



SNPWG DISCUSSION PAPER



MPA PORTRAYAL

Background

- 1 SNPWG is currently drafting a product specification for Marine Protected Areas (MPA). This specification is for data in GML so that it will be possible to portray it immediately in a GML viewer. Test data will then be prepared in accordance with this product specification. SNPWG13 decided to start work on producing a portrayal specification for MPA. This paper is the first step on that task.
- 2 The current objectives are:
 - 2.1 To understand the steps needed to produce a portrayal specification
 - 2.2 To establish any new principles to decide on symbolisation
 - 2.3 To explore the limits of what might be useful and what to avoid
 - 2.4 To achieve portrayal of a test MPA dataset

Discussion

- 3 As their name suggests Marine Protected Areas are area features. However at small scales, they may be displayed as points and display rules will have to be developed. However when displayed as areas, six types of symbolisation are suggested:
 - 3.1 The area name
 - 3.2 A central symbol
 - 3.3 A distinctive boundary
 - 3.4 A distinctive fill
 - 3.5 A distinctive edge, where the area extends beyond the display limit
 - 3.6 A combination of one or more of the above
- 4 The relative merits of fill, distinctive edge or central symbols need to be understood. Solid fills obscure underlying features; hatched or opaque fills inevitably cause clutter. A secondary problem arises in all cases where areas overlap and there are multiple fills or central symbols on top of each other. Solutions to these problems are needed.
 - 4.1 Can display rules be written to separate central symbols? This question is probably for OEMs. If it is possible, a resulting problem could be that central symbols are not immediately associated with a particular area. However this problem already arises with overlapping areas in current ENC's and is solved by a "Highlight feature" button in pick reports. Some ECDISs highlight the feature automatically when a pick report is opened.
 - 4.2 Is a distinctive edge sufficiently obvious? Colour would be selected from the ECDIS colour tables taking advantage of the many years of experience to date. Recommendations for successful combinations could be made following experimentation in a test bed. As with central symbols, there would be a danger of overlapping areas displaying on top of each other without some rule to separate them. There may be merit

in using the same colour for central symbols and for the distinctive edges. Again a compromise will be required to prevent “using up” colours to make an unimportant distinction. These sorts of questions reinforce the need for test datasets and test displays. It is probable that bridge watch keepers using ECDISs will have fewer features selected for display than passage and voyage planners, at the back of bridge or in offices ashore, when full account has to be taken of subsidiary information.

- 5 Further consideration will be required for point and line feature symbolisation.
- 6 It is well understood that too many variations will not only overwhelm the user but also use up the relatively limited colour and symbolisation permutations which are available. However a very wide range of options is proposed here for MPA so that the possibilities can be explored in a test bed. It is anticipated that a production MPA product would receive a much more limited pallet and details would have to be obtained with the use of pick reports.
- 7 Therefore for exploratory purposes only, it is suggested that the different types of MPA could receive distinctive symbols. Three attributes of MPAARE which could be used are:

7.1 CATIUC.

7.1.1 This has 7 enumerations:

7.1.1.1	Category Ia
7.1.1.2	Category Ib
7.1.1.3	Category II
7.1.1.4	Category III
7.1.1.5	Category IV
7.1.1.6	Category V
7.1.1.7	Category VI

7.1.2 The definitions for these are shown at Annex A. While the distinction between them is fairly esoteric and does not really have a great deal of significance for mariners, it is proposed to use the different IUC categories to explore the issues and as examples of how the options at paragraph 3 could be used to portray distinctions.

7.2 CATREA.

7.2.1 This has 8 enumerations which are relevant to MPA:

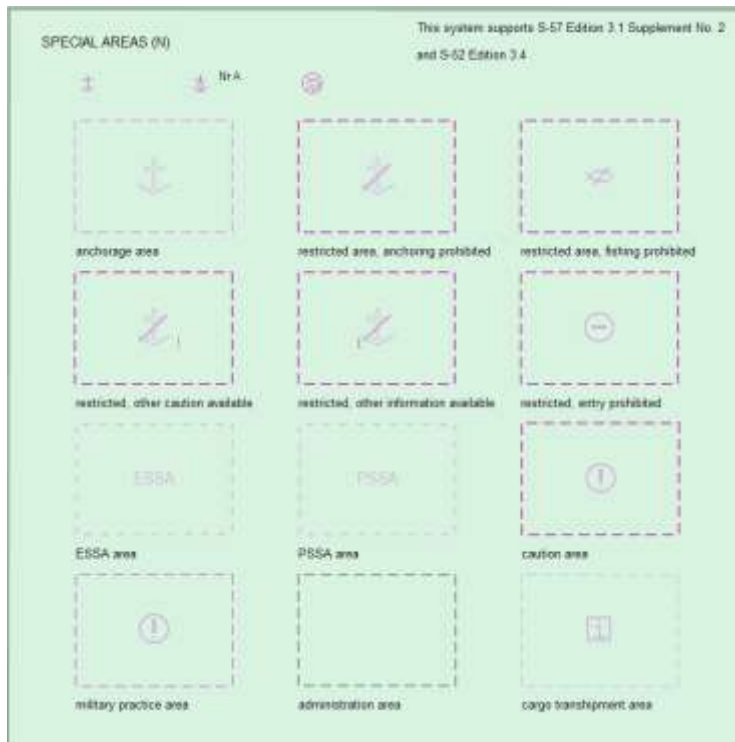
	Enumeration	Definition
7.2.1.1	4	nature reserve N 22
7.2.1.2	5	bird sanctuary N 22
7.2.1.3	7	seal sanctuary N 22
7.2.1.4	10	historic wreck area N 26
7.2.1.5	20	research area
7.2.1.6	22	fish sanctuary

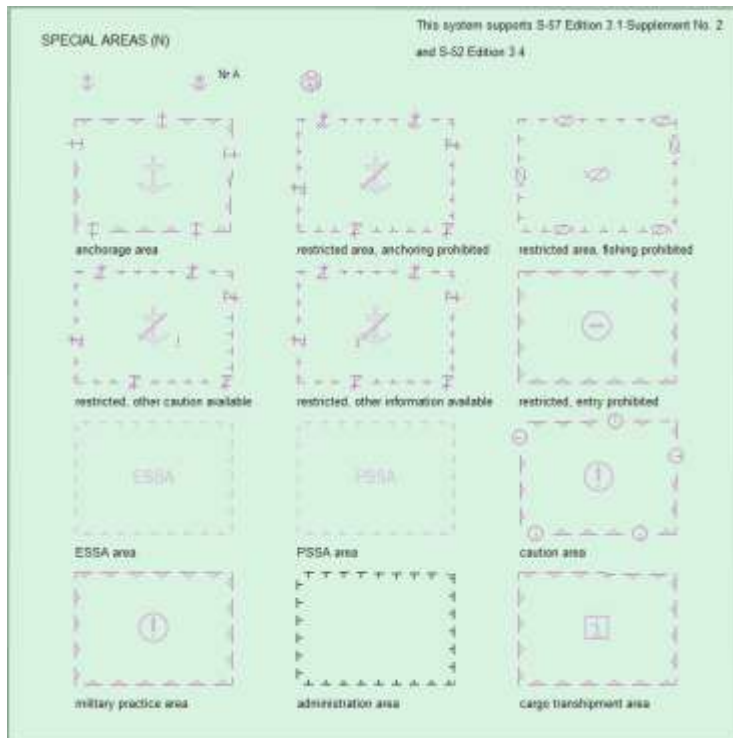
7.2.1.7	23	ecological reserve
7.2.1.8	29	coral sanctuary (proposed)

7.2.2 INT1 suggests that animal silhouettes may be added for specialized areas. “MR” is also shown presumably to suggest “Marine Reserve”. Historic wreck is already symbolised in ENC’s and so no recommendation is made here.

7.2.3 To indicate both these conventions, symbols are proposed at Annex B for the CATREA attributes at 0. Where symbols do not already exist, new symbols have been created.

7.3 RESTRN. This describes restrictions on activities within the area. There are 27 allowed values. Several already have symbolisations in the ENC portrayal catalogue. Symbolisations of some restricted areas use complex line styles and therefore using RESTRN for symbolisation “steps on” using CATREA. Some symbolisations use central symbols with plain or complex line styles:





7.3.1 As an alternative to the “pecked” line, a thicker, transparent band, similar to paper chart symbol N22 for PSSAs, with the addition of the interspersed CATREA icons may have merit. This might allow each of the RESTRN and MPA boundary symbols to be distinguished from one another.

7.3.2 There may not be maritime restrictions, such as fishing or anchoring prohibited, which can be symbolised using these symbols. There may be no restrictions which apply to vessels or, those that do, may not be symbolised but expressed in text such as limiting overboard discharge or something like “Unauthorised landing is prohibited”.

7.3.3 However it is likely that symbolised restricted areas, which have nothing to do with the MPA, will overlap MPA and other areas of information in nautical publications and their limits will rarely be common. It is therefore necessary that the limits of both types of areas can be seen at the same time, and can be distinguished from each other.

- 8 The largest sample MPA has an extent of over 500 miles and other areas in nautical publications, such as NAVMETAREAs, are larger than this. It is therefore inevitable that an ECDIS screen, zoomed in for coastal navigation, will often be entirely within such an area, and no boundary will be within the screen limits. This indicates that distinctive fills or edges could be desirable. To explore this principle, a number of distinctive edges and fills are suggested varying according to the Category. Examples of the sort of fills and distinctive edges that might be used are at Annex B. Consideration will also have to be given to the best colours to use, and which to avoid, and day, night and dusk palettes.
- 9 There are already a profusion of line styles and central symbols. Introducing many more conventions with differing shades and fill patterns with specialised meanings will not be welcome. However one single symbol to indicate that more information is available, without an indication of its nature will not be sufficient. It must be possible to display limits and indicate the type of area or nature of the further information. In symbolising new nautical publications information SNPWG should build on the S-52 conventions in the use of line style and colour.
- 10 While interference with and obstruction of chart symbols on the ECDIS screen is an ever present consideration, this is not the overriding consideration at this stage. Similarly the design of the symbols, fills or edges should not be taken as anything more than examples at this stage.

- 11 Pick report. S-100 and S-101 will have much more guidance on the formatting of pick reports, and these will need to be modelled within MPA.
- 12 Portrayal of Information features. It is anticipated that information held in Information features will be displayed in pick reports. The geometry of the geographic feature to which it is associated will probably be highlighted on opening or on request. It is expected that some very common Information features will need specific symbols; others may use a generic symbol. If a generic symbol is used, its subject could be indicated in text when the cursor is moved over the symbol.

Conclusions

- 13 It is concluded that:
 - 13.1 There are 6 possibilities to symbolise MPAs. (paragraph 3)
 - 13.2 3 attributes could be used to symbolise MPA: CATIUC, CATREA, and RESTRN. (paragraph 7)
 - 13.3 It must be possible to see restricted areas at the same time as seeing areas containing NPUB information, such as MPA, and they must be distinguishable from each other. (paragraph 7.3.3)
 - 13.4 Distinctive fills or edges are desirable. (paragraph 8)
 - 13.5 A single symbol for more information is not sufficient; however a large number of new symbols will not be welcome either. (paragraph 9)
 - 13.6 The current object is to develop the principles and process for portrayal specifications. (paragraph 10)

Recommendations

- 14 DIPWG is requested to note the contents of this paper.
- 15 DIPWG is requested to work in partnership with SNPWG in the development of a portrayal specification for MPA as a test bed for symbolising NPUB information.

CATIUC DEFINITIONSANNEX A

Category Ia:

Strict Nature Reserve: protected area managed mainly for science

Area of land and/or sea possessing some outstanding or representative ecosystems, geological or physiological features and/or species, available primarily for scientific research and/or environmental monitoring. (International Union for Conservation of Nature and Natural Resources publication "Guidelines for Protected Area Management Categories", IUCN, 1994)

Category Ib:

Wilderness Area: protected area managed mainly for wilderness protection

Large area of unmodified or slightly modified land, and/or sea retaining its natural character and influence, without permanent or significant habitation, which is protected and managed so as to preserve its natural condition. (International Union for Conservation of Nature and Natural Resources publication "Guidelines for Protected Area Management Categories", IUCN, 1994)

Category II:

National Park: protected area managed mainly for ecosystem protection and recreation

Natural area of land and/or sea, designated to (a) protect the ecological integrity of one or more ecosystems for present and future generations, (b) exclude exploitation or occupation inimical to the purposes of designation of the area and (c) provide a foundation for spiritual, scientific, educational, recreational and visitor opportunities, all of which must be environmentally and culturally compatible. (International Union for Conservation of Nature and Natural Resources publication "Guidelines for Protected Area Management Categories", IUCN, 1994)

Category III:

Natural Monument: protected area managed mainly for conservation of specific natural features

Area containing one, or more, specific natural or natural/cultural feature which is of outstanding or unique value because of its inherent rarity, representative or aesthetic qualities or cultural significance. (International Union for Conservation of Nature and Natural Resources publication "Guidelines for Protected Area Management Categories", IUCN, 1994)

Category IV:

Habitat/Species Management Area: protected area managed mainly for conservation through management intervention

Area of land and/or sea subject to active intervention for management purposes so as to ensure the maintenance of habitats and/or to meet the requirements of specific species.

(International Union for Conservation of Nature and Natural Resources publication "Guidelines for Protected Area Management Categories", IUCN, 1994)

Category V:

Protected Landscape/Seascape: protected area managed mainly for landscape/seascape conservation and recreation

Area of land, with coast and sea as appropriate, where the interaction of people and nature over time has produced an area of distinct character with significant aesthetic, ecological and/or cultural value, and often with high biological diversity. Safeguarding the integrity of this traditional interaction is vital to the protection, maintenance and evolution of such an area.

(International Union for Conservation of Nature and Natural Resources publication "Guidelines for Protected Area Management Categories", IUCN, 1994)

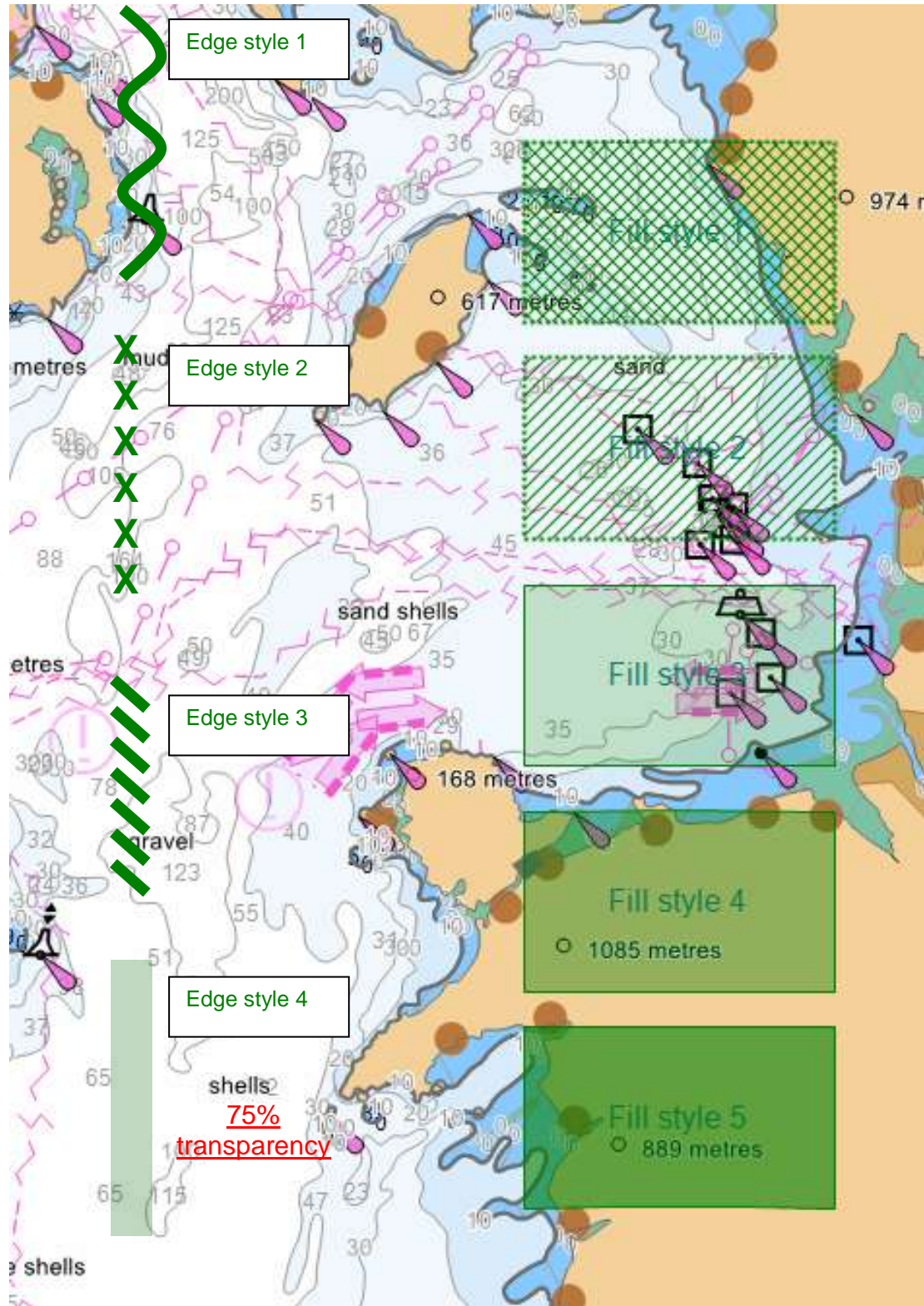
Category VI:

Managed Resource Protected Area: protected area managed mainly for the sustainable use of natural ecosystems

Area containing predominantly unmodified natural systems, managed to ensure long term protection and maintenance of biological diversity, while providing at the same time a sustainable flow of natural products and services to meet community needs. (International Union for Conservation of Nature and Natural Resources publication "Guidelines for Protected Area Management Categories", IUCN, 1994)


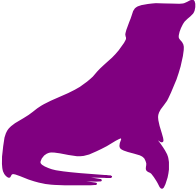
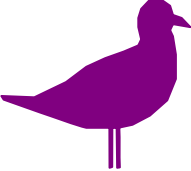
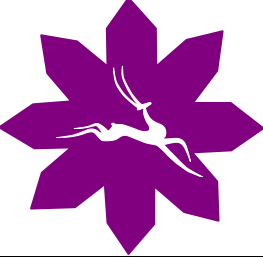


POSSIBLE TYPES OF DISTINCTIVE EDGE AND FILL

ANNEX B



PROPOSED SYMBOLS FOR MARINE PROTECTED AREAS

ANNEX C

Name	Definition	Attribute value	Description of symbol	Proposed image of symbol
fish sanctuary:	a place where fish are protected	CATREA 22	Pecked line: 6 pecks followed by fish symbol	
seal sanctuary:	a place where seals are protected	CATREA 7	Pecked line: 6 pecks followed by seal symbol	
bird sanctuary:	a place where birds are bred and protected	CATREA 5	Pecked line: 6 pecks followed by bird symbol	
nature reserve:	a tract of land managed so as to preserve its flora, fauna, physical features, etc.	CATREA 4	Pecked line: 6 pecks followed by flower and gazelle symbol	
research area:	an area where marine research takes place	CATREA 20	Pecked line: 6 pecks followed by research vessel symbol	
ecological reserve:	a tract of land managed so as to preserve the relation of plants and living creatures to each other and to their surroundings	CATREA 23	Pecked line: 6 pecks followed by whale symbol	
coral sanctuary:	a place where coral is protected	Proposed as CATREA 29	Pecked line: 6 pecks followed by coral symbol	