

Loch Creran Marine Special Area of Conservation

Private and Commercial Moorings Pack

**The mooring application procedure and guidance contained in this pack must
be used when applying for moorings within Loch Creran**

Introduction

Loch Creran is designated as a Special Area of Conservation (SAC) under the Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora). The site was selected for its bedrock reefs and biogenic reefs of the tube worm *Serpula vermicularis* (known as serpulid reefs) and the horse mussel *Modiolus modiolus* (known as horse mussel beds).

Serpulid reefs and horse mussel beds are very sensitive to physical damage from anchors and the placement of moorings; this procedure has been developed to mitigate the impacts of these activities. For further information please refer to www.argyllmarinesac.org or contact the Marine and Coastal Development Unit at Argyll and Bute Council on 01631 567909/567972 or Scottish Natural Heritage on 0300 2449360.

Mooring Pack Contents

- A) Mooring application procedure
- B) A map showing the distribution of serpulid reef and horse mussel beds in Loch Creran indicating areas where mooring applications are likely to be approved.
- C) A description of the diver survey method required to identify a suitable location for your mooring.
- D) A set of reference photographs showing serpulid reefs in various stages of development and horse mussels.
- E) An example of a mooring design commonly used in Loch Creran and an indication of the expected area of impact around the mooring.

(A) Mooring Application Procedure

1. REFER TO MAP (Page 3)

This map outlines areas where serpulid reefs and horse mussel beds are most abundant (red and orange). In these areas, moorings are very unlikely to be approved and the applicant is encouraged to look at an alternative location.

The map also indicates light blue and green areas where moorings are likely to be approved following a clear diver survey.

2. DECIDE TYPE OF DIVE SURVEY REQUIRED

If mooring location lies within light blue or green areas of the reef distribution map, a diver survey will be necessary to confirm that the mooring and its associated tackle will have no effect on the reef habitat.

- A Type 1 survey (see Pages 5-6) is required in green areas.
- A Type 2 survey (see Page 7) in light blue areas.

3. UNDERTAKE DIVE SURVEY USING METHODOLOGY OUTLINED IN THIS PACK

You should employ a diver to carry out a survey of the proposed mooring area using the methodology outlined in the diver survey section below. If you are scuba certified, you may wish to carry out the survey yourself.

4. FOLLOWING A CLEAR DIVER SURVEY, SUBMIT AN APPLICATION FOR A MARINE (SCOTLAND) ACT 2010 PART 4 MARINE LICENSING LICENCE FOR MARINE MOORINGS TO THE LICENSING OPERATIONS TEAM, MARINE SCOTLAND

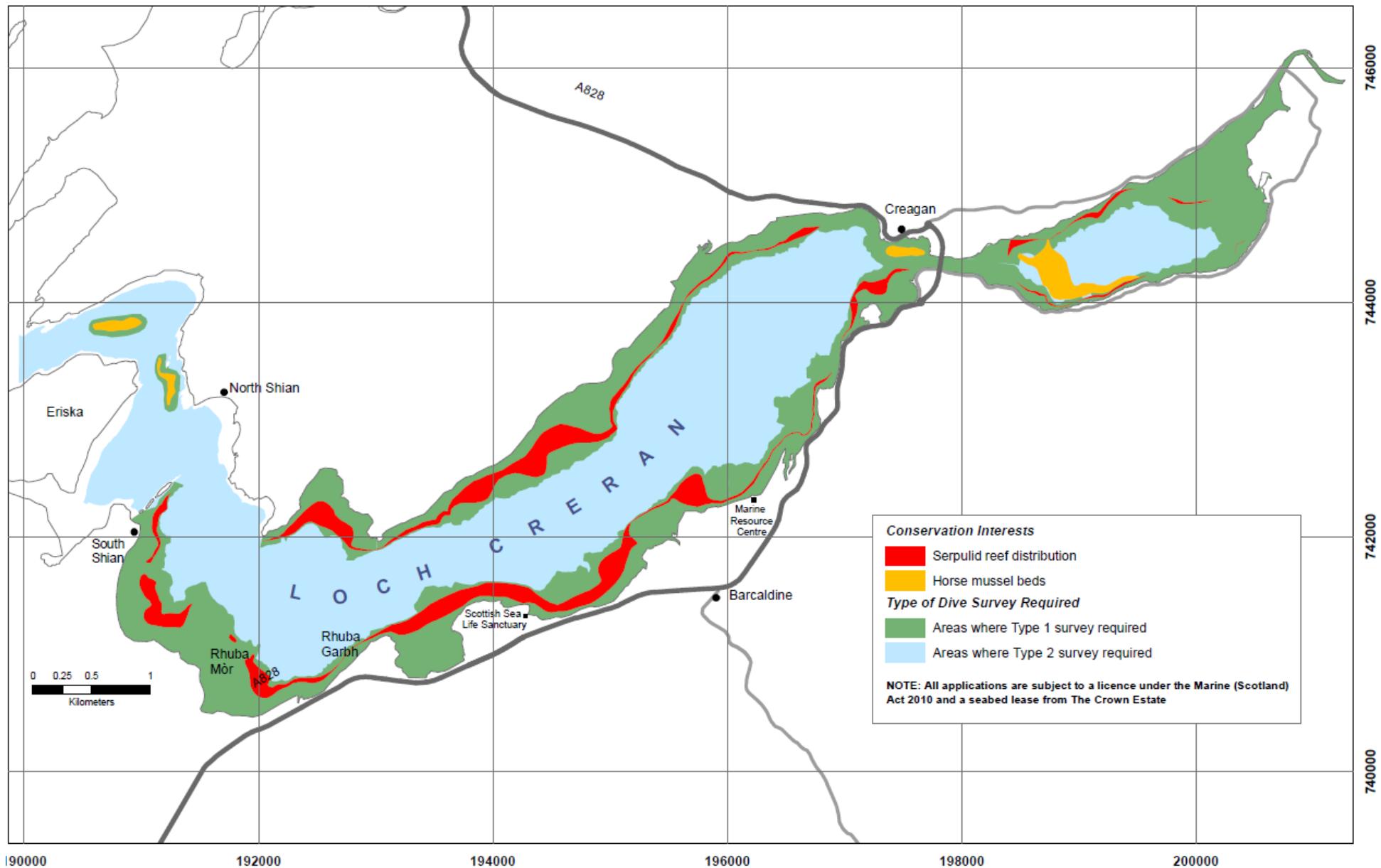
Enclose the findings of the diver survey, including the position and depth of the mooring. Position should be accurately recorded using differential GPS (to 3 decimal places) using WGS84 datum (output in decimal degrees) and using the OSGB 1936 datum. Depth should be recorded as below chart datum.

5. SUBMIT AN APPLICATION FOR A MOORING LEASE TO THE CROWN ESTATE.

Enclose the findings of the diver survey, including the position and depth of the mooring as above.

6. IF YOUR APPLICATION IS APPROVED, YOU SHOULD REFER TO THE MOORING DESIGN SECTION OF THE PACK AND USE IT AS GUIDANCE FOR THE CONSTRUCTION OF THE MOORING.

(B) Distribution of serpulid reefs and horse mussel beds and areas where dive survey is required



Map units are British National Grid, OSGB 1936

(C) Dive Survey Method

Prior to undertaking the dive survey, the diver should view the reference photographs (Section D), which show a horse mussel bed and serpulid reefs at different stages of reef development, in order to ensure they are absolutely clear what they are looking for during the survey. The diver should also refer to Table 1 (and laminate the copy in Appendix 1 to carry whilst diving), which indicates the length of tape or rope that will be necessary at various mooring depths to calculate the potential zone of impact around the mooring block.

Table 1: Calculation of riser chain length and potential zone of impact

Maximum Depth (m) i.e. depth at highest tide = depth at chart datum + tidal range in Loch Creran which is 4 m. (w)	Length of riser chain required (m) = depth at high tide x 1.25 (riser should be attached to end of 6 m ground chain) (x)	Length of ground chain (m) (generally 6 m) (y)	Tidal Range (m) (Loch Creran tidal range = 4 m) (z)	Length of tape / rope to indicate the radius of the potential zone of impact (m) (x-w) + (y+z)
5	6.25	6	4	11.25
6	7.50	6	4	11.50
7	8.75	6	4	11.75
8	10.00	6	4	12.00
9	11.25	6	4	12.25
10	12.5	6	4	12.50
11	13.75	6	4	12.75
12	15.00	6	4	13.00
13	16.25	6	4	13.25
14	17.50	6	4	13.50
15	18.75	6	4	13.75
16	20.00	6	4	14.00
17	21.25	6	4	14.25
18	22.50	6	4	14.50
19	23.75	6	4	14.75
20	25.00	6	4	15.00

NOTE: The length of tape/rope (column 5) indicates the length of tape or rope that should be attached to the stake when surveying the area around the mooring in which no serpulids reefs or horse mussel beds should be present.

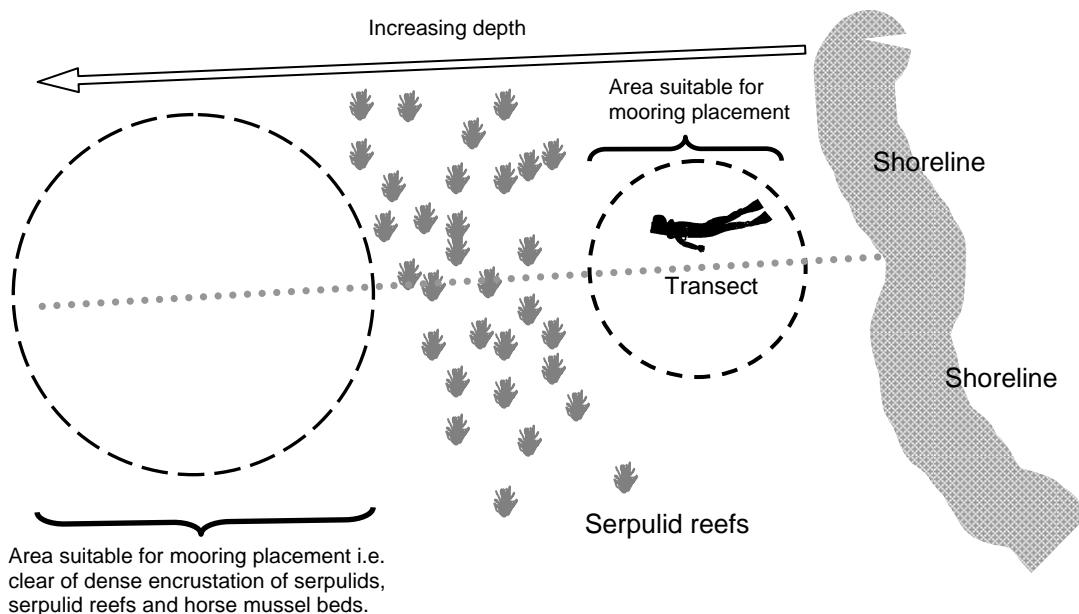
Survey Type 1 (green areas on map)

IMPORTANT: Survey dives should be carried out at high tide. If this is not possible, please take the tidal state into account when determining what depth the mooring will eventually sit in i.e. add the difference in depth between that recorded during the dive and that expected at high tide.

i) Conduct Reconnaissance Dive

The diver should carry out a reconnaissance dive of the area by swimming in a straight line (transect) perpendicular to the shore which passes through the proposed mooring location (see Figure 1). This will allow the diver to identify the distribution (minimum and maximum depth) of dense areas of serpulids and serpulid reefs and horse mussel bed in the area proposed for the mooring.

Figure 1: Reconnaissance transect perpendicular to shore



ii) Choose suitable location for mooring

The diver should use the information collected on the reconnaissance dive to choose a suitable position for the mooring in water shallower or deeper than horse mussel beds and dense areas of serpulids/serpulid reef. This position should include a buffer zone to take into account the potential for riser chain scour on the seabed at low water.

iii) Conduct survey dive at chosen location

Refer to Figure 2

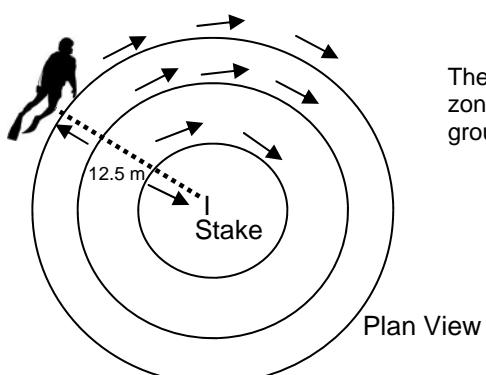
Diver should ensure that the whole potential zone of impact is surveyed by replicating the following steps:

1. Using the calculation in Table 1 work out the radius of the potential zone of impact, and prepare a length of rope to measure this radius underwater.
2. Place a stake in the seabed at the proposed mooring location and tie an end of the pre-measured and marked rope to the stake.
3. Swim in concentric circles around the stake at various distances* from the stake e.g. 5, 10 and 15 m or 3, 6 and 9 m in poorer visibility using the pre-marked rope as a guide ensuring that you cover the full extent of the potential zone of impact.
4. If no dense areas of encrusting serpulids, serpulid reefs or horse mussel beds are present within the circle a shot line should be placed beside the stake to guide placement of the permanent mooring block. The surface marker buoy on the shot line should be labelled 'TEMPORARY MARKER' and include a contact telephone number.

*The distances will vary depending on the depth of water in which the mooring is to be placed and the visibility within the loch at that time. Divers should exercise judgement and ensure that the survey covers the whole potential zone of impact.

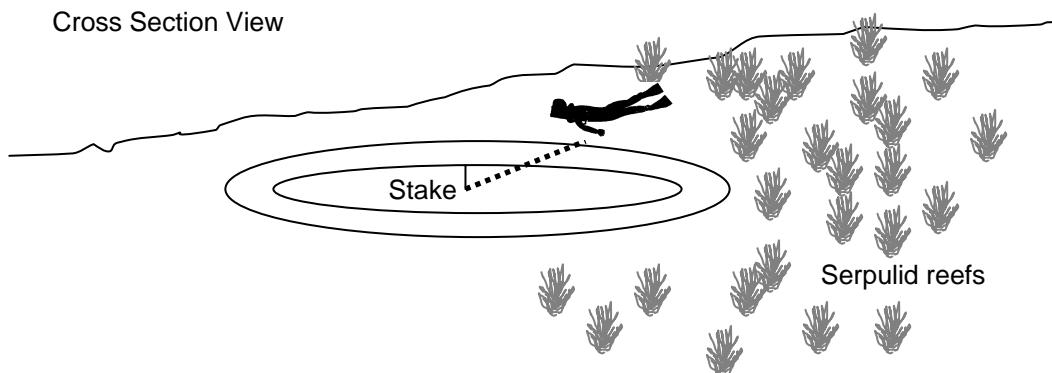
Figure 2: Dive survey method

Dotted line is the tape measure or rope running from the stake which indicates the proposed location of the mooring block. For example, with reference to Table 1, the length of the tape at a depth of 10 m would be 12.5 m long.



The circle indicates potential zone of effect from mooring ground chain and riser chain.

Cross Section View



If areas of dense encrusting serpulid or serpulid reefs are completely absent from the area inside the circle, and the position of the mooring does not cause a problem to navigation a Marine (Scotland) Act 2010 licence will be granted by Marine Scotland.

iv) Record proposed mooring position

The position and depth of the temporary marker should be recorded by differential GPS (to 3 decimal places) firstly using WGS84 datum (output in decimal degrees) and then using the OSGB 1936 datum. The depth of water at the proposed mooring location should be recorded as below chart datum (the lowest astronomical tide). The tide variation in Loch Creran is approximately 4 m.

In the event that your mooring application is refused on navigational grounds, the shot line will have to be removed and another site surveyed.

Survey Type 2 (light blue areas on map)

IMPORTANT: Survey dives should be carried out at high tide. If this is not possible, please take the tidal state into account when determining what depth the mooring will eventually sit in i.e. add the difference in depth between that recorded during the dive and that expected at high tide.

i) Conduct survey dive at chosen location

Refer to Figure 2

Diver should ensure that the whole potential zone of impact is surveyed by replicating the following steps:

1. Using the calculation in Table 1 work out the radius of the potential zone of impact, and prepare a length of rope to measure this radius underwater.
2. Place a stake in the seabed at the proposed mooring location and tie an end of the pre-measured and marked rope to the stake.
3. Swim in concentric circles around the stake at various distances* from the stake e.g. 5, 10 and 15 m or 3, 6 and 9 m in poorer visibility using the pre-marked rope as a guide ensuring that you cover the full extent of the potential zone of impact (See Figure 2).
4. If no dense areas of encrusting serpulids, serpulid reefs or horse mussel beds are present within the circle a shot line should be placed beside the stake to guide placement of the permanent mooring block. The surface marker buoy on the shot line should be labelled 'TEMPORARY MARKER' and include a contact telephone number.

ii) Record proposed mooring position

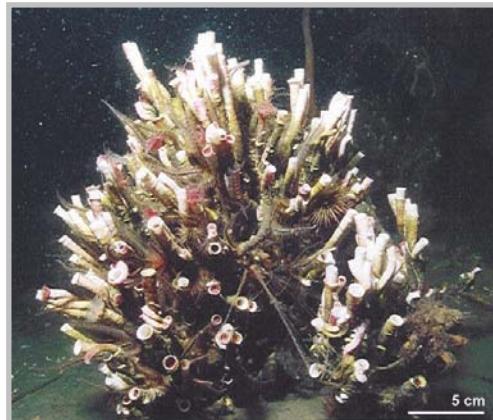
The position and depth of the marker shot line should be recorded by differential GPS (to 3 decimal places) firstly using WGS84 datum (output in decimal degrees) and then using the OSGB 1936 datum. Depth should be recorded as below chart datum (the lowest astronomical tide). The tide variation in Loch Creran is approximately 4 metres.

In the event that your mooring application is refused on navigational grounds, the shot line will have to be removed and another site surveyed.

D) A set of reference photographs showing serpulid reefs in various stages of development and horse mussels



Small reef



Large reef

Note: The worms themselves (the red, pink and white fan shape organisms protruding from the tubes) may not be visible but retracted within the tubes.



Straggling contiguous reefs



Dense encrusting tubes of *Serpula* – not forming a reef (i.e. not intertwining and growing upwards away from the substrate). These individuals may be important in supplying larvae for reef development or may be the initial stages of reef development and should be avoided when selecting a mooring location.



Horse mussels

(E) Mooring Design

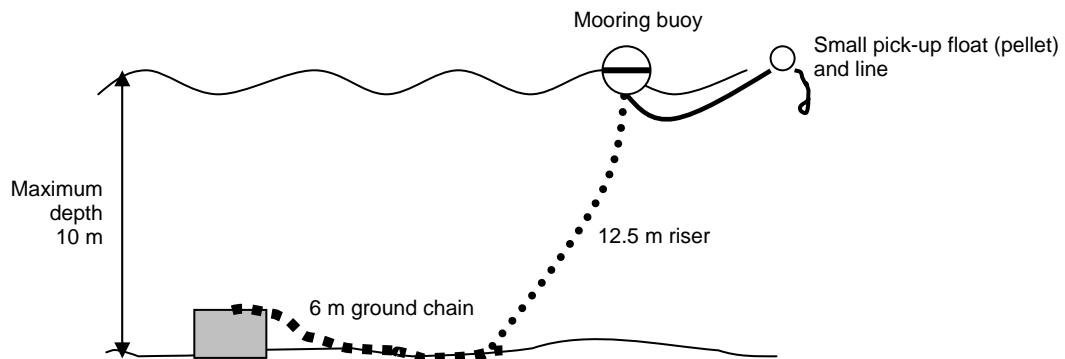
Mooring design should be single point i.e. a concrete block, and not a series of anchors and chain.

For guidance, a typical mooring for Loch Creran may consist of the following:

- A 2 ton concrete block with a heavy (minimum 32 mm) chain 6 m in length attached.
- A 20 mm riser chain (length = $1.25 \times$ water depth at high tide (see Table 1)) attached at the end of the heavy chain by a shackle.
- A swivel intersected near or at the surface to prevent the riser chain twisting and tangling whilst in use.
- A buoy on the surface to which a pickup rope or chain is attached to a small float (pellet) to aid retrieval with a boat hook.

It is important that the length of riser chain does not exceed the values indicated in Table 1. This is to ensure that the potential area of impact for the depth of the mooring is as small as possible.

Figure 3: Example of mooring in Loch Creran at 10 m maximum depth



It is the responsibility of the Applicant to ensure that mooring placed is suitable for the purpose intended.

Appendix 1

Please laminate Table 1 and use whilst conducting the diver survey

Table 1: Calculation of riser chain length and potential zone of impact

Maximum Depth (m)	Length of Riser Chain Required (m)	Length of ground chain (m)	Tidal Range (m) (Loch Creran tidal range = 4 m)	Length of tape / rope to indicate the radius of the potential zone of impact (m)
(w)	(x)	(y)	(z)	(x-w) + (y+z)
5	6.25	6	4	11.25
6	7.50	6	4	11.50
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NOTE: The length of tape/rope (column 5) indicates the length of tape or rope that should be attached to the stake when surveying the area around the mooring in which no serpulids reefs or horse mussel beds should be present.