



IALA GUIDELINE

G1137 AtoN MANAGEMENT IN PROTECTED AREAS

Edition 1.1

December 2017

urn:mrn:iala:pub:g1137:ed1.1



DOCUMENT REVISION

Revisions to this document are to be noted in the table prior to the issue of a revised document.

Date	Details	Approval
December 2017	First issue	Council 65
July 2022	Edition 1.1 Editorial corrections.	



CONTENTS

1. AIMS AND OBJECTIVES.....	4
2. INTRODUCTION	4
3. PROTECTED AREAS AND MARINE PROTECTED AREAS.....	4
3.1. Protected areas.....	5
3.2. Marine protected areas	6
4. AtoN MANAGEMENT IN PAs AND MPAs	7
4.1. The basic principles of AtoN management in A PA and MPA.....	7
4.1.1. Setting up new AtoN.....	8
4.1.2. Existing AtoN	8
4.1.3. Removal of AtoN.....	8
4.1.4. Use of Virtual AIS AtoN	8
4.2. Best Practices.....	9
5. WAY FORWARD	9
6. FIGURES	10
7. DEFINITIONS.....	15
8. ABBREVIATIONS	15
9. REFERENCES	15
ANNEX A LIST OF DESIGNATED PSSAS	16

List of Tables

<i>Table 1</i>	<i>IUCN Protected Area Management Categories.....</i>	<i>5</i>
<i>Table 2</i>	<i>Type of protected areas and their associated level of governance.....</i>	<i>6</i>
<i>Table 3</i>	<i>Sample of marine protected areas</i>	<i>6</i>

List of Figures

<i>Figure 1</i>	<i>Examples of mooring systems less damageable for the seabed</i>	<i>10</i>
<i>Figure 2</i>	<i>Example of Norwegian GIS tool displaying protected areas</i>	<i>13</i>
<i>Figure 3</i>	<i>Example of French System to drop a concrete structure.....</i>	<i>14</i>



1. AIMS AND OBJECTIVES

Over the past few years, Protected Areas (PA) and Marine Protected Areas (MPA) have increased and are gaining more importance in many countries. Large global environmental organizations representing several countries, such as International Union for Conservation of Nature (IUCN), also play an active role in environmental governance and biodiversity conservation. It is why IALA deems it important to create a guideline supporting competent authorities with Marine Aid(s) to Navigation (AtoN) management in PAs and MPAs to better contribute to conservation and protection of environmentally sensitive areas.

This Guideline may be used as a tool for competent authorities in identifying steps to follow when it is time to consider installation of an AtoN in a PA or an MPA or for review, on-going maintenance or removal. There is another IALA Guideline, *G1036 Environmental Management in Aids to Navigation* which should also be used as a practical guide for technicians and staff involved in AtoN operations, which is more detailed on how to minimize or even eliminate negative impact on the environment in general.

2. INTRODUCTION

"No part of the ocean has today completely escaped the impact of human pressures, including the most remote areas."¹

To prevent the degradation of the environment due to human activity, directly or indirectly, by substances, waste or various nuisances such as sound, light, chemicals, thermal and biological hazards, most developed countries already have in place laws or other means to protect the environment including PAs and MPAs.

Some types of AtoN may have a negative impact on the environment. For example: the chain of a floating AtoN scraping the bottom of a fragile ecosystem; audible signals or lights on fixed AtoN being a nuisance for protected birds or other protected species; and access to AtoN for maintenance being a problem if the timing and proximity interfere with the nesting period or spawning season of protected species.

To ensure that the right procedure is followed and compliance requirements are met when creating, reviewing, modifying or removing an AtoN, competent authorities should consult with departments responsible for laws/rules/policies on PAs and MPAs as part of their decision making process, before taking any action. Consulting with responsible authorities on PAs and MPAs will allow the identification of potential issues, risks and possible mitigation measures.

3. PROTECTED AREAS AND MARINE PROTECTED AREAS

IALA has decided to use the definitions of PA and MPA as stated by the IUCN. They read as follows:

- *Protected Area (PA)*: Clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values.
- *Marine Protected Area (MPA)*: Any area of the intertidal or subtidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment.

¹ First Global Integrated Marine Assessment, UN

3.1. PROTECTED AREAS

IUCN classifies protected areas according to its management objectives. These categories are recognized by international bodies such as the United Nations and by many national governments. As such, IUCN categorization is increasingly being incorporated into government legislation as being the global standard for defining and recording protected areas.

Table 1 IUCN Protected Area Management Categories

IUCN Category	Characteristics and Management Objectives
Ia	<p><i>Strict Nature Reserve:</i> Strictly set aside area to protect biodiversity and possibly geological/geomorphological features.</p> <p><i>Main Objective:</i> To conserve regionally, nationally or globally outstanding ecosystems, species (occurrences or aggregations) and/or geodiversity features.</p>
Ib	<p><i>Wilderness Area:</i> Usually large unmodified or slightly modified areas, retaining their natural character and influence without permanent or significant human habitation.</p> <p><i>Main Objective:</i> To protect the long-term ecological integrity of natural areas that are undisturbed by significant human activity, free of modern infrastructure and where natural forces and processes predominate.</p>
II	<p><i>National Park:</i> Large natural or near natural areas set aside to protect large-scale ecological processes, along with the complement of species and ecosystems characteristic of the area.</p> <p><i>Main Objective:</i> To protect natural biodiversity along with its underlying ecological structure and supporting environmental processes, and to promote education and recreation.</p>
III	<p><i>Natural Monument or Feature:</i> Protected areas set aside to protect a specific natural monument.</p> <p><i>Main Objective:</i> To protect specific outstanding natural features and their associated biodiversity and habitats.</p>
IV	<p><i>Habitat/Species Management:</i> Area Protected areas aiming to protect particular species or habitats and management reflects this priority.</p> <p><i>Main Objective:</i> To maintain, conserve and restore species and habitats.</p>
V	<p><i>Protected Landscape/Seascape:</i> Protected area where the interaction of people and nature over time has produced an area of distinct character with significant ecological, biological, cultural and scenic value.</p> <p><i>Main objective:</i> To protect and sustain important landscapes/seascapes and the associated nature conservation and other values created by interactions with humans through traditional management practices.</p>
VI	<p><i>Protected Area with sustainable use of natural resources:</i> Protected areas that conserve ecosystems and habitats, together with associated cultural values and traditional natural resource management systems.</p> <p><i>Main objective:</i> To protect natural ecosystems and use natural resources sustainably, when conservation and sustainable use can be mutually beneficial.</p>

The following table shows different types of protected areas. It illustrates the diversity in the classification of protected areas and their associated level of governance:

Table 2 Type of protected areas and their associated level of governance

	International	Supranational	National	Regional	Local	Private
National Park			X			
Natural Park			X	X	X	
Natural Reserve			X		X	X
Protected Landscape			X	X	X	
Natural Monument			X			
Closed Area			X			
Wetland			X			
Special Protection Area			X			
Key Biotope			X			
Site of Community Importance		X				
Special Area of Conservation		X				
UNESCO World Heritage Sites	X					
Biosphere Reserve			X			
Site of Specific Scientific Interest			X			

3.2. MARINE PROTECTED AREAS

Marine Protected Areas are protected areas of seas, oceans, lakes and their adjacent areas. Human activity is restricted in MPAs for a conservation purposes, typically to protect natural or cultural resources. The following table is a sample of marine protected areas. It illustrates the diversity of type of marine protected areas.

Table 3 Sample of marine protected areas

Marine Protected Area	Country
The Bowie Seamount on the Coast of British Columbia	Canada
The Great Barrier Reef in Queensland	Australia
The Ligurian Sea Cetacean Sanctuary	Seas of Italy , Monaco and France
The Dry Tortugas in the Florida Keys,	USA
The Papahānaumokuākea Marine National Monument	USA
The Phoenix Islands Protected Area	Kiribati
The Channel Islands marine protected areas in California	USA
The Chagos Archipelago	Indian Ocean



Marine Protected Area	Country
The Wadden Sea	Bordering the North Sea in the Netherlands, Germany, and Denmark

It should be noted that the International Maritime Organization (IMO) also identified areas called Particularly Sensitive Sea Areas (PSSA) that need special protection, because of their significance for recognized ecological, socio-economic or scientific reasons and which may be vulnerable to damage by international maritime activities. When a PSSA is designated, an Associated Protective Measure is adopted by IMO to prevent, reduce, or eliminate the threat of the identified vulnerability.² A list of designated PSSAs is available in annex A.

4. AtoN MANAGEMENT IN PAs AND MPAs

When AtoN are deployed in protected areas, the environment should not be disturbed or should only be minimally impacted by the management of an AtoN. The ecological balance should be preserved when operating and managing AtoN in protected areas. If ecosystems and landscapes are damaged or destroyed, all possible efforts should be made to restore the area. In order to minimize the impacts on marine ecosystems caused by the installation and maintenance of AtoN in protected areas, neighbouring countries should cooperate with each other to come up with a common plan.

According to regulations on PAs or MPAs, restrictions should be applied in cases such as:

- New constructions or extension work of any existing structures.
- Modification of water or land characteristics.
- Discarding harmful substances or waste affecting the water quality.
- Use of AtoN that include toxic materials such as heavy metals and polyurethanes or polystyrenes.
- Access during certain times of the year (nesting period).
- Relocation of AtoN which could create a negative impact on the environment.
- Any other behavior harmful to the conservation of the environment.

The first action a competent authority should take before creating, reviewing, modifying or removing an AtoN, is to examine whether the project is in or near a PA or MPA. In such cases, the competent authority should contact the responsible department or organization to enquire about the right procedures to follow in protected areas. The competent authority needs to be aware of all levels of governance implicated for a given area and additional time that might be required to consult proper authorities and take the appropriate actions.

4.1. THE BASIC PRINCIPLES OF AtoN MANAGEMENT IN A PA AND MPA

When an AtoN is located in a PA or MPA, based on the restrictions of the PA or MPA, the competent authority should evaluate if the use of an AtoN is required, or if there is an alternative option, such as choosing a different location or considering rerouting the traffic to avoid the area, and therefore avoiding the need to place an AtoN.

The competent authority should also consider less environmentally damaging actions and prevent excessive damage to the marine ecosystem caused by any activity related to installing and managing AtoN, for example by using special type of anchoring which is less damaging for the seabed³.

² <http://pssa.imo.org/#/intro>

³ Refer to Figure 1 in section 7

It is recommended that the competent authority takes remedial measures, should there be damage to marine ecosystems as a result of the installation, operation or removal of an AtoN in a PA or MPA.

Competent authorities should invest in technology enabling less frequent or invasive maintenance including solar, wind and wave powered AtoN, remote monitoring, and the use of non-corrosive composite materials to minimize the impact on the surrounding environment.

These measures should not compromise the safety of navigation.

4.1.1. SETTING UP NEW ATON

When designing and installing a new AtoN, the following criteria should be considered with respect to the environment:

- Materials used for all parts of the system
- Potential pollution brought by the AtoN: like light, heavy metals residue, colour, paint, noise, fuel, etc.
- Power requirements, autonomy;
- Mooring systems that take into consideration the protection of rare fauna, coral reefs and historical sites. It is recommended that the use of thrashing chain be eliminated, by substituting these with articulated buoys or submerged buoys as an alternative anchoring system.
- Special permission to access a protected area, if required
- Type of AtoN: floating (anchored/on position radius), fixed (offshore/onshore)
- Mitigation of the risk of AtoN failure and seasonal restrictions related to access
- Degree of redundancy necessary to reduce the frequency/ need for visits, including seasonal restrictions
- Remote monitoring systems to minimize the need to access the AtoN for maintenance or routine inspection.

The AtoN supplier should provide instructions on how to dismantle and dispose of materials.

4.1.2. EXISTING ATON

Existing AtoN in PAs or MPAs should be regularly reviewed and the competent authority should determine the best solution between maintenance, relocation, and renewed design or replacement, in regards to environmental protection and safety of navigation.

All possibilities, including the removal of AtoN should be considered.

4.1.3. REMOVAL OF ATON

Specific considerations should be taken when dismantling an AtoN in a PA or MPA; particularly in the case of an older AtoN, as these may contain more hazardous material. The competent Authority should develop and implement an explicit plan in order to minimize the impact on the environment.

4.1.4. USE OF VIRTUAL AIS ATON

Caution is recommended before using virtual AIS AtoN as an alternative to physical AtoN. IALA recommendations and guidelines on this matter should be consulted.

The IMO Policy on Use of AIS Aids to Navigation *MSC1/circ.1473* states that the use of virtual AIS AtoN should be restricted.



4.2. BEST PRACTICES

Below are several examples of best practices happening in different countries:

- In Norway, before establishing a new aid, AtoN Planners use a GIS tool displaying all types of protected areas and listed species to determine the best location and timing to commence work.⁴
- Off the British Columbia coast in Canada, rare glass sponge reefs were found during an AtoN review. Although the area was not protected, measures were taken to minimize the impact of AtoN in that area. A few months later, the federal government announced the creation of a 2,410-square-kilometre marine conservation area in that zone.
- Mercury in lighthouses located in an environmental protected area represents a threat. Where feasible, removal should be considered. Norway has a program to remove mercury from all its lighthouses.
- During a restoration project of a lighthouse in the Scandola reserve, Corsica France, the competent authorities used a specific system to reduce dust and noise pollution. This system enabled the competent authorities to keep the site clean and control pollution.⁵

5. WAY FORWARD

The United Nations Convention on Biological Diversity has set up an international target of conserving 10% of marine areas by 2020 through systems of protected areas and other effective area-based conservation measures. Canada, as an example, is committed to increasing the proportion of Canada's marine and coastal areas that are protected to 10% by 2020.

This means that competent authorities may be encouraged, through research and development, to develop new ways and cleaner technologies to manage AtoN in PAs and MPAs. The development of battery, renewable energy, LED, and virtual AIS AtoN technologies, will all play a part in meeting environmental requirements and challenges.

In parallel, competent authorities should consider including a training syllabus specifically on AtoN management in PAs and MPAs for AtoN Managers and Technicians.

Successful, environmentally friendly AtoN management, relies on good collaboration with environmental specialists to ensure that environmental factors are taken into account at the beginning of an AtoN review and design process.

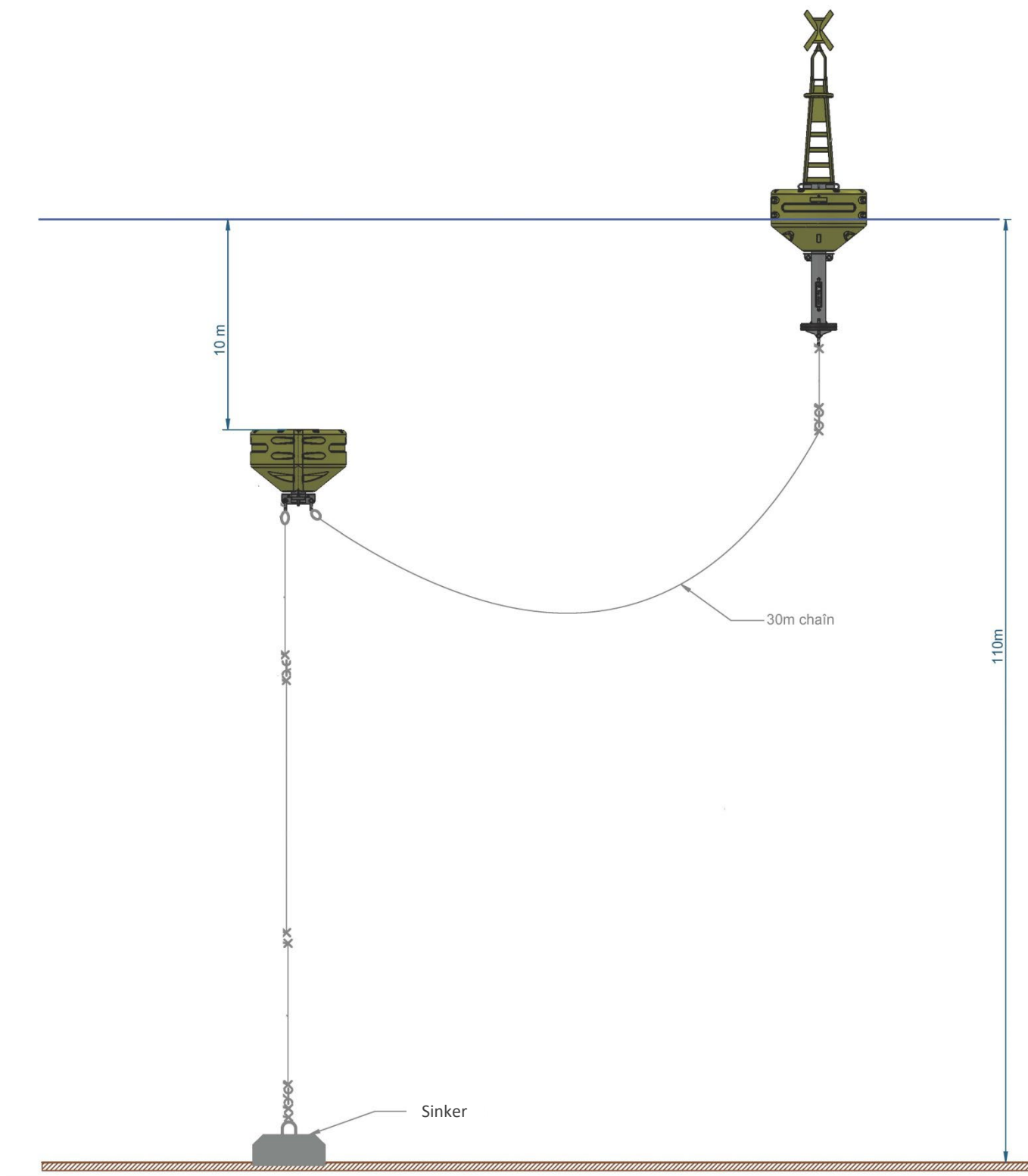
Competent authorities should set good examples for private industry to follow.

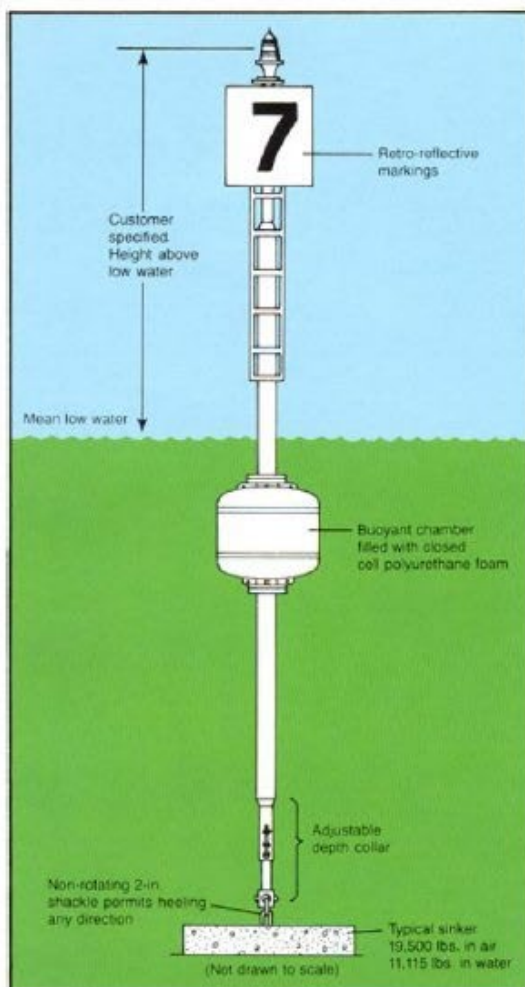
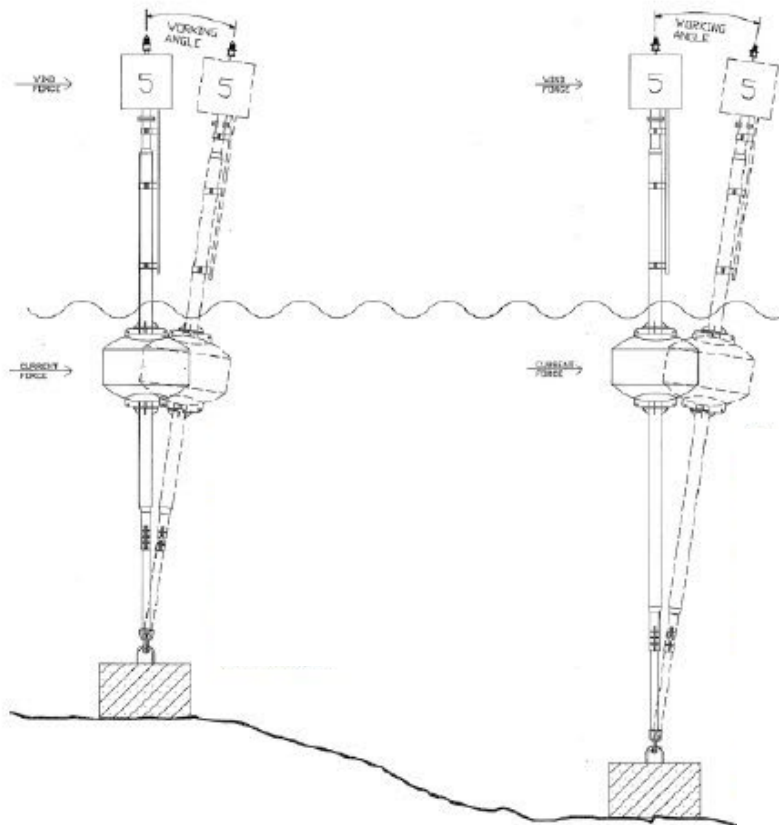
⁴ Refer to Figure 2 in Section 7

⁵ Refer to Figure 3 in section 7

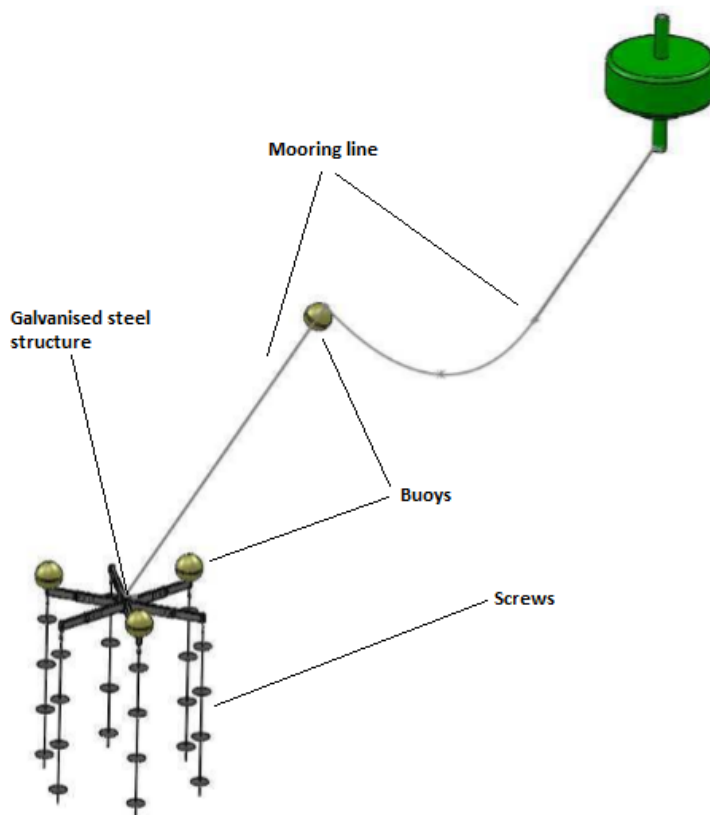
6. FIGURES

Figure 1 Examples of mooring systems less damaging for the seabed





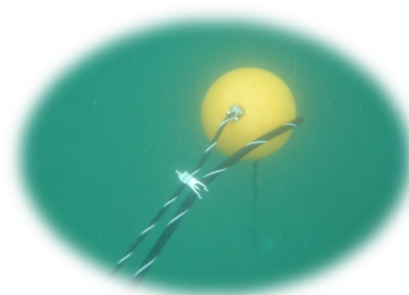
The bottom part of this type of AtoN is composed of screws fixed in the seabed, a structure of galvanized steel attached to the screw heads that minimize impact on the seabed, a central plate with a ring to attach the cable, and buoys to lighten the pressure on the screws. The cable is connected to a submerged buoy at mid-depth which is linked to the floating part of the aid at the surface of the water.



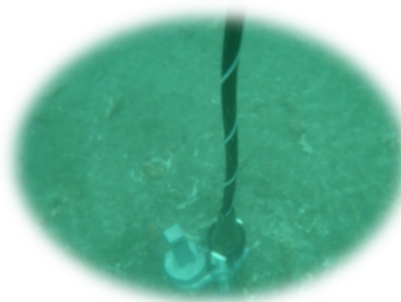
This type of anchoring is used in the Galapagos Marine Reserve (MPA).



Three metre screws

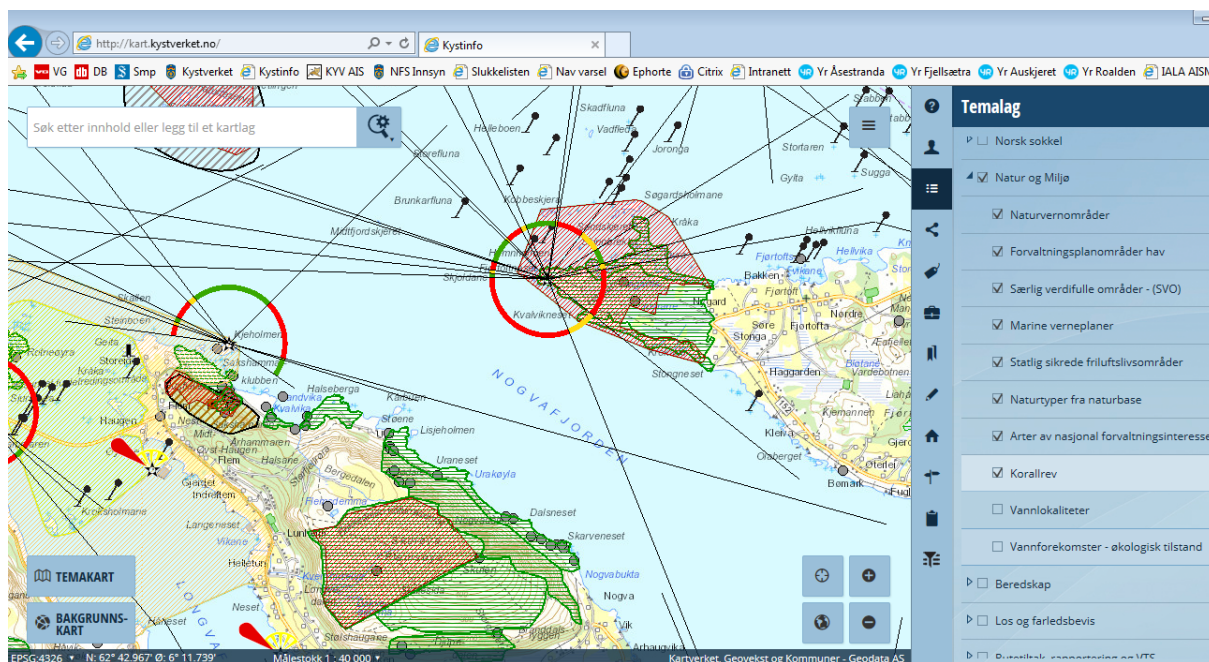


Mid-depth buoy

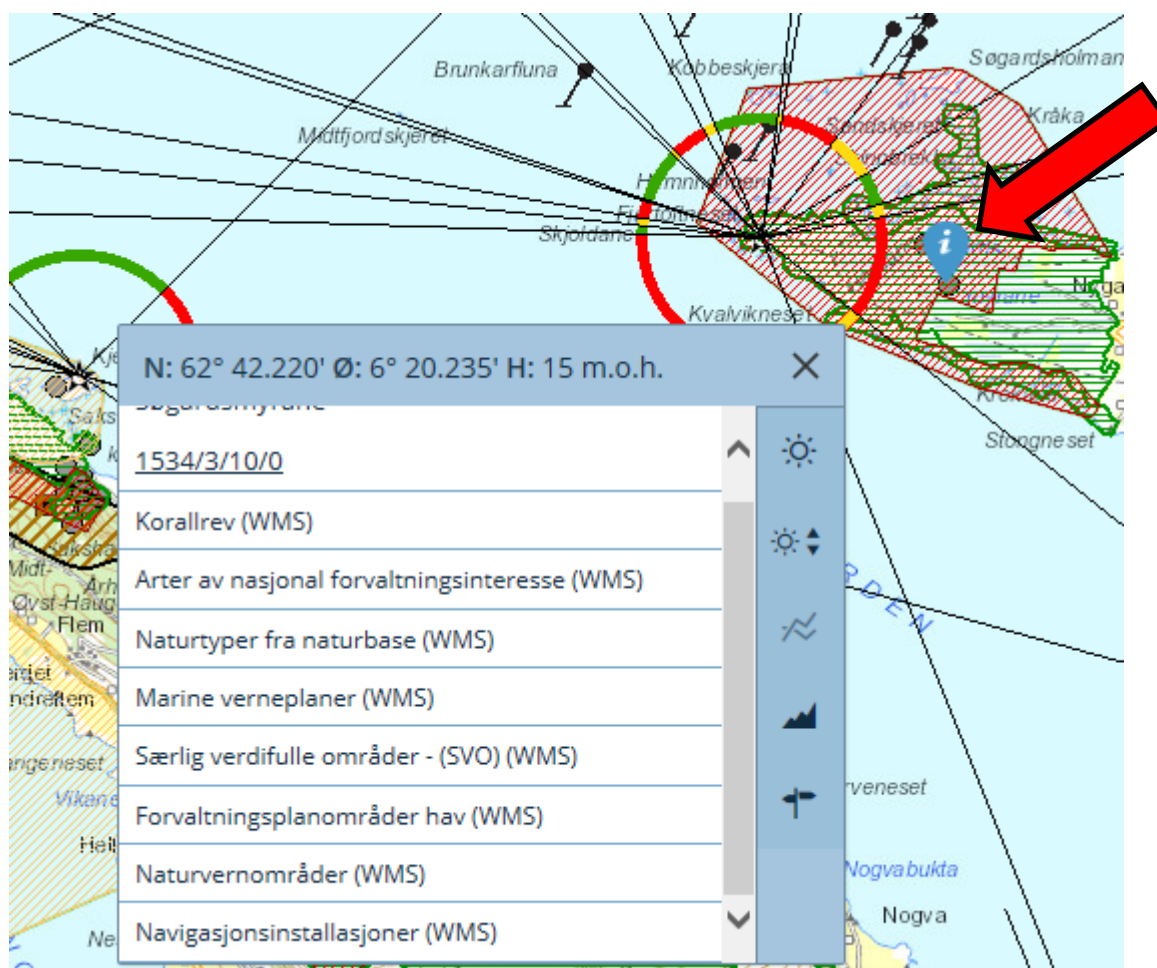


Screw fixed in seabed

Figure 2 Example of Norwegian GIS tool displaying protected areas



Example of home page GIS software



Pick report on a particular area/spot

Arter av nasjonal forvaltningsinteresse (WMS)

Kartlag: 'Alle arter av sarlig stor forv_int_pkt'

Navn	Vitenskapelig_navn	Geografisk_presisjon	Id	Forvaltningskategori	Funn_år	Funn dato	Kriterier_kombinert	Institusjon	Fylke	Kommune	Funnsted
storspove	Numenius arquata	100	Observations/NOF/so2-birds/14994189	Arter av særlig stor forvaltningsinteresse	2016	12.07.2016	trua arter	Norsk Ornitologisk Forening	Møre og Romsdal	Haram (1534)	Søgardsmyrane, Fjærtøfta, Haram, Mr

© Miljødirektoratet Tlf: 73 58 05 00 Fax: 73 58 05 01 E-post: wms@miljodir.no Mer info: kartkatalog.miljodirektoratet.no

Example of additional information regarding endangered species

Naturvernområder (WMS)

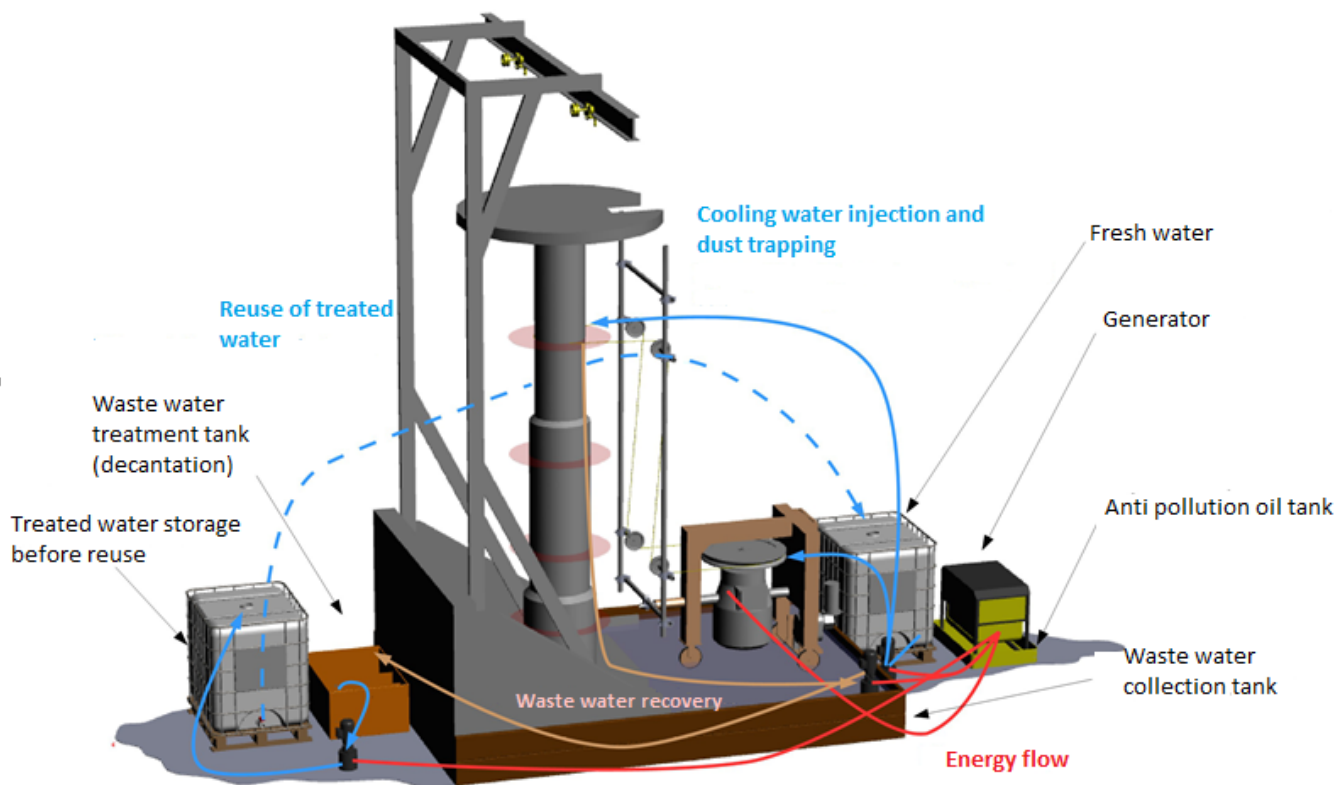
Kartlag: 'naturvern_klasser_omrade'

IID	Omradenavn	Vernedato	VerneformBeskrivelse	VerneplanBeskrivelse	Forvaltningsmyndighet	ForvaltningsmyndighettypeBeskr	RevisjonBeskrivelse	VernedatoRevidert	Verneforskrift
VV00000555	Fjærtøfneset	13.12.1996	naturreservat	Verneplan for myr	Fylkesmannen i Møre og Romsdal	Fylkesmann	Ikke revidert	Ikke registrert	http://www.lovdata.no/forl/fmv/xv-19961213-1216.html

© Miljødirektoratet Tlf: 73 58 05 00 Fax: 73 58 05 01 E-post: wms@miljodir.no Mer info: kartkatalog.miljodirektoratet.no

Example of additional information regarding PA and MPA such as related regulation

Figure 3 Example of French System to demolish a concrete structure





7. DEFINITIONS

The definitions of terms used in this Guideline can be found in the *International Dictionary of Marine Aids to Navigation* (IALA Dictionary) at <http://www.iala-aism.org/wiki/dictionary> and were checked as correct at the time of going to print. Where conflict arises, the IALA Dictionary should be considered as the authoritative source of definitions used in IALA documents.

8. ABBREVIATIONS

AIS	Automatic Identification System
AtoN	Marine Aid(s) to Navigation
IMO	International Maritime Organization
IUCN	International Union for Conservation of Nature
MPA	Marine Protected Area
PA	Protected Area
PSSA	Particularly Sensitive Sea Areas
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization

9. REFERENCES

- [1] IALA .Guideline G1036 Environmental Management in Aids to Navigation
- [2] [First Global Integrated Marine Assessment, UN](#)
http://www.un.org/depts/los/global_reporting/WOA_RegProcess.htm, accessed on 25. October 2017
- [3] [IUCN website](#)
<https://www.iucn.org/theme/protected-areas>, accessed on 25. October 2017
- [4] [Particularly Sensitive Sea Areas](#)
<http://pssa.imo.org/#/intro> , accessed on 25. October 2017



ANNEX A LIST OF DESIGNATED PSSAS

Designated PSSA	Year of Designation
The Great Barrier Reef , Australia	1990
The Sabana-Camagüey Archipelago in Cuba	1997
Malpelo Island, Colombia	2002
The sea around the Florida Keys, United States	2002
The Wadden Sea, Denmark, Germany, Netherlands	2002
Paracas National Reserve, Peru	2003
Western European Waters	2004
Extension of the existing Great Barrier Reef PSSA to include the Torres Strait, Australia and Papua New Guinea	2005
Canary Islands, Spain	2005
The Galapagos Archipelago, Ecuador	2005
The Baltic Sea area, Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland and Sweden	2005
The Papahānaumokuākea Marine National Monument, United States	2007
The Strait of Bonifacio, France and Italy	2011
The Saba Bank, in the North-eastern Caribbean area of the Kingdom of the Netherlands	2012
Extension of Great Barrier Reef and Torres Strait to encompass the south-west part of the Coral Sea	2015
The Jomard Entrance, Papua New Guinea	2016
Tubbataha Reefs National Park, Sulu Sea, Philippines	2017

The list may be altered by IMO at any time.