reef (-10 to -30m)	0	0	0	0	0	0	0	0
Seagrass (0 to -10m)	27	17	20	10	27	16	10	27
Seagrass (-10 to -30m)	5	0	5	0	0	0	0	5
Soft-bottom Habitat (0 to -10m)	6	4	5	3	6	4	3	7
Soft-bottom Habitat (-10 to -30m)	14	10	14	10	10	10	10	14
Unmapped (0 to -10m)	7	30	7	4	4	4	2	30
Unmapped (-10 to -30m)	6	16	6	5	9	9	4	17
Unmapped (-30 to -50m)	6	20	6	0	0	0	0	20
Total	**10**	**18**	**9**	**5**	**10**	**8**	**4**	**21**

Environmental values represented	%
Represented	≥20%
Represented between	10-19%
Represented	<10%
Not represented	0%

Shoreline Habitats	%	%	%	%	%	%	%	%
Bedrock Platform (Moderate)	0	0	0	0	0	0	0	0
Cliff (Exposed)	0	0	0	0	0	0	0	0
Cliff (Moderate)	49	64	49	26	26	26	0	64
Cliff (Sheltered)	20	0	20	0	20	0	0	20
Coarse Sand Beach (Exposed)	0	0	0	0	0	0	0	0
Coarse Sand Beach (Moderate)	0	0	0	0	0	0	0	0
Coarse Sand Beach (Sheltered)	37	0	31	31	35	0	31	35
Fine-medium Sand Beach (Exposed)	0	0	0	0	0	0	0	0
Fine-medium Sand Beach (Moderate)	0	0	0	0	0	0	0	0
Fine-medium Sand Beach (Sheltered)	24	10	24	10	24	10	0	24
Mixed Beach (Sheltered)	62	31	18	5	35	31	14	30
Mudflats and Sandflats (Sheltered)	92	93	92	92	92	93	92	92
Saltmarsh (Sheltered)	83	39	9	9	44	39	9	44
Seagrass (Sheltered)	94	94	94	94	94	94	94	94
Total	**45**	**35**	**41**	**35**	**42**	**31**	**32**	**46**

Environmental values represented	**%**
Represented	**≥20%**
Represented between	**10-19%**
Represented	**<10%**
Not represented	**0%**

Appendix B. **Table 4.** Area, count and length of environmental values represented in each suggested zone

Ecological Importance	Units	G2	G4	G5	I1	I3	Q1	R2	R3	S1	S2	S3	T1	T2	T3	U1	U2	Total in Marine Park (count)
Australian Sealions (breeding)	Count				1	1												2
Australian Sealions (haulout)	Count																	1
Coastal Wader Bird Sites	Count	<1	<1	<1	13	2	223	<1	<1	84	83	25	42	42	18	<1	<1	2588
Cosema Endangered Macroalgae	Count	1											3	3				37
Emergent Land	Count																	2
Estuary	Count	1								1	1							24
Offshore Islands	Count				1	1							1	1	1			11
Reef Fish	Count	16	8	4	1	1												105
Sea Bird Sites	Count				3	3	7			1	1	1	6	6	6			34
Estuaries	Count	<1					16			2	2	<1	<1	<1				45
Underwater Habitats		**G2**	**G4**	**G5**	**I1**	**I3**	**Q1**	**R2**	**R3**	**S1**	**S2**	**S3**	**T1**	**T2**	**T3**	**U1**	**U2**	**Total in Marine Park (km2)**
Deep Sea Sponges	km^2	59	19	<1														93
Rocky Reef (0 to -10m)	km^2	4	2	1			<1			<1								68
Rocky Reef (-10 to -30m)	km^2																	28
Invertebrate Community (0 to -10m)	km^2																	<1
Invertebrate Community (-10 to -30m)	km^2																	2
Invertebrate Community (-30 to -50m)	km^2																	1
Macroalgae (0 to -10m)	km^2	1																18
Macroalgae (-10 to -30m)	km^2																	1
Seagrass (0 to -10m)	km^2	1	1				14	<1	1	15	13	2	20	21	2			271
Seagrass (-10 to -30m)	km^2															2	<1	51
Soft-bottom Habitat (0 to -10m)	km^2	<1					1	<1	5	3	1	<1	5	6	5			291
Soft-bottom Habitat (-10m to -30m)	km^2															3	2	50
Soft-bottom Habitat (-30m to -50m)	km^2																	<1
Unmapped Habitat (0 to -10m)	km^2	29	2	1	1	1	<1	<1	<1	1	1	<1	<1	<1	<1			245
Unmapped Habitat (-10 to -30m)	km^2	52	1		38	7										36	28	1,378
Unmapped Habitat (-30 to -50m)	km^2	14	4															571
Unmapped Habitat (>-50m)	km^2																	<1
Total	km^2	**161**	**28**	**2**	**39**	**7**	**15**	**<1**	**5**	**19**	**15**	**2**	**25**	**27**	**8**	**41**	**30**	**3,070**

Shoreline Habitats		G2	G4	G5	I1	I3	Q1	R2	R3	S1	S2	S3	T1	T2	T3	U1	U2	Total in Marine Park (km)
Bedrock Platform (Exposed)	km																	12
Bedrock Platform (Moderate)	km														<1			20
Bedrock Platform (Sheltered)	km																	2
Boulder Beach (Exposed)	km																	1
Boulder Beach (Moderate)	km																	9
Boulder Beach (Sheltered)	km																	2
Cliff (Exposed)	km																	20
Cliff (Moderate)	km	18	8	5														49
Cliff (Sheltered)	km								2									17
Coarse Sand Beach (Exposed)	km																	2
Coarse Sand Beach (Moderate)	km																	12
Coarse Sand Beach (Sheltered)	km									2	1		12	12	3			51
Fine-medium Sand Beach (Exposed)	km																	61
Fine-medium Sand Beach (Moderate)	km																	50
Fine-medium Sand Beach (Sheltered)	km							<1	2									7
Mixed Beach (Moderate)	km																	1
Mixed Beach (Sheltered)	km							1	1	3	3	2						13
Mudflats and Sandflats (Sheltered)	km									7	7	7						7
Pebble Cobble Beach (Moderate)	km																	1
Pebble Cobble Beach (Sheltered)	km																	2
Saltmarsh (Sheltered)	km									2	2	1	<1	<1				6
Seagrass (Sheltered)	km						27											32
Total	km	**18**	**8**	**5**	**<1**	**<1**	**27**	**1**	**5**	**14**	**12**	**9**	**12**	**12**	**3**	**<1**	**<1**	**377**

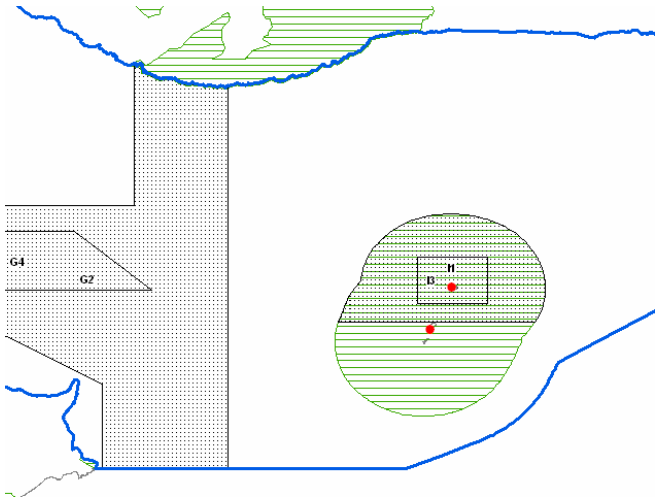
Note: numbers have been rounded to the nearest whole number

Appendix C. Location of the environmental values <10% represented.

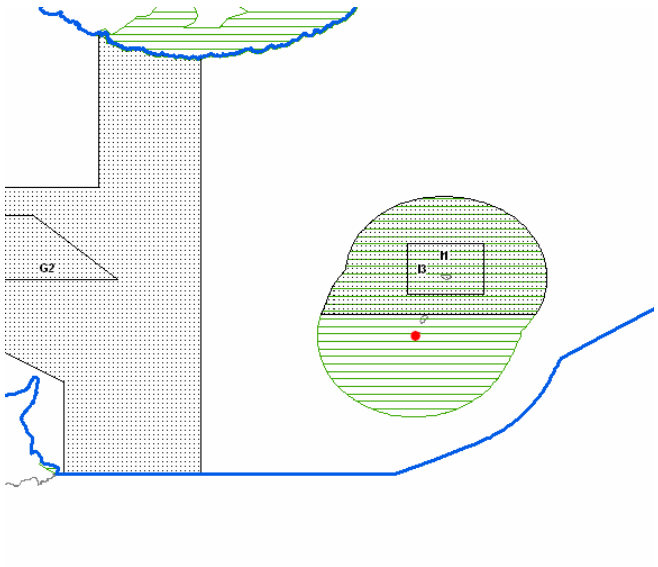
Environmental values that have <10% representation are shown in red, where they could be represented within the outer boundary.

Note: Maps are best viewed in colour.

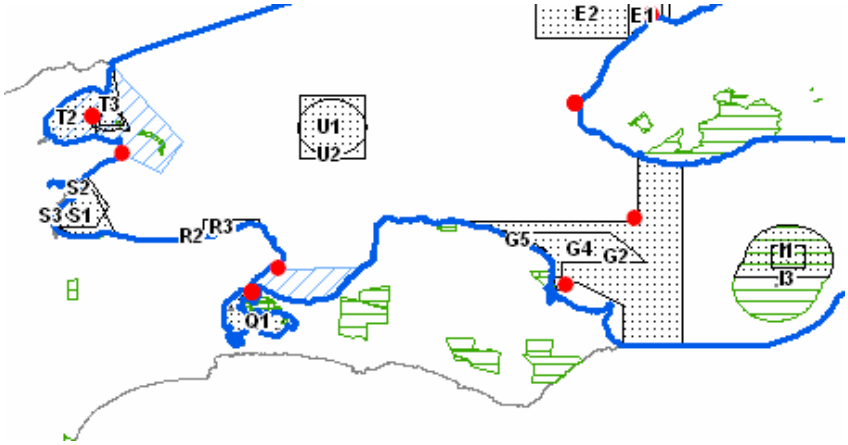
Australian Sea lion (breeding)



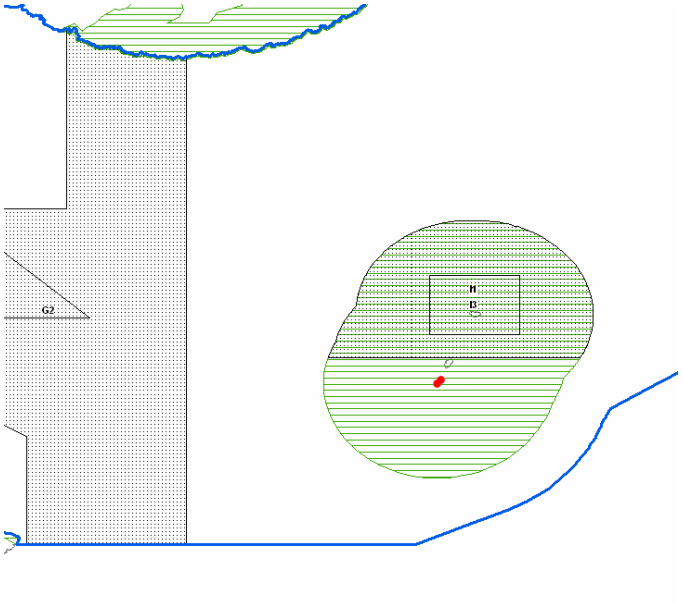
Australian Sea lion (haulout)



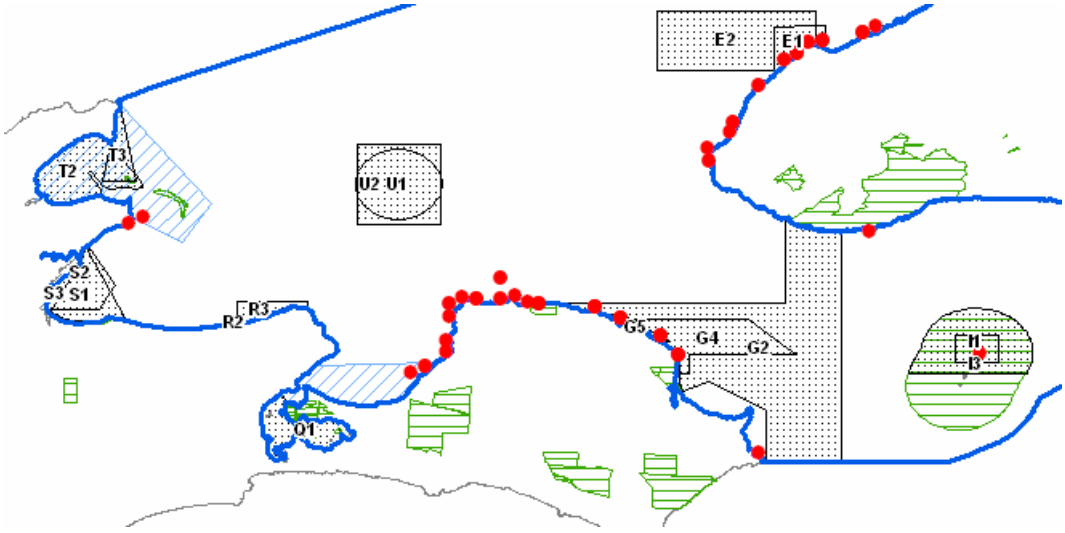
COSEMA endangered macroalgae



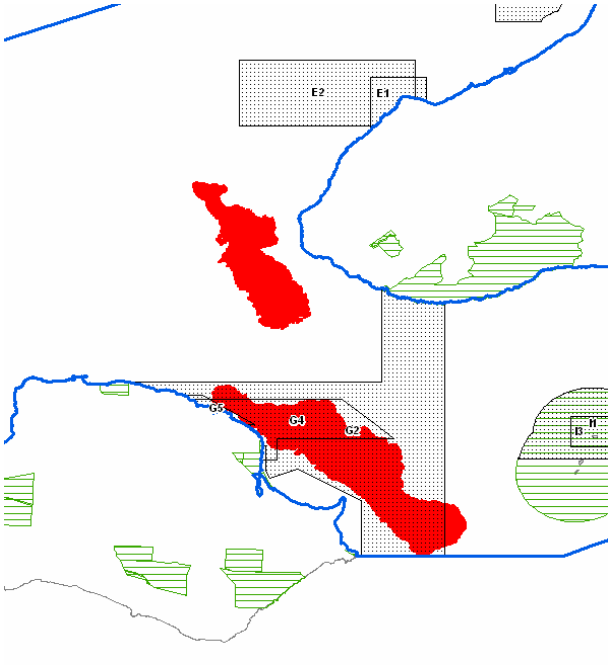
Emergent land



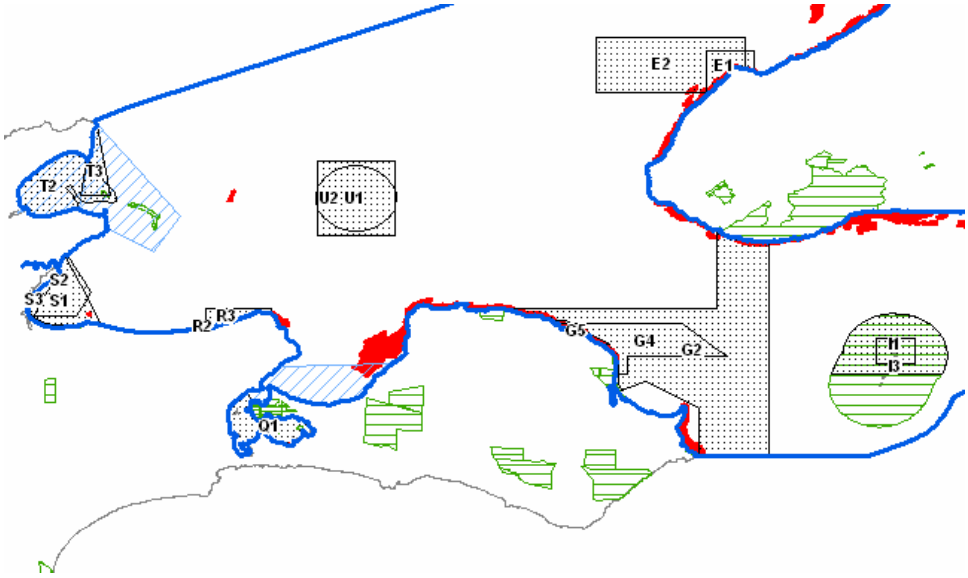
Surveyed Reef Fish Sites



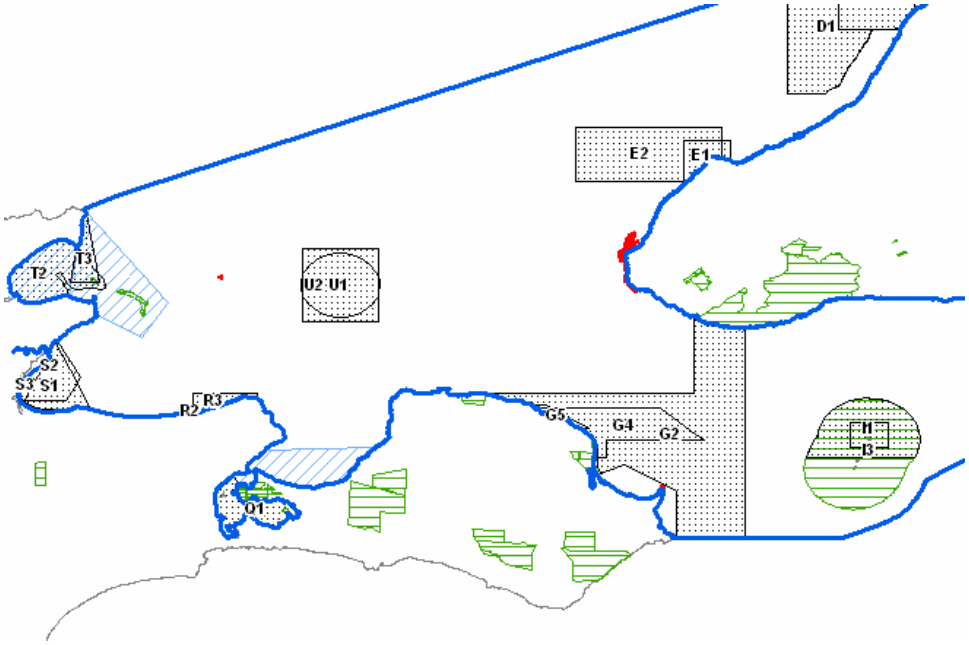
Deep Sea Sponges



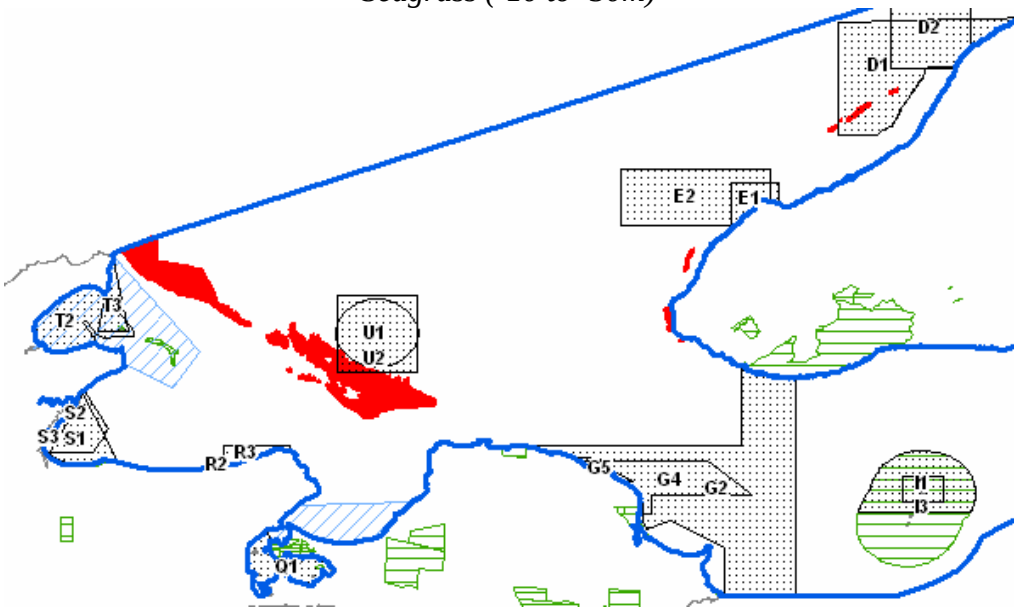
Rocky Reef (0 to -10m)



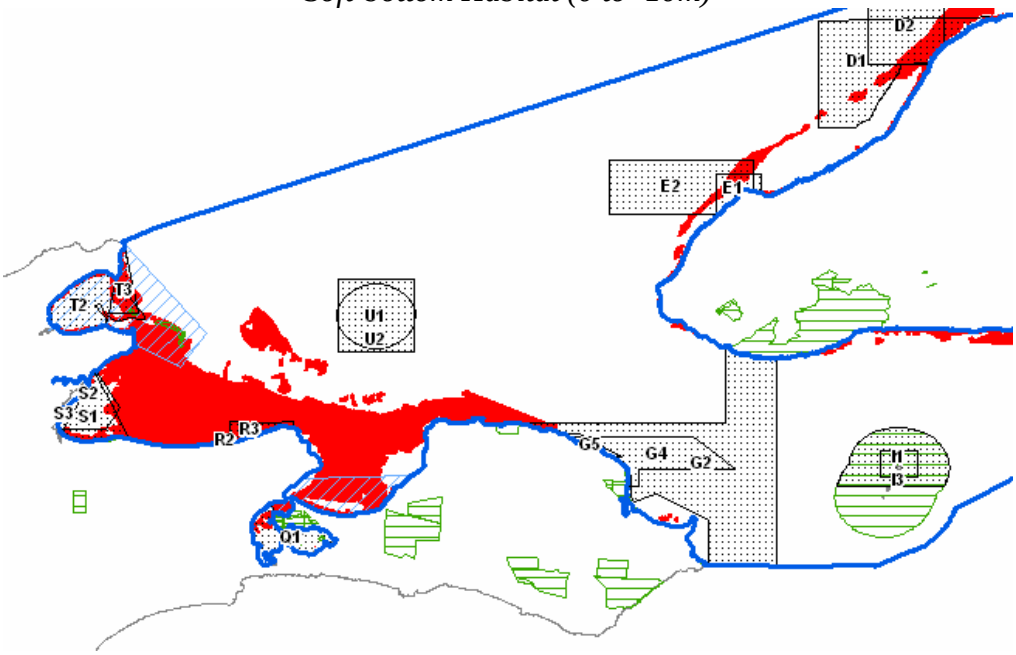
Rocky Reef (-10 to -30m)



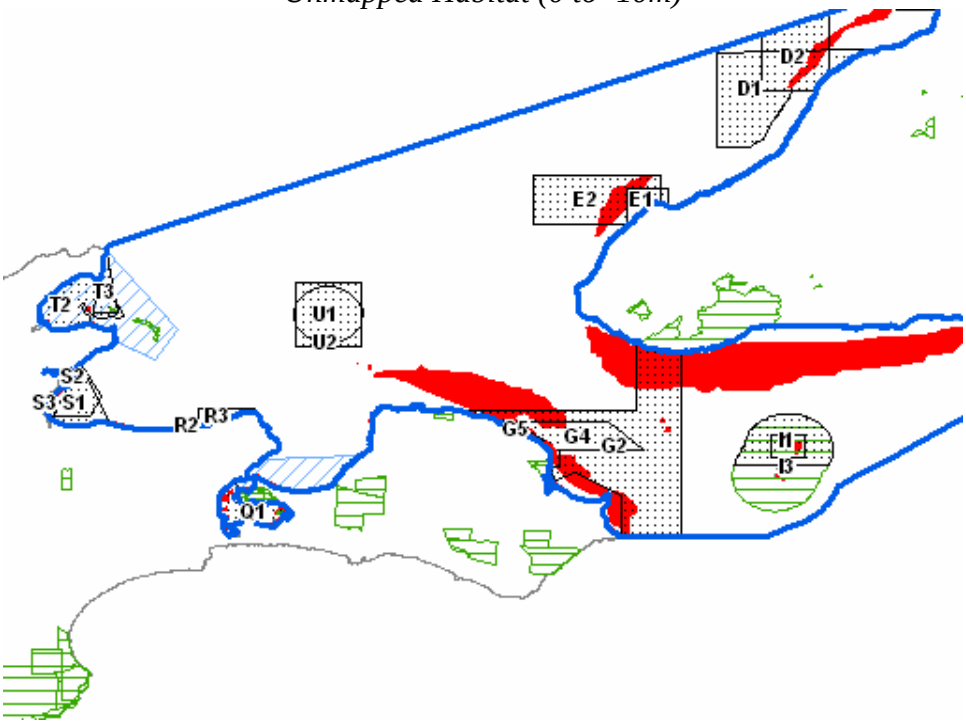
Seagrass (-10 to -30m)



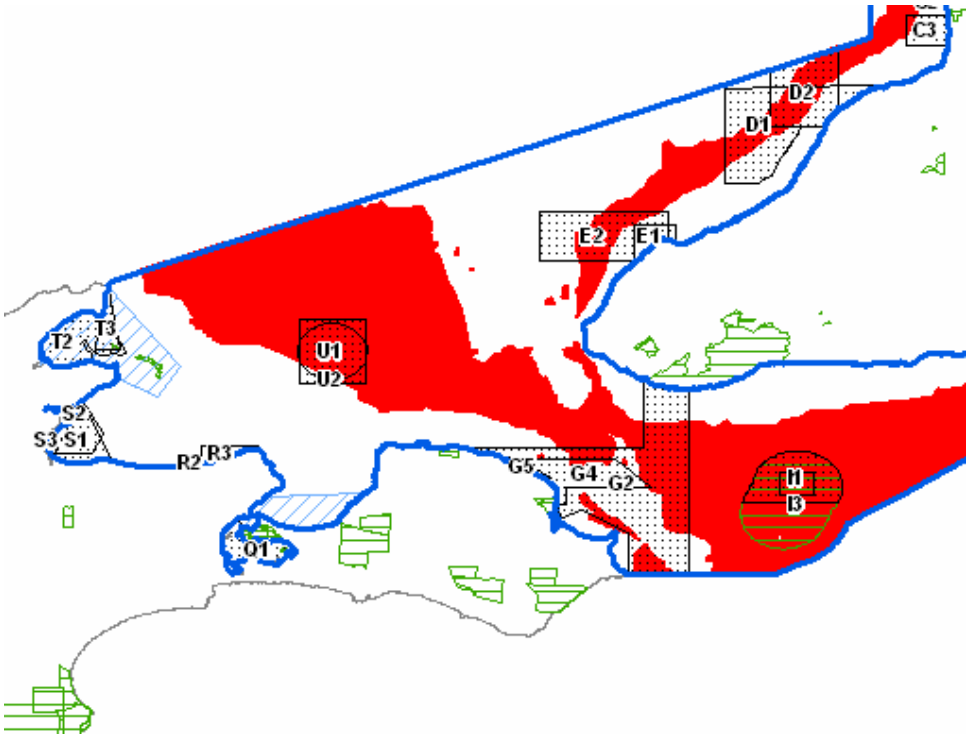
Soft-bottom Habitat (0 to -10m)



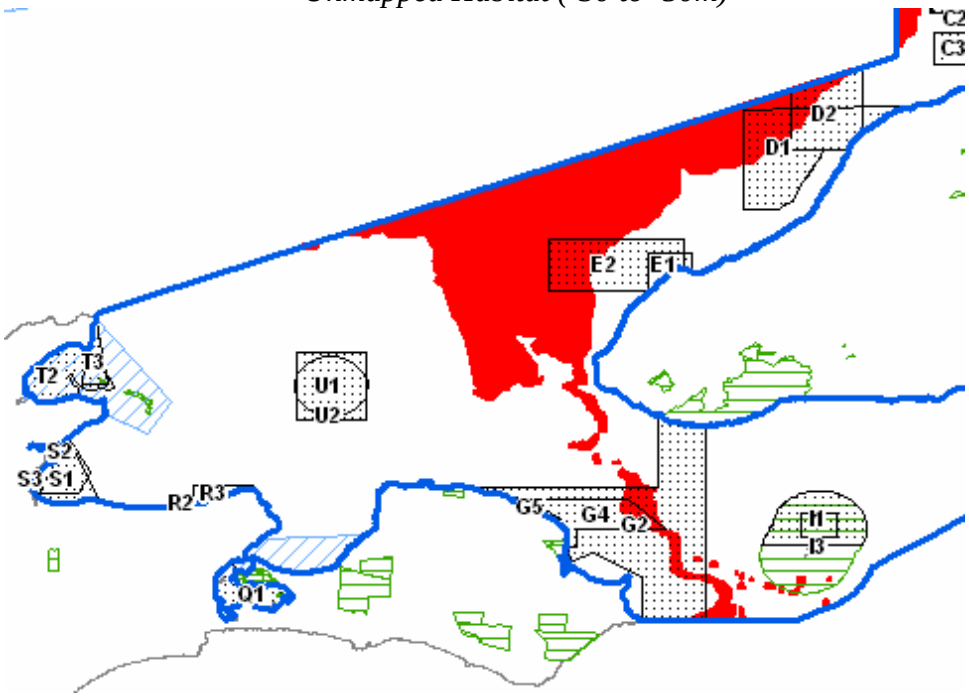
Unmapped Habitat (0 to -10m)



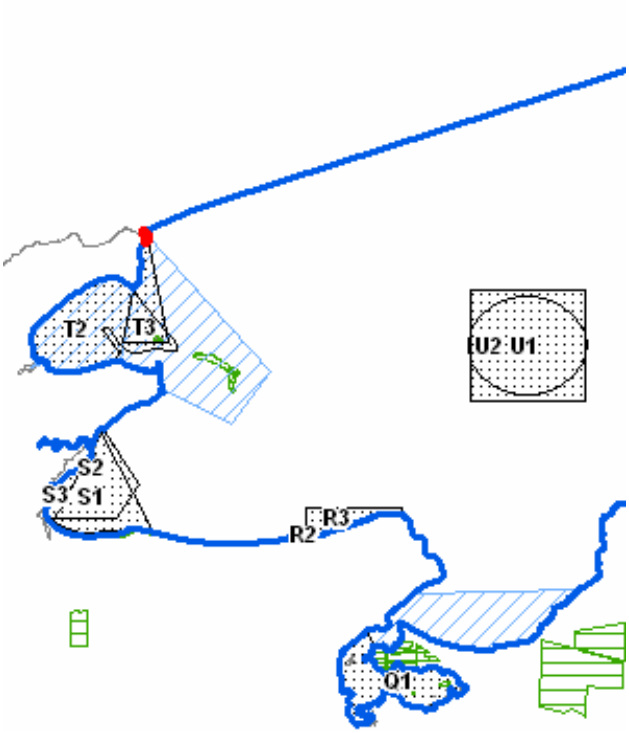
Unmapped Habitat (-10 to -30m)



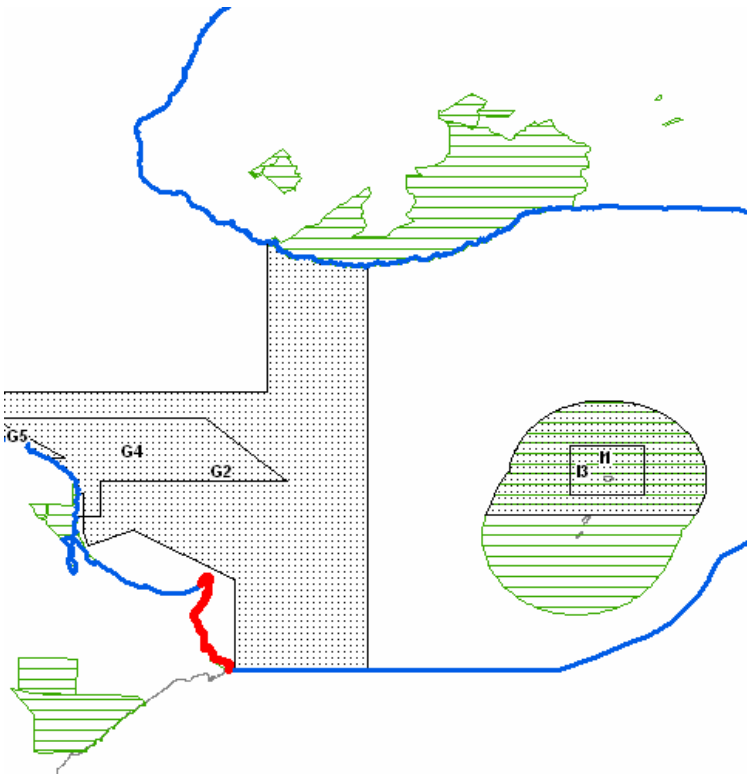
Unmapped Habitat (-30 to -50m)



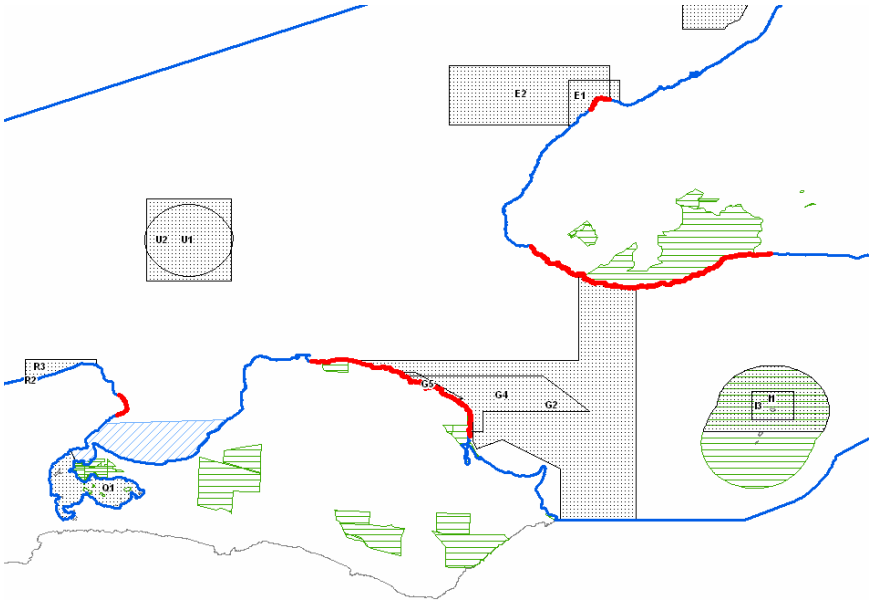
Bedrock Platform (Moderate)



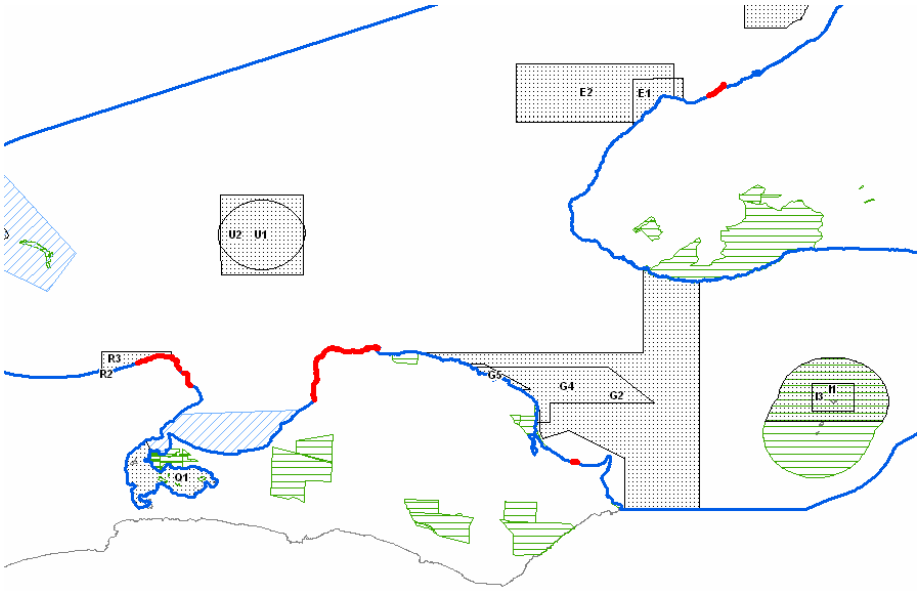
Cliff (Exposed)



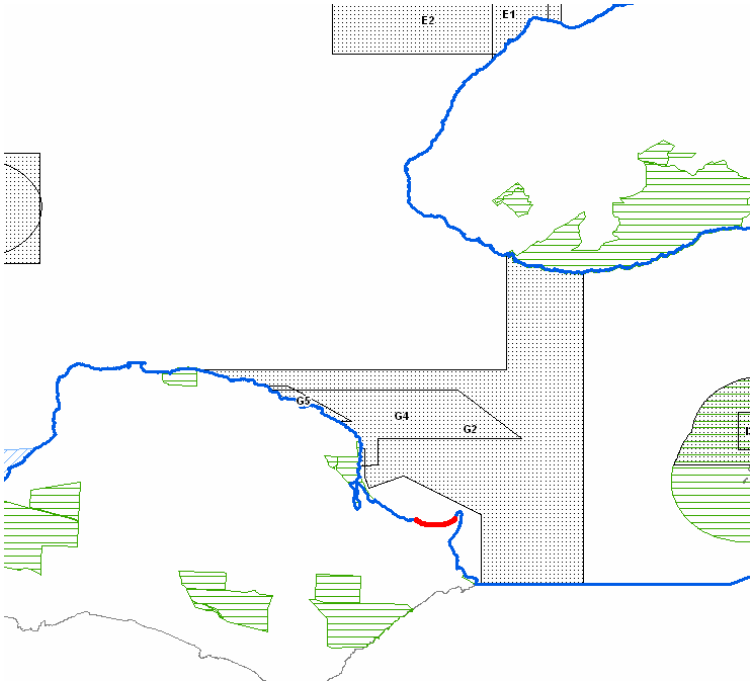
Cliff (Moderate)



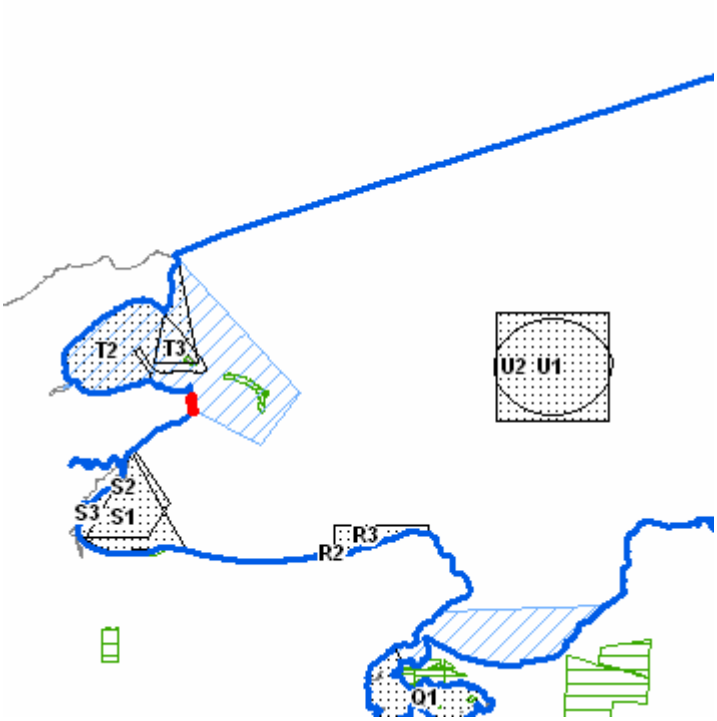
Cliff (Sheltered)



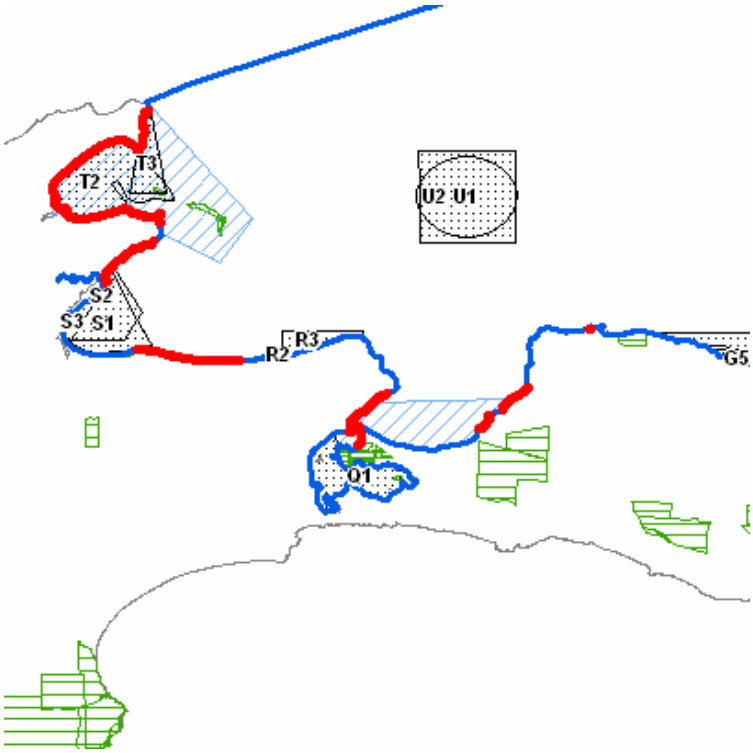
Coarse Sand Beach (Exposed)



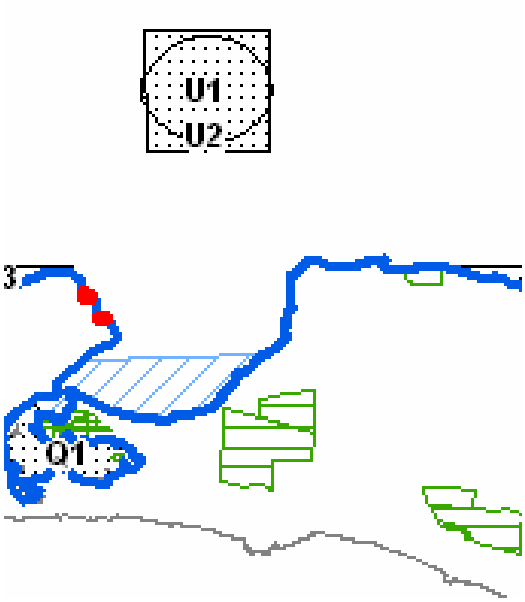
Coarse Sand Beach (Moderate)



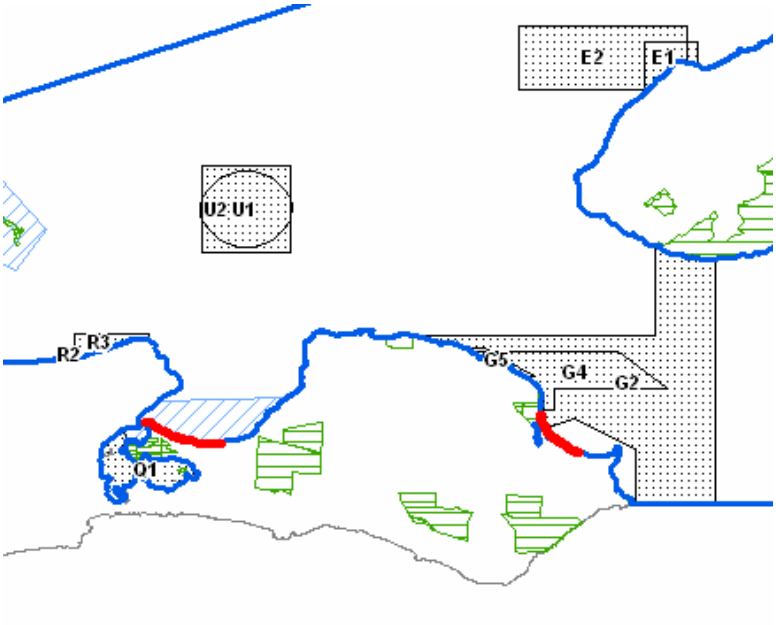
Coarse Sand Beach (Sheltered)



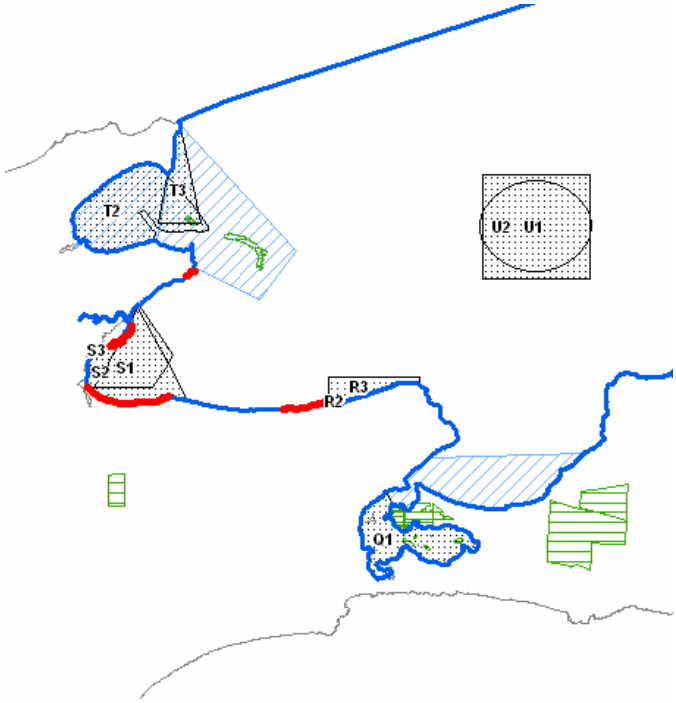
Fine-medium Sand Beach (Exposed)



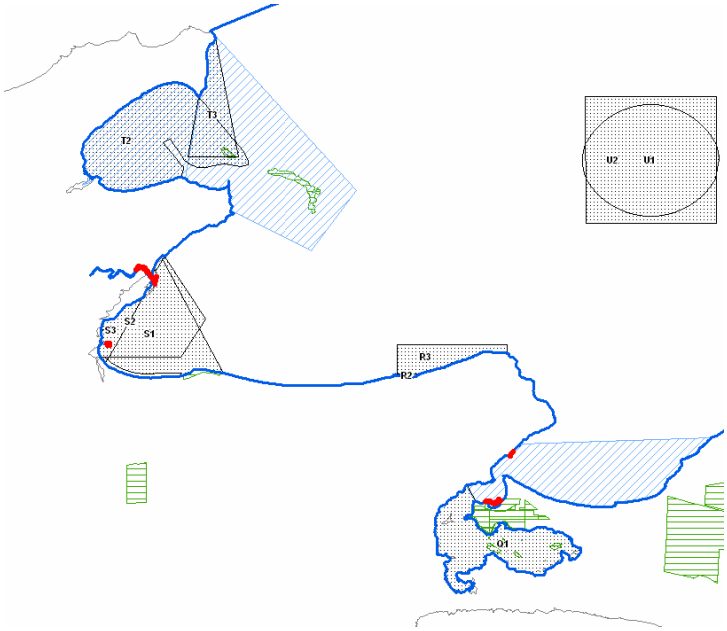
Fine-medium Sand Beach (Moderate)



Mixed Beach (Sheltered)



Saltmarsh (Sheltered)



Mapping information: